APA O
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The 57th Annual Meeting of
The Ophthalmological Society of Chinese Taipei
ABSTRACT BOOK
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Cataract

Mar 26, 2016 (Saturday)

16:30 – 17:50
**Venue:** Elegance Lounge
**Session:** CA-SC07

**Supporting the Unsupported: Challenging Cataractous Eyes and Management**

**Chief Instructor:** Sonu GOEL  
**Instructor(s):** Samaresh SRIVASTAVA, Vaishali VASAVADA, Sonai MUKHERJEE

**Objective:** The objective of this video-assisted course is to show how to conquer challenges in ectopia lentis with rings, hooks, segments, and glue; abnormal lens development such as PEX, coloboma, and microspherophakia followed by intraocular lens (IOL) implantation. At the end of the course, participants will be prepared mentally and technically to use the above adjuncts in these difficult situations.

**Synopsis:**
1. Introduction: Disasters and triumphs with adjuncts such as CTRs, CIONNs, and CTs;
2. Demystifying capsulozonular pathology and tips and tricks for beginners in PEX eyes and nondilating;
3. Pediatric cataracts: Marfan syndrome and traumatic subluxation;
4. Microspherophakia and its management;
5. Biometry and choice of IOLs.

16:30 – 17:50
**Venue:** Conference Room 3 (TWTC)  
**Session:** CA-SC02

**A Video Bouquet of Phaco Complications That Should Never Have Occurred With Tips on Damage Control and Prevention to Optimize Postoperative Outcome**

**Chief Instructor:** Arup CHAKRABARTI  
**Instructor(s):** Jeewan TITIYAL, Johan HUTAURUK, Soonphaik CHEE, Kumar DOCTOR

**Objective:** At the end of the course, the attendee will learn how to avoid and successfully manage certain intraoperative phaco complications that can not only mar the postoperative outcome but can also lead to sight-threatening sequelae.

**Synopsis:** This video course deals with the genesis, management, and prevention of unexpected surgeon- or technique-related complications in phacoemulsification in uncomplicated cataracts. The course will demonstrate complications that may be encountered during all steps of phaco (both uncomplicated and difficult cataracts) and will offer a stepwise strategy to prevent and manage them.

**Course Outline:**
1. Introduction;
2. Wound Complications: Incisions that are too large/too small, Poor incision construction, Phaco burn, and Incision suturing;
3. Complications with Capsulorhexis;
4. Hydrodissection Problems;
5. Iris Prolapse;
6. Problems with Nucleus Management;
7. Late Zonular Damage and Suturing in an Ahmed Segment;
8. Posterior Capsule Rupture – Management Pearls;
9. Malpositioned IOLs – Reposition and Suture Fixation;
10. Ring and Hooks – Pearls and Pitfalls;
11. Discussion.

Mar 27, 2016 (Sunday)

09:00 – 10:20
**Venue:** Elegance Lounge  
**Session:** CA-SC01

**Femtosecond Laser—Assisted Cataract Surgery in Difficult Situations**

**Chief Instructor:** Jeewan TITIYAL  
**Instructor(s):** Abhay VASAVADA, Ronald YEOH, Cesar Ramon ESPRITU, Ramamurthy DANDAPANI

**Objective:** The aim of the course is to demonstrate that femtosecond laser—assisted cataract surgery (FLACS) can be a superior technology in complex cataract cases and to highlight its advantages over conventional phacoemulsification.

**Synopsis:** This instruction course will be a video-assisted teaching session to highlight and demonstrate important practical tips for performing FLACS in difficult situations. The intraoperative challenges faced in managing posterior polar cataracts, subluxated lens, hard nuclei, small pupils, white intumescent cataracts, and vitrectomized eyes with cataract will be highlighted. The use of femtosecond laser technology to manage these challenges while enhancing the safety and visual outcomes will be demonstrated. At the end of the course, attendees will be able to apply the advantages of femtosecond laser technology to manage complex cataract cases.

**Course Outline:**
1. Posterior Polar Cataract: Challenges, FLACS techniques, Outcomes and advantages of FLACS;
2. Subluxated lens: Challenges, FLACS techniques, Outcomes and advantages of FLACS;
3. Hard Cataract: Challenges, FLACS techniques, Outcomes and advantages of FLACS;
4. Small Pupil: Challenges, FLACS techniques, Outcomes and advantages of FLACS;
5. White Cataract: Challenges, FLACS techniques, Outcomes and advantages of FLACS;
6. Cataract After Pars Plana Vitrectomy: Challenges, FLACS techniques, Outcomes and advantages of FLACS;
7. Discussion.

11:00 – 12:20
Venue: Elegance Lounge
Session: CA–SC04
Management of Complicated Cataract Cases With or Without Other Ocular Comorbidities

Chief Instructor: Zia MAZHRY
Instructor(s): Nadeem BUTT, Sharif HASHMANI, Sajid MIRZA

Objective: To describe criteria for evaluation and surgical planning for management of complicated cataract with or without ocular comorbidities and to elaborate variations of surgical procedure to manage different situations encountered in difficult cataract cases.

Synopsis: Cataract surgery is the most frequently performed procedure by any eye surgeon. The ideal patient for cataract surgery has mild to moderate nuclear sclerosis with no other ocular comorbidity. Many times, the situations are far from ideal. Patients in our setup frequently present with hypermature cataracts. This may be further complicated by deficiency of zonular support and capsular tears. Comorbidities like pterygium, uveitis, glaucoma, diabetic retinopathy, and others require careful surgical management. This course is focused on presentation of different surgical techniques for management of complicated cataract cases with or without other ocular comorbidities.

Course Outline: Interactive video-based presentation:
Different surgical videos depicting real-time complicated cataract surgery cases with or without other ocular comorbidities will be presented to the audience. Panelists and their input will be shared and discussed. This will be followed by a presentation of the author’s approach to managing the complication in that particular situation. The panelists/audience will be again invited to comment and share before proceeding to the next video clip. Pretest: 5 minutes; Introduction and Background: 10 minutes; Overview: 15 minutes; Video-Based Scenarios and Interactive Discussion: 40 minutes; Posttest: 5 minutes; Summary and Conclusion: 15 minutes.

Mar 24, 2016 (Thursday)
11:00 – 12:20
Venue: 103

CORNEA, EXTERNAL EYE DISEASES & EYE BANK

Mar 25, 2016 (Friday)
11:00 – 12:30
Venue: North Lounge
Session: OP–SC01
Recent Advances in the Diagnosis and Management of Conjunctival Tumors

Chief Instructor: Santosh HONAVAR
Instructor(s): Fairooz Puthiyapurayil MANJANDAVIDA, Vikas MENON, Kaustubh MULAY

Objective: This course will enable participants to accurately diagnose and manage common conjunctival tumors.
Synopsis: The aim of this course is to provide a systematic overview of clinical manifestations of conjunctival tumors and to discuss recent concepts in the diagnosis, management, and prognosis. Clinical evaluation of a patient with conjunctival tumor will be demonstrated with well-documented clinical cases. Systemic associations will be discussed. Advantages of anterior segment imaging techniques will be highlighted. Evidence-based treatment protocols, and indications and outcome of newer treatment modalities such as topical chemotherapy and plaque brachytherapy, will be discussed. Standard surgical procedures will be demonstrated with videos.

Course Outline: Evaluation of a Patient with Orbital Tumors; Benign Orbital Tumors; Malignant Orbital Tumors; Approach to Orbital Surgery; Challenging Cases of Orbital Tumors; Discussion.

16:30 – 17:50
Venue: South Lounge
Session: CO-SC04

Limbal Stem Cell Transplantation Update—What Is State of the Art Today?
Chief Instructor: Jayesh VAZIRANI
Instructor(s): Virender SANGWAN, Namrata SHARMA

Objective: To provide an evidence-based update on current techniques and outcomes of limbal stem cell transplantation.

Synopsis: Limbal stem cell deficiency is a well-defined entity, and limbal stem cell transplantation has been successfully performed for over 2 decades now. This course takes attendees through various techniques such as CLAU, CLET, and SLET. With extensive use of photographs and surgical videos, nuances of state-of-the-art techniques will be discussed.

Course Outline:
1. Introduction to different techniques of limbal stem cell transplantation – The journey from CLAU to CLET, and now SLET;
2. Why SLET is the technique of choice today – Concept, surgical technique, and outcomes;
3. Biological basis, epithelization patterns, and modifications to techniques for special situations.

Mar 26, 2016 (Saturday)

16:30 – 17:50
Venue: South Lounge
Session: CO-SC08

Biomechanics of the Cornea
Chief Instructor: I-jong WANG
Instructor(s): Jia-yush YEN, Po-jen SHIH, Chi-an DAI, Lon

WANG

Objective: In this course, we will introduce the biomechanics of the cornea in terms of its physical and material property.

Synopsis: The importance of the biomechanics of the cornea is not only related to the measurement of intraocular pressure (IOP), but also to diseases of the cornea such as keratoconus, post–LASIK ectasia, and cornea edema. Its applications in the cornea, such as in the efficacies of corneal cross-linking, intracorneal ring, and orthokeratology, are also interesting to many researchers. However, the state of corneal biomechanics has progressed a lot in recent decades because of the improvement of diagnostic devices. In this course, we will invite researchers in the field of mechanics and material science to discuss all of these issues.

Course Outline:
1. Composition of the cornea and its physical properties;
2. Static model of the cornea;
3. Dynamic properties of the cornea;
4. Corneal changes in response to IOP;
5. Implications of the biomechanics of the cornea on the measurement of IOP and diagnosis of keratoconus and post–LASIK ectasia.

Mar 27, 2016 (Sunday)

09:00 – 10:20
Venue: South Lounge
Session: CO-SC01

Comprehensive Guide to Corneal Collagen Cross-Linking for Keratoconus
Chief Instructor: Alex Lap Ki NG
Instructor(s): Kendrick SHIH, Rohit SHETTY, Colin CHAN, Arthur CHENG

Objective: To guide the audience to employ the most suitable cross-linking techniques (eg, accelerated or transepithelial) and tools and/or combine them with other treatment modalities [eg, topography-guided photorefractive keratectomy (PRK) and Intacs] in treating keratoconus.

Synopsis: This course will discuss the clinical use of corneal collagen cross-linking (CXL) in the treatment of keratoconus. The first part will focus on halting keratoconus progression with various techniques including accelerated, pulsed, and transepithelial cross-linking. Experience with different CXL machines and adjuvant medications will be shared. The audience will have a better understanding of when to use the most suitable technique. The second part will focus on treatment modalities that aim to improve vision, with emphasis on CXL combined with Intacs and topography-guided PRK.
Course Outline:
1. Overview of long–term results and safety of CXL in keratoconus;
2. Different CXL techniques including accelerated and transepithelial CXL;
3. Experience on cross–linking and adjuvant medications in keratoconus treatment;
4. Comparison of cross–linking with Avedro vs UVX;
5. CXL combined with Intacs;
6. CXL combined with topography–guided PRK.

11:00 – 12:20
Venue: South Lounge
Session: CO–SC02

A Systematic Approach to Managing Ocular Complications of Stevens–Johnson Syndrome and Toxic Epidermal Necrolysis in Asians

Chief Instructor: Kendrick SHIH
Instructor(s): Alex Lap Ki NG, Vanissa CHOW, Arthur CHENG, Marcus MARCET

Objective: In regards to Stevens–Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN), the attendee will be able to select appropriate treatment for acute ocular surface inflammation to minimize long–term morbidity, offer comprehensive long–term care for visual and ocular surface rehabilitation, and select appropriate patients who would benefit from surgical interventions.

Synopsis: This instruction course is intended for general ophthalmologists and subspecialists who are keen to develop a systematic and effective approach in the management of severe inflammatory ocular surface disease. The course is divided into therapeutic options during the acute phase of SJS/TEN, long–term ocular care for SJS/TEN patients, and surgical options for visual and ocular surface rehabilitation. The procedures discussed in this session will include autologous serum treatment, scleral contact lens fitting, amniotic membrane transplantation, eyelid reconstruction, and keratoprosthesis.

Course Outline: This is a comprehensive course on the management of early and late ocular complications of SJS and TEN. The objective is to equip attendees with a management plan to reduce/minimize long–term ocular complications through appropriate early treatment and to provide visual and ocular surface treatment for those with chronic morbidity. The course faculty comprises experienced cornea and oculoplastic surgeons working in tertiary–care burn units, managing more than 50% of Hong Kong’s SJS/TEN patients. Their differing expertise is complementary, and each member provides unique insights into the pros and cons of the various treatment options.

GLAUCOMA

Mar 27, 2016 (Sunday)

09:00 – 10:20
Venue: 102
Session: GL–SC01

Correlation of Structure and Function in Glaucoma: Practical Tips on Using Perimetry and OCT

Chief Instructor: Patricia KHU
Instructor(s): John Mark DE LEON, Hannah DE GUZ-MAN, Jose Maria MARTINEZ

Objective: To identify the different features of glaucoma damage in the optic nerve head and correlate them with visual field defects, and to determine progression in structure and function.

Synopsis: This course aims to identify the different clinical features of glaucoma damage when evaluating the optic nerve head, the different types of glaucoma defects in the visual field and their location, and quantitatively assess the probability of occurrence in different locations of the central field. Furthermore, the course will present the clinical aspects of glaucomatous visual field progression and the clinical uses of imaging devices, specifically spectral–domain OCT, to better quantitatively identify early disease and determine true disease progression.

Course Outline: Evaluation of the optic nerve head in glaucoma: features of glaucomatous damage. Visual field defects in glaucoma and common sites of occurrence: how to differentiate fluctuations from true defects. Visual field progression in glaucoma: how to differentiate long–term fluctuations from true worsening of the defects. OCT findings in glaucoma: which structural changes are more reliable and how to determine progression.

11:00 – 12:20
Venue: North Lounge
Session: GL–SC02

Glaucoma Surgery Techniques: Trabeculectomy, Phacotrabeculectomy, and Bleb Revision

Chief Instructor: David GOH
Instructor(s): Shamira PERERA, Lingam VIJAYA, Rahat HUSAIN

Objective: This course will discuss the conventional and emerging options in the surgical management of glaucoma with trabeculectomy, phacotrabeculectomy, and bleb revision. Video vignettes will illustrate each part of the surgical techniques.
**Synopsis:** This course provides a guide to performing the stand-alone trabeculectomy, phac trabeculectomy, and bleb and scleral flap revision techniques. It includes which cases to select and perioperative management. The current controversies regarding staged surgery, single or dual site surgery, and detailed tips on performing successful surgery will be discussed. The practical management of potential complications will also be discussed with reference to the current literature of comparative studies.

**Course Outline:** This course will provide a step-by-step approach to optimizing glaucoma filtration surgery. Our wide experience with the surgical management of the most commonly performed glaucoma procedures places us in an ideal position in which to filter the current literature and advise on the practical application of the best fail-safe surgical techniques to achieve optimal surgical results. Trabeculectomy: use of releasable and adjustable scleral flap sutures, application of antimetabolites with and without sponge applicators, achieve watertight closure of conjunctival wound with purse-string and mattress sutures. Perioperative complications and management; early and late postoperative complications, including bleb-related infections, will be discussed. Bleb and scleral flap revision: use of conjunctiva, sclera, tenons, and corneal tissue; direct conjunctival scleral flap suture technique. Management of difficult cases will also be addressed. Learning Objectives: Attendees will be able to perform glaucoma filtering surgery successfully and manage its inevitable complications with new confidence.

### INTRAOCULAR INFLAMMATION, UVEITIS & SCLERITIS

#### Mar 25, 2016 (Friday)

**14:30 – 15:50**  
**Venue:** South Lounge  
**Session:** IN-SC01

**Viral Retinitis—An Asian Perspective**  
**Chief Instructor:** Ian WONG  
**Instructor(s):** Yong TAO, Koh-hei SONODA

**Objective:** To learn the common presentations of various types of viral retinitis. To know the available options in treating viral retinitis.

**Synopsis:** Viral retinitis is a group of conditions including cytomegalovirus (CMV) retinitis, progressive outer retinal necrosis (PORN), and acute retinal necrosis. Despite different etiologies, there are similarities. Traditionally, CMV retinitis affects human immunodeficiency virus (HIV)-infected patients, but it is now being increasingly recognized outside of this group. Highly active antiretroviral therapy (HAART) has changed the presentation of CMV retinitis, whereas the advent of intravitreal antivirals has changed the treatment options available. The various types of viral retinitis and their respective management approaches will be discussed.

**Course Outline:** This course aims to highlight these and other trends in viral retinitis via the below talks:

1. Who is at risk? Background and demographics;  
2. Situation in Asian vs Western patients;  
3. Presenting signs and symptoms;  
4. Diagnostic challenge – How to make a diagnosis?  
5. Therapeutic challenge – Medical treatment and long-term prophylaxis;  
6. Therapeutic challenge – Surgical treatment;  
7. Summary + case study + small quiz.

### OCULAR IMAGING

#### Mar 26, 2016 (Saturday)

**09:00 – 10:20**  
**Venue:** South Lounge  
**Session:** OI-SC02

**Gonioscopy and Angle Imaging**  
**Chief Instructor:** Shamira PERERA  
**Instructor(s):** David GOH, Rahat HUSAIN, Rajesh KUMAR

**Objective:** At the conclusion of this course, attendees will be to incorporate this valuable skill into their practice and gain a better understanding of how to use angle imaging for the benefit of patients with various angle abnormalities.

**Synopsis:** Asian eyes have a greater proportion of angle closure glaucoma and by definition, gonioscopy plays a crucial part in its diagnosis. The authors have many years of experience with gonioscopy and angle imaging, correlating its importance in the management of angle closure glaucoma especially. Gonioscopy like any other skill requires a learning curve. The training here will concentrate on when to perform gonioscopy and how best to hone this skill along with how best to perform and interpret investigations.

**Course Outline:** This course will educate the comprehensive ophthalmologist on different types of gonioscopy lenses and techniques, correlating the information with imaging studies. Various examples of angle abnormalities will be illustrated. The different grading systems and methods of documentation will be covered along with advice on interpreting state-of-the-art imaging. The course will utilize several high-resolution images of the angle by various imaging modalities including ultrasound biomicroscopy (UBM), anterior segment optical coherence tomography (AS-OCT), and the EyeCam. The clinical implications of the findings from the angle investigations will also be explained, with
particular respect to the indications for various laser procedures. Current evidence comparing machines and the future of imaging will be dealt with, too. In particular, the evolution of the machines and the software will be explained together with the implications for clinicians. This course has been run at AAO 2011, 2012, and 2014 with good feedback.

11:00 - 12:20  
Venue: South Lounge  
Session: OI-SC01

**Choroidal Imaging: Current and Future**

*Chief Instructor: Jay CHHABLANI*  
*Instructor(s): Ian WONG, Colin TAN, Nan-kai WANG*

**Objective:** To demonstrate techniques of choroidal imaging and importance of choroidal assessment in various clinical situations.

**Synopsis:** Basics and advances in choroidal imaging, including enhanced depth optical coherence tomography (OCT), swept source OCT, en face choroidal imaging, automated evaluation of choroidal layers, and the future of choroidal imaging, will be discussed.

**Course Outline:** This course will include the following sections:

1. Optical system: Discussion about the optical system and basic physics in various imaging techniques of choroidal imaging;
2. Enhanced depth imaging;
3. En face optical coherence tomography of choroid;
4. Automated choroidal assessment;
5. Clinical application of choroidal imaging with case discussion;

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**OCULAR ONCOLOGY & PATHOLOGY**

**Mar 25, 2016 (Friday)**

11:00 - 12:20  
Venue: 103  
Session: OP-SC04

**Serious Eye Cancers Masquerading as Common Benign Conditions**

*Chief Instructor: Jerry SHIELDS*

**Objective:** To provide general ophthalmologists and subspecialists in retina, oculoplastics, cornea, pediatric ophthalmology, and others with an alarming number of serious ocular malignancies that initially simulated common benign conditions.

**Synopsis:** Examples will be shown of well-known conditions like astigmatism, strabismus, chalazion, blepharitis, pterygium, cataract, glaucoma, orbital cellulitis, choroiditis, heterochromia, and others.

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**MAR 26, 2016 (SATURDAY)**

14:30 - 15:50  
Venue: Elegance Lounge  
Session: OP-SC03

**Pediatric Ocular Tumors**

*Chief Instructor: Carol SHIELDS*  
*Instructor(s): Jerry SHIELDS*

**Objective:** At the conclusion of this course, the attendee should be able to identify the most common ocular tumors in childhood and understand management strategies.

**Synopsis:** This course will cover the important ocular tumors affecting children.

**Course Outline:** An organized presentation will be given on the recognition and management of tumors of the eyelid, conjunctiva, intraocular structures, and orbit. Retinoblastoma management will be summarized. Various cases will be presented, along with discussion of management.

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**ORBITAL AND OCULOPLASTIC SURGERY**

**Mar 26, 2016 (Saturday)**

14:30 - 15:50  
Venue: Conference Room 2 (TWTC)  
Session: OB-SC01

**3D Video of Common Oculoplasty Surgeries**

*Chief Instructor: Santosh HONAVAR*  
*Instructor(s): Raksha Rao, Fairooz Puthiyapurayil Manjandavid*  

**Objective:** To show common oculoplasty surgical procedures in the unique and interesting high-definition (3D) format.

**Synopsis:** Video in 3D provides a much needed ste-
reoscopic perspective. It can make surgical procedures very dynamic and interesting, especially if the video is of high definition and is viewed through active 3D technology. We will show a series of videos incorporating the entire spectrum of common oculoplasty surgeries recorded and edited using highly specialized equipment. This will help make the surgical procedures simple and easy to understand with clear demonstration of the anatomy, surgical principles, key steps, and surgical pearls.

**Course Outline:** Procedures include entropion, ectropion, conjunctival approach, ptosis surgery, levator resection, tarsofrontal sling, eyelid reconstruction, enucleation, evisceration, exenteration, socket reconstruction, orbital fracture, orbital decompression, and orbitotomy.

16:30 – 17:50
**Venue:** Conference Room 2 (TWTC)
**Session:** OB-SC02

**Anatomy of Complications in Orbitofacial Surgery**

*Chief Instructor:* Gangadhara **SUNDAR**
*Instructor(s):* Yoon-duck **KIM**, Raoul Paolo **HENSON**, Michael **GRANT**, Santosh **HONAVAR**

**Objective:** This instruction course will highlight aspects of clinical, surgical, and radiological anatomy that are important for optimal surgical management and ensure best surgical outcomes and prevention of postoperative complications.

**Synopsis:** This instruction course, presented by renowned experts in the field of orbit and oculofacial surgery from the Asia-Pacific region, will highlight conventional and newer anatomical understandings that are imperative not only in preoperative evaluation but also in intraoperative surgical landmark identification and appropriate manipulation (implant placement, bony removal, soft tissue preservation, intraoperative navigation, etc.), which in turn ensures the most optimal surgical outcomes and most importantly, helps avoid postoperative complications. Ignoring these anatomical landmarks often causes poor clinical outcomes and postoperative complications, which will also be highlighted by case examples.

**Course Outline:** Applied Anatomy of the Eyelids; Applied Anatomy of the Lacrimal System, External and Endonasal; Applied Anatomy of the Orbit; Applied Anatomy of the Face, Skeletal and Soft Tissue; Donor Site Anatomy.

**PEDIATRIC OPHTHALMOLOGY & STRABISMUS**

Mar 24, 2016 (Thursday)
prescription of low vision aids, updates on low vision aids, follow-up of these patients, and interaction with delegates.

**Synopsis:** There are about 10 million people with low vision in India, which is likely to increase due to the increase in life expectancy. Very few have access to low vision clinics. We should focus on establishing low vision evaluation clinics in all secondary level eye care centers.

**Course Outline:**
1. Introduction: 10 minutes;
2. Establishment of Low Vision Clinics: 15 minutes;
3. Prescription of Low Vision Devices: 15 minutes;
4. Training on the Use of Low Vision Devices: 15 minutes;
5. Recent Advances in Low Vision Rehabilitation: 20 minutes;
6. Discussion: 10 minutes.

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**REFRACTIVE SURGERY**

**Mar 24, 2016 (Thursday)**

09:00 – 10:20  
**Venue:** North Lounge  
**Session:** RE–SC01

**Learn How to SMILE**  
*Chief Instructor: Alex Lap Ki NG*  
*Instructor(s): Tommy CHAN, Vishal JHANJI, Yan WANG, George CHENG*

**Objective:** After this course, the attendant will know the principles, patient selection, and surgical technique of performing SMILE and SMILE Xtra. Refractive outcomes will be compared with LASIK.

**Synopsis:** Small incision lenticule extraction (SMILE) is the third generation, flapless refractive surgery for the correction of myopia and myopic astigmatism. This comprehensive course includes a discussion and literature review of the principles and outcomes of SMILE and will be compared with LASIK. Pearls regarding patient selection and surgical techniques (including SMILE Xtra) will be shared. There will be an interactive case discussion with videos on the management of intraoperative and postoperative complications.

**Course Outline:**
1. Overview – The science and optics behind SMILE (15 minutes);
2. Should I offer SMILE or LASIK? – Patient selection (15 minutes);
3. Dealing with intraoperative and postoperative challenges – With videos (15 minutes);
4. Is SMILE better than LASIK? – Comparing the refractive outcome of SMILE vs LASIK (15 minutes);
5. Future directions: SMILE Xtra – SMILE combined with cross-linking (15 minutes);
6. Q & A (5 minutes).

11:00 – 12:20  
**Venue:** Conference Room 2 (TWTC)  
**Session:** RE–SC05

**State-of-the-Art Corneal Tomographic Indices in the Screening of Keratoconus Risk for Refractive Surgery**  
*Chief Instructor: Carlos ARCE*  
*Instructor(s): Ronald KRUEGER*

**Objective:** To teach refractive surgeons to separate normal corneas with and without risk factors of postoperative ectasia from frustrate or initial keratoconus based on corneal topographic, tomographic, pachymetric, and wavefront data.

**Synopsis:** This course will review the different systems available for keratoconus detection and describe the traditional topographic indices for screening keratoconus such as KPI, KProb, I–S, CLMI, e2, and Kmax, and tomographic indices such as TPI, AAI or KAI, and CLMI–X and their differences or equivalency with other indices like the BAD. A correlation of these indices with the total corneal wavefront will also be provided along with the description and use of PTA for normal corneas in laser refractive surgery.

**Course Outline:** After explaining the basis and principles of topographic and tomographic indices for preoperative screening of keratoconus, this course will describe how to obtain and use the Cone Location and Magnitude Index and the new CLMI–X, the Keratoconus Prediction Index and keratoconus probability, the Kranemann–Arce Index or Aspheric Asymmetric Index and the use of BFS and BFTA elevation maps, the Thickness Progression Index, e2, and wavefront data and will compare them with indices shown by a few devices. The percentage tissue altered will be explained as a predictor of ectasia in normal corneas.

**Mar 26, 2016 (Saturday)**

14:30 – 15:50  
**Venue:** South Lounge  
**Session:** RE–SC04

**Prevention and Management of LASIK Complications**  
*Chief Instructor: Sujatha MOHAN*  
*Instructor(s): Ramesh DORAIRAJAN, Sri GANESH, Rohit SHETTY, Chitra RAMAMURTHY*

**Objective:** This will enable any beginning refractive surgeon to perform successful LASIK and to manage patients independently in the presence of complications.
**INSTRUCTION COURSES**

**Synopsis:** LASIK is one of the most commonly performed ophthalmic surgeries, providing a significant lifestyle change. This topic will help budding refractive surgeons to face the challenge of this extremely important surgery.

**Course Outline:** This course will highlight the intraoperative and postoperative complications occurring during LASIK and how to prevent and manage them. Emphasis will be placed on vision-threatening complications like epithelial downgrowth, flap striae, infections, and DLK, with suitable videos. Problems related to postoperative undercorrection, overcorrection, and induced higher-order aberrations (HOA) and ectasia will also be discussed.

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**RETINA (MEDICAL)**

**Mar 24, 2016 (Thursday)**

09:00 – 10:20  
**Venue:** 103  
**Session:** RM–SC03  
**Polypoidal Choroidal Vasculopathy—All You Need to Know**

*Chief Instructor:* Ian WONG  
*Instructor(s):* Youxin CHEN, Jay CHHABLANI, Ryo KAWASAKI

**Objective:** To distinguish a case of polypoidal choroidal vasculopathy (PCV) from a case of neovascular age-related macular degeneration (AMD) and to know the approach in managing a case of PCV and the available treatment options.

**Synopsis:** PCV is characterized by recurrent subretinal pigment epithelial hemorrhages. Before indocyanine–green angiography (ICG) imaging was popular, PCV was sometimes misdiagnosed as neovascular AMD. With the advent of newer imaging modalities and deeper understandings of the disease, PCV is now recognized as a separate entity, with its own unique profile of clinical manifestations. Treatment strategies toward PCV have been revolutionized by recent clinical trials using combination therapy with ranibizumab and verteporfin. Currently, significant differences exist between treatment for PCV and neovascular AMD. There is a clear need to distinguish PCV from neovascular AMD.

**Course Outline:** Introduction: This will cover the background of PCV, focusing on the history, discovery, and common demographics of this disease in detail. Diagnosis of PCV: Clinical photos, ICG findings, and optical coherence tomography scans will be used to illustrate real cases of PCV. Diagnostic approach will be discussed in detail with examples shown. Comparison with AMD: This will cover the differences and similarities between PCV and AMD. Pictures of the fundi, FFA, and ICG images will be used to illustrate the differences and similarities. Treatment Approach and Latest Evidence: The latest evidence in managing PCV cases will be discussed. Various treatment options and results from latest clinical trials will also be discussed. Quiz: A small quiz with real life cases of various forms of PCV will be given. This aims to solidify knowledge acquired during the course.

**Note:** This course has been presented at 2 WOCs consecutively, namely at the Abu Dhabi 2012 and the Tokyo 2014 WOCs. We have a team of instructors from Hong Kong, China, Japan, and India, where PCV is prevalent. We trust that we can deliver this course in a well-balanced manner, which will certainly benefit the audience.

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**Mar 27, 2016 (Sunday)**

11:00 – 12:20  
**Venue:** 102  
**Session:** RM–SC01  
**Macular Optical Coherence Tomography Workshop**

*Chief Instructor:* Wai-ching LAM  
*Instructor(s):* Arif SAMAD, John CHEN, Pear PONG-SACHAREONNONT

**Objective:** Participants will learn how to interpret the optical coherence tomography (OCT) appearances of common macular diseases, the International Classification of Vitreomacular Traction Syndrome (VMT), and how to recognize the common and important artifacts of OCT to avoid misinterpretation.

**Synopsis:** This interactive instruction course will use case examples to help participants with the following: understand the basic principles of OCT, including the latest advances in OCT such as swept source OCT, OCT angiography, etc.; learn how to interpret the OCT appearance of common macular diseases such as AMD, diabetic macular edema, myopia, retinal vein occlusion, and vitreoretinal interface diseases including epimacular membrane, macular hole versus pseudomacular hole, and the latest International Classification of VMT; recognize the common and important artifacts of OCT to avoid misinterpretation.

**Course Outline:** Introduction and pretest questionnaires; Basic principles of OCT, including the latest technology; Vitreoretinal interface diseases: epimacular membrane, macular hole, lamellar macular hole, pseudomacular hole, VMT (including the International Classification of VMT); Miscellaneous macular conditions: myopia, AMD, diabetic retinopathy, retinal vein occlusion; Latest advances in OCT: OCT angi, intraoperative OCT, etc; Wrap up with posttest questionnaires.
INSTRUCTION COURSES

Optical coherence tomography has become a common diagnostic test which all ophthalmologists use daily. There is, however, no formal instructional course to help either practicing ophthalmologists or trainees to understand and properly interpret the images. Recent need assessments have indicated that there is great interest in having such a course made available. We held a similar macular OCT workshop at the annual Canadian Ophthalmological Society Meeting in June 2015 (Victoria, BC), which was extremely well received.

RETINA (SURGICAL)

Mar 25, 2016 (Friday)

09:00 - 10:20
Venue: North Lounge
Session: RS–SC01
ILM Peeling in Macular Hole, Epiretinal Membrane, Diabetic Macular Edema, and Retinal Detachment

Chief Instructor: Hussain KHAQAN
Instructor(s): Ahmad SALLAM

Objective: To deliver information about internal limiting membrane (ILM) peeling in cases of macular hole, retinal detachment, and macular edema in diabetic eyes.

Synopsis: ILM peel for the management of macular conditions including macular hole, epiretinal membrane, diabetic macular edema, and for prevention of PVR after retinal detachment surgery has been the subject of recent research. This technique has its advocates and its opponents. In this course, we will discuss the different techniques of ILM peel as well the pros and cons of ILM peel in different surgical conditions drawing on our experience in this field.

Course Outline:
1. Normal ILM;
2. Indications for ILM peeling;
3. Different vitrectomy and trocar systems (23g, 25g, and 27g);
4. Different ILM staining dyes and staining techniques;
5. Endotamponade;
6. Preoperative fundus images and OCT;
7. Surgical videos showing different vitrectomy systems and staining and peeling techniques;
8. Postoperative fundus images and OCT;
9. Discussion.

14:30 - 15:50
Venue: North Lounge
Session: RS–SC02
Pneumatic Retinopexy—Pearls and Pitfalls

Chief Instructor: Wai-ching LAM
Instructor(s): Nicola GAN, Shao-onn YONG, Sherman VALERO, Jeffrey LIM

Objective: At the conclusion of this course, the participant will be able to identify appropriate patients for this technique, understand the fundamental principles necessary for successful pneumatic retinopexy, and manage subsequent complications.

Synopsis: This course will outline a simplified technique for office–based pneumatic retinopexy, discuss clinical examination techniques, and provide an approach to extended indications. In addition, management of complications will be discussed including new/missed retinal breaks, persistent subretinal fluid, fish eggs, subretinal gas, and prehyaloid gas. Audience participation will be encouraged, and a comprehensive handout will be provided.

Course Outline:
1. Introduction to Pneumatic Retinopexy;
2. Properties of Intraocular Gases and Mechanism of Action;
3. Case Selection – Indications/Extended Indications;
4. Pneumatic Retinopexy in Pediatric Retinal Detachments;
5. Surgical Technique;
6. Results and Complications;
7. Future Directions.

16:30 - 17:50
Venue: North Lounge
Session: RS–SC03
Scleral Buckling for Rhegmatogenous Retinal Detachment: Mastering a Dying Art!

Chief Instructor: Bhuvan CHANANA
Instructor(s): Vinod KUMAR, Rajvardhan AZAD

Objective: In the present era of pars plana vitrectomy (PPV), with improved instrumentation the success rates of vitreous surgery have increased dramatically and PPV is replacing buckling surgery. The art of performing a good scleral buckle is diminishing, and learning how to find a retinal break is definitely on the wane. The objective of this course is to understand the basic principles and master the technique of scleral buckling.

Synopsis: In selected cases, scleral buckling has shown superior results to PPV, and buckling surgery is also more cost–effective. Rather than didactic lectures, the sessions will stress interaction–based learning.

Course Outline:
1. Indications and basic principles of scleral buckling surgery;
2. Technique of conventional scleral buckling;
3. Cryotherapy: principle, procedure, and advantages/disadvantages;
4. Indications and techniques of subretinal fluid drain-
Mar 27, 2016 (Sunday)

09:00 – 10:20
Venue: North Lounge
Session: RS-SC04

IOL Rescue and Secondary IOL Options in the Aphakic Patient

Chief Instructor: Shao-onn YONG
Instructor(s): Nicola GAN, Wai-ching LAM, Tock-han LIM, Rajesh RAJAGOPALAN

Objective: To elucidate the challenges and critical decisions in the assessment and surgical management of patients with aphakia and subluxed or dislocated intraocular lens (IOL) implants.

Synopsis: Visual rehabilitation of the aphakic patient poses a unique challenge to ophthalmologists. This course will provide a comprehensive overview of the range of options available for aphakia management using IOL rescue or secondary IOL implantation and subsequent fixation to a variety of sites within the globe. Surgical videos demonstrating the various techniques such as iris suturing, iris enclavation, scleral suturing, sutureless scleral tunnels or flaps, and the use of conjunctiva-sparing corneoscleral pockets will be shown. A stepwise review process, essential in selecting the best method for each patient, will also be discussed.

Course Outline:
1. Introduction;
2. Causes and Sequelae of Aphakia and IOL Subluxation/Dislocation;
3. Decision Tree – Key management questions that determine surgical approach;
4. Pearls on IOL Rescue, Fixation Options, and Techniques (including instructional surgical videos) – Anterior chamber IOL, iris-sutured IOL, iris-enclavated IOL, scleral-sutured IOL, “sutureless” scleral-fixated IOL, etc.;
5. Complications and Pitfalls;
6. Pros and Cons – Identifying the most suitable technique for your patient.
Comparison of Different Variants of Blended Vision With Rotational Asymmetric Multifocal Intraocular Lenses

First Author: Detlev BREYER
Co-Author(s): Hakan KAYMAK, Karsten KLABE, Philipp HAGEN, Florian KRETZ, Gerd AUFFARTH

Purpose: The aim of this study was to compare visual outcomes between different variants of bilaterally implanted segmental multifocal intraocular lenses (MIOLs; Oculentis). Thereby, the Comfort with a near addition of 1.5 D was implanted in the dominant eye and 1 of the following 4 lenses was implanted in the nondominant eye: a) Comfort with near addition of 1.5 D, b) Comfort with near addition of 1.5 D and –1.5 D target refraction, c) Comfort with near addition of 2.0 D and –1.0 D target refraction, or d) MplusX with near addition of 3.0 D.

Methods: We retrospectively analyzed the results of 200, 75, 25, and 25 patients in groups A, B, C, and D, respectively. Results for subjective refraction and visual acuity were evaluated. Additionally, we analyzed the binocular defocus curves and compared the area under these curves (MIOL capacity) with those of phakic juvenile patients. In addition, we correlated the monocular defocus curves to MTF-focus-through curves, measured on an optical bench. Halo and glare were assessed with a computer-based system. Contrast sensitivity was assessed with the Ginsburg box.

Results: Compared with phakic juvenile eyes, all variants showed binocular defocus capacities above 90% with group B achieving the highest value: 105%. After 3 months, photopsia were either absent or described as undisturbing. Contrast vision was better than in other bi- or trifocal MIOLs.

Conclusions: MIOL capacity showed results competitive with trifocal IOLs. The mixed implantation of 2 different refractive MIOLs seems to provide a new alternative to a diffractive trifocal IOL.

Co-Author(s): Ching-ju HSIEH, Yen-jui CHANG, Lin-chung WOUNG

Purpose: To identify the ocular findings in Taiwanese patients with mental retardation.

Methods: A total of 75 patients with mental retardation from 8 months to 55 years of age were examined for ocular findings from January 2014 to August 2015 at Yu-Cheng Social Welfare Foundation. Ocular examinations including visual acuity assessment, slit lamp biomicroscopy, ocular motility, cycloplegic refraction, and ophthalmoscopy were performed.

Results: The prevalence of ocular findings were the following: entropion (2 patients, 2.7%), ptosis (2 patients, 2.7%), astigmatism (3 patients, 4%), hyperopia (2 patients, 2.7%), myopia (7 patients, 9.3%), strabismus (22 patients, 29.3%; 7 esotropia and 15 exotropia), nystagmus (9 patients, 12%), retinal abnormalities (1 patient, 1.3%), cataract (25 patients, 33.3%), and glaucoma (9 patients, 12%).

Conclusions: Patients with mental retardation demonstrate a high incidence of strabismus and cataract, which contribute to some factors of learning disabilities.
for AL, ACD, and K values, whereas WTW measurements had TRT = 0.80 mm and ICC = 0.795. Bland–Altman analysis also showed good agreement between the 2 operators for ocular component measurements in all recruited subjects, except WTW in patients with cataract had wider 95% LoA (range, −0.88 to 0.95 mm).

**Conclusions:** The new Aladdin OLCI biometer showed excellent intraoperator repeatability and interoperator reproducibility for AL, ACD, and K measurements in both groups. However, the precision of WTW measurements was lower in patients with cataract.

**A Curve of the Ophthalmic Surgery Simulator**

*First Author: Foo Hui Xian VALENCIA Co-Author(s): Shamira PERERA*

**Purpose:** To assess the learning curve of a robotic virtual reality ophthalmic surgery simulator and determine which tests are discriminatory in grading surgical aptitude among resident surgeons.

**Methods:** A total of 7 year 1 and 2 ophthalmology residents were recruited into this prospective educational case series. They were allowed to practice on the Eyesi surgical simulator (VRmagic Holding AG, Mannheim, Germany) which provides training for cataract surgery via a simulator program. Across the 3 training modules—Phacoemulsification 1 and 2 and Basic Micromatic Skills—participants were allowed to repeat their attempts until the “pass” criteria of the respective modules was reached. The “pass” criteria is defined as obtaining a score of 80 or more a minimum of 3 times.

**Results:** Participants used the most attempts in the Phacoemulsification 2 modules, namely, the “Phaco Divide and Conquer,” “Phaco Chopping and Training,” and “Hydro Maneuvers” modules. The number of attempts to obtain a “pass” in these modules were 26.1, 25.7, and 25.1 times, respectively, accompanied by a large SD indicating a large variation. The total time required was 116, 98, and 68 seconds, respectively. In contrast, fewer attempts were needed on the Phacoemulsification 1 modules—“Phacoemulsification,” “Cracking and Chopping Training,” and “Bimanual Training”—with 10.4, 9.2, and 7.7 attempts, respectively.

**Conclusions:** With regard to the Eyesi phacoemulsification training simulator, residents required the greatest number of attempts on the Phacoemulsification 2 modules. The “Phaco Divide and Conquer” and “Phaco Chopping and Training” modules may be more discriminatory tests of surgical aptitude in phacoemulsification compared with the rest of the modules. As this correlates well with the observation that residents find these tasks more challenging in real-world patients, this seems to validate the Eyesi scoring system.

**Postoperative Endophthalmitis in Western Australia: A Whole-Population Study**

*First Author: Jonathon NG Co-Author(s): Kyle CHOW, Antony CLARK, Nigel MORLEY*

**Purpose:** To determine the incidence and risk factors of postoperative endophthalmitis in Western Australia.

**Methods:** All cataract operations and endophthalmitis cases occurring between 2002 and 2013 were identified using data linkage. Risk factors were evaluated with multivariate logistic regression.

**Results:** The incidence of postoperative endophthalmitis decreased from 0.2% to 0.03% between 2002 and 2013. The risk of endophthalmitis was higher in men [odds ratio (OR), 1.5; 95% confidence interval (CI), 1.2–1.8], those aged 80+ years (OR, 1.7; 95% CI, 1.3–2.1), and operations occurring before publication of the ESCRS study in 2007 (OR, 3.3; 95% CI, 2.6–4.2).

**Conclusions:** There was a sustained decrease in postoperative endophthalmitis and loss of the previously described cyclical pattern in incidence. This may be related to widespread adoption of prophylactic intracameral antibiotics.
Conclusions: for the same variance. (A88Xfs107), and 2 female carriers were heterozygous for the same variance.

Results: All 3 affected males had bilateral congenital dense cataracts, glaucoma, microcornea, strabismus, and nystagmus. Visual acuity ranged from no light perception to 20/400. Facial abnormalities were observed, including long–narrow face, prominent nose, large antverted and simple pinnae. Increased spacing, irregular incisal edges, and crown–shaped permanent teeth were distinctive dental features. One female carrier displayed lens opacities centered on the posterior Y–suture in both eyes and mild dental abnormalities. Genetic analysis showed 3 affected males carrying a novel small deletion in NHS gene c.263_266delCGTC (A88Xfs107), and 2 female carriers were heterozygous for the same variance.

Conclusions: The phenotypic features of a Chinese pedigree with Nance–Horan syndrome were described and a novel causative NHS gene mutation was identified.

09:00 – 10:30
Venue: VIP Room
Session: CA–FP03

A New Dimension of an Intraoperative Surgical Guidance System

First Author: Florian KRETZ
Co-Author(s): Ralf BREYER, Matthias MUELLER, Detlev MUELLER, Hakan KAYMAK, Gerd AUUFFARTH

Purpose: To compare the efficacy of toric intraocular lens (IOL) placement with an intraoperative surgical guidance system (Callisto, Carl Zeiss Meditech, Germany) and a pendal marker (Geuder, Germany).

Methods: In a prospective study, patients were marked in an upright position fixating a fixation target with the pendal marker. During surgery in all cases, the Callisto system was used for correct toric IOL placement. Intraoperatively, the manual markings were compared with the guidance system by evaluating visibility. One day postoperatively, the intended axis was reevaluated on the slit lamp.

Results: Ten percent of the manually made markings had poor visibility in the operating theater. There was an average deviation between the manual and the surgical guidance axis of approximately 5 degrees intraoperatively. As all toric IOLs were placed with the help of the Callisto system, mean deviation from the target axis was 1 degree postoperatively.

Conclusions: Surgical guidance systems offer a more secure surgery, especially in the field of toric IOLs for our patients. In our study, automated eye recognition worked in cases. Data transfer between the IOLMaster and the Callisto system is simple and fast.

09:00 – 10:30
Venue: VIP Room
Session: CA–FP03

Postoperative Dropless Cataract Surgery

First Author: Ajay MEHTA

Purpose: To study AC inflammation, intraocular pressure changes, and incidence of cystoid macular edema and endophthalmitis in uncomplicated phacoemulsification surgery cases where intravitreal triamcinolone acetonide and intravitreal plus intracameral ceftazidime injections were given at the end of surgery and no topical medications were given postoperatively; to study the safety of transzonular intravitreal injection; and to study the acceptance of dropless cataract surgery among patients in a private set–up.

Methods: A prospective interventional study was carried out on uncomplicated phacoemulsification cases in 200 eyes. Perioperatively, intravitreal antibiotic steroid combination was injected via the transzonular route after PCIOL implantation, and intracameral antibiotic was injected at the end of surgery. Intravitreal injection (0.1 mL) comprised 2.8 mg/0.07 mL of preservative–free triamcinolone acetonide (Aurocort) and 2.25 mg/0.03 mL of ceftazidime (Cefazid). Intracameral injection comprised 1 mg/0.1 mL of ceftazidime. Patients were not given any topical eye drops postoperatively. The rate of AC inflammation, intraocular pressure, central macular thickness, and patient comfort level were assessed until 3 months postoperatively.

Results: No patient had high intraocular pressure, and the incidence of postoperative endophthalmitis was zero in our study. Twelve out of 200 patients had breakthrough inflammation at 1 month postoperatively, of which 7 had uncontrolled diabetes. Two patients had cystoid macular edema, of which 1 had uncontrolled diabetes. Thirty patients needed placebo therapy for minor complaints like burning sensation and foreign body sensation.

Conclusions: The transzonular route of intravitreal injection is a safe method of drug delivery during phacoemulsification surgery. Postoperative dropless cataract surgery is a safe and effective method of endophthalmitis prophylaxis. Using this simple technique, common complications due to postoperative drops can be easily avoided.

09:00 – 10:30
Venue: VIP Room

**First Author:** Bharti KASHYAP  
**Co-Author(s):** Birendra KASHYAP, Bibhuti KASHYAP

**Purpose:** To compare the quantitative and qualitative visual outcomes and intraocular lens (IOL) decentration values obtained after femtosecond laser–assisted capsulorhexis (CCC) with those of Verion Image Guided System manual CCC and standard manual CCC.

**Methods:** Candidates for cataract extraction were randomized into 1 of 3 groups as follows: Lensx femtosecond laser cataract surgery capsulotomy (laser group), Verion guided capsulorhexis (Verion group), and standard manual capsulorhexis (manual group). Postoperatively at 7 days, 30 days, and 180 days, uncorrected (UDVA) and corrected (CDVA) distance visual acuity and spherical equivalent (SE) were measured. IOL decentration and modular transfer function test were measured with iTrace aberrometer.

**Results:** Each group comprised 40 eyes. The capsulotomies in the laser group and Verion group showed significantly better IOL centration than the manual group at all time points ($P < 0.05$). Between groups, differences in UDVA and CDVA were not statistically significant. The residual spherical equivalent was statistically smaller in the laser and Verion groups than in the manual group and increased significantly over time in all groups. Modular transfer function test was statistically better at all spatial frequencies in the laser and Verion groups.

**Conclusions:** Both the laser and Verion groups produced better capsulotomy characteristics resulting in significantly better IOL centration and modular transfer function tests at all spatial frequencies, with better refractive results immediately after surgery and over time.

**Cellular Responses of Lens Epithelial Cells to Light-Emitting Diode—Generated Lights**

**First Author:** Shu-wen CHANG  
**Co-Author(s):** Tsan-chi CHEN

**Purpose:** To examine the effect of commercial light-emitting diode (LED)–generated lights on the cellular response of human lens cells.

**Methods:** HLE–B3, a cell line of human lens epithelial cells (HLEs), was cultivated in Opti–MEM with 20% fetal bovine serum. HLEs were exposed to the LEDs of 420 nm (violet), 470 nm (blue), or 530 nm (green). Viability of the exposed cells was determined by WST–1 assay.

**Results:** Cell morphology revealed that violet LED obviously induced cell detachment and cell loss. In addition, WST–1 results indicated that the survival rate of the violet LED–exposed HLEs (16.9 ± 6.5%) was more damaged than the HLEs exposed to blue LED (67.1 ± 8.1%) or green LED (103.3 ± 6.9%). Blue LED significantly suppressed HLE motility; however, green LED had no obvious effect on HLE motility. Finally, IL–8 was highly expressed in HLEs with exposure to green or blue LEDs.
Conclusions: Shorter wavelength LEDs triggered cell damage and induced inflammatory response in HLEs.

09:00 – 10:30
Venue: VIP Room
Session: CA–FP03

Incorporating OCT in the Cataract Preoperative Armamentarium: Additional Need or Additional Costs?
First Author: Viraj VASAVADA
Co-Author(s): Aditya SUDHALKAR, Deepak BHOJWANI, Shail VASAVADA, Abhay VASAVADA

Purpose: Subtle macular pathologies, difficult to diagnose in the presence of cataract, are often a cause of postoperative dissatisfaction for the patient and embarrassment for the surgeon. The purpose of this study was to determine the usefulness of preoperative OCT examination to detect asymptomatic macular abnormalities in patients scheduled to undergo cataract surgery.

Methods: This prospective observational series included 1 eye of patients undergoing cataract surgery for senile cataracts (grades 1–4, with or without posterior subcapsular cataract). None of the patients had a history of poor vision or previous retinal/ocular disorders. Preoperatively, no retinal/macular pathology was identified on fundus evaluation. All eyes were subjected to fundus photography, previous retinal/ocular disorders, and any abnormalities/variations therein were noted. Quantitative measurement of central macular thickness (CMT) was made. Presence of macular structural abnormalities was the primary outcome measure.

Results: Ongoing study. Preliminary data of 122 eyes included. OCT examination could not be captured in 2 eyes (1.6%). Mean CMT was 195 ± 23 µm. There was a clinical suspicion of epimacular membrane in 4 eyes (3.3%) and drusen in 2 eyes (1.6%); however, OCT examination ruled out any pathology. In the presence of a “normal” fundus evaluation, OCT examination revealed the presence of epiretinal membrane (ERM) in 2 eyes (11.6%), foveal attenuation in 4 eyes (3.3%), and vitreomacular traction in 4 eyes (3.3%). Based on abnormal OCT findings, we avoided implanting multifocal IOLs in 2 eyes. Results will be updated at the time of presentation.

Conclusions: A significant proportion of patients have asymptomatic macular anomalies detected only on OCT. These act as prognostic factors for postoperative visual prognosis. More importantly, it helps the surgeon decide the IOL strategy, particularly for premium IOL implantation. Thus, we believe that OCT examination has an important place in the preoperative armamentarium.

CORNEA, EXTERNAL EYE DISEASES & EYE BANK

Mar 25, 2016 (Friday)
09:00 – 10:30
Venue: Elegance Lounge
Session: CO–FP05

One-Year Results After Femtosecond Laser–Assisted Circular Keratotomy as a Treatment for Keratoconus Stage I and II: Comparison Between Two Different Age Groups
First Author: Hakan KAYMAK
Co-Author(s): Detlev BREYER, Karsten KLABE, Philipp HAGEN, Florian KRETZ, Gerd AUFFARTH

Purpose: Circular keratotomy (CKT) represents an effective treatment for the progression of keratoconus. Recently, we refined CKT by replacing the trephine cut technique with a femtosecond laser–induced intracorneal cut, rendering sutures unnecessary. The aim of this quality management investigation was to address the question of whether patient age has a significant influence on the success of femtosecond laser–assisted CKT (Femto–CKT) in treating stage I and II keratoconus.

Methods: The results of 40 eyes were evaluated for up to 12 months after Femto–CKT treatment (Femto LDV, Ziemer). For clinical evaluation, visual acuity at far (CDVA) and subjective refraction (SR) were measured. Corneal radii were assessed with Scheimpflug tomography (Pentacam). Furthermore, optical coherence tomography of the anterior segment was performed with Visante OCT. We compared the results of patients younger than 35 years with those that were older than 35 years.

Results: In all eyes, no signs of progressing keratoconus were found. Corneal radii and refractive values remained stable within the 1-year period of observation. CDVA was <0.00 logMAR 1 year after surgery and improved compared with preoperative values. No significant differences were found between the 2 age groups.

Conclusions: So far, our results indicate that Femto–CKT is an efficient way to stop the progression of stage I and II keratoconus. The success of the treatment appears to be independent of patient age.
Purpose: To assess the safety and efficacy of deep anterior lamellar keratoplasty (DALK) in different scenarios.

Methods: This was a retrospective analysis of all the patients who underwent DALK from January 2009 to February 2015. Of 202 patients who underwent DALK during this period, only 95 patients were included, whose final follow-up was at least 6 months from the day of surgery. DALK was performed using a modified Melle technique (75 eyes) or big bubble technique (20 eyes). Preoperative and postoperative best spectacle corrected visual acuity (BSCVA), spherical equivalent (SEQ), and adverse events were recorded.

Results: The most common indication for DALK was keratoconus (75 eyes: 52 eyes with apical scar and 23 eyes with no scar), corneal dystrophy (9 eyes), corneal opacity (9 eyes), Terrien degeneration (1 eye), and post-LASIK ectasia (1 eye). The mean follow-up was 21.2 months. At the latest follow-up, BSCVA of 6/9 or better was seen in 10.1%, 6/12 or better in 34.8%, and 6/36 or better in 92.1% of the eyes. The mean postoperative refractive cylinder was –2.22 ± 2.53 D, and SEQ was –2.11. The only intraoperative complication was microperforations (9.5%), which were seen only with the big bubble technique; all these cases were completed as predescemetic DALK. The most common postoperative complication was double anterior chamber in 9 eyes (9.5%), which resolved spontaneously in 7 eyes and with air tamponade in 2 eyes. Stromal rejection in 7 eyes (7.5%) was reversed in all cases with intensive topical steroid therapy.

Conclusions: A manual lamellar technique is more predictable and safer in difficult cases where big bubble would not have been possible, thereby eliminating the need for conversion to penetrating keratoplasty (PKP). However, visual outcomes of the 2 methods of DALK are comparable.

Safety and Efficacy of Collagen Cross-Linking With and Without Epithelial Debridement in Eyes With Keratoconus

First Author: Jing ZHANG

Purpose: To compare the safety and efficacy of corneal collagen cross-linking (CXL) with the epithelium off (epi-off) and with the epithelium on (epi-on) in eyes with keratoconus.

Methods: Collagen cross-linking was performed on 61 eyes: 29 eyes in the epi-off group and 32 eyes in the epi-on group. Patients were evaluated for uncorrected distance visual acuity (UDVA), best corrected visual acuity (BCVA), corneal topography, endothelial cell count, and corneal biomechanics at baseline and after CXL at 1, 3, and 6 months.

Results: Most of the patients in the epi-off group experienced pain, tears, and photophobia during the first 3 days, but not the epi-on group. The mean UDVA and BCVA significantly improved after CXL in both groups (P < 0.01). There was no significant difference in UDVA and BCVA 6 months after CXL between the 2 groups (P > 0.05). The mean of average keratometry value and astigmatism significantly decreased in both groups (P <
0.01), and the reduction in steep K was greater in the epi−off group (P = 0.003). No significant decrease was observed in mean endothelial count in both groups (P > 0.05). The changes of corneal hysteresis and corneal resistance factor were not significant in both groups (P > 0.05).

Conclusions: The effect on visual acuity and K values of epi−on CXL are likely to be similar to that of epi−off CXL. Thus, transepithelial CXL offers similar efficacy to epithelium−off CXL with more patient comfort.

09:00 – 10:30
Venue: Elegance Lounge
Session: CO−FP05

Tear Inflammatory Cytokines in Allogeneic Hematopoetic Stem Cell Transplantation Patients

First Author: Sridevi NAIR
Co−Author(s): Murugesan VANATHI, Jasbir KAUR, Rajesh SINGHA, Jeewan TITIYAL, Radhika TANDON

Purpose: The aim of this study was to analyze tear cytokine levels in allogeneic hematopoetic stem cell transplant (allo−HSCT) patients and their correlation with clinical parameters.

Methods: A preliminary prospective longitudinal study of allo−HSCT patients and controls for ocular surface evaluation and serum and tear cytokines at 3 consecutive follow−up visits (at 3 monthly intervals) was done. Clinical parameters including visual acuity, symptom score, Ocular Surface Disease Index score (OSDI), slit lamp biomicroscopy, and ocular surface evaluation tests [fluorescein tear break−up time (FTBUT), Schirmer test I, ocular surface staining] were noted in each visit. Biochemical analysis of tears and serum samples for cytokines [IL−10, IL−12, IL−2, IL−4, IL−6, IL−17, interferon (IFN)−gamma, tumor necrosis factor (TNF)−alpha, VEGF] and MMP 2, 9, 7, 13, 10, and Chemokine (IL−8) was done using Bio−Plex ProTM Human Cytokine Group 1−11 Plex Assay (BIORAD, USA) and Milliplex MAP Human MMP Magnetic Bead Panel (MERCK MILLIPORE, USA). The quantitative data was compared using nonparametric Mann−Whitney U test when comparing 2 groups and Kruskal Wallis test for more than 2 groups. Qualitative data was compared using χ² test. Spearman test was used for correlation analysis. A P value < 0.05 was considered significant.

Results: Twenty−four patients of allo−HSCT (19 males, mean age, 28.2 ± 6.2 years; 5 females, mean age, 30.2 ± 8.78 years) and controls (mean age, 34.3 ± 5.8 years) were recruited into the study. Ocular graft vs host disease (oGVHD) was seen in 8 patients (33.3%). The mean tear cytokine levels of IFN−Y, IL−10, IL−5, IL−2, IL−4, IL−6, IL−8, IL−17A, VEGF, and MMP 9 were raised in oGVHD patients as compared with non−oGVHD pa-
tients and normal controls in all follow−up visits. Tear cytokine levels of IFN Y, IL−6, IL−17A, IL−8, and VEGF showed a good correlation with the clinical parameters [OSDI score, conjunctival and corneal staining scores, Schirmer I, FTBUT; Spearman correlation factor for OSDI (0.6, 0.605, 0.6, 0.68), conjunctival staining score (0.6, 0.5, 0.4, 0.5, 0.6), Schirmer I score (−0.8, −0.7, −0.5, −0.5, −0.7), FTBUT (−0.7, −0.6, −0.5, −0.5, −0.7) for the above, respectively]. The serum levels of inflammatory cytokines and MMPs were not found to be raised in correspondence with tear levels in the oGVHD patients.

Conclusions: The elevated tear cytokines point toward a predominantly T cell mediated pathway of inflammation along with B cell involvement in oGVHD.

09:00 – 10:30
Venue: Elegance Lounge
Session: CO−FP05

Pigment Epithelial−Derived Factor Peptide Facilitates the Regeneration of a Functional Limbus in Rabbit Partial Limbal Deficiency

First Author: Shu−i YEH
Co−Author(s): Huey Chuan CHENG, Yeou−ping TSAO

Purpose: To investigate the potential of a pigment epithelial−derived factor (PEDF) peptide 44−mer to promote limbal regeneration in a rabbit partial limbal deficiency model.

Methods: A 180−degree limbal excision was created surgically, and topical application of 44−mer−containing ointment once a day for 2 weeks was started immediately after injury. Limbal barrier function was inspected at 2 and 6 months after treatment. Corneal neovascularization was observed under slit−lamp microscope. The presence of goblet cells on the corneal surface was examined using impression cytology. The resulting repair tissue was assessed by immunohistochemical staining with antibodies for putative limbal stem cell colony forming capacity and expressions of LSC marker beta−Np63−alpha, and ABCG2. Cells harvested from the regenerated tissue were analyzed for colony forming capacity and expressions of LSC marker by immunostaining assay and quantitative real−time PCR (qPCR).

Results: Eyes treated with the 44−mer blocked vascularization and goblet cell migration onto the corneal surface. By means of immunohistochemical staining and cell isolation in the repair tissue, we showed that LSCs were widely distributed at the regenerated tissue after 44−mer treatment. The repaired limbus contributed robustly to corneal wound healing as effectively as undamaged limbus.

Conclusions: We demonstrated that 44−mer regenerates a functional limbus−like structure on limbal exci-
sion wounds. Our finding suggests that the PEDF peptide derivative may be an innovative strategy of tissue engineering and repair therapy in partial LSC deficiency diseases.

09:00 – 10:30
Venue: Elegance Lounge
Session: CO-FP05

**Bandage Soft Contact Lens Therapy and Anterior Segment Optical Coherence Tomography Evaluation for Ocular Graft-Versus-Host Disease**

First Author: Yi-chen SUN
Co-Author(s): Narae KO, Yoshihiro INAMOTO, Ruikang WANG, Stephanie LEE, Tueng SHEN

**Purpose:** To identify the structural changes of ocular graft-versus-host disease (GVHD) on anterior segment optical coherence tomography (AS-OCT) and the efficacy of disposable bandage soft contact lens (BSCL) treatment for symptomatic relief and ocular surface protection in ocular GVHD patients.

**Methods:** This prospective phase II clinical trial enrolled 19 patients with the diagnosis of chronic GVHD as defined by the NIH criteria and ocular symptoms of NIH eye score 2 or greater. Extended disposable BSCL were applied to the GVHD-affected eyes with topical antibiotic coverage. Ocular exam, patients’ survey, and AS-OCT were performed with signed informed consents. Patients were followed for 1 to 3 months. Clinical outcomes, such as visual acuity and corneal presentations (abrasion, punctate epithelial erosion, and filament) were correlated with symptomatic survey findings and AS-OCT.

**Results:** Thirty-eight eyes of 19 patients with ocular GVHD underwent BSCL placement in this study. Fourteen out of 19 patients underwent AS-OCT scan. The mean BCVA at enrollment, 2-week, and 4-week visit was 0.180, 0.128, and 0.163 logMAR, respectively. Twenty-four out of 25 eyes (96%) which initially presented with conjunctival inflammation (chemosis, injection, or staining) showed improvement after 2 and 4 weeks of BSCL wear. Twenty-three of 30 eyes (76.7%) with punctate epithelial erosion and 8 out of 15 (53.3%) eyes with filamentous keratopathy showed improvement after 2 and 4 weeks of BSCL wear. AS-OCT is promising in visualizing several ocular GVHD manifestations, such as abnormal meibomian gland orifice, conjunctival hyperemia, and corneal epithelial irregularity.

**Conclusions:** BSCL therapy offers significant symptomatic relief for patients with ocular GVHD. This treatment can reduce the irritation of cornea from the eyelid and improved the patients’ vision as well. Meanwhile, we also found AS-OCT can be a feasible method to characterize the dynamic ocular surface changes related to ocular GVHD.

09:00 – 10:30
Venue: Elegance Lounge
Session: CO-FP05

**Co-Transfection of Human β-NGF and PDGF-B Gene in Cat Corneal Endothelial Cells via Adeno-Associated Virus Mediation**

First Author: Chuanfu WANG

**Purpose:** To research the biological effect of co-transfection of adeno-associated virus (AAV)–mediated human nerve growth factor–β (β-NGF) and human platelet derived growth factor B (PDGF–B) in cat corneal endothelial cells in vitro.

**Methods:** Cat corneal endothelial cells were cultured in vitro. The type and purity of the endothelial cells were further confirmed by morphological analysis and NSE immunofluorescence study. After forming the adeno-associated virus vector, cat corneal endothelial cells were transfected by AAV–mediated green fluorescent protein (GFP) gene. Then the efficiency of transfection was evaluated according to positive expression of GFP. Human β–NGF gene and human PDGF–B gene were transfected into cat corneal endothelial cells in vitro by AAV vector. Real–time PCR and Western blot were used to check the expression status of β–NGF and PDGF–B on mRNA and protein level in cat corneal endothelial cells at 24 hours, 48 hours, and 72 hours after respective transfection and co–transfection. MTT was used to detect the proliferation ability of cells, and flow cytometry was used to detect cell number at different stages of cell cycles at 72 hours after respective transfection and co–transfection of AAV–β–NGF and AAV–PDGF–B. By cell scratch test, the effect of cell spreading ability in cat corneal endothelial cells after transfection was detected.

**Results:** Cat corneal endothelial cells could be rapidly cultivated to form pure single layer. Cat corneal endothelial cells displayed green fluorescence clearly under fluorescence microscope 72 hours after transfection of AAV–mediated GFP gene. The efficiency of transfection reached 67.8%. The results of real–time PCR and Western blot showed that the expression of β–NGF and PDGF–B increased with time. Compared with the control groups, the difference was statistically significant (P < 0.05). There were no significant differences (P > 0.05) between the expression of β–NGF and PDGF–B in co–transfection groups and respective transfection groups at 24 hours, 48 hours, or 72 hours. The results of MTT showed that the proliferation ability of cells increased after the transfection of AAV–β–NGF and AAV–PDGF–B, moreover co–transfection groups increased obviously. There were statistical differences (P
< 0.05) between the transfection groups and the control groups. The results of flow cytometry showed that the proliferation index increased after the transfection of AAV-β–NGF and AAV–PDGF–B, and the co–transfection groups increased more obviously than others. The results of cell scratch test showed the effect of cell spreading ability in cat corneal endothelial cells was increased after the transfection of AAV-β–NGF and AAV–PDGF–B, especially in co–transfection groups. The cell spreading ability of each group was statistically different (P < 0.05) between the transfection groups and the control groups.

**Conclusions:** Human β–NGF gene and human PDGF–B gene could be effectively transfected into cat corneal endothelial cells in vitro by AAV vector and expressed stably. Co–transfection of AAV-β–NGF and AAV–PDGF–B could increase the ability of proliferation and spreading in cat corneal endothelial cells.

09:00 – 10:30  
**Venue:** Elegance Lounge  
**Session:** CO–FP05  
**ROCK Inhibitor Combined With MMP Inhibitor Improves the Quality of Ex Vivo Culture of Corneal Endothelial Cells**  
**First Author:** Wei-ting HO  
**Co–Author(s):** I-jong WANG  
**Purpose:** To determine the effect of a ROCK inhibitor combined with a matrix metalloproteinase (MMP) inhibitor in improving the quality of ex vivo culture of bovine corneal endothelial cells (BCECs).

**Methods:** BCECs were cultured in medium with 10 µM of Y–27632. Marimastat, a broad spectrum MMP inhibitor, was added into the medium after Y–27632 treatment. Cell shape and protein localization were shown by immunofluorescence. The protein level was demonstrated by Western blot. Cell viability was determined by MTT assay.

**Results:** Y–27632 significantly increased the viability of BCECs during ex vivo culture. Although the levels of active beta catenin (ABC), snail, and slug were decreased compared with controls, there was prominent filopodial protrusion upon Y–27632 treatment. Adding Marimastat after Y–27632 further reduced the levels of ABC, snail, and slug. The cell shape became hexagonal after Marimastat, and the filopodial protrusion was also diminished.

**Conclusions:** ROCK inhibitor increases the viability of BCECs during ex vivo culture. Adding an MMP inhibitor further maintains the phenotype of BCECs, and thus improves the quality of ex vivo culture.

14:30 – 16:00  
**Venue:** Elegance Lounge  
**Session:** CO–FP06  
**Methicillin-Resistant Staphylococcus aureus Ocular Infection in Taiwan: Clinical Features, Genotyping, and Antibiotic Susceptibility**  
**First Author:** Yu-chuan KANG  
**Co–Author(s):** Ching-hsi HSIAO, Hsin-yuan TAN, Hung-chi CHEN, Shin-yi CHEN  
**Purpose:** To characterize clinical features, antibiotic susceptibility, and genotypes of ocular infections caused by methicillin–resistant *Staphylococcus aureus* (MRSA) based on the clinical and molecular definitions of community–associated (CA) and healthcare–associated (HA) strains.

**Methods:** Fifty–nine patients with culture–proven *S. aureus* ocular infection were enrolled from January 2010 to December 2011 at Chang Gung Memorial Hospital, Taiwan. Clinical information was retrospectively collected. Antibiotic susceptibility was verified using disk diffusion/E test. For characterization, staphylococcal cassette chromosome mec (SCCmec), pulsed–field gel electrophoresis (PFGE), multilocus sequence type (MLST), and Panton–Va]nteau leukocidin (PVL) gene were performed. MRSA isolates from the patients with HA factors were classified as clinically defined HA–MRSA, with those carrying SCCmec type I–III as molecularly defined HA–MRSA.

**Results:** Thirty–four patients with MRSA ocular infection were identified. The most common clone of CA–MRSA and HA–MRSA isolates was ST59/PFGE type D/ SCCmec IV, VT/PVL(+) (n = 12) and CC 239/PFGE type A/ SCCmec III, IIIA/PVL(−) (n = 10), respectively. All the 11 patients with molecularly defined HA–MRSA infections and 50% of the 22 patients with molecularly defined CA–MRSA infections were found to have HA factors (P = 0.005). CA–MRSA tended to cause lid infections, whereas HA–MRSA tended to cause corneal infections. Contrary to HA–MRSA isolates, nearly all the CA–MRSA isolates were susceptible to trimethoprim/sulfamethoxazole and fluoroquinolones under either clinical or molecular classifications.

**Conclusions:** In Taiwan, CA–MRSA isolates exhibited considerably higher susceptibility to fluoroquinolones when compared with HA–MRSA isolates. A strong correlation was observed between the HA factors and molecularly defined HA–MRSA isolates.

14:30 – 16:00  
**Venue:** Elegance Lounge  
**Session:** CO–FP06  
**Demodex Infestation as a Potential Cause of Keratitis**  
**First Author:** Lingyi LIANG
Purpose: To report *Demodex* mite infestation in keratitis.

Methods: This observational prospective comparative study included 40 eyes of 29 patients with refractory keratitis. *Demodex* mites were detected by lash sampling and microscopic examination. Meibomian gland and tear lipid layer image were evaluated by Oculus keratography. Patients were treated with tea tree oil (TTO) eyelid scrubs. Improvement of symptoms, corneal and conjunctival signs, and lipid tear image was evaluated.

Results: The patients included 24 males and 16 females with an average age of 17.8 ± 12.1 years. *Demodex* mites were detected in all cases including *Demodex folliculorum* in 34 cases and *Demodex brevis* in 30 cases. Bacterial, fungal, and virus culture were negative in all cases. All patients manifested persistent ocular cases. Bacterial, fungal, and virus culture were negative folliculorum mites were detected in all cases including

Conclusions: Demodicosis should be considered as a potential cause of refractory keratitis. Further investigation into its pathogenic role is warranted.

14:30 – 16:00
Venue: Elegance Lounge
Session: CO-FP06

**Association of Type III Secretion System, Serotype, and Antibiotic Susceptibility of* Pseudomonas aeruginosa *From Ocular Isolates**

First Author: Elizabeth SHEN

Purpose: To determine the association of type III secretion system (T3SS) genotype with antibiotic susceptibility, serotypes, and clinical manifestation of *Pseudomonas aeruginosa* keratitis.

Methods: From 2001–2011, *P. aeruginosa* strains isolated from ocular infections were collected. Serotyping was performed using antiserum kits from Denka Seiken Co, Ltd (Tokyo, Japan). *P. aeruginosa* strains were analyzed for T3SS genotype with multiplex PCR for exoU, exoT genes. Minimum inhibitory concentrations (MIC) were determined using agar dilutions containing gentamicin, amikacin, ceftazidime, pipercillin, ciprofloxacin, gatifloxacin, and moxifloxacin. Fisher exact test was used to compare the antibiotic susceptibility between serotypes and genotypes of *P. aeruginosa*.

Results: Among a total of 119 ocular isolates collected, 37 isolates were from contact lens-related microbial keratitis (CLMK) and 48 were from non-CLMK (Table 1). Genotype distribution found 62.2% of CLMK strains were cytotoxic (expressing exoU), whereas only 18.8% of non–CLMK strains were cytotoxic (*P* < 0.01) (Table 1). Among CLMK isolates, serotypes 11 (51%), 2 (16%), and 6 (11%) were most commonly found. Among non-CLMK isolates, serotypes 2 (40%), 11 (23%), and 6 (15%) were more prevalent. Among the antibiotics tested, 13% of the invasive strains were resistant to gentamicin and 10% were resistant to moxifloxacin. Cytotoxic strains had lower resistance rates to all the antibiotics tested compared with invasive strains, although they were not statistically significant. Fifty percent of invasive strains with serotype 2 from CLMK isolates were sensitive to fluoroquinolones. There were 5 multiple drug resistant (MDR) strains: 2 of cytotoxic genotype and 3 of invasive genotype.

Conclusions: Contrary to other reports, our cytotoxic strains did not show a statistically significant increase in antibiotic resistance compared with invasive strains. Invasive strains with serotype 2, in particular, showed a higher resistance to fluoroquinolone antibiotics. Clinicians should be aware of the 2 different genotypes of *P. aeruginosa* affecting prognosis.

14:30 – 16:00
Venue: Elegance Lounge
Session: CO-FP06

**Bacterial Flora in the Conjunctiva and Meibomian Gland in Patients With Meibomian Gland Dysfunction**

First Author: Shaodan ZHANG

Purpose: To investigate the aerobic and anaerobic bacterial flora in the conjunctiva and meibomian gland in patients with meibomian gland dysfunction (MGD).

Methods: Samples from the conjunctivas and meibomian gland secretions were obtained from 385 eyes of 201 MGD patients. Both aerobic and anaerobic culture were performed.

Results: Of the 385 conjunctiva samples, 250 had positive aerobic bacterial growth and 258 bacterial strains were isolated: 159 (61.6%) *Staphylococcus epidermidis*; 24 (9.3%) *Staphylococcus lentus*; 12 (4.7%) *Corynebacterium tuberculostearicum*; 6 (2.3%) *Staphylococcus*
Clinical Features, Diagnosis, and Treatment Outcomes of Cytomegalovirus Endotheliitis in Hong Kong

First Author: Ka Wai KAM
Co-Author(s): Rachel KWOK, Alvin YOUNG, Vishal JHANJ

Purpose: To report the clinical features, diagnosis, and treatment outcomes of cytomegalovirus endotheliitis in Hong Kong.

Methods: This was a retrospective cohort in which patients diagnosed with cytomegalovirus (CMV) endotheliitis were reviewed. Patients were categorized into typical and atypical endotheliitis based on the diagnostic criteria proposed by the Japanese Corneal Endotheliitis Study Group. Data including demographics, clinical signs, and treatment outcomes were analyzed.

Results: Seventeen eyes of 16 patients were included (mean age, 60.9 ± 14.8 years). Thirteen eyes were categorized as atypical CMV endotheliitis. The mean time between onset and final diagnosis was 1569.2 ± 14.8 days. Clinical signs included localized corneal edema (n = 10, 58.8%), iris atrophy (n = 5, 29.4%), coin-shaped keratic precipitates (n = 3, 17.7%), linear keratic precipitates (n = 1, 5.9%), and diffuse bullous keratopathy (n = 1, 5.9%). Ganciclovir was used in all patients, whereas oral valganciclovir was used in 13 (81.2%) patients. Uveitis was controlled in 15 (88.2%) eyes at the final follow-up. The mean intraocular pressure was significantly reduced from 28.53 ± 14.09 mm Hg at presentation to 15.47 ± 5.43 mm Hg at the final visit (P = 0.001). The mean number of antiglaucoma medications was reduced significantly from 3.71 ± 1.69 to 1.65 ± 1.17 (P = 0.001).

Conclusions: CMV endotheliitis remains an important differential diagnosis for anterior uveitis. In our retrospective cohort, atypical disease features were commonly seen in our locality. Early recognition and initiation of anti–CMV treatment may yield good outcomes in terms of intraocular pressure control.
0.05), though significant decline was seen in Schirmer test ($P = 0.008$) and Saxon test ($P = 0.015$) at 6 months. Goblet cell density was preserved in cases during 6 months, whereas it decreased in controls ($P = 0.157$)

**Conclusions:** Oral rebamipide causes marked improvement in symptoms and signs of dry eye and dry mouth in patients with Sjogren syndrome.

14:30 – 16:00  
**Venue:** Elegance Lounge  
**Session:** CO–FP06

**Reliability of Noninvasive Tear Film Break-Up Time Using a Keratograph**

**First Author:** Sang-bumm LEE  
**Co-Author(s):** Seongyong JEONG

**Purpose:** To evaluate the reliability of noninvasive tear film break-up time and identify its relationship with dry eye parameters.

**Methods:** A total of 100 participants (50 with dry eye and 50 in the control group) were enrolled prospectively. Noninvasive first (Nf) and average (Nav) break-up time were evaluated 2 times using a Keratograph 4 (Oculus, WA). The patients were examined regarding tear film break-up time with fluorescein (BUT), Schirmer test (ST), and Ocular Surface Disease Index (OSDI).

The correlation analysis was performed between noninvasive parameters (Nf and Nav) and BUT. Intraclass correlation coefficient (ICC) was evaluated in Nf and Nav.

**Results:** The correlation analysis revealed positive correlations between Nf and BUT and Nav and BUT, both in the dry eye ($r = 0.440, P < 0.001$; $r = 0.66, P < 0.001$) and control groups ($r = 0.61, P < 0.001$; $r = 0.77, P < 0.001$). The ICCs of Nf and Nav were 0.72 and 0.94 in the dry eye group and 0.70 and 0.91 in the control group. Nf, Nav, BUT, and ST were shorter in the dry eye group than in the control group ($P < 0.001$ in all parameters). The OSDI was higher in the dry eye group than in the control group ($P < 0.001$ in all). BUT was longer in Nf than in the control group ($P < 0.001$).

**Conclusions:** Both Nf and Nav showed a positive correlation with BUT, and the high ICCs verified the repeatability of noninvasive break-up time using a Keratograph. The mean Nav revealed no difference from BUT. Noninvasive break-up times (Nf and Nav) are considered as new parameters to evaluate dry eye syndrome.

14:30 – 16:00  
**Venue:** Elegance Lounge  
**Session:** CO–FP06

**Effects of Ferulic Acid on Reactive Oxygen Species—Induced Apoptosis in Corneal Epithelial Cells**

**First Author:** I-lun TSAI  
**Co-Author(s):** Yung-hsin CHENG, Ching-yao TSAI, Li-lin KUO, Lin-chung WOUNG

**Purpose:** To investigate the effects of ferulic acid (FA) in corneal epithelial cells under oxidative stress.

**Methods:** The cell viability of FA and hydrogen peroxide (H2O2) on rabbit corneal epithelial (RCE) cells was evaluated with crystal violet assay. The ROS production was performed by chemiluminescence assay. The expressions of inflammation–related, catabolic, and anti-catabolic genes were selected to evaluate the effects of FA on H2O2–damaged RCE cells. The apoptosis analysis of the RCE cells was evaluated with terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) staining.

**Results:** The results of cell viability demonstrated that 200 μM of FA might be the optimal concentration to treat RCE cells. The results of chemiluminescence assay suggested that 25 μM of FA might be enough to terminate the free radical reaction caused by 200 μM H2O2. In the posttreatment model, the results of mRNA gene expression showed that the inflammation level (TNF–α, IL–1α, TGF–b, and MMP–9) was significantly decreased. The results of TUNEL staining showed that after treatment of FA on H2O2–induced oxidative stress, RCE cells could decrease apoptosis.

**Conclusions:** The results of this study suggest that FA could be used as an agent to protect the corneal epithelium from oxidative injuries.

14:30 – 16:00  
**Venue:** Elegance Lounge  
**Session:** CO–FP06

**Anterior Keratotomy Astigmatism Correction in Femtosecond Laser Cataract Surgery—Hong Kong Nomogram**

**First Author:** George CHENG  
**Co-Author(s):** Victor WOO

**Purpose:** To report the clinical results and key findings from using the new femto–cataract technique in Asian eyes after 4000 cases.

**Methods:** This was a single-center evaluation of femtosecond laser (FSL) cataract results using the VICTUS femtosecond laser platform (Bausch+Lomb Technolas). The VICTUS femtosecond laser was used to perform anterior capsulotomies, lens fragmentation, and corneal incisions before phacoemulsification in all cases. FSL anterior keratotomy (FSL–AK) was used in astigmatism from 0.75 diopters (D) to 3 D. AK zone was at 8.5 mm
and depth at 500 µm. There was no manual opening of the AK. The new “mark first method” using Nidek OPD Scan III was done for accurate corneal centration and steep axis marking.

Results: Docking can be easily performed even in small Asian eyes, with a 99% success rate of docking on the first attempt. The overall FSL-cataract procedure including docking, treatment planning, and the laser procedure was quick, taking 2–3 minutes. Capsulotomies were accurate and well centered, with complete capsulotomy in 99% of cases. Fragmentation allowed for a reduction in phaco power and reduced manipulation of the lens. FSL-AK can correct up to 3 D of astigmatism using our new Hong Kong Nomogram.

Conclusions: Anterior keratotomy using VICTUS anterior keratotomy gives accurate results and is very safe. No manual opening of the AK wound has more accurate results, less inflammation, less scarring, and less regression. The VICTUS docking system can be easily used on small Asian eyes. Astigmatism up to 3 D can be corrected using the VICTUS AK Hong Kong Nomogram.

### EYE TRAUMA, EMERGENCIES & INFECTIONS

**FREE PAPERS**

**Elegance Lounge**

**11:00 - 12:30**

**Session:** IN-FP02

**Factors Affecting Visual Outcome in Traumatic Cataract Surgery After Blunt Trauma**

First Author: Karina PRATIWI
Co-Author(s): Purjanto UTOMO, Agus SUPARTOTO

Purpose: The aim of this study was to determine preoperative conditions and their effect on visual outcome after traumatic cataract surgery.

Methods: This was a descriptive analytical study. Analysis included data from 76 patients with traumatic cataract after blunt trauma from 2013–2015. Data regarding demographics, causative agent, associated ocular damage, time to surgery, surgeon, type of cataract extraction, and final visual outcome were retrieved from medical records. Final visual acuity was assessed at the end of 12 weeks.

Results: Thirty routine control patients (mean age, 32.8 ± 19 years) were included in the analyses. The majority of the cases seen were more than 45 years old, with male preponderance (4.6:1). Corneal tissue injuries and lens subluxation were the 2 most common associated injuries. The most common causative agent was metallic (20.3%), followed by ball (17.7%). Median time to surgery was 4 months. The time interval between injury and surgery had no significant effect on final visual outcome in open globe injury ($P = 0.064$) and closed globe injury ($P = 0.881$). Neither did the surgeon and type of cataract extraction. Causes of nonimprovement in visual acuity were retinal detachment (45%) and corneal laceration (18%).

Conclusions: Postoperative visual acuity varied as a result of associated ocular damage after blunt trauma. Visual acuity might improve after cataract surgery if there were no another ocular pathology.

**Study on Differentiation of Human Bone Marrow Mesenchymal Stem Cells Into Corneal Epithelial-Like Cells**

First Author: Guoling CHEN

Purpose: To investigate whether human bone marrow mesenchymal stem cells (HMSCs) are able to differentiate, in vitro, into corneal epithelial-like cells.

Methods: The primary human corneal keratocytes (HCFs) were obtained from the corneal stromal pieces by tissue culture, and the HMSCs were isolated by density gradient centrifugation. Both the HMSCs and HCFs were identified according to their morphological characteristics, and the protein expression of CD29 and vimentin were analyzed by immunocytochemistry. To induce cell differentiation, HMSCs were cultured by establishing epithelial culture microenvironment in a co-culture model. Cells were characterized by phase contrast microscopy observation. Using immunocytochemistry, we confirmed the protein presence of corneal-specific cytokeratin 12 (CK12) in differentiated cells. What is more, the CK12 mRNA in differentiated cells was analyzed by reverse transcriptase-polymerase chain reaction (RT–PCR).

Results: Most of the adherent HCFs and HMSCs were in spindle-shape and perfectly aligned in a certain direction of the whirlpool-like shape, while cells were grown to near confluence. HMSCs positively stained for CD29 and HCFs expressed vimentin. HMSCs changed shape toward irregular polygon morphology after co-culture with HCFs over time, and the differentiating cells formed cell clusters, some of which resembled epithelial-like cells. The expression of CK12 was positive for immunocytochemistry staining in differentiated cells and further confirmed by RT–PCR. These results indicated that the differentiated cells acquired characteristics similar to those of corneal epithelial cells.

Conclusions: HMSCs isolated from human bone marrow were capable of differentiating into epithelial-like cells and possess the phenotypical characteristics of corneal epithelial cells.
Multivariate Analysis of Refractory Hypotony After Vitrectomy in Open Globe Eye Injuries

First Author: Yuntao HU

Purpose: To explore the risk factors contributing to refractory hypotony in open globe injuries after vitrectomy.

Methods: Two hundred eleven eyes with open globe injuries from 2005 to 2012 in our hospital were reviewed. Among the injuries were rupture in 121 eyes; penetrating in 52 eyes; perforating in 15 eyes; and intraocular foreign body in 9 eyes. All injured eyes received vitrectomy. Refractory hypotony was defined as sustained intraocular pressure (IOP) lower than 10 mm Hg in the eyes filled with silicone oil or lower than 8 mm Hg in those without. The mean follow-up time was 20 months.

Results: In eyes with refractory hypotony, there was rupture in 64 eyes; penetrating in 19 eyes; perforating in 6 eyes; and intraocular foreign body in 9 eyes. Multivariate analysis revealed that refractory hypotony was significantly related to injury involvement with the ciliary body or choroid and the scope of retinal defect/removal, but was not significant in relation to the size of the eye wound.

Conclusions: Refractory hypotony is a difficult problem to solve in open globe injuries. To save injured eyes, it may help to act according to risk factors in the treatment of open globe injuries.

Retinal Detachment After Open Globe Injury

First Author: Syam SUHARYONO
Co-Authors: Purjanto UTOMO, Doni WIDYANDANA, Brian ARDITYA MAHENDRA

Purpose: This study was designed to characterize the development of retinal detachment (RD) after open globe injury and determine those characteristics that could prevent RD.

Methods: This was a retrospective analysis. Data were analyzed from medical records of open globe injury (OGI) patients from January 2011 to December 2014 at Sardjito General Hospital. Data regarding age, sex, causes, therapy, presence of vitreous hemorrhage, RD with B-scan USG examination, and ocular trauma zone were collected.

Results: The mean age of the 260 patients was 35 years (range, 1–72 years). Sixty-nine eyes were diagnosed with RD after open globe injury. Multivariable analysis was done for age, sex, orbital zone trauma, mechanism trauma, presence of vitreous hemorrhage, and time diagnosed with RD. Multivariable analysis of those that developed RD revealed male patients (odds ratio (OR), 2.43; \( P = 0.039 \)). Mechanism of trauma did not affect the development of RD (OR, 1.85; \( P = 0.255 \)). Older age (OR, 14.82; \( P = 0.002 \)), higher zone trauma (OR, 3.55; \( P = 0.169 \)), and vitreous hemorrhage were not statistically significant. Average time to develop RD was within 4 weeks.

Conclusions: Retinal detachment is common after open globe injury. Orbital zone trauma, age, sex, time diagnosed, presence of vitreous hemorrhage and mechanism of injury each had their own characteristics on the development of RD and can result in poorer visual acuity. Several clinical variables could predict the risk of future detachment. Early detection and treatment of RD could prevent visual loss or phthisis bulbi.
the most common sites of injury. Open globe injury was common (49.6%), and zone I injury was the most common (74%). Follow-up data were analyzed from 108 patients who had at least 5 months of follow-up. From univariate analysis, initial visual acuity [RR, 4.98 (1.91–12.98)], time to surgery [RR, 1.95 (0.94–4.07)], and intraocular foreign body [RR, 1.74 (1.08–2.79)] were the significant predictive factors for poor visual outcome.

Conclusions: Initial visual acuity, time to surgery, and intraocular foreign body were significant predictive factors in this study. However, more sample sizes are needed for future research to reanalyze these factors.

GLAUCOMA
Mar 24, 2016 (Thursday)

09:00 – 10:30
Venue: Conference Room 3 (TWTC)
Session: GL-FP03

Short-Term Results of Biodegradable Collagen Matrix–Augmented Ahmed Glaucoma Valve Implantation: 6-Month Follow-Up

First Author: Seungsoo RHO
Co-Author(s): Marvin LEE, Kyoung Tak MA, Sae-heun RHO

Purpose: To evaluate the short-term efficacy of a biodegradable collagen matrix (BCM) as an adjuvant for Ahmed valve implantation surgery to prevent the hypertensive phase.

Methods: This prospective study included 43 refractory glaucoma eyes all followed up for 6 months. Refractory glaucoma was defined as an intraocular pressure (IOP) >20 mm Hg with antiglaucoma eye drops without previous glaucoma surgery. The conventional method was performed in 21 eyes, and BCM–augmented Ahmed valve implantation (BAAVI) was done in 22 eyes. In the BAAVI group, a 10 x 10 x 2-mm BCM was sutured on an Ahmed glaucoma valve, FP7 model. Complete success was defined as an IOP ≤21 mm Hg (target IOP 1) or ≤17 mm Hg (target IOP 2) without antiglaucoma medications, and qualified success was defined as an IOP ≤21 mm Hg with or without medications. Maximal bleb thickness was measured using anterior segment optical coherence tomography images.

Results: The preoperative IOPs and numbers of preoperative antiglaucoma medications were similar for both groups. Complete target IOP 1 success rates were 38.1% and 86.4%, complete target IOP 2 success rates were 19.0% and 59.1%, and qualified success rates were 52.4% and 90.9% in the conventional and BAAVI groups, respectively (P < 0.05). The hypertensive phase rate was lower in the BAAVI group (4.5% vs 47.6%; P = 0.002). Maximal bleb thickness was increased in the BAAVI group on postoperative day 30 and 180 (P < 0.05).

Conclusions: Success rates were higher in the BAAVI group than in the conventional group with the change of bleb morphology. Furthermore, the use of BCM significantly decreased the need for antiglaucoma medications for at least 6 months postoperatively.
tend to have larger areas and longer lengths than those without correspondence. These results suggest that FLCD may be the site more vulnerable to microvascular disruption.

09:00 – 10:30  
**Venue:** Conference Room 3 (TWTC)  
**Session:** GL–FP03  
**Factors Related to Prostaglandin-Associated Periorbitopathy in Glaucoma Patients**  
*First Author: Chanikarn PATRADUL*  
*Co-Author(s): Visanee TANTISEVI, Anita MANASSA-KORN*  
**Purpose:** To determine the prevalence and factors associated with prostaglandin–associated periorbitopathy (PAP) in glaucoma or ocular hypertension patients using prostaglandin analogs (PGa).

**Methods:** A cross-sectional study of glaucoma or ocular hypertension patients using topical PGa for at least 3 months was performed. Eyes treated with PGa were photographed and independently evaluated for PAP by 2 glaucoma specialists, using at least 4 out of 7 clinical appearances. The factors of interest were sex, age, body mass index (BMI), types of glaucoma, types of PGa, duration of PGa use, and concurrent 0.5% timolol.

**Results:** One eye each from 134 patients were included. Seventy (52.2%), 21 (15.7%), and 43 (32%) eyes received components of latanoprost, travoprost, and bimatoprost, respectively. Prevalence of PAP was 44.8% (95% CI, 36.3% to 53.3%). Older age > 60 years (OR, 0.7) was reversely associated with PAP. Interestingly, timolol possibly precipitated periorbital change when in use with prostaglandins.

**Conclusions:** Older age, bimatoprost, or travoprost was associated with PAP, whereas high BMI was found as a protective factor. Interestingly, timolol possibly precipitated periorbital change when in use with prostaglandins.

09:00 – 10:30  
**Venue:** Conference Room 3 (TWTC)  
**Session:** GL–FP03  
**Ocular Distribution of Bimatoprost After Intracameral Administration of a 15-µg Sustained-Release Bimatoprost Implant or Topical Administration of Bimatoprost**  
*First Author: Jennifer SEAL*  
*Co-Author(s): Michael ROBINSON, James BURKE, Mayssa ATTAR*  
**Purpose:** To compare the ocular distribution of bimatoprost...
Bimatoprost SR delivered bimatoprost to the target tissue efficiently and more selectively than topical dosing. Bimatoprost levels in the bulbar conjunctiva, eyelid margin, and periorbital fat (tissues associated with potential adverse effects of hyperemia, eyelash growth, and periorbital fat atrophy) were remarkably reduced or undetectable with bimatoprost SR.

Conclusions: Bimatoprost SR delivered bimatoprost to the target tissue efficiently and more selectively than topical dosing. Bimatoprost levels in the bulbar conjunctiva, eyelid margin, and periorbital fat (tissues associated with potential adverse effects of hyperemia, eyelash growth, and periorbital fat atrophy) were remarkably reduced or undetectable with bimatoprost SR.

Methods: Both eyes of 24 normal research dogs were administered a ~35-μL drop of bimatoprost 0.03% once daily for 7 days or an intracameral bimatoprost SR implant containing 15 μg bimatoprost. Animals were euthanized, and ocular/periorcular tissues were collected at time points ≤7 months after bimatoprost SR injection or ≤9 hours after completion of topical dosing. Bimatoprost concentrations in tissue samples were measured using liquid chromatography/tandem mass spectrometry and high-performance liquid chromatography.

Results: After bimatoprost SR administration, the rank order of tissue mean bimatoprost concentrations (Cmax and AUC0–last) was iris–ciliary body (ICB) > cornea > aqueous humor > bulbar conjunctiva; bimatoprost concentrations were below the limit of quantitation (BLQ; <0.05 ng/mL) in periorbital fat, eyelid margins, and retina. After topical bimatoprost dosing, the rank order was eyelid margins > bulbar conjunctiva > periorbital fat > cornea > ICB > aqueous humor; bimatoprost was BLQ in retina. The maximal bimatoprost concentration in the ICB (target tissue for lowering intraocular pressure) was >10,000-fold higher after bimatoprost SR administration than after topical dosing; maximal bimatoprost concentration in the bulbar conjunctiva was >500-fold higher after topical dosing.

Conclusions: The extracted physiological parameters are unique. They facilitate the understanding of corneal biomechanics and create potential clinical indications.

Quantitative Measurements of the Ciliary Body in Eyes With Acute Primary Angle Closure and Their Fellow Eyes

First Author: Jingjing HUANG
Co-Author(s): Chuchen CHUNG, Zhonghao WANG, Jialiu LIN, Jianan XU

Purpose: To evaluate and compare the structural differences of the ciliary body in eyes with and without acute primary angle closure (APAC).

Methods: Forty-four patients with APAC in 1 eye and 25 normal control eyes were included. Ultrasound biomicroscopy and A-scan ultrasound measurements were performed on the eyes with APAC, the fellow eyes of the patients with APAC, and the normal control eyes. Ciliary body parameters included maximum ciliary...
body thickness (CBTmax), ciliary body thickness at the point of the scleral spur (CBT0) and at 1000 μm from the scleral spur (CBT1000), and the trabecular–ciliary process angle (TCA). Biometric measurements including axial length, central anterior chamber depth (ACD), pupil diameter, lens thickness, and lens vault were also recorded.

Results: Average CBTmax were 0.875 ± 0.155, 0.940 ± 0.160, and 1.057 ± 0.120 mm, respectively; CBT0 were 0.793 ± 0.130, 0.881 ± 0.171, and 0.945 ± 0.215 mm, respectively; CBT1000 were 0.594 ± 0.167, 0.623 ± 0.131, and 0.789 ± 0.144 mm, respectively; TCA were 47.483 ± 13.871, 51.493 ± 10.361, and 81.284 ± 16.177 degrees in eyes with APAC, their fellow eyes, and normal control eyes. CBTmax and ACD were smallest in APAC eyes, smaller in their fellow eyes, and largest in normal control eyes (P < 0.05). However, there was no significant difference in CBT1000 and TCA between the eyes with APAC and their fellow eyes. Smaller CBT1000 and TCA were shown in both eyes of APAC patients than the normal controls (P < 0.05).

Conclusions: The ciliary bodies were thinner in eyes with APAC than in their fellow eyes, both of which were thinner than normal controls. This might be related to the mechanism of acute APAC attack.

Retinal Neurodegeneration in Amyotrophic Lateral Sclerosis Patients

First Author: Henry TSENG
Co-Author(s): Nisha MUKHERJEE, Anthony KUO, Richard BEDLACK

Purpose: Recent human genetic studies have linked 2 genes called optineurin and TBK1 for normal–pressure glaucoma with amyotrophic lateral sclerosis (ALS). However, it is unclear whether retinal neurodegeneration occurs in ALS patients even without glaucoma. We hypothesized that ALS patients may exhibit retinal neurodegeneration and tested this hypothesis by using optical coherence tomography (OCT) imaging to assess their retinas.

Methods: ALS patients were recruited from the Duke University Medical Center under an IRB–approved protocol. Patients with glaucoma or retinal pathology were excluded. We performed an ophthalmic examination before measuring retinal nerve fiber layer (RNFL) thickness using spectral-domain OCT (SD–OCT) (Spectralis; Heidelberg Engineering). Mean RNFL thickness and 6-sector RNFL thickness were compared with the normative database. ALS disease severity was determined through the ALS Functional Rating Scale (ALSFRS–R).

Results: Twenty–one patients with ALS were enrolled. The mean intraocular pressure (IOP) was 13.9 ± 2.8 in the right eye and 14.1 ± 3.6 in the left eye. Slit lamp examinations in all patients were normal. Optic nerves showed mean cup:disc ratio of 0.35 ± 0.1 in the right eye and 0.35 ± 0.1 in the left eye. SD–OCT imaging was successfully performed in all ALS patients despite positional challenges resulting from motor deficits. Mean
RNFL thickness for this group was thinner than values obtained from the Heidelberg normative database, even after adjusting for each patient’s age (difference of 6.86 μm for the right eye and 8.15 μm for the left eye). RNFL thinning was primarily attributed to the temporal quadrant when 6-sector RNFL results were analyzed.

**Conclusions:** Our study shows that OCT imaging can be performed rapidly and effectively in ALS patients despite positional challenges. The use of OCT in ALS patients may allow the retina to be used as a biomarker to diagnose and detect progression in ALS, but further work is required. Moreover, when performing a glaucoma evaluation of patients with ALS, and possibly other neurodegenerative patients, RNFL thinning will need to be interpreted with caution as it cannot be entirely attributed to a glaucomatous etiology.

**Results:** The follow-up ranged from 1 to 12 months (mean, 10.5 ± 5.1 months). IOP in group A went from 10.62 ± 4.26 mm Hg (1 mm Hg = 0.133 kPa) to 16.21 ± 3.35 mm Hg at 6 and 12 months. IOP in group B went from 14.24 ± 5.74 mm Hg to 19.70 ± 5.00 mm Hg accordingly. The IOP in group B was significantly higher than that in group A (F = 3.201, P < 0.05). The difference in total success rates between these 2 groups was statistically significant (0.5 year, X^2 = 5.964; 1 year, X^2 = 6.894; P < 0.05). The incidence of shallow anterior chamber early postoperatively in group A and group B was 2/21 (9.5%) and 3/21 (14.3%), respectively. The difference in complication rates between these 2 groups was not statistically significant (P > 0.05).

**Conclusions:** AGV wrapped with human amniotic membrane is an effective and safe method for treating refractory glaucoma. It can effectively reduce the formation of surgery filtering bleb scar in the early- and medium-term and control IOP with less medication and acupuncture separation of subconjunctival fibrosis.

**Purpose:** To investigate the use of human acellular dermal matrix (ADM) for the repair of leaking filtering blebs after glaucoma surgery in a rabbit eye model.

**Methods:** A rabbit eye model with leaking filtering blebs was established using 48 New Zealand rabbits. The rabbits were randomly divided into 3 groups: the ADM group, the amniotic membrane transplantation (AM) group, and the conjunctiva overlap group, with the last 2 being designated as the control groups. An ADM or AM patch was placed over the leaking region in the ADM group and the AM group, respectively. The conjunctiva was directly sutured to the limbus in the conjunctiva overlap group. The intraocular pressure (IOP) was measured preoperatively and at 1 day, 1 week, 1 month, 3 months, and 6 months postoperatively. IOP levels for the 3 groups were analyzed by 1-way analysis of variance (ANOVA). Slit lamp and anterior segment optical coherence tomography (AS-OCT) images were recorded at 1 week, 1 month, 3 months, and 6 months postoperatively. Histopathology changes at different follow-up time points were evaluated by hematoxylin and eosin (H&E) staining and picrosirius red staining.

**Results:** The IOP measurements of the ADM group were statistically lower than the measurements of the control groups at 1 month postoperatively (ANOVA, F = 13.006, P = 0.000; LSD-t test, P = 0.001, 0.000). There was no statistically significant difference in IOP among the 3 groups at other follow-up points. The IOP
was lower than preoperative levels at 3 months after surgery in the ADM group compared with the control groups, which failed to maintain a lower IOP level beyond 1 month postoperatively. Slit lamp and AS–OCT images showed that, in the ADM group, the filtering bleb could maintain function up to 3 months postoperatively and that conjunctival neovascularization occurred within 3 months after surgery. In contrast, in the AM and conjunctiva overlap groups, the filtering bleb could only maintain function up to 1 month and conjunctival neovascularization occurred within 1 month postoperatively, with continuous corneal neovascularization. H&E staining and picrosirius red staining showed that the ADM patch could hold up to 6 months postoperatively, with good histocompatibility.

Conclusions: Our study demonstrated that filtering bleb function and IOP control time were better in the ADM group compared with the 2 control groups. Conjunctival neovascularization occurred later in the ADM group than in the control groups, suggesting that ADM could be a safe and effective biomaterial for the surgical repair of leaking filtering blebs.


Conclusions: Dynamic changes of miRNAs were observed over the course of EAAU. By initiating NF–κB signaling, the expression of downstream cytokines and effector cells from the Th17 and Th1 lineages were sequentially activated, contributing to the disease.

INTRAOCULAR INFLAMMATION, UVEITIS & SCLERITIS

Mar 24, 2016 (Thursday)

11:00 - 12:30
Venue: Elegance Lounge
Session: IN-FP02

Expression of MicroRNAs in the Eyes of Lewis Rats With Experimental Autoimmune Anterior Uveitis

First Author: Yung-ray HSU
Co-Author(s): Chang-hao YANG

Purpose: This study aimed to determine the dynamic changes of NF–κB–related microRNAs (miRNAs) and cytokines over the course of experimental autoimmune anterior uveitis (EAAU) and elucidate its possible immunopathogenesis.

Methods: Uveitis was induced in Lewis rats using bovine melanin–associated antigen. The inflammatory activity of the anterior chamber was clinically scored, and leukocytes in the aqueous humor were quantified. RNA was extracted from the irides/ciliary bodies and popliteal lymph nodes to reveal the dynamic changes of 8 target miRNAs (miR–155–5p, miR–146a–5p, miR–182–5p, miR–183–5p, miR–147b, miR–21–5p, miR–9–3p, and miR–223–3p) and 6 cytokine miRNAs (IFN–γ, IL–17, IL–12p35, IL–1β, IL–6, and IL–10). In situ hybridization of miRNA and enzyme–linked immunosorbent assay quantification of cytokines were performed to confirm the results.


Conclusions: Dynamic changes of miRNAs were observed over the course of EAAU. By initiating NF–κB signaling, the expression of downstream cytokines and effector cells from the Th17 and Th1 lineages were sequentially activated, contributing to the disease.

11:00 - 12:30
Venue: Elegance Lounge
Session: IN-FP02

Relationship Between Uveitis, Viral Hepatitis, Cirrhosis, and Interferon Treatment: A 12-Year Nationwide Population-Based Cohort Study

First Author: Chun-ju LIN
Co-Author(s): Peng-tai TIEN, Yi-yu TSAI, Chih-hsin MUO, Jane-ming Lin LIN, Wen-lu CHEN

Purpose: This study investigates whether patients with viral hepatitis, liver cirrhosis, or those undergoing interferon treatment are at risk of uveitis in the years after the hepatitis infection.

Methods: In this population–based retrospective cohort study, we used data from the Taiwan national health insurance system. The cases were patients newly diagnosed with viral hepatitis from 2000 to 2011. The controls were randomly selected subjects without a history of hepatitis or uveitis. The endpoint of interest was a diagnosis of uveitis. The joint effect for uveitis between cirrhosis and interferon treatment was assessed.

Results: We selected 27,429 patients with viral hepatitis and 109,716 matched controls. The risk of uveitis in the viral hepatitis cohort was 1.27–fold [95% confidence interval (CI), 1.03–1.56]. In a multivariable model, patients with HBV and HCV coinfection had the highest risk of uveitis [hazard ratio (HR) = 2.64; 95% CI, 1.03–6.38] followed by only HCV infection (HR = 1.59; 95% CI, 1.09–2.32). Patients with liver cirrhosis complications had a significantly higher risk in a multivariable model (HR = 1.29; 95% CI, 1.02–1.64). In patients only infected with HCV, interferon users had a significantly higher risk (HR = 3.18; 95% CI, 1.28–7.91).

Conclusions: Patients with HBV and HCV coinfection had the highest risk of uveitis. Viral hepatitis complicated with cirrhosis and interferon use for HCV treatment had a significant higher risk. These epidemiologic studies yielded informative results; nevertheless, the
underlying mechanism remains to be investigated.

11:00 - 12:30  
**Venue:** Elegance Lounge  
**Session:** FREE PAPERS  
**Non-Human Immunodeficiency Virus—Related Ocular Syphilis in Korean Population: Clinical Manifestations and Treatment Outcomes**  
First Author: Yonguk **KIM**  
Co-Authors: Eung-suk **KIM**, Seung Young **YU**, Hyung-woo **KWAK**  
**Purpose:** To describe the clinical manifestations and treatment outcomes of ocular syphilis in patients without HIV infection.  
**Methods:** Forty-five eyes of 39 patients with ocular syphilis confirmed by serologic tests were reviewed retrospectively. The case definition was any non-HIV infected patient presenting with intraocular inflammation from 2002 to 2014 in Kyung Hee Medical Center. Medical records of 45 eyes were analyzed including best corrected visual acuity (BCVA) and ophthalmologic examination findings of anterior and posterior segments to determine the focus of inflammation. Optical coherence tomography and fluorescein angiography findings along with both medical and surgical management were also analyzed.  
**Results:** The mean age was 61.0 years (range, 37 to 89). Bilateral ocular involvement occurred in 6 (15.4%) patients and diagnoses at presentation were most frequently related to posterior uveitis (38%), followed by panuveitis (29%) and optic neuritis (11%). Isolated interstitial keratitis and intermediate uveitis were uncommon (both 4%). Twenty-eight (62.2%) eyes were treated with penicillin, and 11 (24.4%) eyes underwent surgical treatment. The mean baseline BCVA was 0.79 ± 0.59 (logMAR) and significantly improved to 0.60 ± 0.63 at final follow-up after treatment (P = 0.019). Mean visual improvement was significantly greater in the penicillin-treated group (P = 0.001). Visual impairment at the final visit occurred in 11 (24.4%) eyes. Among the visual impairment group, 10 (90.1%) eyes were related to posterior segment–involving uveitis.  
**Conclusions:** Visual outcomes for treated non-HIV-related ocular syphilis were favorable regardless of the time to presentation. Posterior segment–involving uveitis at presentation was associated with poor visual outcome.

11:00 - 12:30  
**Venue:** Elegance Lounge  
**Session:** FREE PAPERS  
**Referral Center in Southern Taiwan**  
First Author: Shih-chou **CHEN**  
Co-Authors: Ying-ying **CHEN**, Shwu-jiuan **SHEU**  
**Purpose:** To investigate the clinical presentation, visual outcome, and incidence rate of bleb–related endophthalmitis (BRE) in glaucoma surgeries at a tertiary center in southern Taiwan.  
**Methods:** This was a retrospective chart review of BRE cases and patients who received glaucoma surgeries from January 2002 to December 2013 at Veteran General Hospital, Kaohsiung, Taiwan.  
**Results:** Eleven BRE cases were identified from January 2002 to December 2013, including 7 cases that received glaucoma surgeries at our hospital and 4 patients that received glaucoma surgeries at other hospitals. There were 9 males and 2 females. The mean age at presentation was 49.18 ± 26.0 years, and 2 cases (18.2%) presented with repeat infections. The interval between BRE and glaucoma surgery was 39.47 ± 41.83 months (range, 2 days to 120 months). Two cases were early–onset BRE with an interval of less than 1 month, and 9 cases were late–onset BRE with an interval of more than 1 month. Five cases (45.5%) were culture–positive, and *Staphylococcus* species was the most frequently isolated pathogen (2/5, 40%). Nine patients received intravitreal antibiotics injection, 5 patients received pars plana vitrectomy, and 1 patient received evisceration. Poor final visual acuity of counting fingers or worse was seen in 5 patients (45.5%). Of 1113 glaucoma surgeries performed within the 12 years at our hospital, 7 cases (0.63%) developed BRE. Five cases (0.72%) were diagnosed as BRE in 692 trabeculectomies, and 2 cases (0.48%) were diagnosed as BRE in 421 bleb revision surgeries.  
**Conclusions:** Despite early treatment, the visual outcome of BRE was still poor. The incidence rate of BRE was 0.72% in trabeculectomies and 0.48% in bleb revision surgeries. Early diagnosis and aggressive treatment should be pursued for management of BRE cases.

11:00 - 12:30  
**Venue:** Elegance Lounge  
**Session:** IN-FP02  
**Intravitreal Sirolimus Provides Long-Term Improvements in Inflammation and Visual Acuity in Active Noninfectious Uveitis of the Posterior Segment: 12-Month Results From the SAKURA Study**  
First Author: Somasheila **MURTHY**  
Co-Authors: Yusuf **ALI**  
**Purpose:** To present the safety and efficacy through month 12 of intravitreal sirolimus, a novel immunoregulatory therapy being investigated for the treatment of
active noninfectious uveitis of the posterior segment (NIU–PS) in the SAKURA Study 1, a randomized, multinational, 24–month phase 3 study.

Methods: Three hundred forty-seven subjects with active NIU–PS were randomized to every–other–month injections of intravitreal sirolimus 440 µg (n = 114), 880 µg (n = 116), or 44 µg (active control; n = 117). At 6 months, subjects transitioned to open–label treatment and received 880 µg every 2 months. Vitreous haze (VH) and best corrected visual acuity (BCVA) were assessed at month 5 and month 12.

Results: Significantly more subjects in the double–masked period who received 440 µg intravitreal sirolimus every other month achieved resolution of inflammation on the VH scale at month 5 without the use of rescue therapy versus the active control dose. Improvements in VH were maintained in the open–label treatment period. In subjects originally randomized to receive 440 µg and transitioned to open–label 880 µg, the mean change in VH from baseline was –1.14 at month 5 and –1.29 at month 12 (mean baseline VH = 1.91). BCVA was also maintained through month 12. The most common serious ocular adverse events (study eye) occurring in ≥2% of subjects through month 12 were ocular inflammation (2.9%–5.8%), cataract (3.8%), and medication residue (ie, transient drug depot in the visual axis; 2.3%).

Conclusions: In the SAKURA Study 1, the statistically significant improvements in inflammation and clinically relevant vision–related benefits achieved in the double–masked treatment period with 440 µg intravitreal sirolimus were maintained through month 12 with 880 µg.

Amiodarone-Associated Optic Neuropathy: A Nationwide Study

First Author: Hui-chen CHENG
Co-Author(s): An-quoer WANG, Huan-jui YEH, Nicole HUANG, Yiing-jenq CHOU, May-yung YEN

Purpose: To investigate whether amiodarone use is associated with an increased risk of optic neuropathy.

Methods: This was a retrospective population–based cohort study. Patients newly treated with amiodarone between 2005 and 2009 were identified from the Taiwan National Health Insurance Research Database (NHIRD). For each patient, the study also included 4 age– and sex–matched control subjects who did not receive amiodarone treatment. Multivariable Cox regression analysis was used to assess the association between amiodarone and the occurrence of optic neuropathy.

Results: The analysis included 6175 amiodarone–treated patients and 24,700 controls. The mean age was 66.7 years, and 55.3% of subjects were male. The mean follow–up was 688 days. During the observational period, optic neuropathy developed in 17 amiodarone–treated patients (0.3%) and 30 control patients (0.1%) (P = 0.006). Multivariable Cox regression analysis showed that amiodarone–treated patients had a 2–fold increased risk of optic neuropathy [hazard ratio (HR), 2.09; 95% confidence interval (CI), 1.13–3.85; P = 0.02]. After stratification by sex, amiodarone use remained a significant factor for optic neuropathy development among males (HR, 3.05; 95% CI, 1.42–6.55; P = 0.004) but not females (HR, 1.15; 95% CI, 0.38–3.47; P = 0.81). Among amiodarone–treated patients, male sex was associated with a nearly three–fold increased risk of optic neuropathy development compared with female sex (HR, 2.91; 95% CI, 0.94–9.01; P = 0.06). We also detected a trend of increased cumulative incidence of optic neuropathy with longer treatment duration (>41 days vs ≤41 days; HR, 3.46; 95% CI, 0.99–12.07; P = 0.05). However, a higher daily dose did not increase the risk of optic neuropathy (HR, 0.96; 95% CI, 0.91–1.00; P = 0.07).

Conclusions: The present results demonstrated a higher risk of optic neuropathy in patients treated with amiodarone, especially in males and possibly in patients with longer treatment duration.

Optic Neuritis With Positive HLA-B27: Characteristic Phenotype in a Chinese Population

First Author: Shuo ZHAO

Purpose: To review the clinical features of optic neuritis (ON) with positive human leukocyte antigen (HLA–B27) retrospectively.

Methods: Clinical data were reviewed for HLA–B27–positive ON in the Chinese People’s Liberation Army General Hospital from January 2009 through June 2015. All patients underwent intensive ophthalmologic examinations and paraclinical tests. The inflammatory factors and serum autoimmune antibodies were tested and evaluated. Blood was drawn for HLA–B27 and aquaporin 4–antibody (AQP4–Ab) using the approach of polymerase chain reaction/sequence specific primers and cell–based assay, respectively. Computed tomography (CT) of sacroiliac joints was
Results: A total of 22 ON patients (14 female and 8 male, 38 involved eyes) with positive HLA-B27 were collected from 410 ON patients who underwent HLA-B27 screening. Recurrent episodes were observed in 14/22 patients. Seven patients presented with bilateral simultaneous ON. Of involved eyes, 68.4% (22/38) exhibited severe visual impairment (<0.1) at onset, which decreased to 31.6% (12/38) after an average follow-up period of 19.8 months (range, 3–62). A total of 10/22 patients had positive results in tests for accompanied autoantibodies (auto-Abs). The frequency of AQP4-Ab was 36.4% (8/22). Among 13 patients that underwent sacroiliac joints CT scan, bilateral sacroiliitis was revealed in 7 (53.8%) patients. Three patients were diagnosed as definite ankylosing spondylitis (AS), and 1 patient experienced the co-occurrence of active AS and bilateral ON.

Conclusions: HLA–B27–positive ON usually presented recurrent episodes and severe visual impairment at onset. The co-occurrence of ON and AS, along with the frequent presence of bilateral sacroiliitis, may indicate the underlying alternation of autoimmune background in this condition.

11:00 - 12:30
Venue: Elegance Lounge
Session: NE-FP01
Simultaneous Bilateral Optic Neuritis in Asians: Clinical, Serological, and Prognostic Features
First Author: Hao KANG

Purpose: Simultaneous bilateral acute optic neuritis (AON) is rare in adults in Western countries, but it is relatively common in Asian populations. We aimed to establish the clinical profile of simultaneous bilateral acute optic neuritis in adults, the efficacy of steroid therapy, extent of visual recovery, and neurological outcome.

Methods: We reviewed 51 patients (14 males, 37 females; age range, 5–58 years) diagnosed with simultaneous bilateral AON between 2003 and 2009. All patients had acute visual loss; there were 34 (66.7%) patients with bilateral visual loss onset less than 24 hours, and 17 (33.3%) with bilateral visual loss onset less than 15 days. Demographic, clinical, serum autoantibody data, connective tissue disorders (CTDs), and visual performance were compared with a group of patients with unilateral AON.

Results: There was not a significant difference between groups in visual acuity (VA) during acute ON attacks (P = 0.890); however, a VA recovery of less than 0.1 after the last attack occurred more frequently in the simultaneous bilateral ON group (P < 0.001). Moreover, the simultaneous group experienced the worst outcome after the last attack (P < 0.001). Compared with unilateral ON, AQP4-Ab seropositivity was more prevalent in the simultaneous bilateral ON group (P = 0.034), and more patients converted to NMO at last follow-up (P = 0.027). The 2 groups did not differ significantly in terms of other coexisting autoimmunity antibodies, connective tissue disorders, lesions on MRI, or RNFL.

Conclusions: Our study suggests that simultaneous bilateral AON has some clinical differences to unilateral AON and that visual loss onset less than 24 hours may predict a poor long-term visual acuity recovery and neurological outcome.

OCULAR IMAGING
Mar 25, 2016 (Friday)

11:00 - 12:30
Venue: Elegance Lounge
Session: NE-FP01
The Different Damage Pattern of Macular Ganglion Cells Between Glaucomatous and Nonglaucomatous Optic Atrophy
First Author: Hui XIAO
Co-Author(s): Xing LIU, Xiaoyu XU

Purpose: To compare the different pattern of macular ganglion cell damage between glaucoma and nonglaucomatous optic atrophy.

Methods: Twenty-eight eyes of 28 early glaucoma patients (G group), 29 eyes of 29 patients clinically identified as nonglaucomatous optic atrophy (NG group) (optic neuropathy–induced atrophy, 25 cases; toxic optic neuropathy, 4 cases) whose parapapillary average retinal never fiber layer thickness (RNFLT) was similar to that of glaucomatous optic atrophy, and 15 eyes of 15 healthy controls (N group) were recruited in this study. The absolute value of mean deviation (MD) in the central 30–2 visual field <6 dB was defined as early optic atrophy. All of the patients underwent spectral-domain optical coherence tomography using macular cube 512 × 128 and optic disc cube 200 × 200 scan procedures. ANOVA and LSD was used to analyze the average difference of RNFLT and average ganglion cell complex (GCC) in superior, temple–superior, temple–inferior, nasal–superior, nasal–inferior, and inferior regions among glaucomatous optic atrophy, nonglaucomatous optic atrophy, and healthy controls. Pearson correlation was used to analyze the relationship between RNFL and GCC.

Results: The mean age was 33.78 ± 4.32 years, 36.42 ± 4.65 years, and 34.76 ± 4.32 years in the controls, respectively. The average
RNFLT in the 3 groups was 85.90 ± 20.28 μm, 83.00 ± 6.74 μm, and 93.20 ± 5.78 μm, respectively. No significant difference was found among the 3 groups (F = 2.76; P = 0.07). The average GCC in the 3 groups was 61.48 ± 8.75 μm, 78.39 ± 7.77 μm, and 83.00 ± 5.15 μm, respectively. Significant differences were found among the 3 groups (F = 51.14; P < 0.001). LSD analysis found average GCC in the NG group was significantly thinner than in the G group and the controls. The average GCC was a little thinner in the G group than in the controls (P = 0.04). The GCC in superior, temple–superior, temple–inferior, nasal–superior, nasal–inferior, and inferior regions of the NG group were significantly thinner than that of the G group and controls (F=21.85~52.20, P < 0.001). GCC in the superior and nasal–inferior regions were thinner in the G group than in the controls (P=0.03, 0.01). No statistical difference in the other regions of GCC was found between the G group and controls (P=0.1~0.47). The GCC was positively related to RNFL in the 3 groups, respectively (r = 0.524~0.71, P < 0.01).

Conclusions: Macular ganglion cell atrophy occurs in the early phase of nonglaucomatous optic atrophy, even more severely than in glaucoma. The measurement of macular ganglion cells will help to distinguish nonglaucomatous optic atrophy from glaucoma at an early stage.

11:00 - 12:30
Venue: Elegance Lounge
Session: NE-FP01

Retinal OCT Measurements of Posterior Eye Shape Comparable to MRI
First Author: Anthony KUO
Co-Author(s): Carol CHEUNG, Ching-yu CHENG, Terri YOUNG, Seang Mei SAW, Joseph IZATT

Purpose: Posterior eye shape is an important biomarker influencing eye development and progression of myopia. In this study, we compared SD–OCT with MRI measurements of posterior eye shape as described by radius of curvature (Rc).

Methods: Retinal SD–OCT images and 3T head MRI images previously acquired as part of the Singapore Epidemiology of Eye Disease study were analyzed. For MRI, the posterior 240 degrees of the right eye in each axial slice was automatically segmented. For SD–OCT, the right eye retinal pigment epithelium was automatically segmented, and the volumes were corrected for distortions. The segmentations of the right eyes for both imaging modalities were then fit into a sphere to obtain the posterior eye Rc. The paired differences in Rc measured by MRI and SD–OCT were tested for significance using a 2-sided t test.

Results: Fifty–two subjects (67.8 ± 5.6 years old) were included. The spherical equivalent refraction ranged from +0.50 to −5.38 (mean, −0.81). The mean difference between MRI and original SD–OCT posterior eye Rc was 24.03 ± 46.49 mm (P = 0.0005). After correction of the SD–OCT images, there was no significant difference between MRI and SD–OCT (mean difference, −0.23 ± 2.47 mm; P = 0.51).

Conclusions: Corrected SD–OCT images of the posterior eye are not significantly different from MRI images of the posterior eye as measured by Rc. This study provides compelling evidence that when distortions are corrected, noninvasive office–based SD–OCT could...
potentially be used instead of MRI to study the posterior or eye shape.

11:00 - 12:30  
**Venue:** Elegance Lounge  
**Session:** NE-FP01

### Comparison of Choroidal Thickness in Primary Open Angle Glaucoma and Primary Angle Closure Disease

**First Author:** Suria **SUDHAKARAN**  
**Co-Author(s):** Rajesh **KUMAR**

**Purpose:** To evaluate choroidal thickness in primary open angle glaucoma and the spectrum of primary angle closure disease using spectral–domain optical coherence tomography (SD–OCT).

**Methods:** Patients with no retinal or choroidal disease, diagnosed with primary open angle glaucoma or primary angle closure disease (primary angle closure suspect, primary angle closure, and primary angle closure glaucoma), underwent enhanced depth image scanning using SD–OCT (Cirrus; Zeiss Meditec, USA). Choroidal thickness was measured from the posterior edge of the retinal pigment epithelium to the choroid/sclera junction at subfoveal (SFCT) and peripapillary (PCT) regions of the choroid. All measurements were performed by a single observer and calculated manually in the plane by ImageJ software (version 1.42, USA). Linear regression was used to correlate choroidal thickness with angle closure disease.

**Results:** Eighty–seven eyes (47 subjects) with a mean age of 61.1 years were enrolled. Angle closure eyes showed greater choroidal thickness compared with open angle eyes for both mean SFCT (228.9 ± 65.1 µm vs 162.3 ± 26.7 µm; \( P < 0.0001 \)) and mean PCT (163.9 ± 37.2 vs 128.5 ± 20; \( P < 0.0001 \)); the significance was persistent after adjusting for age and sex. Univariate analysis showed that both SFCT and PCT were significantly associated with angle closure disease \(( P < 0.0001)\). Area under the curve for subfoveal choroidal thickness was 0.82 and for peripapillary choroidal thickness was 0.79 \(( P < 0.02)\).

**Conclusions:** Eyes with primary angle closure disease appear to have thicker chroids compared with open angle eyes. Choroidal thickness might be a possible determinant of primary angle closure disease.

11:00 - 12:30  
**Venue:** Elegance Lounge  
**Session:** NE-FP01

### A Novel Preoperative Three-Dimensional Macular Hole Index to Predict Postoperative Anatomical Closure and Outer Layer Restoration

**First Author:** Rameez **HUSSAIN**  
**Co-Author(s):** Giridhar **ANANTHARAMAN**, Mahesh **GOPALAKRISHNAN**, Bindu **RAJESH**, Thomas **THACHIL**, Santosh **PATEL**

**Purpose:** To describe a novel 3–dimensional (3D) preoperative macular hole measurement, “macular hole volume,” measured using spectral–domain optical coherence tomography (SD–OCT) and the structural engineering software AutoCAD (version 18.2) and to correlate it with postoperative anatomical closure and external limiting membrane (ELM) and inner segment/outer segment (IS/OS) junction layer restoration.

**Methods:** A prospective case series of 62 eyes of 62
patients diagnosed with macular hole. SD-OCT imaging was done (Spectralis HRA+OCT) in high-definition dense scan mode; 9 20-degree x 20-degree raster B-scans, each composed of 768 A-scans and resulting from an average of 9 frames. The following macular hole indices were calculated: macular hole height (MHH), base diameter (BD), minimum linear diameter (MLD), macular hole inner opening (MHIO), and 2 more diameter measurements done at equal distances. These measurements were used to create a 3D drawing of the macular hole in CAD software. With the help of a professional architect, the SD-OCT measurements were fed into the AutoCAD software. Accuracy was confirmed by repeated diameter measurements for each case. All 62 SD-OCT images were converted into a 3D diagram. Automated volume measurement was done using the software’s built-in data analyzer module. All cases underwent uncomplicated 23G vitrectomy (triamcinolone assisted). 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were normal and similar symmetrically both in the VFD area and NVFD area. We suppose that outer layer structures still remain normal even in the VFD area of an advanced glaucoma patient.

Methods: A retrospective consecutive case series of RB managed over 20 years.

Results: Of 1360 eyes of 929 patients evaluated, 642 (47%) were classified as group D (n = 159, 12%) or group E (n = 483, 36%). Enucleation was performed in 85 (53%) and 390 (80%) eyes in group D and group E, respectively. Histopathological high risk factors were present in 25% in group D and 52% in group E (P < 0.0001). Systemic metastasis occurred in 0.6% in group D and 4.2% in group E. Treatment abandonment was 12.5% in group D and 23% in group E.

Conclusions: Eye salvage in eyes with group E retinoblastoma is low and may carry significant histopathological high risk factors for systemic metastasis.

## OCULAR ONCOLOGY & PATHOLOGY

### Mar 24, 2016 (Thursday)

09:00 – 10:30
Venue: Elegance Lounge
Session: OP–FP02

### Outcome of International Classification of Retinoblastoma Group D and Group E Eyes and Correlation of Histopathological High Risk Factors

First Author: Fairooz Puthiyapurayil MANJANDAVIDA
Co-Author(s): Santosh HONAVAR, Vijayanand P REDDY

Purpose: To evaluate the outcome and histopathological high risk features in group D and group E retinoblastoma (RB).
Primary Intraocular Lymphoma—Clinical Features, Treatment, and Outcome
First Author: Chang-ping LIN

**Purpose:** As primary intraocular lymphoma (PIOL) is a rare subtype of lymphoma, a standard treatment has not been well defined. This study will present our experience of the clinical features, treatment, and outcome for PIOL in a single medical center.

**Methods:** This study retrospectively analyzed the clinical features and outcomes of all patients with PIOL who were treated with a first-line therapy comprising combined intravenous high-dose methotrexate and intravitreal methotrexate between January 2003 and December 2013.

**Results:** Nineteen patients were collected in the period. Thirteen (68.4%) patients were female, and the median age at diagnosis was 57 (39–77 years). Diagnoses were based on the identification of abnormal lymphoid cells in vitreous fluid. Ten (52.6%) patients had bilateral eye involvement and 6 had concurrent central nervous system (CNS) involvement. All 19 patients achieved complete remission (CR) as confirmed by cytological examination of vitreous and CSF and brain imaging if CNS was involved. Patients with concurrent brain involvement required a longer time to achieve CR. However, the duration of complete remission did not differ between patients with and without CNS involvement. The 5-year overall survival rate was 55.8% for the total cohort and was higher (68.8%) in patients with isolated PIOL than in those with concurrent CNS involvement. In all patients, methotrexate treatment was well tolerated, with manageable side effects.

**Conclusions:** We conclude that combined intravitreal methotrexate and systemic high-dose methotrexate treatment is effective in patients with PIOL.

09:00 – 10:30
**Venue:** Elegance Lounge
**Session:** OP–FP02
**FREE PAPERS**

Studies on the Relationship Between the Lymphangiogenesis of Uveal Melanoma With Histopathology High Risk Factors
First Author: Bin LI

**Purpose:** To investigate the role of lymphangiogenesis in the occurrence, development, invasion, and metastasis of uveal melanoma (UM).

**Methods:** Immunohistochemical method with D2–40/LYVE-1 antibodies was used to detect the formation of UM–associated lymphangiogenesis and microvessels.

The expression levels of VEGF–C and VEGF–D in 55 UM tissues were investigated, and through a semiquantitative scoring method, the positive expression rates of VEGF–C and VEGF–D were determined. Human UM cell lines MUM–2B, C918, and OCM–1A were cultured in vitro, using Q–PCR reaction to quantify the expression of VEGF–C mRNA of 3 different invasive human UM cell lines.

**Results:** No LYVE–1/D2–40–positive lymphangiogenesis formation was found within intraocular tumors, but a large number of CD–34–positive microvessels could be observed in diffuse distribution. The lymphatic microvessel density and microvessel density of 36 UM cases were positively correlated ($P < 0.001$). There was correlation between the positive rate of VEGF–C and positive lymphangiogenesis rate ($P < 0.05$; correlation coefficient, $r = 0.853$). The VEGF–C mRNA expression level of MUM–2B and C918 cell lines was significantly greater than OCM–1A cell line, which was statistically significant ($P = 0.000$); however, there was no statistical significance between the difference of expression levels of VEGF–C mRNA in MUM–2B and C918 ($P = 0.815$).

**Conclusions:** UM tumor cells may promote lymphangiogenesis by synthesizing and secreting VEGF–C, and then participate in the invasion and metastasis of tumor. Using immunohistochemical staining with D2–40/LYVE–1 antibodies to detect the formation of tumor–associated lymphangiogenesis may be become one of the indicators to judge the prognosis of UM patients.

09:00 – 10:30
**Venue:** Elegance Lounge
**Session:** OP–FP02
**DANGEROUS ANTERIOR PSEUDOUVEITIS: DIFFUSE ANTERIOR RETINOBLASTOMA**
First Author: Carol SHIELDS
Co-Authors: Jerry SHIELDS

**Purpose:** Diffuse anterior retinoblastoma (Rb) is a rare variant of retinoblastoma in which the tumor resides in the anterior segment of the eye, without apparent retinal involvement. Previously published cases have been managed with enucleation. Herein, we describe globe salvage and visual preservation in 3 cases using chemotherapy and radiotherapy.

**Methods:** A case series of 3 children managed with plaque radiotherapy plus intravenous chemotherapy.

**Results:** The mean patient age at presentation elsewhere was 5.7 years (median, 7; range, 3–7 years). There were 2 females and 1 male; 2 whites and 1 African American. The initial observation by parents/caregiver was reduced vision (n = 1), red eye (n = 1), or cloudy eye (n = 1), and the initial finding by physician was iris tumor (n = 2) or hyphema (n = 1). Referring di-
agnosis was iris melanoma (n = 1), infectious endotheelitis (n = 1), and possible tumor (nonspecified) (n = 1). At our evaluation, visual acuity was 20/50–20/60 (n = 2) and fix not follow (n = 1). In all cases, the opposite eye was normal. Mean intraocular pressure was 20 mm Hg (median, 16; range, 15–30 mm Hg). Our examination revealed solid iris tumor (n = 3), ciliary body involvement (n = 2), and anterior chamber seeding (n = 3). In no case was there choroidal or retinal tumor, vitreous seed or subretinal seed, or extrascleral extension. Clear corneal fine needle aspiration biopsy confirmed the diagnosis as retinoblastoma in each case. Treatment included plaque radiotherapy (n = 3) plus additional systemic chemotherapy (n = 2). At mean follow-up of 35 months (median, 34; range, 20–51 months), there has been no recurrence, extrascleral extension, enucleation, metastasis, or death. In all 3 cases, cataract surgery was necessary at a mean interval of 16 months after complete and stable regression of retinoblastoma.

Conclusions: This rare diffuse anterior form of retinoblastoma can be managed with globe salvaging alternatives and with visual preservation in selected cases.

In an analysis of 200 consecutive injections, results were maintained in 95% of eyes. Those eyes with recurrent injections were performed with sterile technique in the operating room under patient draping and physician scrub and gowning. The technique involves transcleral injection through pars plana at a site near seeds and cryotherapy triple freeze–thaw during needle withdrawal.

Conclusions: Intravitreal chemotherapy is safe and effective for vitreous seeding from retinoblastoma.

Purpose: To analyze the management and outcome of adenoid cystic carcinoma (ACC) of the lacrimal gland.

Methods: This retrospective case series included 40 consecutive cases of ACC primarily managed by 3 different treatment protocols: surgery + radiotherapy (group 1), surgery + radiotherapy + adjuvant chemotherapy (group 2), and neoadjuvant chemotherapy + surgery + radiotherapy + adjuvant chemotherapy (group 3). The minimum follow-up was 3 years after completion of treatment. Local tumor control and systemic metastasis were the outcome measures.

Results: Forty cases of ACC comprised 4% of all orbital tumors. Age ranged from 11–72 years (mean, 36 years), with 26 male and 14 female patients. Twelve (30%) patients belonged to group 1, 8 (20%) to group 2, and 20 (50%) to group 3. Surgery included tumor excision in 36 (90%) and orbital exenteration in 4 (10%). Chemotherapy comprised cisplatin + 5FU for 6 cycles in 28 (70%) patients. Stereotactic radiotherapy with a dose of 5000–6000cGy included the orbit, superior orbital fissure, cavernous sinus, and temporal fossa. Follow-up after completion of treatment ranged from 36–180 months (median, 60 months). In all, local tumor recurrence occurred in 10 (25%) patients (median, 24 months): 5 (43%) in group 1, 2 in group 2 (25%), and 2 in group 3 (10%). These were managed by excision in 2, excision + stereotactic radiotherapy in 3, excision with after-loaded brachytherapy in 3, and orbital exenteration in 2. None of the patients manifested local tumor recurrence at the final follow-up. Overall, eye salvage was possible in 34 (85%) patients, with visual acuity > 20/40 in 28 (70%). Six patients underwent orbital exenteration: 4 (33%) in group 1, 1 (13%) in group 2, and 1 (5%) in group 3. Systemic metastasis occurred in 9 (23%) patients (median, 30 months): 8 (67%) in group 1, 1 (13%) in group 2, and none in group 3. Metastasis occurring included 6 to brain and 3 to lung.
Three patients with brain metastasis were managed by neurosurgical excision and stereotactic radiotherapy, of whom 2 were tumor-free at the final follow-up. Seven (11%) overall, 6 (50%) in group 1, and 1 (13%) in group 2 died with systemic metastasis.

**Conclusions:** Multimodal treatment protocol including neoadjuvant chemotherapy, followed by surgery, extended-field stereotactic radiotherapy, and adjuvant chemotherapy seems effective in eye conservation, local tumor control, and minimizing the risk of systemic metastasis.

09:00 – 10:30  
**Venue:** Elegance Lounge  
**Session:** OP-FP02

**Intraocular Medulloepithelioma: New Observations on Clinical Features, Management, Pathology, and Genetics**

**First Author:** Jerry SHIELDS  
**Co-Author(s):** Swathi KALIKI, Ralph EAGLE, Carol SHIELDS

**Purpose:** To provide an update on intraocular medulloepithelioma, a rare but important neoplasm of childhood.

**Methods:** A chart review of 41 cases seen by the authors with emphasis on clinical features, pathology, new genetic observations, and management.

**Results:** All patients had a ciliary body mass. Related features include lens notch, iris neovascularization, glaucoma, cataract, lens subluxation, and neoplastic cyclitic membrane, which often led to diagnostic confusion. In 2 cases, there was a recently recognized association with pleuropulmonary blastoma, a rare pediatric tumor on DICER 1 gene in which 35% of patients have other dysplastic or malignant conditions. Treatment included enucleation, iridocyclectomy, plaque radiotherapy, or cryotherapy. Histopathology disclosed benign features in 20%, malignant features in 80%, teratoid features in 37%, and nonteratoid features in 63%. Tumors classified as malignant had extremely low metastatic potential. If diagnosed early enough, removal by iridocyclectomy can be successful. However, enucleation is often necessary.

**Conclusions:** Ciliary body medulloepithelioma displays clinical features that should prompt the clinician to investigate further for this tumor. There is frequently a long delay in diagnosis and misdirected treatment and hence, the ophthalmologist should be aware of this condition. In some cases, there is an association with pleuropulmonary blastoma. Plaque radiotherapy and iridocyclectomy provide satisfactory tumor control for some smaller tumors, whereas enucleation is necessary for larger tumors and for smaller tumors that fail to respond to conservative treatment.

9:00 - 10:30  
**Venue:** Elegance Lounge  
**Session:** OR-FP01

**Incidence and Risk Factors of Vitreous Hemorrhage: A Nationwide Population-Based Study**

**First Author:** De-kuang HWANG  
**Co-Author(s):** Ching-yu WANG, Min-yen HSU

**Purpose:** To report the epidemiology and incidence of vitreous hemorrhage and to evaluate risk factors for patients with vitreous hemorrhage in Taiwan.

**Methods:** A million subjects randomly selected from all enrollees in Taiwan’s national health insurance program were analyzed. Subjects’ sex, date of birth, all records of clinical visits and hospitalizations, and diagnosis codes were obtained and studied. The main outcomes were the incidence of vitreous hemorrhage and risk factors.

**Results:** During the study period, 4379 patients were newly diagnosed as having vitreous hemorrhage. The crude incidence was 4.8 cases per 10,000 person-years in Taiwan. Significantly increasing trends of incidence were noted in subjects younger than 40 years old and aged between 40 and 59 years. Subjects with older age, male sex, and having been prescribed any anticoagulation drug had a higher risk of vitreous hemorrhage.

**Conclusions:** We found a significant increasing trend of vitreous hemorrhage incidence in Taiwan. Risk factors of vitreous hemorrhage were also identified. More clinical studies are needed to confirm the findings of our study.

9:00 - 10:30  
**Venue:** Elegance Lounge  
**Session:** OR-FP01

**Determinants of Increasing Outdoor Time to Prevent Myopia in Singaporean Children**

**First Author:** Dharani RAMAMURTHY  
**Co-Author(s):** En Hui Nadine CHIA, Seang Mei SAW

**Purpose:** To examine the individual and social determinants of increasing outdoor time in Singaporean children to reduce their risk of myopia.

**Methods:** Qualitative research methods were used to identify the factors influencing children’s outdoor be-
havior mapped against the Green PRECEDE–PROCEED model. Three focus group discussions were conducted with 25 children aged 5–12 years. Myopic and nonmyopic children without any speech and language disorders and/or hearing disabilities were included. In-depth interviews were conducted with 14 parents of the children. Audio recordings were transcribed verbatim and thematically analyzed.

**Results:** Ten boys (40%) and 15 girls (60%) participated in the study (mean age, 8.24 ± 2.33 years). Children are naturally programmed to go outdoors, but key factors such as parental expectations for academic excellence contributing to outdoor time becoming a “reward” for children if they finish their homework, concerns over children’s safety, lack of official guidelines on outdoor time particularly for before and after school care centers, and exposure to “smart gadgets” have encouraged children to participate in alternate activities that are increasingly sedentary in nature.

**Conclusions:** The findings support the PRECEDE–PROCEED model of socioecological and environmental influences on children’s outdoor behavior. They underscore the importance of directed efforts to emphasize national guidelines for small bouts of daily outdoor activities within and outside the formal curriculum, and educating parents, caregivers, and teachers about the importance of outdoor time so that they understand its value in relation to myopia.

**9:00 - 10:30**
**Venue:** Elegance Lounge
**Session:** OR-FP01

**The Neglected Eye Problems Among Cognitively Impaired Students in Eastern Taiwan**

*First Author:* Nancy CHEN
*Co-Author(s):* Min SHEU

**Purpose:** To assess the prevalence of refractive error and ocular diseases in cognitively impaired students in Eastern Taiwan.

**Methods:** This cross-sectional study of students in 3 special education schools in Eastern Taiwan was conducted in 2015. Each student received presenting visual acuity exam via Landolt–C chart. An experienced ophthalmologist performed associated assessments through retinoscopy, slit lamp, and fundoscopy.

**Results:** Five hundred thirteen students (336 boys and 177 girls) aged 7 to 18 years old participated. Visual acuity examination could be performed in 307 (59.8%), of which 17 eyes were below 0.1, 81 eyes were between 0.1 and 0.3, 147 eyes were between 0.4 and 0.7, and 368 eyes were 0.8 or better. Refractive error was found in 284 students (284/513 = 55.4%). Of the 331 eyes with myopia, 35 eyes were highly myopic. One hundred fourteen eyes were hyperopic, and 160 eyes had astigmatism above –2.0 D. Spectacles could improve vision in 187 students, whereas merely 32 (36.9%) had appropriate corrections at the time. There were 101 students who had ocular diseases other than refractive error that impeded their visual function, including strabismus in 64 students and nystagmus in 16 students. Of the 202 diseased eyes, 16 eyes had amblyopia, 14 eyes had lens anomaly, 6 eyes had keratocorneal, 5 eyes had glaucoma, 4 eyes had corneal leukemia, and 2 had aniridia.

**Conclusions:** The prevalence of refractive error and ocular diseases was high compared with other child and teenage populations. Although ocular examination is difficult among students with cognitive impairment, early diagnosis and timely treatment could improve their visual function and, presumably, their learning abilities.

**Longitudinal Patterns in Growth of Refraction in Southern Chinese Children: Cluster and Principal Component Analysis**

*First Author:* Yanxian CHEN
*Co-Author(s):* Mingguang HE

**Purpose:** To use hypothesis–free analysis to investigate the patterns in refraction growth process in Chinese children and to explore the possible risk factors of different components in progression.

**Methods:** The first–born twins (n = 637, 51.3% girls) in the Guangzhou Twin Eye Study with 6-year annual visit were included in the analysis. The mean age at baseline was 10.6 ± 2.3 years. A clustering method was conducted to group similar growth patterns. A principal component analysis (PCA) was used to extract the main differences in the refraction growth.

**Results:** Clusters 1–3 were classified using the cluster analysis, representing steady, slow, and fast progressing patterns of refraction, respectively. Baseline age, baseline spherical equivalence (SE), paternal SE, maternal SE, and proportion of 2 myopic parents were significantly different across the 3 groups. Three major components were identified using PCA: “average refraction,” “acceleration,” and “stabilization.” Younger children with more myopic SE tended to have greater “acceleration” (both \( P < 0.001 \)) when baseline SE was ≤0. Changes of height and weight (both \( P < 0.001 \)) near work time (\( P = 0.020 \)), and having 2 myopic parents (\( P = 0.028 \)) were positively related to “acceleration,” whereas paternal SE (\( P = 0.047 \)) and maternal SE (\( P = 0.012 \)) showed opposite association. Positive relation-
ships between “stabilization” and females ($P < 0.001$) were found.

**Conclusions:** We revealed the variation in refraction growth process of children and found that refraction progression consists of 3 major components. The results indicated that genetic risk factors may contribute to the acceleration but not stabilization of myopia in children.

9:00 - 10:30
**Venue:** Elegance Lounge  
**Session:** OR-FP01

**The Prevalence of Uncorrected Refractive Error: Pooled Data From Population Studies for Global Burden of Disease Subregions**

**First Author:** Connie CAO

**Purpose:** To summarize the prevalence of uncorrected refractive error (URE) from studies in the global burden of disease (GBD) subregions.

**Methods:** The pooled analysis used the individual participant data from population–based studies around the world by regions. Uncorrected refractive error (URE) was defined as presenting visual acuity (VA) $< 6/18$ and improving to $\geq 6/18$ or $\geq 1$ line on using a pinhole in either eye, with main causes of myopia, hyperopia, or astigmatism.

**Results:** The combined pooled data contained 14,371,149 individuals from 60 studies. The age– and subregion–standardized prevalence was 3.82 per 1000 [confidence interval (CI), 2.16–5.99] for hyperopia, 4.65 per 1000 (CI, 2.65–5.32) for myopia, and 1.13 per 1000 (CI, 0.71–1.22) for astigmatism. Prevalence varied by age and subregions, but did not differ by sex. The age– and region–standardized prevalence of myopia was 4.24 per 1000 (CI, 3.86–5.01) in the Western Pacific region (14 studies), 3.19 per 1000 (CI, 2.65–4.79) in the Southeast Asia region (21 studies), and 2.17 per 1000 (CI, 1.56–3.68) in Americans (7 studies). Hyperopia was the first-leading cause in the Africa region (5 studies), with the prevalence rate of 9.15%. On the basis of these data, an estimated 11.20 million (CI, 9.91–13.56) individuals are affected by myopia, with 7.53 million (CI, 5.19–9.31) affected by hyperopia and 2.21 million (CI, 2.35–6.22) affected by astigmatism.

**Conclusions:** Providing appropriate refractive correction to those URE individuals is an important public health endeavor with implications for quality of life.

**Incidence of Blindness After Orbital Surgery**

**First Author:** Shu-hong CHANG  
**Co-Author(s):** Matthew KAPELES, Colin MCINNIS

**Purpose:** Blindness is the most devastating risk associated with orbital surgery. Surprisingly, very little data exist regarding the incidence of vision loss after orbital surgery. This dearth of information creates significant medical–legal and ethical dilemmas for surgeons and patients undertaking orbital surgery. We present a 20-year retrospective chart review of the incidence of blindness after orbital surgery at a major academic medical center in the United States.

**Methods:** Diagnosis and billing codes were used to identify all patients who underwent orbital surgery from any surgical subspecialty from January 1994 to January 2014. Patients who underwent orbital surgery whose charts included diagnoses of vision loss and/or optic neuropathy were reviewed. Numerous pre-, post-, and intraoperative variables were studied to elucidate risk factors and treatment options.

**Results:** Of 1667 orbital surgeries performed over 20 years, we identified 13 cases of postoperative blindness attributable to the surgery, for an incidence of 0.78%. No statistically significant pre-, post-, and intraoperative risk factors for vision loss were identified, except 50% of cases with vision loss underwent surgery with plastic surgery service. No treatment modalities effectively reversed blindness, with the exception of immediate return to surgery for clot evacuation and orbital decompression when etiology of vision loss was due to postoperative hematoma.

**Conclusions:** In this largest known study of the incidence of blindness after orbital surgery, we found a 0.78% incidence rate. Given the devastating and often irreversible nature of this complication, all patients undergoing orbital surgery should be informed about the risk of blindness.

11:00 – 12:30  
**Venue:** Elegance Lounge  
**Session:** OB–FP03

**An Australian Case Series of Orbital Mycosis Over 23 Years**

**First Author:** Princeton LEE  
**Co-Author(s):** Tai SMITH, Timothy SULLIVAN

**Purpose:** To report the spectrum of fungal infections involving the orbit encountered in a Queensland subtropical and tropical population with respect to the presentation, evolution of disease, host risk factors, treatments, and outcomes.
**Methods:** An observational case series with retrospective chart review. All patients were treated by the senior author from 1992–2015.

**Results:** Twenty-eight cases of orbital fungal infection were included in this study. The causative organisms were mucor, rhizopus, apophysomyces, cunninghamella, exserohilum, fusarium, bipolaris, and apsergillus. The risk factors included hematological malignancies, poorly controlled diabetes mellitus, and immunosuppression. The death rates for patients infected with zygomycetes and nonzygomycetes were 55% and 27%, respectively.

**Conclusions:** Zygomycosis (mucormycosis) is not just opportunisitic but a true pathogen. Although initial symptoms may be varied, the early development of orbital apex syndrome suggests zygomycosis infection. Possible fungal infection must be considered early in any patient with opthalmoplegia and signs of orbital infection, regardless of whether they are immunocompromised. Multidisciplinary management with ENT, neurosurgery, relevant physicians, and infectious disease consultants is essential.

11:00 – 12:30  
**Venue:** Elegance Lounge  
**Session:** OB–FP03

### Revision Surgery for Unfavorable Upper Blepharoplasty in Asians

**First Author:** Yueh-ju TSAI  
**Co-Author(s):** Hsueh Yen CHU, Yi-lin LIANG, Yen-chang CHU, Shu-ya WU

**Purpose:** Unfavorable upper eyelid contour may occur after various double–eyelid procedures, such as wide creases, ptosis, sunken appearance, and multiple folds. Correction is difficult in cases of severe tissue adhesion and local deficiency of tissue due to over–removal in previous surgery.

**Methods:** We collected 40 patients with unfavorable double eyelid surgery. We frequently set the new incision lower than the original one, and a complete dissection and release of the scar were performed. We preserved the entire remaining fat and pretarsal orbicularis oculi muscle flap to restore the glide zone between the skin and levator muscle. For severe cases, tissue augmentation with microfat graft was necessary. A tenting suture was introduced to prevent readhesion. We summarized the correction procedure in the steps presented.

**Results:** In 36 patients (90%), the patients reported satisfaction with the result of correction surgery. One patient reported a puffy appearance after revision surgery, and another reported the crease was too narrow for her. Two patients were unsatisfied with asymmetry, which was corrected by reoperation.

**Conclusions:** In revision surgery for upper blepharoplasty, accurate dissection to release the adhesion and restoration of the glide zone with maintenance and/or augmentation of eyelid soft tissue are key factors. In addition, our tenting suture is effective in preventing readhesion. The method we present can provide quite satisfactory results in double–eyelid revision surgery for Asians.

11:00 – 12:30  
**Venue:** Elegance Lounge  
**Session:** OB–FP03

### A Comparative Study of Repeat External Dacryocystorhonostomy With and Without Use of Mitomycin C

**First Author:** Pradeep TEKADE  
**Co-Author(s):** Ashok MADAN, Dilipkumar KUMRE, Mona DESHMUKH, Nilesh GADDEWAR

**Purpose:** To compare the outcome of repeat dacryocystorhinostomy (DCR) with and without the intraoperative use of mitomycin C.

**Methods:** This prospective randomized comparative study was conducted at a department of ophthalmology at a tertiary center in central India. The study period was 2 years (August 2013 to August 2015). Patients were followed up for 6 months.

**Results:** In our study, we found that most patients were aged 40–50 years (mean age, 46). There was female preponderance (65%). In our prospective study, we found that there was a statistically significant difference ($P = 0.026$) in the success rate between the 2 groups. The success rate of external DCR with MMC was 96%, significantly higher than external DCR without MMC (75%).

**Conclusions:** Utilizing the antifibroblastic activity of mitomycin C can prevent reblockage and maintain the postoperative patency of passage. Distinctly higher success rates were achieved in patients undergoing DCR with intraoperative application of mitomycin C. Hence, intraoperative application of mitomycin C is considered a safe, simple, and very effective method for revision DCR.

11:00 – 12:30  
**Venue:** Elegance Lounge  
**Session:** OB–FP03

### Baseline Characteristics and Risk Factor Profile in Thyroid Orbitopathy in Australasian Thyroid Orbitopathy Research

**First Author:** Jwu Jin KHONG  
**Co-Author(s):** Chamika DE SILVA, Stacey THORPE, Sue FINCH, Jamie CRAIG, Peter EBELING
**Purpose:** To determine the risk factors for thyroid orbitopathy (TO) in patients with Graves disease and the clinical characteristics of TO in a large multicenter Australian case-control study.

**Methods:** This was a case–control study of 1042 participants with Graves disease with and without TO.

**Results:** In the Australasian TO research (ATOR) Graves disease cohort, 604 (58%) were TO cases and 438 (42%) were non–TO controls. For each decade increase in the age of diagnosis of Graves disease, there was a 17% increase in the odds of TO (odds ratio (OR), 1.17; confidence interval (CI), 1.06–1.29). For each year increase in the duration of Graves disease at recruitment, there was a 7% increase in the odds of TO (OR, 1.07; CI, 1.05–1.10). The odds ratio for TO increased for current smokers (2.22) and ex-smokers (2.07), relative to nonsmokers. The odds of TO were 86% less in Graves disease patients using antithyroid medication treatment than in those not on antithyroid medication (OR, 0.14; CI, 0.06–0.34). DON occurred in 8.4% of TO cases. Predictors for DON included age of onset of TO, ocular motility restriction, severe strabismus, reduced right palpebral aperture, and activity of TO.

**Conclusions:** This study identified increased age of diagnosis of Graves disease, duration of Graves disease, and smoking as risk factors for TO. The use of antithyroid medication protects against TO. Older patients with restricted ocular motility, strabismus, and active TO are at risk of DON and may benefit from early intervention.

11:00 – 12:30  
**Venue:** Elegance Lounge  
**Session:** OB–FP03

**Changing Trend of Antibiotic Sensitivity**

**First Author:** Anjali KIRAN  
**Co-Author(s):** Parvathi HARI, Roshmi GUPTA, K Bhujang SHETTY

**Purpose:** To evaluate the changing trend of antibiotic sensitivity in eyelid infections.

**Methods:** A retrospective analysis of the patients who underwent treatment for lid and lacrimal abscess. A total of 27 patients with lid and lacrimal abscess were included in the study. Patients underwent incision and drainage and were treated with broad spectrum antibiotics, which were later modified based on the culture report and the clinical response.

**Results:** Twelve patients (12/13) with lacrimal abscess had positive culture; 5 had *Staphylococcus* species, of which 3 were resistant to amoxicillin–clavulanic acid. Eight were resistant to gentamicin, and all Gram–negative (n = 7) were also sensitive to amikacin. Eight patients (8/14) with lid abscess had culture growth. *Staphylococcus* (n = 7) was the most common organism, which had 100% resistance to amoxicillin–clavulanic acid and 50% resistance to ciprofloxacin and moxifloxacin. All were sensitive to cefazolin and gentamicin.

**Conclusions:** Lacrimal infections may have Gram–positive or –negative organisms sensitive to cefazolin and amikacin. The commonest cause of eyelid abscess was *Staphylococcus* species. Intravenous drugs cefazolin, amikacin, and gentamicin were found to be the most effective in our series. The emerging trend of resistance to commonly used broad spectrum antibiotics is a matter of concern.

11:00 – 12:30  
**Venue:** Elegance Lounge  
**Session:** OB–FP03


**First Author:** Yinwei LI

**Purpose:** The repair of delayed complex orbital fractures is challenging. Previous studies have reported reduction of complex orbital fractures with either navigation–assisted surgery or endoscope–assisted surgery. This study evaluates the benefits of a newly researched and developed endoscope–navigation system (ENS) in the treatment of delayed complex orbital fractures.

**Methods:** We designed and developed a new system combining the navigation system and the endoscope system with a specifically designed device and specific software. We studied 50 patients with delayed complex orbital fractures who had undergone meticulous preoperative planning, rapid prototype model manufacturing, individual implant shaping, orbital rim reduction, and orbital wall repair with the aid of the ENS. All patients were followed up for at least 12 months. Visual acuity and diplopia were recorded before and after surgery. The postoperative anatomical outcome of the bony orbit was assessed by statistical analysis.

**Results:** All 50 patients were successfully treated with the assistance of ENS. None of the patients showed postoperative impairment of visual acuity. The objective quantitative analysis of orbital changes based on pre– and postoperative CT measurements showed complete anatomical reduction of the orbital fracture. There were 29 patients with diplopia, of which 8 cases resolved and 18 improved. Of the 37 patients with enophthalmos or exophthalmos, 33 patients’ globe position was normalized.

**Conclusions:** The ENS combines an endoscope sys-
Clinical Features of Affected and Fellow Eyes in Patients With FEVR-Associated Rhegmatogenous Retinal Detachment

First Author: Xiaoyan Ding
Co-Author(s): Miner Yu, Yang Shanshan, Yuan Jiaqing, Li Lin Lu

Purpose: To report the clinical characteristics of the affected and fellow eyes in patients with familial exudative vitreoretinopathy–associated rhegmatogenous retinal detachment (FEVR–RRD).

Methods: Forty-three patients with FEVR–RRD were included. The affected and fellow eyes were given complete examinations, including Goldmann 3-mirror contact lens and fundus fluorescein angiography (FFA). The age, sex, and clinical features of the affected and fellow eyes, for example, the type of retinal breaks, presence of subretinal fibrosis, and choroidal detachment, were analyzed.

Results: The average age was 21.8 ± 10.9 years, although the male participants were younger (19.9 ± 9.6) than the female participants (28.1 ± 1.2). Some 65.6% of male patients were aged 11 to 20 years old, whereas 54.6% of female patients were aged 21 to 30 years old. Purely retinal round holes were noted in 32 (71.1%) eyes. Additionally, horseshoe retinal tears and giant retinal tears were present in 10 (22.2%) eyes and 3 (6.7%) eyes, respectively. Subretinal fibrosis was seen in 20 eyes, and choroidal detachment was shown in 6 eyes. A high prevalence of abnormalities was noted in the fellow eyes in the peripheral retina, including vascular leakage on FFA (75.6%), lattice degeneration (53.7%), and vitreous traction (51.2%).

Conclusions: Male predominance, juvenile onset, and subretinal fibrosis are the main characteristics of FEVR–RRD. Male patients experience an earlier onset than females. Retinal tears, even giant tears, could be responsible for FEVR–RRD. The fellow eyes of FEVR–RRD patients were characterized by predetachment changes, which need both lifelong monitoring and timely prophylactic treatment.

09:00 – 10:30
Venue: 103
Session: PO–FP02

Ocular Morbidities of 240 Consecutive School Children Referred to a Learning Disability Clinic in India

First Author: Mihir TRIVEDI
Co-Author(s): Roshani DESAI, Nayana POTDAR, Akshay NAIR, Chhaya Ashok SHINDE

Purpose: To report the ocular morbidities among children referred to a learning disability clinic (LDC).

Methods: Children with learning difficulties and poor academic progress were referred by their schools to LDC. Ocular findings of 240 such children were retrospectively reviewed.

Results: Of 240 students examined, 42 (17.5%) had an uncorrected refractive error, strabismus was seen in 30 (12.5%), nystagmus in 12 (5%), amblyopia in 10 (4.17%), accommodative insufficiency in 4 (1.67%), convergence insufficiency in 32 (13.3%), optic atrophy in 16 (6.7%), retinal dystrophy in 2 (0.88%) cases, and 12.5% children had abnormal neuroimaging findings.

Conclusions: A large proportion of the children referred to LDC in this study had ocular morbidities, which could be the cause of their learning disabilities.

09:00 – 10:30
Venue: 103
Session: PO–FP02

Recurrence After Intravitreal Antivascular Endothelial Growth Factor Injection in Retinopathy of Prematurity

First Author: Yun-chun PENG
Co-Author(s): Ling-ing LAU, An-fei LI, Shih-jen CHEN, Chang-sue YANG, Po-kang LIN

Purpose: To report the late reactivation of retinopathy of prematurity (ROP) and its unique clinical presentation after intravitreal antivascular endothelial growth factor (anti–VEGF) injection.

Methods: A retrospective chart review was performed on consecutive premature infants screened for ROP at Taipei Veterans General Hospital from June 2012 to April 2015. Infants treated with intravitreal anti–VEGF were specifically identified to review their birth history, general condition, ophthalmic clinical course, and outcomes. Reactivation of ROP was defined as the recurrence of neovascularization (NV) or plus sign after regression of NV or plus sign after intravitreal anti–VEGF injection.
**Results:** A total of 229 premature infants were screened during the study period. ROP was noted in 97 eyes of 52 babies, and 33 eyes of 17 babies underwent treatment including conventional laser therapy or intravitreal anti-VEGF injection. Twenty-one eyes of 11 babies received anti-VEGF injection, with a mean gestational age of 26.57 weeks and mean birth weight of 862 g. Reactivation was noticed in 7 eyes of 4 babies (33.3%) with a mean gestational age of 26.36 weeks and mean birth weight of 771.7 g in an average of 8 weeks after treatment. There was no significant difference in the gestational age, birth body weight, time of treatment, zone of ROP, or drugs of injection between the reactivation group and the nonreactivation group ($P = 0.749$, $P = 0.143$, $P = 0.445$, $P = 0.509$, $P = 0.194$, respectively). The reactivation after anti-VEGF injection could show a unique NV without fibrovascular component.

**Conclusions:** Intravitreal anti-VEGF injection is an effective treatment for ROP. However, reactivation can occur late in the clinical course with unique clinical presentation. Prolonged and vigilant follow-up after intravitreal anti-VEGF injection is thus warranted.

**Results:**

- **Number of cases:** 229
- **Premature infants:** 52 babies, 17 babies underwent treatment
- **Treated eyes:** 97 eyes
- **Anti-VEGF injection cases:** 22
- **Mean gestational age:** 26.57 weeks
- **Mean birth weight:** 862 g
- **Reactivation:** 7 eyes (33.3%) in 4 babies
- **Mean interval after treatment:** 8 weeks
- **Comparison between groups:** No significant difference

**Conclusions:** Intravitreal anti-VEGF injection is an effective treatment for ROP. Reactivation can occur late with unique clinical presentation.

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**Characteristics and Clinical Presentations of Retinoblastoma in a Tertiary Public Hospital in Bangladesh**

*First Author: Md Ashiqur AKANDA*
*Co-Author(s): Utpal SEN, Enayet HUSSAIN, Khair Ahmed CHOWDHURY, Md. Forhad HOSSAIN*

**Purpose:** To report and analyze the characteristics and clinical presentations of retinoblastoma in a series of pediatric patients from a tertiary public hospital in Bangladesh.

**Methods:** In this retrospective study, profiles of pediatric patients with retinoblastoma archived in a tertiary public hospital in Bangladesh from January 2014 to December 2014 (80 patients with 114 eyes) were reviewed. Demographics, along with the laterality, clinical manifestations, findings of CT scan of orbits and brain, and the types of treatment were the major endpoints.

**Results:** There were 46 cases (57.7%) with unilateral and 34 cases (42.5%) with bilateral involvement. The male-to-female ratio was 1.4 to 1 with a mean admitting age of 24.0 ± 11.3 (range, 5–62) months. The mean diagnosis delay was 7.4 ± 9.6 months (range, 10 days to 13 months). The most common presenting sign was leukocoria (72.5%) followed by proptosis (7.5%), strabismus (7.5%), hyphema (5%), orbital cellulitis (5%), and glaucoma (2.5%). Enucleation was performed in 95.7% of the cases with unilateral involvement and at least 1 eye of the patients with bilateral disease.

**Conclusions:** This is the first study evaluating a series of Bangladeshi children with retinoblastoma. Leukocoria was the most common presentation of retinoblastoma in our study in a tertiary public hospital in Bangladesh. The critical issues in the management of childhood blindness are early diagnosis, timely intervention, and lengthy follow-up.

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**Topographic Map Technology in Esotropic Children With Binocular Suppression**

*First Author: Qi LIN*

**Purpose:** We conducted this study to provide a simple and effective drawing method for suppression scotoma of strabismus.

**Methods:** We report 16 cases of obvious visual suppression (mean age, 6.81 ± 1.68 years), including 10 cases of concomitant esotropia, 3 cases of accommodative esotropia, and 3 cases of microtropia. We also compared 10 cases of normal controls with orthotropia and normal stereopsis (mean age, 6.22 ± 1.64 years). Binocular vision separation was performed using polarized glasses and 3-dimensional video technology. Binocular suppression was detected using 2 different sized sighting targets with the same shape and contrast. The computer recorded the suppression scotoma and calculated the scotoma area.

**Results:**

- **Concomitant esotropia:** Largest suppression scotoma area was 170,726 pixels, and the minimum was 17,063 pixels.
- **Accommodative esotropia:** Suppression scotoma was located near the center with stable shape and high repeatability.
- **Microtropia:** Suppression scotoma were located and the sizes were larger.

**Conclusions:** A definite correlation was found between suppression topographic map shape and size and strabismus degree in children. In concomitant esotropia and microtropia, suppression scotoma were located near the center with stable shape and high repeatability. The suppression scotoma of accommodative esotropia is smaller when wearing glasses.
A New Software Tool for Documenting, Evaluating, and Long-Term Monitoring of Childhood Glaucoma

First Author: Karthikeyan ARCOT SADAGOPAN
Co-Author(s): Connie CAO, Priyanka VORA, Mohammed HUSSAIN, P VUJIALAKSHMI, Dennis LAM

Purpose: Childhood glaucoma is a potentially blinding condition and is responsible for 5% of childhood blindness. Long-term follow-up is mandatory both to assess the control of intraocular pressure (IOP) and management of refractive errors and amblyopia. We describe a new software tool and analyze its usefulness in evaluating and monitoring childhood glaucoma.

Methods: Children (younger than age 18) who were diagnosed with childhood glaucoma (both new and review patients) at 2 centers in 2 countries during a 1-year period were enrolled. Examination under anesthesia (EUA) was performed by standard international recommended protocols in children who were unable to cooperate for an office examination.

Results: Twenty-five children were evaluated with the tool. There were 13 male and 12 female children. Ten patients had unilateral glaucoma, and 15 had bilateral glaucoma. The average corneal diameter at presentation was 13.50 mm. The average IOP at presentation was 23.38 mm Hg. The average axial length at presentation was 23.64 mm. The average cup-to-disc (CD) ratio at presentation was 0.55. The results were analyzed with the tool.

Conclusions: Our graphic tool enables a clinician to easily corroborate and compare all the clinical findings at any given point of time over prolonged periods both prospectively and retrospectively. It helps in analyzing the effect of treatment and response to a particular medication or procedure. It also serves as a teaching tool for parents and provides easily accessible data for research and publications.

A Diffusion Tensor Imaging Study in Unilateral Anisometropic Amblyopes Before and During Occlusion Therapy

First Author: Reena SINGH
Co-Author(s): Rohit SAXENA, S Senthil KUMARAN, Pradeep SHARMA, Vimla MENON

Purpose: To evaluate white matter patterns in unilateral anisometropic amblyopes before and after occlusion therapy.

Methods: Ten left eye anisometropic amblyopes (age, 12.1 ± 2.9 years) with best corrected visual acuity (BCVA) in the right eye of 0.06 ± 0.13 and in the left eye of 0.77 ± 0.21 logMAR and 10 age-matched controls (age, 13.4 ± 4.7 years) were included. All patients received full-time occlusion therapy after refractive correction and were followed for 4 months. Those with >2 lines improvement of BCVA on Snellen chart were categorized as responders. DTI acquisition was performed in controls (baseline) and patients (baseline and 4 months); 20 directions; b value 800; 31 axial slices; 4.5-mm thickness (1.5 T MR scanner, Magnetom Avanto). Data analysis was done with Nordic Ice Software (Nordic NeuroLab, Norway). For fractional anisotropy (FA) estimation, ROIs (in bilateral occipital hemispheres) were drawn in at least 3 axial sections. Two ROIs were drawn, one at the optic tract level and the other at the occipital cortex for tractography.

Results: No difference in age (P = 0.165) or mean refractive error (right eye, P = 0.165; left eye, P = 0.259) was seen in responders versus nonresponders. Controls had higher FA values (0.269 ± 0.11) in comparison with patients (0.209 ± 0.6. P = NS). Although responders had higher FA values [0.198 ± 0.53 in the right hemisphere (RH) and 0.193 ± 0.75 in the left hemisphere (LH)] as compared with nonresponders [0.186 ± 0.05 (RH) and 0.179 ± 0.05 (LH)], no significant difference in FA and tracts were observed at baseline or follow-up in both groups.

Conclusions: There were no significant differences between patients and controls or responders and nonresponders in FA values or white matter pathways. The changes in amblyopia may be at the subcortical level.

The Role of Dynamic Digital Subtraction Dacryocystography in Pediatric Epiphora

First Author: Ruth CHEN
Co-Author(s): Katya TAMBE

Purpose: Childhood epiphora is conventionally managed with syringing and probing. This, however, does not identify the site of obstruction and is poorly tolerated by children in the outpatient setting. This study evaluates the role of dynamic digital subtraction dacryocystography (DSDCG) in managing pediatric epiphora.

Methods: A case review of 32 children, looking at 45 lacrimal drainage systems (LDS), was performed. Inclusion criteria were children with persistent epiphora with previously failed syringing and probing, presence of fistulae, dacryocystitis, or older children presenting...
with epiphora for the first time. DSDCG was performed in all cases under general anesthesia. The results were correlated with subsequent management, which included stent intubations (proximal and distal), canaliculare trephination, dacryocystorhinostomy (DCR), and fistulectomy.

Results: DSDCG identified the site of obstruction in 43 (96%) cases and revealed 2 (4%) patent systems. Nine LDS (20%) had obstruction at the punctual/canalicular ducts and 9 (20%) at the proximal nasolacrimal duct. Twenty–five cases (56%) were obstructed at the distal nasolacrimal duct, 5 of which had fistulae identified. Subsequent management were as follows: 9 DCRs, 5 fistulectomies, 3 canalicular trephinations, 5 proximal stent intubations, and 21 dedicated distal stent intubations.

Conclusions: DSDCG identifies the exact location of the LDS obstruction well, giving an objective measure to the degree of obstruction. It has better diagnostic value and provides additional information, such as the presence of fistulae. Its role in pediatric epiphora has not been described in the literature, making this study the first of its kind.

09:00 – 10:30
Venue: 103
Session: PO–FP02
Comparison of Optic Canal Diameter Between Infantile Osteopetrosis and Normal Children
First Author: Wenhong CAO

Purpose: To detect the difference in optic nerve tube diameter between malignant osteoporosis children and normal children and to evaluate the effect of hematopoietic stem cell transplantation on optic nerve tube diameter.

Methods: A series of case studies. Twelve children diagnosed with osteopetrosis from 1~26 months were observed, of which 7 underwent hematopoietic stem cell transplantation successfully. Optic canal diameter and visual evoked potential (VEP) were compared before and after transplantation. Twenty–two normal children, aged from 1 month to 4 years, were collected, whose optic nerve tube diameters were measured as controls. The correlation between age and optic canal diameter were also analyzed.

Results: The Pearson coefficient between age and diameter was 0.722 (P = 0.000), suggesting a high correlation between these 2 variables. The mean optic canal diameter before transplantation was 1.63 ± 0.53 mm, with 3.38 ± 0.60 mm in the normal children. The difference between the mean diameters in the 2 groups was statistically significant (t = -13.875, P = 0.000). The factor of age was removed by covariance analysis. The mean optic canal diameter was 2.69 ± 0.58 mm after transplantation. The difference between the groups before and after was statistically significant (t = -7.936, P = 0.000). P2 latency period of VEP was prolonged in all 7 cases before transplantation. Mean P2 latency period of VEP shortened in 5 cases and was prolonged in 2 cases after transplantation.

Conclusions: Canals of infantile osteopetrosis were statistically narrower than those of age–matched controls. Optic nerve tubes became wider after hematopoietic stem cell transplantation, and visual deterioration was arrested in some cases.

09:00 – 10:30
Venue: 103
Session: PO–FP02
Differences in Aqueous Concentrations of Cytokines in Pediatric and Adult Patients With Coats Disease
First Author: Jing FENG

Purpose: To investigate the different aqueous concentrations of vascular endothelial growth factor (VEGF) and inflammatory cytokines in pediatric and adult patients with Coats disease.

Methods: A total of 20 eyes of 20 patients with Coats disease [12 eyes of 12 pediatric patients and 8 eyes of 8 adult patients plus 6 patients (6 eyes) with congenital cataract as the pediatric control group and 10 patients (10 eyes) with senile cataract as the adult control group] were examined. Aqueous humor samples were assessed for interleukin 6, 8, and 1β (IL-6, IL-8, IL-1β, respectively); basic fibroblast growth factor (bFGF); monocyte chemoattractant protein 1 (MCP1); tumor necrosis factor alpha (TNFa); and VEGF by multiplex bead assay.

Results: Significantly higher concentrations of VEGF, IL-6, and IL-1β were found in pediatric patients with Coats disease (P = 0.001, P = 0.004, and P = 0.006). The concentration of VEGF in pediatric patients with stage 3B Coats disease was significantly higher than that of stage 3A (P = 0.010). In adult patients with Coats disease, the aqueous levels of IL-8, IL-6, and IL-1β were significantly higher than those of the controls (P = 0.016, P = 0.012, and P = 0.005). The concentration of IL-6 was significantly associated with the extent of exudative retinal detachment (P = 0.001, R = 0.933). Compared with pediatric patients, the VEGF level in the aqueous humor of adult patients was significantly lower (P = 0.039).

Conclusions: Besides VEGF, other inflammatory factors such as IL-8, IL-1β, and IL-6 may be associated with Coats disease, especially in adult patients.
The Role of Apelin/APJ in the Animal Model of Retinopathy of Prematurity

First Author: Jing FENG

Purpose: The aim of this study was to investigate the correlation between apelin and vascular endothelial growth factor (VEGF) in an animal model of retinopathy of prematurity (ROP).

Methods: We used a mouse model of oxygen-induced retinopathy to explore the progress of ROP. The expression of apelin and angiotensin-1-like receptor APJ in the retina was examined by immunohistochemistry, quantitative PCR, and Western blot analysis. We also compared the effect of anti-VEGF and antiapelin by detecting apelin and VEGF expression changes after intravitreal injection of anti-VEGF or anti-APJ.

Results: Apelin and APJ expression were dramatically increased during the hypoxic phase in a mouse model of oxygen-induced retinopathy. The expression of apelin reached the peak value first, followed by VEGF and APJ. However, when the apelin protein level began to decline, VEGF and APJ remained highly expressed. Inhibiting VEGF expression did not affect apelin expression. We thus concluded that apelin was not dependent on VEGF function.

Conclusions: Our results strongly suggest that apelin is a prerequisite factor for hypoxia-induced retinal angiogenesis. The apelin/APJ system may be another mechanism for retinal neovascularization independent of VEGF during the development of ROP.

Ocular Morbidity in Children of North India

First Author: Gaurav KUMAR
Co-Authors: Alka GUPTA, Siddharth AGRAWAL, Sonali GUPTA, Swati CHAWLA

Purpose: To study the prevalence of various ocular morbidities in children of north India.

Methods: This was a population-based, observational, cross-sectional study. A total of 10,052 children between the ages of 4 and 15 were examined at eye camps conducted in schools from January 2011 to December 2014. Ophthalmic assistants conducted vision assessments on a logMAR visual acuity chart. Anterior segment examination was done using torch light by ophthalmic trainee residents. All patients with less than 0.3 logMAR visual acuity or abnormal torch light examination were further evaluated at the base hospital.

Results: Out of 10,052 children examined, 1297 had ocular morbidity. Refractive error was present in 52.97% (95% confidence interval (CI), 0.50–0.55), congenital diseases in 25.5% (95% CI, 0.23–0.27), trauma in 8.3% (95% CI, 0.06–0.09), vitamin A deficiency in 7.0% (95% CI, 0.05–0.08), infection and allergies in 4.0% (95% CI, 0.03–0.05), orbital disease in 1.5% (95% CI, 0.00–0.02), and retinal diseases in 0.04% (95% CI, 0.00–0.01).

Conclusions: Refractive errors were the most common form of ocular morbidity seen in children of north India, followed by cataract. Both of these diseases can be detected with fair sensitivity and specificity at eye camps conducted by ophthalmic assistants.
the welfare premium for disabled people. As a result, the incremental cost–effectiveness ratio of this telemedicine was 259 THB per prevented blindness case and 17,397 THB per QALY saved.

Conclusions: Store–and–forward telemedicine for ROP screening is cost–effective given the set threshold.

09:00 – 10:30
Venue: 103
Session: PO–FP02

Morning Glory Disc Anomaly in Children: A Clinical Spectrum
First Author: Srikanth RAMASUBRAMANIAN
Co-Authors: Meenakshi SWAMINATHAN

Purpose: To evaluate ophthalmic findings, visual outcomes, and associated ocular and systemic features in a series of children with morning glory disc anomaly (MGDA) at a tertiary care referral center.

Methods: A retrospective clinical study in children with MGDA. A database search was done for coded diagnosis—Congenital anomaly of the optic nerve: Morning Glory Syndrome—in children (aged less than 16 years) who attended the pediatric ophthalmology outpatient department (OPD) from November 1999 to November 2009. Clinical records were reviewed, and data was collected and analyzed.

Results: A total of 37 eyes of 31 patients were included in the study. Average age at presentation was 7.07 years (range, 11 months to 16 years). Male-to-female ratio was found to be 1:1.45. Bilaterality was seen in 19.4% (6 patients). Decreased vision was the most common presenting complaint in 51.6% of patients, followed by squinting in 41.9% of patients. Eighty–two percent of patients had less than 6/60 vision at presentation. Average visual acuity (VA) was 2.06 logMAR units. Refractive error among the patients ranged from +2.5 diopters (D) to −17.5 D. The average spherical equivalent was −5.02 D. Other ocular anomalies that were found associated have been elaborated. Rhegmatogenous retinal detachment (RD) was the most common retinal association (27%), followed by PFV in 8.10%. Pierre Robin syndrome was the most common systemic association (38.5%). Radiological findings and response to treatment if required were also studied.

Conclusions: MGDA has a variable spectrum of presentation and severity of involvement. A complete physical examination followed by neurological examination may be needed to rule out life–threatening ocular and systemic associations.

09:00 – 10:30
Venue: 103
Session: PO–FP02

Utilization of Intermittent Exotropia Questionnaires in China
First Author: Hui ZHU

Purpose: Health–related quality of life (HRQOL) is helpful in establishing the overall impact of childhood intermittent exotropia (IXT). Currently, there is no questionnaire specifically to study the HRQOL influence of childhood IXT in China. Therefore, the present study aimed to develop a Chinese–language version of the Intermittent Exotropia Questionnaire (IXTQ) and evaluate its reliability and validity when used in Chinese IXT children and parents.

Methods: The original IXTQs were translated into Chinese to form the CIXTQs. A total of 175 IXT children (2–17 years old) and 151 orthophoric control children (2–17 years old) along with 1 of their parents were recruited. Five– to 17–year–old children completed the 5– to 7–year–old or the 8– to 17–year–old child CIXTQ according to their age. Parents completed the proxy and the parent CIXTQ. Psychometric properties of the CIXTQs were examined by floor and ceiling effects, item analysis, Cronbach α coefficient, split–half and test–retest reliability, content validity, convergent validity, construct validity, and discriminative validity. Patient factors’ effects on the CIXTQs scores were also explored.

Results: No items were found having strong floor or ceiling effects. Item analysis revealed significant differences between the scores of all items of the 2 extreme groups (P < 0.001) and significant correlations between each item and the total scores (P < 0.01). Cronbach α coefficient, split–half reliability, test–retest reliability, and content validity were 0.843~0.925, 0.732~0.918, 0.909~0.948, and 0.966~0.988, respectively. For the multidimensional parent CIXTQ, moderate correlations within the subscale scores and strong correlations between each subscale and the total scores indicated good convergent validity, and principal component analysis demonstrated that its subscale construction was consistent with the original parent IXTQ. The median scores for the IXT group were significantly lower than these for the controls (P < 0.001) thus indicating good discriminative validity of the CIXTQs. Parent sex and education level and angle of deviation had significant effects on some questionnaire scores (P < 0.05).

Conclusions: The CIXTQs are useful tools to evaluate the influence of IXT on HRQOL among Chinese IXT children and their parents.
Knowledge and Practice Patterns of Childhood Cataract Screening Among Pediatricians and Obstetricians in Bangladesh

First Author: Nahid FERDAUSI
Co-Author(s): Enayet HUSSAIN, Ava HOSSAIN

Purpose: The purpose of this study was to determine the level of knowledge and practice patterns of childhood cataract screening among pediatricians and obstetricians, who have the greatest potential for early detection.

Methods: This cross-sectional mixed-method study was conducted during the period of July to December 2014. A total of 75 obstetricians and 70 pediatricians in 5 cities in Bangladesh participated in this study. A questionnaire-based assessment was used prior to a talk on childhood cataract, in a seminar on sharing experiences of pediatric eye care services. Twenty in-depth interviews were carried out among participants.

Results: The mean age of the participants was 44.83 ± 8.3 years. Of the participants, 58.7% had been practicing for more than 10 years, and 41.3% had about 5–10 years of experience. A total of 83.64% had good knowledge of childhood cataract. In terms of practice, 65.78% of pediatricians carried out full eye examinations in children, and 82.66% of obstetricians examined the eyes of newborn babies by flashlight. Major barriers for childhood cataract screening identified by the participants were the absence of national level screening and referral guidelines and the lack of awareness among service providers and parents.

Conclusions: These study findings reveal an urgent need to involve all key stakeholders in childcare to make a greater impact in reducing the burden of avoidable blindness due to childhood cataract. Thus, appropriate coordination between ophthalmologists, pediatricians, and obstetricians can help develop an effective and comprehensive screening model for early diagnosis and timely intervention of childhood cataract.

Awareness of Diabetic Retinopathy and Utilization of Eye Care Services Among Diabetics in Longfeng, Guangzhou, China

First Author: Siming CHEN
Co-Author(s): Xiaogang HAN, Meng JIE, Wenyong HUANG

Purpose: To investigate factors affecting the awareness of diabetic retinopathy (DR) and use of eye care services (ECS) among diabetics.

Methods: Patients aged 18 or older were recruited from a community health care service center in Longfeng, Guangzhou, China. All information was obtained via questionnaire including sociodemographic status, economic status, visual care status, knowledge and use of ECS for diabetes mellitus (DM) and DR, and medical history.
Results: Among 170 patients (mean age, 67.8 ± 8.45 years; 58.8% female), only 3 (1.7%) were excluded due to incomplete data and noncooperation. Of those included, 90.4% had never been informed that fundus examination was part of DM treatment. A total of 40.7% had had eye examinations, and 22.2% had had their eyes examined in the past 12 months. Among those who had eye examinations, 42.5% were aware that DM could affect the eyes, and 43.4% knew that DR might cause blindness. A total of 55.7% realized the importance of fundus examination for DR screening. In multiple logistic regression analyses, an education of a middle school degree or above could improve the awareness and utilization rate of ECS; odds ratio (OR) [95% confidence interval (CI)] = 0.22 (0.06, 0.80); P = 0.022. Travel time from home to the hospital longer than 1 hour could affect the use of health care; OR (95% CI) = 4.5 (1.18, 17.2); P = 0.028.

Conclusions: These results suggest that the low proportion of diabetics receiving recommended annual eye examinations might be increased through patient education and better execution of DR screening guidelines.

9:00 - 10:30
Venue: Elegance Lounge
Session: OR-FP01

Evaluation of Sensitivity of FDT Perimetry in Comparison With Standard Automated Perimetry in Light of Retinal Nerve Fiber Loss Detected With Scanning Laser Polarimeter as Mass Screening Tool for Glaucoma Detection in Rural India

First Author: Debdas MUKHERJEE
Co-Author(s): Khevna PATEL, Debantan MUKHERJEE

Purpose: This was a prospective comparative study to evaluate the sensitivity of FDT perimetry in comparison with standard automated perimetry (HFA) in light of retinal nerve fiber loss detected with scanning laser polarimeter (GDX-Vcc) as a mass screening tool for glaucoma detection in rural India.

Methods: A total of 300 patients were tested; 100 normal, 100 known glaucoma patients, and 100 were suspected on the basis of high intraocular pressure (IOP), abnormal cup–to–disc (C:D) ratio, positive family history, or any combination. Tests were performed, and abnormal results were retested. Inconsistent results were excluded from the study. Sensitivity of FDT perimeter was assessed by comparing with results of SAP (HFA) and corroborating with the results of scanning laser polarimeter (GDX-VCC).

Results: Sensitivity of FDT versus GDX was found to be 86.95%. Sensitivity of HFA versus FDT was found to be 88.23%. Sensitivity of HFA versus GDX was found to be 88.40%.

Conclusions: This small portable FDT perimeter can safely be used for glaucoma screening to diagnose and follow up glaucoma patients in rural India with high sensitivity. It can be used as a sole perimetric machine where patients cannot reach base hospitals. We consider the possibility of over-diagnosis due to high sensitivity rather than to miss genuinely possible glaucoma cases where misdiagnosis varies from 35% to 70% and incidences vary from 2% to 12%.
Chemical Cross-Linking, the New Hope for Myopia Treatment!

First Author: Mengmeng WANG

Purpose: To evaluate the effects of 2 chemical cross-linking reagents (genipin and glyceraldehyde) in form-deprivation myopia.

Methods: Twenty-seven infantile guinea pigs were randomly divided into 3 groups: group A, B, and C (n = 9 per group). All right eyes had form deprivation. The subtenon sacs in groups B and C were injected with genipin and glyceraldehyde solutions, respectively. Ocular refraction, axial length, biomechanical test, and light and electron microscopy were performed 21 days postoperatively.

Results: Compared with the eyes in group A, myopic conditions and axial elongations in group B and C eyes were significantly decreased because of the cross-linking procedures (P < 0.05); no histological damage on the retina or choroid was observed. No difference between groups B and C was found at the end of this study (P > 0.05).

Conclusions: Both cross-linking reagents can be effectively used to block the development of form-deprivation myopia. Chemical cross-linking might be a new hope for myopia treatment in the future.

Various Indications for Expplanation of Implantable Collamer Lens

First Author: Jeewan TITIYAL
Co-Author(s): Manpreet KAUR, Rajesh SINHA

Purpose: To evaluate the reasons for explantation of implantable collamer lens (ICL).

Methods: A retrospective analysis of 9 cases that underwent ICL explantation in the past 3 years was undertaken. The causes leading to ICL explantation were analyzed. Phacoemulsification with implantation of intraocular lens (IOL) was done if needed.

Results: Nine cases required explanation of the ICL in the past 3 years. The reasons for ICL explantation were cataract (2/9), chipped haptic of ICL during insertion (2/9), first stage ICL explantation with phacoemulsification before vitreoretinal surgery for retinal detachment (2/9), posttraumatic ICL dislocation with anterior subcapsular cataract (1/9), shallow vault with recurrent uveitis (1/9), and acute postoperative endophthalmitis (1/9). Concomitant phacoemulsification with IOL implantation was needed in 5 cases (5/9). In the case with a shallow vault and recurrent uveitis, ICL explantation alone was done. In the case with endophthalmitis, ICL explantation was done with intravitreal antibiotics, and reimplantation of ICL was done after successful resolution of endophthalmitis. Of the 2 cases with cataract, 1 case had a nuclear sclerosis, and the second case had a silicone–oil induced cataract after vitreoretinal surgery.

Conclusions: ICL explantation may rarely be needed after successful implantation in cases with damaged ICL, cataract, or posterior segment pathologies. Phacoemulsification with IOL implantation is often needed simultaneously in cases with coexisting cataract or to facilitate vitreoretinal surgery.

Evaluation of the Clinical Outcomes After LASIK for the Correction of Myopia Using an Advanced Aberrometer

First Author: Chi-chin SUN

Purpose: To evaluate the clinical outcomes of wavefront-guided LASIK for myopia and myopic astigmatism correction using aberrometric data obtained with the iDesign.

Methods: A total of 20 eyes from 13 patients with an age ranging from 23 to 50 years were included in the study. All eyes had myopia or myopic astigmatism that underwent wavefront-guided LASIK. The aberrometric data were obtained with the iDesign aberrometer. Corneal flaps were created using the Intralase FS 150 kHz femtosecond laser. Patients were followed at postoperative months 1, 3, and 6. The study’s main outcome measures were uncorrected (UCVA) and corrected distant visual acuity (CDVA), predictability and safety of refractive correction, dry eye parameters, contrast sensitivity, and wavefront aberrometry.

Results: After 6 months, the mean logMAR UCVA improved from 1.76 to ~0.03 (P < 0.001). Nine (45%) eyes had gained 1 or more lines of CDVA. Average spherical equivalent refractions were 0.00 ± 0.16 diopters and all eyes were within 0.5 diopters of target refraction. There were no significant differences compared with preoperative measurements in all dry eye parameters tested, which included corneal sensitivity, tear break up time, Schirmer test, conjunctival, and corneal staining scores. Dim light contrast sensitivity improved significantly at high spatial frequency (P = 0.007 at 12 cycles/degree and P = 0.035 at 18 cycles/degree). The spherical aberrations were significantly decreased as compared with preoperative measurements.

Conclusions: Wavefront-guided LASIK is a safe and effective surgery to correct myopia and myopic astigmatism. It also decreases postoperative spherical aberrations and improves dim light contrast sensitivity at high
4:13 – 6:00
Venue: 103
Session: RE-FP02

Treatment Effects and Wound Healing Profiles of Hyperopic Small Incision Lenticule Extraction

First Author: Yu-chi LIU
Co-Author(s): Heng Pei ANG, Erica TEO, Chan Lwin NYEIN, Jodhibir MEHTA

Purpose: To investigate the treatment effects and wound healing profiles of hyperopic small incision lenticule extraction (SMILE) and to compare the profiles with those of hyperopic laser-assisted in situ keratomileusis (LASIK).

Methods: Twenty-two rabbits were randomly allocated to 3 groups: hyperopic SMILE (+2.0 D, +4.0 D), hyperopic LASIK (+2.0 D, +4.0 D), and controls. Slit lamp, autorefractor/keratometer, intraocular pressure evaluation, anterior segment optical coherence tomography (AS-OCT), Visante Omni, and in vivo confocal microscopy (IVCM) were performed during the follow-up of 1 month. The corneas were then subjected to immunofluorescence of markers for inflammation (CD11b), wound healing (fibronectin), and keratocyte response (HSP47).

Results: All the corneas were clear without haze formation. Autorefractor measurement and Visante Omni evaluation showed that hyperopic SMILE and hyperopic LASIK eyes had comparable keratometric changes and central/paracentral steepening for both +2.0 D and +4.0 D corrections. No CD11b-positive cells were observed after postoperative 1 week in hyperopic SMILE or hyperopic LASIK eyes. However, compared with hyperopic SMILE eyes, hyperopic LASIK eyes had significantly greater stromal keratocyte activities on IVCM evaluation during the first postoperative period (P < 0.038), and the expression of fibronectin and HSP47 was significantly greater throughout the study period (P < 0.01 at 1 month).

Conclusions: Hyperopic SMILE, a new treatment option for hyperopia, is effective. Postoperative inflammation was minimal, irrespective of the power of correction. The postoperative wound healing response and stromal reaction were significantly less than those of hyperopic LASIK.

14:30 – 16:00
Venue: 103
Session: RE-FP02

Comparison Between the Verion Digital Marker and the Conventional Marking

Approach in Toric IOL Implantation

First Author: Robert YEO
Co-Author(s): Hazel TAN

Purpose: To evaluate the accuracy in toric IOL placement by comparing the postoperative residual astigmatism (postop RA) measurement of patients using the Verion Digital Marker (VDM) (Verion Image Guided System, software version 2.6; Alcon) and the conventional marking approach.

Methods: This was an interventional prospective study involving 60 monotoric IOL patients. Sixty patients who fulfilled the defined surgical criteria were separated equally into 2 groups: the first group was operated on using the conventional marking approach, whereas in the second group, the new preoperative registration system was used to align the toric meridian. The surgical outcome over a 3-month period was determined by measuring the patient’s postop RA.

Results: A majority of the patients had RA ≤ −0.75, with 15 (56.7%) in the Verion group and 18 (60.0%) in the conventional group. Both approaches had 1 outlier reading each: 1 (3.3%) with RA = −1.75 in the VDM arm and 1 (3.3%) with RA = −2.25 in the conventional arm. Three-month postop RA results for Verion and conventional techniques were comparable, with means of −0.875 ± 0.346 (P < 0.05) and −0.875 ± 0.393 (P < 0.05) diopters, respectively.

Conclusions: Astigmatism marking and lens placement are difficult hurdles when implanting toric IOLs. In this study, both marking approaches appear to be equally effective. However, the newer digital marking technology potentially enhances the surgical workflow, as it removes the need for a complicated and inaccurate marking system before surgery.
(1st A-length), first applanation velocity (1st A-velocity), second applanation time (2nd A-time), second applanation length (2nd A-length), second applanation velocity (2nd A-velocity), highest concavity time (HC-time), highest concavity deformation amplitude (HC-DA), highest concavity peak distance (HC-peak distance), and highest concavity radius (HC-radius) were measured using the Corvis ST. The Shapiro–Wilk test, Pearson correlation coefficient (r), Spearman correlation coefficient (rs), multiple linear regressions, and paired t test were used in this study.

**Results:** The 1st A-time, 2nd A-time, HC-time, and HC-DA were normally distributed; however, other parameters of the Corvis ST had skewed distribution. All the parameters except for the 1st A-length were correlated with central corneal thickness (CCT) measured by Pentacam (P < 0.05). Corneal resistance factor (CRF) measured by the Ocular Response Analyzer (ORA) was correlated with all the parameters of Corvis ST except for the 1st A-length (P < 0.05).

**Conclusions:** When measuring normal myopic eyes, the Corvis ST deformation parameters can quantitatively describe the corneal biomechanical properties. In clinical practice, multiple measurements and comprehensive analysis could obtain more authentic results.

14:30 – 16:00
**Venue:** 103
**Session:** RE-FP02

**Initial Experience of Laser In Situ Keratomileusis Flap by LenSx Multifunctional Femtosecond Laser System**

**First Author:** Hung-yu LIN  
**Co-Author(s):** Chan-wei NIEN

**Purpose:** To evaluate the outcome of laser in situ keratomileusis (LASIK) flaps using a multifunctional femtosecond laser suitable for cataract and corneal surgery.

**Methods:** Six patients (10 eyes) scheduled for full myopia and myopic astigmatism correction by LASIK were enrolled. LASIK was performed using the LenSx femtosecond laser for corneal flaps and the STAR S4IR excimer laser for corneal stromal photoablation. Evaluations included measurement of uncorrected distance visual acuity (UDVA) on the first and seventh day postoperatively, wavefront aberrometry, and complications.

**Results:** The study enrolled 10 eyes of 6 patients. The mean preoperative spherical equivalent refraction was -6.76 diopters (D) ± 2.06 (SD). One day postoperatively, UDVA was 20/20 or better in 9 of 10 eyes and 20/16 or better in 6 of 10 eyes. Seven days postoperatively, UDVA was 20/20 or better in 10 of 10 eyes and 20/16 or better in 8 of 10 eyes. No serious complications were noted during the operation or postoperatively.

**Conclusions:** Application of this multifunctional femtosecond laser in LASIK proved to be safe. The procedure was easily performed for Asians with excellent visual outcomes.

14:30 – 16:00
**Venue:** 103
**Session:** RE-FP02

**Subcapsular Vacuolar Change of the Crystalline Lens in Patients After Hole Posterior Chamber Phakic Intraocular Lens Implantation**

**First Author:** Shaowei LI

**Purpose:** We present 4 cases of vacuolar changes in the anterior subcapsular space of the crystalline lens in patients after hole posterior chamber phakic intraocular lens implantation.

**Methods:** The hole posterior chamber phakic intraocular lenses (hole ICLs) were implanted in healthy myopic patients, and ophthalmic viscosurgical devices (OVDs) were used during the surgery. The first patient received Discovisc in both eyes; the other 3 patients received Discovisc in the right eye and sodium hyaluronate in the left eye.

**Results:** Vacuolar changes developed 1 day after surgery. Slit-lamp examinations showed bleb-like lesions in the anterior subcapsular space of the 4 cases (5 eyes) with Discovisc, though the lesions gradually improved and faint opacity was left without visual deterioration in the subsequent 1 to 3 months. This phenomenon was not observed in the 3 cases (3 eyes) with sodium hyaluronate.

**Conclusions:** As a cohesive high-viscous OVD, Discovisc may be at risk for the short-term development of vacuolar changes in the crystalline lens. Observation indicates that the application of Discovisc in the implantation of the hole ICL should be paid more attention.

14:30 – 16:00
**Venue:** 103
**Session:** RE-FP02

**Postoperative Changes in Posterior Corneal Surface Elevation and Corneal Biomechanics: Small Incision Lenticule Extraction Versus Femtosecond Laser—Assisted Laser In Situ Keratomileusis**

**First Author:** Lulu XU

**Purpose:** To evaluate the postoperative elevation of the posterior corneal surface and investigate the changes induced by corneal biomechanics after small incision lenticule extraction (ReLEx SMILE) compared
with those after femtosecond laser–assisted laser in situ keratomileusis (Femto–LASIK).

Methods: One hundred twelve eyes of 106 patients were involved in this study. Fifty–six patients underwent ReLEx SMILE and 50 patients underwent Femto–LASIK as control. The posterior corneal elevation was measured preoperatively and 1 month, 3 months, and 6 months postoperatively using Scheimpflug imaging (Pentacam; Oculus, Wetzlar, Germany).

Results: In the Femto–LASIK eyes, almost all regions protruded after surgery ($P > 0.05$ for all), especially 3 months postoperatively. However, in the ReLEx SMILE group, there was a significant backward displacement in the center and 2–mm regions, except for the 225–degree semimeridians of 2–mm diameter after surgery. A slight elevation was found at the 4–mm vertical meridian ($P = 0.032$), but a progressive backward shift was found at the 4–mm horizontal meridian ($P = 0.019$). The various elevations returned to original levels 6 months after the procedure. Linear regression showed that there was significant correlation between the corneal resistance factor (CRF) and center and 2–mm region posterior corneal elevation at 1 month and 3 months ($r = 0.764, 0.428$) after the Femto–LASIK procedure. Significant correlations were also found between corneal hysteresis (CH), intraocular pressure (IOP), and center posterior corneal elevation 1 month after Femto–LASIK ($r = 0.364, 0.128$). However, for ReLEx SMILE, a significant correlation was only found between the CRF and 2–mm region posterior corneal elevation at 1 month postoperatively ($r = 0.226$).

Conclusions: The ReLEx SMILE procedure shows less change in posterior corneal surface elevation than the Femto–LASIK procedure. Postoperative elevation changes are closely related to corneal biomechanics.

24-Month Dynamic Range of Visual Outcomes After Laser Anterior Ciliary Excision Procedure

First Author: David Hui-kang MA
Co-Author(s): Chi-chin SUN, Annmarie HIPSLEY, Mitchell JACKSON, Karolinne ROCHA

Purpose: To evaluate accommodating benefits for dynamic range of vision at near (40 cm) and intermediate (60 cm) after laser anterior ciliary excision (LaserACE) procedure.

Methods: This prospective clinical trial evaluated the LaserACE results over 24 months. Twenty–one subjects over age 40 demonstrating loss of accommodative function, good uncorrected distant vision with less than 1.0 diopter (D) of refractive astigmatism, and otherwise healthy eyes were evaluated. LaserACE was performed using a 2.94 µm Er:Yag laser in 4 quadrants on the sclera over the ciliary muscle in 3 key zones to weaken scleral rigidity and decrease ocular rigidity so as to improve biomechanical accommodative forces. Primary study targets were improvement in UIVA/DCIVA (60 cm), UNVA/DCNVA (40 cm), and UDVA/CDVA.

Results: All patients achieved improved near/intermediate vision. Postoperatively, DCIVA was 20/30 or better in 100% of subjects; 89% were 20/25 ($P < 0.176$). DCNVA was 20/30 or better in 83% of subjects; 67% were 20/25 ($P < 0.007$). Postoperatively, UIVA was 20/30 or better in 89% of subjects; 72% were 20/25 ($P < 0.305$). UNVA was 20/30 or better in 83% of subjects, or 78% ($P < 0.046$). No statistical change was noted in DCVA/UDVA. Stereopsis improved from 75.77” to 60,” which was clinically significant.

Conclusions: LaserACE performed using the VisioLite Er:Yag laser seems to be a safe and effective procedure for restoring visual performance for near and intermediate visual tasks without compromising UDVA/CDVA or binocularity. Stereopsis was not only preserved but also improved over time, and was sustained over the 24 months.
Factors on the Nomogram Design for Small Incision Lenticule Extraction Surgery

First Author: Fengju ZHANG

Purpose: To develop a rational nomogram design for small incision lenticule extraction surgery (SMILE), multiple regression analysis was used to evaluate the correlation between achieved manifest refraction spherical equivalent (MRSE) and several possible influencing factors (age, preoperative spherical equivalent, targeted spherical equivalent, corneal curvature, central corneal thickness, and noncontactable tension).

Methods: This study included retrospective analysis and prospective analysis. Uncorrected visual acuity, best corrected visual acuity, and MRSE were collected 1 day, 1 week, 1 month, and 3 months after SMILE surgery performed by 1 doctor. Three hundred forty-five eyes from 174 patients were included in the retrospective analysis by evaluating the spherical deviation 3 months after surgery; patient age, 18–45 years (25.22 ± 6.24); preoperative spherical equivalent (SE), spherical -2.25~−9.50, cylinder 0~−4.25; mean SE, -5.62 ± 1.69D; central corneal thickness (CCT), 485~606 µm (538.92 ± 25.77); lenticule thickness, 65~151 µm (104.32 ± 19.76); corneal curvature, 39.0~47.7 D (43.28 ± 2.71); and NCT, 14.44 ± 2.48 mm Hg. Multiple regression analysis was used to evaluate the correlation between SE deviation and multiple factors. In the prospective analysis, which was based on the result of retrospective analysis, 59 eyes from 30 patients from 2014~2015 were selected. Patient age was 17~34 years (22.55 ± 3.80); preoperative SE, -7.37~−2.25 D (~4.52 ± 1.66); and targeted SE was +0.5 D. Uncorrected visual acuity, best corrected visual acuity, manifest refraction, and residual astigmatism were analyzed 1 day, 1 week, 1 month, and 3 months after surgery to evaluate the refractive shift and stability of refractive visual outcome. SPSS 20.0 was used for variance analysis, and LSD-T test was conducted for comparison between groups.

Results: In retrospective analysis, spherical equivalent deviation (SD) after 3 months was correlated with preoperative SE and age according to the regression formula SD = 0.781 + 0.101 x preoperative SE -0.029 x age; postoperative SE was positively correlated with preoperative SE and negatively correlated with age. Beta value revealed that the weight for preoperative SE was 0.303, and 0.282 for age. In prospective analysis, there was no difference between 1 day postoperative visual acuity and 1 week, 1 month, and 3 months at different time points (F value = 2.33, P > 0.05). Visual acuity had an increasing tendency over time; there was no difference between 1 day postoperative SE and 1 week, 1 month, and 3 months postoperative SE (F value = 1.11, P > 0.05). Postoperative SE tended to plano in 3 months after surgery.

Conclusions: Postoperative SE for SMILE surgery was
stable at 1 week, which was positively correlated with preoperative SE and negatively correlated with age. Age and preoperative SE are important factors for the optimization of nomogram in SMILE surgery.

**Methods:** SMILE was performed in patients with previous keratoplasty. The preoperative refractive errors, uncorrected visual acuity (UCVA), and CVA were recorded. The residual refractive error, UCVA, and best corrected visual acuity (BCVA) were recorded 6 months postoperatively.

**Results:** Sixteen eyes of 16 patients underwent SMILE. Mean follow-up was 6 months. The mean UCVA (Snellen decimal) changed from 0.14 (range, 0.05–0.3) preoperatively to 0.68 (range, 0.4–0.8) postoperatively. The mean BCVA changed from 0.73 (range, 0.5–0.9) preoperatively to 0.8 (range, 0.6–0.9) at 6 months postoperatively.

**Conclusions:** SMILE for the correction of myopia and astigmatism after keratoplasty is a reproducible procedure with good visual outcomes.

**Small Incision Lenticule Extraction for Myopia and Astigmatism After Keratoplasty**

**First Author:** Moones ABDALLA  
**Co-Author(s):** Osama IBRAHIM

**Purpose:** To evaluate the visual and refractive outcomes along with the reproducibility of small incision lenticule extraction (SMILE) in postkeratoplasty eyes.

**Methods:** SMILE was performed in patients with previous keratoplasty. The preoperative refractive errors, uncorrected visual acuity (UCVA), and CVA were recorded. The residual refractive error, UCVA, and best corrected visual acuity (BCVA) were recorded 6 months postoperatively.

**Results:** The mean CRF and CH in both groups showed significant reduction at 1w, 1m, and 3m postoperatively ($P < 0.05$); the mean CRF and CH in group B (OZ = 6.0 mm) were significantly higher than in group A (OZ = 6.5 mm) at 1w and 3m postoperatively ($P < 0.05$).

**Conclusions:** The size of the optical zone has some effects on corneal biomechanical properties after small incision lenticule extraction; a smaller optical zone diameter has relatively less effect on corneal biomechanical properties.
Comparison of Clinical Results Between 120 μm and 140 μm Cap Thicknesses After SMILE in Eyes With Thick Corneas

First Author: Manli LIU

Purpose: To evaluate the clinical outcomes after small incision lenticule extraction (SMILE) with different cap thicknesses in thick corneas.

Methods: Forty patients with central corneal thickness (CCT) more than 560 μm were recruited in this prospective, randomized, masked, paired-eye study. Patients were randomized to receive SMILE with 120 μm cap thickness in 1 eye and 140 μm in the other. Uncorrected and corrected distance visual acuity (UDVA, CDVA), contrast sensitivity (CS), higher order aberrations (HOAs), and morphologic modifications of corneal architecture were measured for 3 months of follow-up.

Results: Postoperative refractive, visual outcomes, CS, and the changes in HOAs were similar between both groups. The activity of keratocytes and corneal fibrotic tissues was noted in the corneal interface layer of all eyes after SMILE. The persistence of brightly reflective particles was higher in the group with 120 μm cap thickness (P < 0.01), and for this same group, the hyperreflectivity line at the interface layer disappeared more slowly than in the 140 μm cap thickness group.

Conclusions: There was a lower level of corneal wound–healing response after SMILE with the 140 μm cap thickness than with 120 μm, although the thickness of cap creation did not affect visual outcomes by 3 months postoperatively.
only slightly at 30 days [LogMAR 0.45 ± 0.31 (Snellen equivalent: 20/60)] compared with baseline [LogMAR 0.37 ± 0.24 (Snellen equivalent: 20/50); \( P = 0.51 \)].

**Conclusions:** Single intravitreal injections of ziv–aflibercept into eyes with neovascular AMD appear to be safe through 1 month. Ziv–aflibercept could become a safe, low-cost therapy for macular diseases in developing countries and those where intravitreal aflibercept (Eylea) is not available.

**Long-Term Outcomes of Anti-VEGF Treatment in East-Asian Patients With Myopic Choroidal Neovascularization**

**First Author:** Nikolle TAN

**Purpose:** Myopic choroidal neovascularization (mCNV) is a leading cause of visual impairment. Asians are at an increased risk of developing mCNV due to a high prevalence of high myopia. In the RADIANCE trial, rapid and sustained best corrected visual acuity (BCVA) improvement was observed with ranibizumab 0.5 mg treatment over 12 months in mCNV patients. This post–RADIANCE study examined the long-term outcomes of East–Asian patients who participated in RADIANCE.

**Methods:** A retrospective chart review in a cohort of East–Asian mCNV patients who completed the RADIANCE trial. All patients had received ranibizumab during RADIANCE. In the post–RADIANCE study (months 12–48), the decision to treat further was made by the clinician. The primary outcome was mean BCVA change from baseline of the RADIANCE trial to each follow-up visit. Anti-VEGF treatment frequency and adverse events (AEs) were recorded.

**Results:** Of the 41 patients included, 7 (17%) required additional anti-VEGF treatment after the 12-month RADIANCE trial. There were 11 mCNV recurrences in 7 patients. In this cohort, mean BCVA at RADIANCE baseline (month 0) was 56.5 ± 12.1 letters. Mean BCVA change was +14.3 ± 11.4 letters at month 12 and +16.3 ± 18.7 letters at month 48. Patients requiring further treatment received an average of 5.0 injections during the post–RADIANCE follow-up. Six AEs were recorded (5 cataracts, 1 glaucoma).

**Conclusions:** Visual acuity gains in East–Asian patients in the 12–month RADIANCE trial were maintained over the 3 year follow-up, with the majority of patients not requiring further anti-VEGF treatment.

**Therapeutic Efficacy of Intravitreal Bevacizumab (Avastin) in Patients With Parafoveal Telangiectasis Type II Complicated by Choroidal Neovascular Membrane and/or Cystoid Macular Edema**

**First Author:** Achyut PANDEY

**Purpose:** To evaluate the therapeutic efficacy of intravitreal bevacizumab (Avastin) on visual acuity and macular edema in patients with parafoveal telangiectasia type II complicated by choroidal neovascular membrane and/or cystoid macular edema.

**Methods:** This study was conducted over a period of 12 months at a tertiary eye care hospital and included 40 eyes of 25 patients (11 male, 14 female) suffering from type II parafoveal telangiectasia with choroidal neovascular membrane and/or cystoid macular edema who fulfilled the inclusion criteria. They were treated with intravitreal bevacizumab (Avastin). Each of the 40 eyes was enrolled in 1 of 2 groups: group 1, eyes with parafoveal telangiectasia type II with choroidal neovascular membrane and group 2, eyes with parafoveal telangiectasia type II with cystoid macular edema but no choroidal neovascular membrane. All patients underwent best corrected visual acuity, slit lamp biomicroscopy, direct and indirect ophthalmoscopy, intraocular pressure (IOP), clinical fundus photography, fundus fluorescein angiography (FFA), and optical coherence tomography (OCT). Follow-up was done at the first, third, and sixth month after presentation.

**Results:** In group 1, there were 11 patients with an equal male-to-female ratio and mean age of 56.27 ± 8.49 years. Group 2 included 18 patients with female preponderance and mean age of 53.5 ± 7.18 years. In group 1, no significant improvement in mean BCVA before (0.121 ± 0.06) or after (0.147 ± 0.06) bevacizumab injection was seen \( (P = 0.051) \). Statistically significant improvement was noticed in mean central foveal thickness (CFT), from 469 ± 89.67 before to 310.78 ± 85.61 after injection \( (P = 0.001) \). Similarly in group 2, there was no significant improvement in mean BCVA before (0.224 ± 0.16) or after (0.254 ± 0.09) injection \( (P = 0.453) \), but there was statistically significant improvement in mean CFT before (356.77 ± 43.22) and after (253 ± 42.59) injection \( (P = 0.001) \). Transient hyperemia and subconjunctival hemorrhage were noticed in 2 patients in both group 1 and 2, whereas increased blood pressure was observed in 2 patients in group 1 and 4 in group 2. None of the patients reported deterioration of vision after injection.

**Conclusions:** In parafoveal telangiectasis type II complicated by choroidal neovascular membrane, there is definite short-term improvement in visual acuity (approaching statistical significance) and definite significant reduction of CFT after intravitreal injection of bevacizumab. In patients suffering from parafoveal
telangiectasis type II complicated by cystoid macular edema, there is definite significant reduction of CFT but no significant improvement in visual acuity after intravitreal injection of bevacizumab. Bevacizumab is safe and well tolerated in eyes with parafoveal telangiectasis type II complicated by choroidal neovascular membrane and/or cystoid macular edema. No severe ocular or systemic adverse effects were encountered in this study.

**Clinical Characteristics of Exudative Macular Degeneration in a Chinese Population: A Prospective Multicenter Study**

*First Author: Ling YEUNG*  
*Co-Author(s): Chi-chun LAI, Chien-neng KUO, An Ning CHAO, Kuan-jen CHEN, Wei-chi WU*

**Purpose:** To determine the clinical characteristics of exudative macular degeneration in a Chinese population.

**Methods:** This was a prospective, multicenter, observational, cross-sectional study among 4 hospitals in Taiwan. Patients with age ≥50 and newly diagnosed exudative macular degeneration were included. The diagnosis was classified into 4 groups: (1) typical age-related macular degeneration (AMD), (2) polypoidal choroidal vasculopathy (PCV), (3) retinal angiomatous proliferation (RAP), and (4) undetermined etiology. The clinical manifestations in each group were documented and analyzed.

**Results:** We enrolled 170 patients with a mean age of 73.5 (SD, 9.6) years. There were 117 (68.8%) males and 53 (31.2%) females. The final diagnosis was AMD in 71 (43.5%) patients, PCV in 76 (44.7%) patients, RAP in 16 (9.4%) patients, and undetermined in 4 (2.4%). The mean age was significantly higher in RAP than in AMD ($P = 0.024$) and PCV ($P < 0.001$). Patients with RAP had a significantly higher incidence of hypertension than patients with AMD ($P = 0.029$) but were not significantly different when compared with patients with PCV ($P = 0.066$). The incidence of massive submacular hemorrhage was significantly higher in PCV than in AMD ($P < 0.001$) and RAP ($P = 0.019$). Regarding the condition in fellow eyes, 37 (22%) patients had disiform scar, 25 (15%) patients had active exudative macular lesion(s), 55 (32%) had dry AMD, and 50 (29%) had unremarkable fundus findings.

**Conclusions:** AMD and PCV were seen in similar proportions among Chinese patients with exudative macular degeneration. RAP is not uncommon in the Chinese population. Most patients with exudative maculopathy in 1 eye also had certain maculopathy in the fellow eye.

**Ube3d is Required for Normal Retinal Development in Zebrafish**

*First Author: Luzhen HUANG*

**Purpose:** To characterize the function of ubiquitin protein ligase E3D (ube3d), a new gene associated with neovascular age-related macular degeneration (AMD), in eye development in zebrafish.

**Methods:** Knockdown of zebrafish ube3d was carried out using antisense morpholino injection. The phenotype of morphants was characterized by histology and hematoxylin-eosin staining. The whole-mount TUNEL assay was optimized for analysis of apoptotic cells in the eye. Transmission electron microscopy (TEM) was used to compare morphological differences between WT and MO zebrafish. To study trafficking, a melanosome assay was performed using epinephrine. The behavior of zebrafishes was observed by Noldus EthoVision-XT video system.

**Results:** Ube3d knockdown in zebrafish resulted in abnormal eye development, including small eyes and delayed retinal development. We observed that the thickness of the photoreceptor outer segment layer was smaller, and more pigment granules were deposited in MO zebrafish larvae compared with WT zebrafish. For adult MO zebrafish, the retinal ganglion cell layer, inner nuclear layer, and outer nuclear layer were all decreased compared with WT zebrafish. TUNEL assay showed that knockdown of ube3d caused increased cell death in the eye. Furthermore, knockdown of ube3d also resulted in an intracellular transport defect affecting retrograde melanosome transport. However, compared with WT zebrafish, knockdown of ube3d did not affect the activity pattern based on Noldus findings of the total distance traveled, velocity, and moving time.

**Conclusions:** Ube3d plays an important role in retinal development in zebrafish. Additionally, ube3d knockdown zebrafish could provide a foundation for revealing the underlying mechanism of neovascular AMD.

**Reproducibility of Smartphone-Based Mesopic Visual Acuity Testing in Eyes With Early AMD**

*First Author: Bo Kwon SON*  
*Co-Author(s): Eung-suk KIM, Seung Young YU, Hyung-woo KWAK*

**FREE PAPERS**
**Purpose:** To assess the reproducibility and concordance of a smartphone-based electronic method of mesopic visual acuity (VA) testing in eyes with early AMD and to compare the difference between photopic and mesopic visual acuity in 2 groups.

**Methods:** Mesopic visual acuity was measured with smartphone-based electronic visual acuity (SEVA) testing using the SightBook application twice and both ETDRS distant chart and LEA numbers near vision chart once on 1 eye of each 21 normal and 20 early AMD patients (n = 41). The difference between photopic and mesopic visual acuity was compared in the 2 groups.

**Results:** For SEVA testing, test–retest reliability was high (ICCs = 0.874, 0.859 for early AMD and 0.925, 0.874 for normal subjects). SEVA and distance VA by ETDRS were highly correlated (r = 0.866, 0.806 in SEVA). There were no differences between VA with SEVA and distance VA with ETDRS chart in the 2 groups. SEVA and near VA with LEA number chart were highly correlated (r = 0.817, 0.835 in SEVA). There were no differences in SEVA and near VA with LEA numbers in the 2 groups. The difference between photopic and mesopic visual acuity using SEVA testing was 0.45 ± 0.06 in early AMD and 0.30 ± 0.07 in normal subjects. Therefore, the difference was significantly higher in early AMD than normal subjects (P < 0.001).

**Conclusions:** SEVA testing using the SightBook application has high test–retest reliability and good concordance with ETDRS distant visual acuity and standard near vision testing. The difference between photopic and mesopic visual acuity was significantly higher in early AMD than normal subjects.

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**Intravitreal Aflibercept Is Effective in the Treatment of Patients With Diabetic Macular Edema From Asia and Russia: Results From the VIVID-EAST Study**

**First Author:** Youxin CHEN  
**Co-Author(s):** Xiaoxin LI, Xun XU, Gezhi XU, Young Hee YOON, Yurij SERGEYEVIC ASTAKHOV

**Purpose:** VIVID–EAST evaluated intravitreal aflibercept (IVT–AFL) versus laser in patients with diabetic macular edema (DME) from China, Hong Kong, Korea, and Russia.

**Methods:** Patients were randomized (1:1:1) to IVT–AFL 2 mg every 4 weeks (2q4)/sham laser, IVT–AFL 2 mg every 8 weeks (2q8) (after 5 initial monthly doses)/sham laser, or laser/sham injections. Primary endpoint was mean change in best corrected visual acuity (BCVA) to week 52.

**Results:** A total of 378 patients were randomized to treatment (mean age, 58.5 years; 92.3% Asian; mean baseline BCVA, 55.9 letters). Mean number of active injections was 12.6 (IVT–AFL 2q4) and 8.7 (2q8). Mean BCVA change at week 52 was significantly higher with IVT–AFL 2q4 (13.7 letters) and 2q8 (12.8 letters) versus laser (–0.2 letters) (P < 0.0001). In the IVT–AFL 2q4, 2q8, and laser groups, 43.3%, 36.5%, and 12.1% gained ≥15 letters; 60.7%, 62.3%, and 21.7% had a ≥2-step improvement in ETDRS DRSS; and mean change in central retinal thickness was –238.7 µm, –234.7 µm, and –109.3 µm, respectively (all P < 0.0001 vs laser). The most frequent ocular treatment–emergent adverse event (study eye) (IVT–AFL combined) was conjunctival hemorrhage (11.8%). Antiplatelet trialists’ Collaboration–defined arterial thromboembolic events occurred in 4 (IVT–AFL 2q4), 3 (2q8), and 2 (laser) patients.

**Conclusions:** VIVID–EAST showed that IVT–AFL (2q4 and 2q8) was superior to laser in improving visual and anatomical outcomes. Incidence of adverse events was consistent with the known safety profile of IVT–AFL. These findings are comparable with VIVID/VISTA–DME studies.

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**Correlation of Apolipoprotein Level With Diabetic Retinopathy Grading and Diabetic Macular Edema**

**First Author:** Ririn SAMINTO  
**Co-Author(s):** Habibah MUHIDDIN, Ichesan ANDI

**Purpose:** The purpose was to find the correlation of apolipoprotein (ApoA1 and ApoB) with diabetic retinopathy (DR) grading and the accident of diabetic macular edema (DME) in type 2 diabetes mellitus (DM) patients.

**Methods:** A observational analytic study with cross-sectional design.

**Results:** The study was conducted over a year in 66 subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects. Hard exudate (HE) was found in 75.85% (50 DR subjects). DME was found in 74.2% (49 DR subjects). A ratio of ApoB/ApoA1 < 1 was found in more DR subjects.
0.016). HE was significantly correlated with systolic BP ($P = 0.019$) and ApoA1 ($P = 0.034$). DME was significantly correlated with systolic BP ($P = 0.036$), diastolic BP ($P = 0.015$), and ApoA1 ($P = 0.007$). Levels of ApoB and the ratio of ApoB/ApoA1 were not statistically related to DR grading or DME. This could be because almost all subjects, 78.8% (n = 58), had adequate control of blood sugar, blood pressure, and lipid that changed the lipid level.

**Conclusions:** The level of ApoA1 was significantly correlated with DR grading and DME. The lower the level of ApoA1, the greater the degree of DR with DME. The level of ApoB and the ratio of ApoB/ApoA1 were not statistically related to DR grading and DME. DME was significantly correlated with BP (systolic and diastolic) and ApoA1 level. Adequate control of blood sugar and lipid do not change the condition of DR and DME that have already happened.

**FREE PAPERS**

**RETINA (SURGICAL)**

Mar 26, 2016 (Saturday)

16:30 - 18:00  
**Venue:** 103  
**Session:** OE-FP01  

**ASRS Retina Image Bank**

**First Author:** Suber HUANG  
**Purpose:** To introduce the Retina Image Bank (imagebank. ASRS. org) as a unique worldwide platform for all things retina and as a unique educational program to browse, share, and learn about the wide spectrum of retinal diseases.

**Methods:** This presentation will focus on the use and uses of the ASRS Retina Image Bank (RIB). The RIB is housed and has dedicated staff at the international headquarters of the American Society of Retina Specialists. Features of the site, including upload, download, search, and rating functions, will be demonstrated. The RIB utilizes Boolean search algorithms, editor and review rating systems, and crowdsourcing logic to ensure that the RIB is a dynamic platform. New contributions refresh the website with the highest rated and most viewed content. Users enjoy a continuously refreshed experience.

**Results:** The Retina Image Bank is the world’s largest, most comprehensive, open-access, multimedia platform for retinal diseases. The RIB has nearly 40,000 searchable images to date.

**Conclusions:** The ASRS Retina Image Bank is an open resource and unique platform for education and all topics related to retina. Participants will learn how to access this resource and use it to browse, share, learn, and incorporate retinal knowledge into patient care.

16:30 - 18:00  
**Venue:** 103  
**Session:** OE-FP01  

**RETMA: Retinal Expansion Technique for Macular Hole Apposition (A Novel Surgical Technique for Closure of Large Full Thickness**
Macular Holes)
First Author: Roger WONG
Co-Author(s): Giancarlo DELL’AVERSANA

Purpose: To report the methods and success rate of a novel technique to close large macular holes.

Methods: This was a prospective study of patients who underwent the RETMA (retinal expansion technique for macular hole apposition) procedure. Inclusion criteria included macular hole patients with opening diameters > 650 µm. Patients were excluded if they had concomitant eye disease. Preoperative assessment included visual acuity, optical coherence tomography (OCT), and measurement of the opening and base diameters of the full thickness macular hole. Follow-up occurred at day 1, 2 weeks, 6 weeks, 4 months, and 12 months after surgery. Pars plana vitrectomy was performed, followed by internal limiting membrane peel. The macula was detached using subretinal saline injection. Fluid-air exchange was performed to promote retina stretch. Standard fluid-air exchange was then performed and perfluoroprane gas was injected.

Results: We report 15 patients who underwent the RETMA procedure. Thirteen out of 15 cases had successful hole closure. Average opening diameter of macular holes was 722 µm, with an average base diameter of 1233 µm. At 3 months follow-up, no worsening in visual function was reported, and improvement in visual acuity was noted in 10 of 13 eyes. There were no adverse events observed.

Conclusions: It is possible to achieve anatomical closure of large macular holes using the RETMA procedure. Further follow-up and larger samples will allow better understanding of the true visual potential after closure of these large macular holes.

16:30 - 18:00
Venue: 103
Session: OE-FP01

25-Gauge Phakic Vitrectomy With Adhesion Dissection of Retina and Posterior Lens Capsule for Familial Exudative Vitreoretinopathy in Infants
First Author: Jin MA

Purpose: To evaluate the clinical outcome of 25-gauge phakic vitrectomy with adhesion dissection of the retina and posterior lens capsule, a new surgical technique to achieve both posterior retinal drag release and lens preservation and avoid progressive lens opacification, for infants with familial exudative vitreoretinopathy (FEVR)-associated retrolental retinal adhesion.

Methods: Thirty-one eyes of 31 infants with FEVR-associated retrolental retinal adhesion and comorbid conditions of retinal folds, tractional retinal detachment, and macular dragging were included. Adhesion of retina and posterior lens capsule was manually dissected, and 25-gauge phakic vitrectomy was performed using a pars plana approach. Before and up to 7 months after surgery, fundus features (including retinal folds, attachment of the posterior pole, and macular dragging), lens opacity [graded using the Lens Opacity Classification System III, (LOCS III)], and intraoperative and postoperative complications were observed and recorded monthly.

Results: Anatomical posterior retinal drag release was achieved in all 31 cases and maintained throughout the study period. Overall, no change in lens opacity was observed between the preoperative and any postoperative visit (SNK-q test comparing the means of LOCS III grades between visits, all P > 0.05; X² test comparing the distributions of lens opacity among visits, P > 0.05).

Conclusions: The proposed surgical technique can achieve posterior retinal drag release and avoid lens removal and progressive lens opacification in infants with FEVR-associated retrolental retinal adhesion. It may become a primary choice for treating infants with such a condition.

16:30 - 18:00
Venue: 103
Session: OE-FP01

Classification and Treatment of X-Linked Congenital Retinoschisis
First Author: Shibo TANG

Purpose: X-linked congenital retinoschisis is a relatively common disease in young boys. The literature shows that RS gene mutation leads to the separation of the inner retina. Although the mechanism of the disease is quite clear, the treatment is limited and unsatisfactory. We need to find a more effective way to treat this kind of disease.

Methods: In the present presentation, 60 cases (120 eyes) were studied. According to the changes of optical coherence tomography (OCT), a new clinical classification will be reported. Patients were divided into 2 groups, the surgical and nonsurgical groups. A 25G microinvasive surgery was performed.

Results: The results of surgery showed that the cavity of retina separation disappeared in 68% of the eyes after surgery. Vision was improved in 65% of the eyes. In the nonsurgical group, 78% of the eyes remained stable during a follow-up period of 2 years. The retinal cavity of the other 22% of the eyes increased in different degrees.

Conclusions: The present study revealed that the separation of the retina can be seen in different layers
of the retina. A 25G surgery seems to be an effective treatment for the majority of patients. However, the surgical risks and complications should be noted.

16:30 - 18:00
Venue: 103
Session: OE-FP01

Relationship Between Abnormal Fundus and Macular Changes in Children With Retinopathy of Prematurity

First Author: Xin HUANG

Purpose: To analyze the relationship between macular changes and the severity of drag-disc, one kind of abnormal fundus, in children with retinopathy of prematurity (ROP).

Methods: There were 21 patients (34 eyes) with drag-disc, who were diagnosed with ROP in the Eye and ENT Hospital of Fudan University between December 2004 and April 2014. Among them, 7 patients (12 eyes) received laser treatment for ROP, and 14 patients (22 eyes) regressed spontaneously. After detailed inquiry into the medical history of all patients, digital fundus camera was used to record fundus results, which were further processed to acquire angles of arcus vasculosus and distance between the macula and papillary center. Macular changes, including foveal thickness and thickness difference of the fovea and parafovea, were recorded by Heidelberg optical coherence tomography (OCT).

Results: According to the angle of arcus vasculosus (≥50 degrees and <50 degrees), eyes with drag-disc were divided into 2 levels of severity (level 1 and level 2). There were 23 eyes with level 1 drag-disc and 11 eyes with level 2 drag-disc. Compared with normal eyes, eyes with level 1 drag-disc showed a slight increase in distance between the macula and papillary center with a mean of 3.6 PD (range, 3.1 PD to 4.0 PD); a distinct thickening of foveal thickness with a mean of 274 μm (range, 255 μm to 301 μm); and no obvious change in thickness difference of the fovea and parafovea with a mean of 84 μm (range, 73 μm to 95 μm). Eyes with level 2 drag-disc demonstrated a distinct increase in distance between the macula and papillary center with a mean of 5.6 PD (range, 4.9 PD to 6.1 PD); an obvious thinning of foveal thickness with a mean of 214 μm (range, 150 μm to 252 μm); and a distinct decrease in thickness difference of the fovea and parafovea with a mean of 50 μm (range, 20 μm to 60 μm).

Conclusions: When the angle of arcus vasculosus was greater than 50 degrees, foveal thickness became thicker. When the angle of arcus vasculosus was less than 50 degrees, foveal thickness became thinner and the thickness difference of the fovea and parafovea decreased. There was a correspondence between abnormal fundus and macular changes.

16:30 - 18:00
Venue: 103
Session: OE-FP01

Comparison of Three Types of Posterior Scleral Reinforcement Implants in the Management of Foveoschisis in High Myopia

First Author: Lin LU

Purpose: To compare the surgical effectiveness and complications associated with the use of 3 different types of posterior scleral reinforcement implants in the management of high myopia foveoschisis.

Methods: Three different types of posterior scleral reinforcement implants were used in highly myopic patients [either spherical refraction ≤ -8.0 diopters (D) or axial length ≥ 26.5 mm] with posterior scleral staphyloma and foveoschisis and disease progression. The 3 types of implants used were silicone capsules, silicone–titanium plate implants, and silicone sponge–titanium plate implants. Out of which, 11 patients used silicone capsules, 5 patients used silicone–titanium plate implants, and 17 patients used silicone sponge–titanium plate implants. Follow-up period varied between 6 and 24 months, and all patients were evaluated for their visual acuity, axial length, extent of foveoschisis, and other complications.

Results: Patients that used silicone capsule implants and those with silicone sponge–titanium plate implants had obvious postsurgical macular ridge. In the silicone capsule group, presurgery best corrected visual acuity (BCVA) (logMAR) improved from 1.49 ± 0.64 to 0.96 ± 0.69 (P = 0.014) postsurgery. Complete recovery was observed in 4/11 cases, and improvement of foveoschisis was observed in 6/11 cases. Five of 11 cases showed a temporary increase in intraocular pressure (25–42 mm Hg), whereas 3/11 cases had choroidal detachment. However, these complications recovered spontaneously. For affected eyes that had silicone–titanium plate implants, presurgery BCVA (logMAR) improved from 2.18 ± 0.59 to 1.94 ± 0.70 (P = 0.047) postsurgery. Surgical ridges were not obvious in 5/5 cases, whereas axial length showed a mean decrease of 0.96 ± 0.34 mm. After surgery, 2/5 cases showed foveoschisis retinal detachment, whereas 3/5 cases showed improvement in foveoschisis and visual acuity. None of 5 cases showed choroidal detachment and 2/5 cases showed a temporary increase in intraocular pressure (22–34 mm Hg). In the silicone sponge–titanium plate group, presurgery BCVA (logMAR) improved from 1.93 ± 0.814 to 1.22 ± 0.76 (P = 0.019) postsurgery and axial length showed a mean decrease of 1.42 ± 0.48 mm. Twelve of 17 cases showed a complete recovery or improvement of foveoschisis, 4/17 cases showed a minor increase.
in intraocular pressure (22–32 mm Hg), 0/17 cases showed choroidal detachment, whereas 4/17 cases had surgical rids that deviated from the fovea.

Conclusions: Silicone capsule posterior scleral reinforcement implants are more convenient to use in surgical procedures and yield observable results. However, they can cause a short-term increase in postsurgical complications. The surgical rids were less ideal with the use of silicone–titanium plate implants.

Conclusions: In a hypoxic environment, HMGB1 is activated in human RPE cells. Activated HMGB1 can stimulate the gene expression of fibrogenic factors (Collagen I, OPN, CTGF, and TGFβ2) as well as angiogenic factors (VEGF and bFGF). All these factors might contribute to angiogenesis and tissue remodeling in a hypoxic environment such as diabetic retinopathy.

**FREE PAPERS**

**Mar 25, 2016 (Friday)**

16:30 – 18:00  
**Venue:** Elegance Lounge  
**Session:** VS-FP01  
**Investigation of the HMGB1-Activated Signaling Pathways in Human Retinal Pigment Epithelial ARPE-19 Cells**

**First Author:** Yo-chen CHANG  
**Co-Author(s):** Wen-chuan WU

**Purpose:** Diabetic retinopathy (DR) is a common microvascular complication associated with diabetes. It is a leading cause of acquired blindness in working adults. The earliest histological features of DR include neuroretinal damage, capillary basement membrane thickening, and loss of pericytes and endothelial cells. High–mobility group box–1 (HMGB1), a nonhistone chromatin–associated protein, triggers inflammation and angiogenesis. In a diabetic environment, HMGB1 acts as a proinflammatory cytokine which is considered to participate in many of its complications including nephropathy and cardiomyopathy. However, the signaling systems triggered by this protein in DR pathogenesis are not fully understood. Herein we present an in vitro study to further investigate the biomodulatory effect of HMGB1 on human RPE cells and the downstream signaling pathway involved in the HMGB1–induced RPE cell activation.

**Methods:** Cultured human RPE cells (ARPE–19) were used for subcellular location of HMGB1 under oxidative or hypoxic insult, adhesion assay, expression of cytokines under the pretreatment of HMGB1, and detection–related signaling pathway.

**Results:** Chemically mimicked hypoxia induced nucleocytoplasmic translocation of endogenous nuclear HMGB1 peptides by immunohistochemical staining. Under simultaneous hypoxic and oxidative stresses, ARPE–19 cells could release endogenous HMGB1 peptides by Western blotting. HMGB1 upregulated fibrosis–related genes including TGFβ, CTGF, OPN, and Collagen Iα. In addition, HMGB1 also upregulated gene expression of angiogenic factors including VEGF–A, VEGF–B, VEGF–C, and bFGF. By Western blotting, HMGB1 induced hyperphosphorylation of Akt and ERK1/2.

**Conclusions:** In a hypoxic environment, HMGB1 is activated in human RPE cells. Activated HMGB1 can stimulate the gene expression of fibrogenic factors (Collagen I, OPN, CTGF, and TGFβ2) as well as angiogenic factors (VEGF and bFGF). All these factors might contribute to angiogenesis and tissue remodeling in a hypoxic environment such as diabetic retinopathy.

16:30 – 18:00  
**Venue:** Elegance Lounge  
**Session:** VS-FP01  
**Using Nanomedical Methods (Paper-Based ELISA, Scanning Electron Microscopy, and Transcriptome Analysis) to Identify the Existence of Exosomes and RNA in Aqueous Humor**

**First Author:** Min-yen HSU  
**Co-Author(s):** De-kuang HWANG

**Purpose:** To identify the existence of exosomes and RNA within aqueous humor by new biomedical methods. Since 2010, exosomes [also called extracellular vesicles (EVs)] have been isolated as membranous particles released from various types of biological fluids, including blood and aqueous humor. However, the reported diameter of exosomes is between 30 and 100 nm. Thus, due to their small size, previous protocols for isolation of EVs are often time consuming, difficult, and require larger sample volumes and expensive equipment, such as an ultracentrifuge. To solve the mentioned limitations, we validated a paper–based immune–affinity method and further scanning electron microscopy (SEM) for separating subgroups of EVs.

**Methods:** EVs contain nucleic acid and protein cargo and are increasingly recognized as a means of intercellular communication utilized by both eukaryote and prokaryote cells. In ophthalmology, the appearance of MYOC–associated exosomes in conditioned media from human TM cells is regulated by a corticosteroid and was a component of aqueous humor, suggesting that TM cells respond to environmental cues by releasing MYOC–associated exosomes. Thus, we validate the assay by using SEM, paper–based enzyme–linked immunosorbent assays (P–ELISA), and transcriptome analysis for aqueous humor. EVs are heterogeneous in size, specific contents, and biogenesis routes. To bind EVs on paper–based devices, a single layer of cellulose was coated with 2 different EV capture molecules, anti–CD63 antibodies and annexin V. CD63, a member of the tetraspanin family, is enriched on EV membrane, and annexin V has a strong affinity for phosphatidylinerine.
**Results:** We collected aqueous humor from 4 patients with AMD, PCV, and DME. After finishing our assay, the average of RNA extracted (ng) as anti-human CD63 was 1.49 ± 0.08 and annexin V was 0.99 ± 0.26, respectively. RNA from EVs captured on the paper device was extracted and analysed with a bioanalyzer showed similar overall profiles for total RNAs extracted from CD63+ and PS+ EVs. Analyses of SEM images showed that the size distributions of CD63+ EVs and PS+ EVs were different, with mean diameters of 80 and 43 nm, respectively (P < 0.0001, 2-tailed Student t test). Surprisingly, CD63+ EVs appear rounder and larger than PS+ EVs on average, the biological significance of which remains to be elucidated. Compared with the amounts of RNA extracted using the microfluidic and ultracentrifugation techniques, respectively, about twice and 39 times more RNA per unit volume of serum sample were extracted utilizing this paper-based device. Only 72 µL of samples was required for each analysis through our assay.

**Conclusions:** Thus, exosomes and RNA were successfully isolated in aqueous humor through our assays. These paper-based devices will enable the study of EVs in the clinic and the research setting to help advance our understanding of EV functions in ocular disease like Fuchs dystrophy and glaucoma.

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16:30 – 18:00  
**Venue:** Elegance Lounge  
**Session:** VS–FP01

**Histopathologic Analysis of Choroidal Neovascular Membrane in 43 Eyes With Hemorrhagic Age-Related Macular Degeneration**

**First Author:** Liang HAN  
**Co-Author(s):** Yen-ling CHO, Zhi Zhong MA

**Purpose:** To classify surgically excised choroidal neovascular (CNV) membrane specimens and to compare the histopathologic differences of CNV membrane in anti-VEGF treated eyes and treatment-naive eyes with hemorrhagic age-related macular degeneration (hAMD).

**Methods:** Forty-three CNV membrane specimens were captured from 43 eyes with hAMD during autologous simple RPE sheet transplantation surgery, including 6 patients who failed to respond to anti-VEGF therapy before surgery and 37 treatment-naive patients. All specimens were processed with HE, PAS, and Masson staining before applying light microscope observation. Transmission electron microscope was applied to analyze the components of the specimens.

**Results:** The specimens of PCV were mainly composed of blood clot. The diameters of the vasculopathy lumen were big with thickened walls, and choroidal mela-nocytes were also observed. Occult CNV membrane specimens were mainly neovascular membrane lesions. Degenerated thickened Bruch membranes were observed both in PCV and AMD eyes. The specimens in the treatment-naive group were divided into 4 groups: 1) neovascular vessels dominant with small amount of collagen fibers; 2) collagen fibers dominant with small amount of neovascular tissue; 3) blood clot dominant; and 4) degenerated thickened Bruch membrane dominant with basal laminar deposits. In the group with anti-VEGF treatment, density of macrophages was significantly higher; dendritic cells and fibroblast cells were also observed, and neovascular lumen closed dramatically.

**Conclusions:** The components of CNV membrane are diversified. CNV membrane specimens with anti-VEGF therapy are characterized by high cellular proliferative activity and dramatic appearance of neovascular lumen closure. The high density of macrophages along with dendritic cells and lymphocytes might have an effect on stabilizing CNV progression.

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**Morphofunctional Study of Rabbit Retina With Rhodopsin Mutation**

**First Author:** Ken ASAKAWA  
**Co-Author(s):** Hitoshi ISHIKAWA, Kimiya SHIMIZU, Mineo KONDO, Hiroko TERASAKI

**Purpose:** To examine the changes in retinal degeneration from functional evaluations by pupil light response and the amplitude of electroretinography (ERG) and morphological findings by using microscopy in rhodopsin Pro347Leu transgenic (Tg) rabbits.

**Methods:** The experiments were performed on 6 eyes of Tg and 6 eyes of wild-type (WT) rabbits. We conducted functional evaluations by recording the changes in pupil response to red (635 nm) and blue (470 nm) light stimulus and the amplitude of ERG. Morphologically, rod and cone distribution was examined using light and electron microscopy. Immunostaining for the identification of retinal ganglion cells (RGCs) was also confirmed by injecting a TUJ-1 monoclonal and PA1-780 polyclonal antibody.

**Results:** Pupil constriction for infrared pupillography and the a– and b-waves for ERG in the Tg rabbits decreased with increasing age, and differences were found compared with the age-matched WT rabbits. Pupil constriction to red light had almost disappeared, but it was still induced during exposure to blue light in outer retinal degeneration. Morphologically, light and electron microscopy showed a progressive loss of rods and cones in peripheral retina. Some remaining RGCs
Cytoprotection With Primitive Cellular Reprograming After Delivery of Oct4 and SirT1 With Cationic Polyurethane—Short Branch Polyethylenimine

First Author: Chi-hsien PENG
Co-Author(s): Shih-jen CHEN, Shih-hwa CHIOU

Purpose: Cationic polyurethane is a biodegradable and nonviral vector to deliver genes efficiently. Oct4 maintains pluripotency and SirT1 promotes cellular longevity. To investigate the possible rescuing role of Oct4/SirT1 overexpression by PU–PEI delivery system into aged RPEs (aRPEs) or light–injured rat retinas.

Methods: Cellular self–renewal ability, stemness gene expression, and antioxidant properties were detected after Oct4/SirT1 overexpression by PU–PEI delivery system in aRPEs. The activity of Oct4 promoter with demethylation and gene expression microarray analysis also evaluated the progenitor features. In rat light–induced retinal damage after Oct4/SirT1 delivery, cytoprotective effects with quantification outer nuclear thickness, recording of electroretinography, and detection of antioxidative level were all measured.

Results: Oct4/SirT1 overexpression increased the expression of several progenitor–related genes and the self–renewal ability of aRPEs. Moreover, Oct4/SirT1 overexpression resulted in the demethylation of the Oct4 promoter and enhanced the expression of antioxidant enzymes, which was accompanied by a decrease in intracellular ROS production and hydrogen peroxide–induced oxidative stress. Importantly, PU–PEI–mediated Oct4/SirT1 gene transfer rescued retinal cell loss and improved electroretinographic responses in light–injured rat retinas.

Conclusions: The possible use of PU–PEI or other nonviral DNA–free delivery of Oct4 and SirT1 should be further explored for its clinical advantages.

A Novel Antimyopia Eye Drop Using RNA Interference Technique

First Author: Chung-ling LIANG
Co-Author(s): Edward HSI, Suh-hang JUO

Purpose: Myopia has become a pandemic disease. We previously identified a microRNA called miR–328 that is involved in myopia development. In mice, miR–328 was increased in myopic eyes compared with normal eyes. We developed a new miR–328 inhibitor as an eye drop to treat myopia.

Methods: Form–deprivation myopia (FDM) was induced in the right eye of C57BL/6J mice at the age of 23 days. The fellow eye of the same mouse was used as the control. MiR–328 antisense was dissolved in normal saline to become an eye drop to treat FMD eyes. Two types of control groups were used: the first type received 1% atropine in the FDM eyes, and the second group received normal saline in the FDM eyes. The treatment effect was assessed by the difference in axial length (AXL) for any given mouse. To improve measurement consistency and accuracy, we also developed a computerized automatic measure, which takes the longest anterior–posterior axial as the AXL.

Results: In the saline treated group, the difference (FDM eye – fellow eye) of AXL was 0.015 ± 0.048 mm. The difference of AXL was −0.029 ± 0.053 mm in the anti–miR–328 treated group. Therefore, the anti–miR–328 treatment was more effective in suppressing eyeball elongation than atropine or normal saline.

Conclusions: In conclusion, we have the proof of principle of anti–miR–328 efficacy in treating myopia–associated eyeball elongation.

The Role of Stem Cells in Myopia Development

First Author: Suh-hang JUO
Co-Author(s): Ching-hua LIANG, Edward HSI, Chung-ling LIANG

Purpose: During the development of myopia, the sclera has dynamic changes and remodeling leading to the elongation of the eyeball. Mouse scleral stem cells highly express CD44 surface marker. We investigated...
whether stem cells are involved in myopia development.

**Methods:** The right eyes were covered to induce form-deprivation myopia (FDM) in mice (23 days old). The axial length (AXL) was measured, and the difference of AXL between the covered right eye and uncovered left eye was a surrogate of myopia. The majority of scleral stem cells were located in the ciliary body. We measured the number of scleral stem cells among different severities of myopia. The correlation test was performed for the relationship between stem cell abundance and myopia severity. MicroRNA–328 can directly target CD44, and microRNA–328 effects on CD44 expression and stem cell functions were assessed.

**Results:** Myopic eyes had fewer scleral stem cells than normal eyes (P < 0.0001). There was negative correlation (−0.59) between myopia severity (ie, difference of AXL of each mouse) and stem cell abundance (P = 0.004). A low microRNA–328 level could increase CD44 expression (P = 0.0002), increase the scleral stem cell proliferation rate (P < 0.0001), and elevate ALP expression (P = 0.03) and ALP activities (P = 0.0003). In addition, a decrease in microRNA–328 could substantially enhance the stem cell ability of differentiation to osteocytes, chondrocytes, and adipocytes. Retinoic acid (RA) could increase microRNA–328 expression, and RA also reduced stem cell functions (P = 0.008).

**Conclusions:** We demonstrated that low scleral stem cell count and function are risk factors for myopia, and microRNA–328 suppresses scleral stem cells.

16:30 – 18:00
Venue: Elegance Lounge
Session: VS–FP01

**Update of RetinoGenetics: A Comprehensive Mutation Database for Genes Related to Inherited Retinal Degeneration**

First Author: Feifei CHENG
Co-Author(s): Zi-bing JIN

**Purpose:** Inherited retinal degeneration (IRD) is the leading cause of blindness at the age of adolescence and postadolescence. With the emergence of second-generation sequencing, numerous mutations have been identified in various genes underlying IRD. We previously developed a mutation database, Retino-Genetics, which serves as an efficient tool for genetic counseling and gene diagnosis. This study aimed to improve the database with updated information.

**Methods:** All IRD–related genes and mutations were included by comprehensive searching and were updated periodically.

**Results:** The database currently contains 7172 mutations, 292 genes, 178 phenotypes (in which 4310 mutations, 194 genes, and 178 phenotypes were included at the last update on March 23, 2014), and their diverse functional annotations. Moreover, extensive annotations were displayed for each gene using various resources, including Gene Ontology, protein–protein interaction, KEGG pathways, and gene–disease network. All data was stored in a MySQL relational database. In addition, a user–friendly web interface has been designed and implemented by PHP and JavaScript running on an Apache HTTP server.

**Conclusions:** The updated RetinoGenetics database is an integrative and informative resource for clinical ophthalmologists, genetic counselors, and researchers in the IRD field. Database URL: http://www.retinogenetics.org/ (update: http://yikedaxs.xg.325604.net/).

16:30 – 18:00
Venue: Elegance Lounge
Session: VS–FP01

**Whole-Genome Sequencing Reveals an Unexpected Genetic Cause of Stargardt Disease Missed by Targeted Next-Generation Sequencing**

First Author: Xiu-feng HUANG
Co-Author(s): Zi-bing JIN

**Purpose:** Stargardt disease (STGD1) is the most common form of juvenile macular dystrophy, and the identifiable molecular etiology is absent in approximately 30% of patients due to technological limitations. The genetic architecture was deciphered in 5 families presenting with STGD1 using a combination of whole-genome sequencing (WGS) and targeted next-generation sequencing (tNGS).

**Methods:** Five unrelated Chinese families with simplex STGD1 were recruited and received tNGS for 201 known inherited retinal dystrophy (IRD) genes. Subsequently, WGS was performed on the patients who tested negative with tNGS.

**Results:** We determined the cause of disease in 4 families (80%, 4/5) using tNGS. Eight different mutations were identified, including 2 novel mutations. The patient F5–1, who tested negative, was assessed with WGS. Surprisingly, we identified a novel large (>10 bp) duplication (c. 6642_6669dup28bp, p. S2224Pfs*36) in ABCA4 with WGS, which was missed by high-depth WGS. A comparison of large indels detected between WGS and tNGS suggests greater accuracy and sensitivity of low–depth (30X) WGS than high–depth (187X) tNGS.

**Conclusions:** We compared the efficiency of WGS and tNGS techniques in identifying genetic defects, suggesting that low–depth WGS performs better than high–depth tNGS. This was the first time WGS was
The Antiangiogenic Effect of Tectorigenin in a Mouse Model of Retinopathy of Prematurity

First Author: Kuidong KANG
Co-Author(s): Su Ah KIM

Purpose: Tectorigenin is an isoflavone derived from the rhizome of Belamcanda chinensis. In this study, oxygen-induced retinopathy was used to characterize the antiangiogenic properties of tectorigenin in mice.

Methods: ICR neonatal mice were exposed to 75% oxygen from postnatal day (P)7 until P12 and returned to room air for 5 days (P12 to P17). Mice were subjected to daily intraperitoneal injection of tectorigenin (1 mg/kg, 10 mg/kg) and vehicle from P12 to P17. Retino-orbital injection of FITC-dextran was performed, and retinal flat mounts were viewed by fluorescence microscopy. Central avascular area was quantified using image analysis software. Neovascular tufts were quantified by using SWIFT_NV, and neovascular lumens were quantified from histologic section. Immunohistochemistry and Western blot analysis were also performed to demonstrate the antiangiogenic activity of tectorigenin.

Results: In the retina of tectorigenin–injected mice (10 mg/kg), the central nonperfusion area was significantly decreased compared with the vehicle–injected group (P < 0.05). In the vehicle–injected group, 33.45 ± 5.51% of the total retinal area was avascular, whereas the retinas of pups treated with high-dose (10 mg/kg) tectorigenin showed avascular retinal areas of 21.25 ± 4.34% (P < 0.05). A high dose of tectorigenin also significantly reduced the number of vascular lumens in the histologic section. Tectorigenin significantly reduced the expression of VEGF, MMP-2, MMP-9, and angiotensin II compared with the vehicle. Tectorigenin did not affect CD31 abundance at any tested dose.

Conclusions: Our results show that tectorigenin possesses powerful antiangiogenic properties and can attenuate new vessel formation in the retina after systemic administration.

Identification of PGF as a New Gene for Neovascular Age-Related Macular Degeneration

First Author: Li Jia CHEN
Co-Author(s): Li MA, Haoyu CHEN, Alvin YOUNG, Calvin C.p.

Purpose: To determine the association of the placental growth factor (PGF) genes with neovascular age-related macular degeneration (nAMD) and polypoidal choroidal vasculopathy (PCV).

Methods: Five single-nucleotide polymorphisms (SNPs) in PGF were genotyped in a Hong Kong cohort of over 230 nAMD patients, 230 PCV patients, and 360 controls, using TaqMan genotyping technology. Significant SNPs were validated in a Shantou cohort of over 180 nAMD patients, 180 PCV controls, and 530 controls.

Results: PGF SNP1 [G allele, P < 0.005; odds ratio (OR), 1.5] and SNP2 (G allele, P < 0.05; OR, 1.46) were associated with nAMD. A significant omnibus haplotype association with nAMD was detected for a 2–SNP window containing SNP1 and SNP2, with a haplotype G–G conferring a 1.5-fold increased risk (P < 0.005) in the Hong Kong cohort and a 1.4-fold risk (P < 0.05) in the Shantou cohort. Meta-analysis of the Hong Kong and Shantou data affirmed the association of nAMD with SNP1 (P = 0.002; OR, 1.38; I2 = 0%), SNP2 (P = 0.007; OR, 1.33; I2 = 0%), and the G–G haplotype (P = 0.001; OR, 1.46; I2 = 0%). No PGF SNP was associated with PCV.

Conclusions: PGF is a susceptibility gene for nAMD, providing new evidence to support a biological role of PGF in choroidal neovascularization.
in other diseases like amblyopia, progressive supranuclear palsy, Parkinson disease, Alzheimer disease, and mild cognitive impairment. But they have never been studied in hemianopia. Our aim was to investigate if and how MS features are altered in HH.

**Methods:** Fourteen patients with HH (mean age, 59) and 14 healthy controls (mean age, 60) were recruited. We used a fixation task (a white fixation dot was presented against a grey background). Participants were instructed to fixate the central dot. Binocular eye movements were recorded by an EyeLink–1000 system (SR Research, Ontario, Canada) with a 500 Hz sampling rate. An adapted MS detection algorithm was used to identify MS and a binocular conjugacy algorithm was specifically developed by us to quantify binocular MS conjugacy. Linear models were used to test the MS difference between the 2 groups.

**Results:** Group effect was not found in MS velocity, rate, percentage of binocular MS, or vertical conjugacy. The hemianopic group showed a larger amplitude (mean, 0.46; SEM, 0.03) compared with the control group (mean, 0.39; SEM, 0.02) \[F(1, 26) = 4.15, P = 0.052\] and a larger horizontal conjugacy index (mean, 12.50; SEM, 1.70) than controls (mean, 8.58; SEM, 0.64) \[F(1, 26) = 5.71, P = 0.024\]. This suggests that hemianopic patients’ left and right eyes worked poorly together compared with normal eye coordination in healthy subjects. Although controls’ MS showed no preference over either side, hemianopic patients’ MS showed a significant bias toward the intact side \[F(1, 25) = 4.93, P = 0.036; F(1, 25) = 8.56, P = 0.007\].

**Conclusions:** Although MS magnitudes, velocities, durations, and frequencies were comparable between both groups, hemianopic patients produced significantly less conjugate binocular MS. While performing monocular and binocular MS, hemianopic patients tend to make more MS toward their intact visual fields. Thus, binocular MS are impaired in patients with HH. The discovery of an asymmetric MS direction favoring the seeing field will facilitate a better understanding of the nature of vision loss in hemianopia and help us design new rehabilitation methods.

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**Glutathione S-Transferase Pi Isoform Induction Protects Human Retinal Pigment Epithelial Cells Against Hydroquinone-Mediated Oxidative Stress**

**First Author:** Wen-hsiang Lee  
**Co-Author(s):** Matthew Donovan

**Purpose:** Glutathione S-transferase pi isoform (GSTP1), a phase 2 intracellular detoxification enzyme that catalyzes reduction of chemically reactive electrophiles, is a zeaxanthin-binding protein in human macula. Previously, we showed decreased GSTP1 levels in human age-related macular degeneration (AMD) retina compared with normal controls. We also showed that GSTP1 levels parallel human retinal pigment epithelial (RPE) cell survival upon UV light exposure, and GSTP1 overexpression protects against UV light damage. Here we determined the dose–response effect of cigarette smoke component hydroquinone (HQ)–mediated oxidative stress on GSTP1 expression and its response to phase 2 enzyme inducer sulforaphane in human RPE cell viability.

**Methods:** Human RPE cell culture (ARPE-19) was maintained using established protocols. ARPE-19 cells were plated at subconfluent density in 6 well plates and grown to confluence. Cells were pretreated without or with sulforaphane (5 μM) for 24 hours before exposure to HQ (50, 100, 150 μM) for 8–12 hours. Cell survival was measured using trypan blue exclusion assay. GSTP1 expression was assessed using Western blot analysis.

**Results:** ARPE-19 cell survival and GSTP1 expression decreased when exposed to increasing concentrations of HQ. When pretreated with sulforaphane, ARPE-19 cell survival and GSTP1 levels improved when compared with untreated control upon exposure to HQ.

**Conclusions:** HQ negatively affects human RPE cell viability and parallels reduced GSTP1 levels. Sulforaphane induces GSTP1 expression and increases survival of human RPE cells exposed to HQ. Enhanced GSTP1 expression may protect human RPE cells against oxidative stress.
Poster No.: EX1–001
Panel No.: 1, Session 1

Wound Integrity of Clear Corneal Incisions Created Using a Femtosecond Laser

First Author: Harvey UY

Purpose: To evaluate and compare wound integrity and sealing of clear corneal incisions (CCI) created with a 2.2 mm keratome or a femtosecond laser in eyes undergoing refractive laser–assisted cataract surgery (RELACS).

Methods: This was a prospective randomized clinical trial of 100 eyes undergoing RELACS. The CCI was created using either a 2.2 mm keratome (n = 31) or a femtosecond laser (Lensar, Orlando, FL) (n = 31). Phacoemulsification was performed by a single surgeon. At the conclusion, after removal of the irrigation/aspiration probe, the eyes were graded as follows: grade 1, flat anterior chamber (AC) needing CCI wound hydration (WH) and anterior chamber (AC) reformation via paracentesis wound; grade 2, flat AC not needing WH but needing AC reformation; grade 3, formed AC not needing WH or AC reformation. The main outcome measure was mean wound grade per incision type.

Results: Both treatment groups were comparable in terms of patient age, nuclear density, cumulative dissipated energy, and operative time. The mean (SD) wound seal grade for the keratome group was 1.32 (0.65) and for the laser group, 2.35 (0.84) (P < 0.0001). In the keratome group, the frequency of eyes with wound grade of 1, 2, and 3 was 77%, 13%, and 10%, respectively, but in the laser group was 23%, 19%, and 58%, respectively. None of the eyes developed significant postoperative wound–related complications.

Conclusions: Both methods created CCI with adequate wound integrity. Overall, the laser CCI wounds seemed to demonstrate better wound closure reliability and a greater tendency to self-seal.

Poster No.: EX1–002
Panel No.: 2, Session 1

Cataract Operations in An Giang Province, Vietnam: What Have We Done to Increase Output and Outcome?

First Author: Duong DIEU

Purpose: To launch mobile cataract surgery (MCS) camps from the provincial ophthalmic department in a southern province with a population of 2 million and to report results of MCS camps at district hospitals/in remote areas in reducing the cataract backlog over 2 decades.

Methods: Community intervention trials included the following: 1. Organise the MCS camps with 3 groups: society, patients, and medical services; 2. Four S’s (steps): statement, selection, surgery, and sequelae; 3. Four C’s in action: cooperate, coordinate, change new instruments, and conclude.

Results: The following were compared: 1. Cataract surgical rate (CSR) during periods with MCS; 2. Cataract surgery cost; 3. Some sustainability considerations of MCS.

Conclusions: The MCS achievements are as follows: 1. Performed intracapsular cataract extraction, extracapsular cataract extraction, intraocular lens implantation, PHACO surgery; increased the number of cataract patients with restored vision, which can raise community awareness about the magnitude of the problem to resolve it at higher levels; 2. Kept the cost low or free for poor patients, as well as providing high-tech services such as PHACO at a low cost accepted by the community. MCS also helps people living in the countryside access more advanced treatment; 3. Could be applied to other situations in much of the developing world for the benefit of thousands with curable blindness due to cataract while cataract surgeons are too few and instruments are too expensive. For successful MCS, special training of technical and nontechnical groups is needed.

Poster No.: EX1–003
Panel No.: 3, Session 1

Visual Outcomes After Bilateral Trifocal Intraocular Lens Implantation

First Author: Vivien LIM

Purpose: To evaluate the refractive and visual parameters related to distance, intermediate, and near vision after cataract surgery and quality of vision of a new diffractive trifocal intraocular lens (IOL).

Methods: Patients had bilateral phacoemulsification surgery and multifocal diffractive IOL (AT Lisa tri 839 MP) implantation. A complete ophthalmology examination was performed preoperatively and postoperatively. The follow–up was 6 months. The main outcome measures were uncorrected distance (UDVA) and corrected distance (CDVA), intermediate, and near visual acuities; spherical equivalent; and aberrations (total, corneal, internal).

Results: The study comprised 26 eyes of 13 patients (mean age, 60.5 ± 8.8 years; range, 55 to 76 years). There was significant improvement in UDVA, uncorrected intermediate visual acuity, uncorrected near visual acuity, CDVA, and corrected intermediate and near visual acuity. The mean UDVA was 0.08 ± 0.10 logMAR. The postoperative spherical equivalent was within the range of +0.50 to −0.50 diopters. All the patients were
Methods: The inflammatory response of fluoroquinolones in human cells was analyzed to explore the antifibrosis efficiency and optical performance. The HLE cell line HLE-B3, obtained from American Type Cell Collection, was used to analyze the effect of fluoroquinolones in HLE. The cells were incubated in 20% FBS-contained Opti-MEM with ciprofloxacin (CIP), levofloxacin (LEV), or moxifloxacin (MOX) in the absence or presence of TGF-β1 at 10 ng/mL. Cell viability was analyzed by WST-1. Expression and filament of alpha smooth muscle action (α-SMA) were separately detected by immunoblotting and immunofluorescent staining. IL-8 expression was analyzed by enzyme-linked immunosorbent assay (ELISA).

Results: The in vitro results revealed that the survival rate of HLEs under 3-day incubation of MOX (56.4%) is more toxic than those under 3-day incubation of CIP (82.6%) or LEV (101.3%). These 3 fluoroquinolones alone induced endogenous α-SMA expression. However, they suppressed formation of the α-SMA filaments in TGF-β1-incubated HLEs. Furthermore, these fluoroquinolones noticeably suppressed the secretory IL-8 expression in HLEs.

Conclusions: Fluoroquinolones might be a potential inhibitor of lens fibrosis and inflammatory responses.

Poster No.: EX1-004
Panel No.: 4, Session 1

Modulation of Lens Fibrosis and Inflammatory Response by Fluoroquinolones

First Author: Tsan-chi CHEN
Co-Author(s): Shu-wen CHANG, I-yu CHEN, Fang-yu HSU

Purpose: To explore the antifibrosis efficiency and inflammatory response of fluoroquinolones in human lens epithelial cells (HLEs).

Methods: The HLE cell line HLE-B3, obtained from American Type Cell Collection, was used to analyze the effect of fluoroquinolones in HLE. The cells were incubated in 20% FBS-contained Opti-MEM with ciprofloxacin (CIP), levofloxacin (LEV), or moxifloxacin (MOX) in the absence or presence of TGF-β1 at 10 ng/mL. Cell viability was analyzed by WST-1. Expression and filament of alpha smooth muscle action (α-SMA) were separately detected by immunoblotting and immunofluorescent staining. IL-8 expression was analyzed by enzyme-linked immunosorbent assay (ELISA).

Results: The in vitro results revealed that the survival rate of HLEs under 3-day incubation of MOX (56.4%) is more toxic than those under 3-day incubation of CIP (82.6%) or LEV (101.3%). These 3 fluoroquinolones alone induced endogenous α-SMA expression. However, they suppressed formation of the α-SMA filaments in TGF-β1-incubated HLEs. Furthermore, these fluoroquinolones noticeably suppressed the secretory IL-8 expression in HLEs.

Conclusions: Fluoroquinolones might be a potential inhibitor of lens fibrosis and inflammatory responses.

Poster No.: EX1-006
Panel No.: 6, Session 1

Comparison of Axial Length Measurements From Three Biometric Instruments in High Myopia

First Author: Xiaogang WANG
Co-Author(s): Jing DONG

Purpose: To compare the axial lengths (ALs) measured with Lenstar with those obtained with IOLMaster and A-scan echography. IOL power was calculated using the SRK–T formula. Postoperative refractions were compared with the target refractions calculated under the assumption of fluid–filled condition. The difference in refraction between the SO-filled and control groups was investigated.

Methods: A retrospective, comparative study was done in 21 consecutive SO-filled eyes of 20 patients and 42 vitrectomized eyes of 39 patients who received cataract surgery. Axial length (AL) was measured using A-scan echography. IOL power was calculated using the SRK–T formula. Postoperative refractions were compared with the target refractions calculated under the assumption of fluid–filled condition. The difference in refraction between the SO-filled and control groups was investigated.

Results: The mean postoperative refraction in spherical equivalents showed a significant difference between the SO-filled and the control group (+1.07 ± 2.26 diopters vs –0.57 ± 1.15 diopters; P = 0.003). In addition, the SO-filled group showed a significant tendency for hyperopic shift and greater variability from the target refraction as compared with the control group (+2.89 ± 2.15 diopters vs +0.04 ± 1.0 diopter; P < 0.001). This refraction deviation was not correlated with any ocular parameters including anterior chamber depth, lens thickness, AL, and corneal keratometry values.

Conclusions: In cataract surgery of SO-filled eyes, postoperative refractive outcomes were not very predictable and had a tendency for hyperopic shift from the target refraction. Choosing more myopic target refraction is suggested to reduce the postoperative hyperopic shift.

Poster No.: EX1-006
Panel No.: 6, Session 1

Comparison of Axial Length Measurements From Three Biometric Instruments in High Myopia

First Author: Xiaogang WANG
Co-Author(s): Jing DONG

Purpose: To compare the axial lengths (ALs) measured with Lenstar with those obtained with IOLMaster and A-scan contact ultrasound in normal and high myopia (HM).

Methods: Eighty-four normal eyes and 49 HM eyes were included. Three consecutive measurements were performed on each eye in the following order: Lenstar, IOLMaster, and ultrasound. The repeatabilities of the AL measurements for each instrument were assessed by calculating the pooled coefficients of variation (CVs) of 18 eyes in each group. Comparisons between the HM and normal groups were made with independent sample t tests. The interdevice agreements were evaluated with Bland–Altman analyses and paired 2-tailed t tests.

Results: For the normal group, the CVs of the AL measurements taken with the Lenstar, IOLMaster, and ul-
The mean difference in ave K [(K1 + K2)/2] was 0.32 ± 0.39 D, also with a statistically significant difference (t = -2.87; P < 0.05). The mean differences in K1 and K2 axis of VERION with other devices were 0.6°~4.5 degrees and 2.0°~7.8 degrees, with no statistically significant difference. The mean difference in corneal astigmatism of VERION was from 0.00 ± 0.30 D to 0.06 ± 0.28 D larger than other devices, but no statistically significant differences were found. The mean difference in K1 axis and corneal astigmatism between VERION and auto keratorefractometer were 10.43 ± 15.28 degrees and 0.09 ± 0.27 D, with a statistically significant difference (t = 2.34, P < 0.05 and t = -2.01, P = 0.047 < 0.05, respectively). K1, K2, and ave K were significantly highly correlated with VERION and other devices (correlation coefficient, 0.89~0.94), and astigmatism axis was moderately correlated. With the auto keratorefractometer and AL-Scan, both the correlation coefficient values and K2 axis were greater than K1 axis.

Conclusions: Compared with 4 devices, the VERION can also provide accurate corneal astigmatism measurements. All of the VERION parameters were not significantly different between AL-Scan and LenStar, and especially AL-Scan (2.4-mm zone) was similar to VERION. However, the measurement and application of methods should be according to individual patient factors and clinical purposes.

Poster No.: EX1-008
Panel No.: 8, Session 1

Rapid Cataract Progression After Nd:YAG Vitreolysis for Vitreous Floaters

First Author: Chih-hsin CHEN
Co-Author(s): Tsung-han LEE

Purpose: To report a case of rapidly progressing cataract (posterior subcapsular type) after Nd:YAG vitreolysis for vitreous floaters.

Methods: A case report including history, clinical features, and treatment course.

Results: A 55-year-old male patient who had undergone Nd:YAG vitreolysis for vitreous floaters in his left eye 2 days previously at a local clinic presented to our office due to acute onset blurred vision in the same eye. Best corrected visual acuity was 20/1000 at initial evaluation. Ocular examination revealed frost-like opacity over the back surface of the lens. Lens extraction was performed 3 days later. Unfortunately, ruptured posterior capsule was detected intraoperatively, and a sulcus-fixated posterior chamber intraocular lens (PC-IOL) was implanted after phacoemulsification and anterior vitrectomy. Subsequent pars plana vitrectomy was performed a month later to remove some residual lens material in the vitreous causing inflammation and floaters. His vision improved to 20/25 1 week later and was well maintained there-
after.

Conclusions: Nd:YAG vitreolysis has been reported as one of the effective treatments for symptomatic vitreous floaters. However, careful use of Nd:YAG laser is important, especially in phakic eyes. Rapid cataract progression may be one of the possible complications after this procedure. In addition, subsequent cataract management should be done with great caution due to possible disruption of the posterior lens capsule integrity.

Poster No.: EX1–009
Panel No.: 9, Session 1

Bilateral Electrical Cataract: Case Report and Review of the Literature

First Author: Wino VIERLIA

Purpose: To report an uncommon case of bilateral electrical cataract and review the literature.

Methods: A 50-year-old man presented with diminution of vision 1 year after an overhead high-tension electric transmission wire fell on his head. He had been in a deep coma, and his level of consciousness improved over a week though he remained amnestic about the event. The electrical trauma had resulted in severe burn scars on his scalp and both legs. Best corrected visual acuity (BCVA) of the right eye was hand movements and 6/15 in the left eye. Slit lamp examination confirmed typical stellate-form anterior capsule fibrosis in both eyes and subcapsular posterior opacity only in the right eye. The remaining ocular examinations were within normal limits.

Results: Diagnosis of bilateral electric cataract was made in view of the history of electrical injury and typical appearance of the lens opacities. Cataract surgery with intraocular lens implantation was performed in the right eye. The BCVA of the right eye after surgery improved to 6/6 and remained stable over 6 months of follow-up. No significant changes of visual acuity and lens opacity noted in the left eye.

Conclusions: Electrical cataract is one of the uncommon causes of cataract due to the low survival rate after high-tension electrical injuries that may result in lens opacity. Proper treatment will lead to good visual rehabilitation unless there are additional ocular complications.

Poster No.: EX1–010
Panel No.: 10, Session 1

Comparison of Optical Performance of Spherical and Aspheric Intraocular Lenses

First Author: Shin Yu CHANG
Co-Author(s): Huey Chuan CHENG

Purpose: To compare the optical performance of spherical intraocular lenses (IOLs) with aspheric IOLs aiming for zero residual postoperative ocular spherical aberration (postOSA) based on preoperative corneal SA (preCSA).

Methods: Ocular and corneal SAs (Z4, 0) were analyzed preoperatively and 1 month after phacoemulsification and electively chosen IOL implantation. Spherical IOLs were SA60AT or AA800. The predicted postOSA aimed for zero by adding preCSA and asphericities from aspheric IOLs. The eyes with preCSA < 0.09 μm were implanted with Superflex, 0.09 μm ≤ preCSA < 0.225 μm with iSert251, and preCSA ≥ 0.225 μm with ZCB00. The predicted error of postOSA was derived from the absolute value of subtracting predicted postOSA from actual postOSA.

Results: Thirty-seven eyes, from 42 to 80 years old, with normal distributions of age, axial lengths (AL), and preCSA, were separated into the spherical (n = 13) and aspheric (n = 24) IOL groups. Moderate correlations were revealed between age and AL (r = -0.489, P = 0.002) and between age and preCSA (r = 0.410, P = 0.012). AL (23.359 ± 1.241 vs 24.535 ± 1.529 mm, t = -2.376, P = 0.023) and the absolute value of postOSA (0.3668 ± 0.3786 vs 0.1173 ± 0.1156, t = 2.317, P = 0.037) in the spherical and aspheric groups, and the absolute value of postOSA between the spherical and 3 aspheric IOLs (P < 0.05) were significantly different. The predicted error of postOSA was 58.3% within 0.1 μm, and cumulative 79% within 0.25 μm in the aspheric groups. The absolute value of postOSA between spherical IOLs with preCSA ≥ 0.225 μm (n = 9) and ZCB00 (n = 16) were significantly different (t = 2.602, P = 0.016).

Conclusions: The actual postOSA achieved approximately 60% of the target with minimal error when using aspheric IOLs based on preCSA. Aspheric IOLs based on preCSA had better outcomes of postOSA compared with spherical IOLs especially when preCSA ≥ 0.225 μm.
Macular Microvascular Changes by Optical Coherence Tomographic Angiography in Pseudophakic Cystoid Macular Edema After Intravitreal Bevacizumab Injection

First Author: Chih Chiau WU

Purpose: To demonstrate microvascular changes by optical coherence tomography (OCT) angiographic technology in pseudophakic cystoid macular edema (CME) before and after intravitreal bevacizumab injection.

Methods: Best corrected vision, fluorescein angiography, and OCT were assessed to confirm the diagnosis and to exclude age-related macular degeneration, diabetes, and retinal vascular occlusive diseases. Three males and 2 females, aged from 76 to 87, were included. They were treated with intravitreal bevacizumab (2.5 mg/0.1 mL) injection. OCT angiography (AngioVue System, OptoVue) was performed before and 1 week, 1 month, 3 months, and 6 months after injection for treatment evaluation.

Results: Macular microvascular abnormalities were shown in all cases before bevacizumab injection. Vascular damages were restored after injection in 4 cases, which were compatible with clinical visual improvements. One who had no visual improvement also demonstrated no vascular restoration in OCT angiography studies.

Conclusions: OCT angiography studies support vascular ischemic injury as an important mechanism in pseudophakic CME. They also explain why bevacizumab is effective in most cases but ineffective in a few cases. A high compliance, noninvasive OCT angiography study can provide more detailed microvascular information, which may be obscured by fluorescein leaking or pooling in fluorescein angiography.
Methods: Forty eyes that underwent either conventional phacoemulsification (group I, n = 20) or FLACS (group II, n = 20) were prospectively evaluated. In group I, a 2.2–mm keratome was used, and in group II, a biplanar 2.2–mm clear corneal incision was created using femtosecond laser. The wound architecture was assessed using iOCT in all cases immediately after creating the incision and after stromal hydration at the end of surgery. Anterior segment OCT was also done in all cases on the first postoperative day.

Results: In group I, a uniplanar morphology of the clear corneal incision was observed. In group II, a biplanar configuration of the corneal incision was observed after femtosecond laser application. All cases had a uniplanar configuration at the end of surgery. Anatomically superior apposition was observed with minimal gaping of the corneal wound in cases that underwent FLACS as compared with conventional phacoemulsification. A significantly higher incidence of localized wound–site DMD was observed intraoperatively in group I (group I = 11/20, group II = 3/20; P = 0.019). On the first postoperative day, there was no difference in localized DMD between the 2 groups (group I = 3/20, group II = 0/20; P = 0.07).

Conclusions: Femtosecond laser creates biplanar corneal incisions with superior wound apposition and a lesser incidence of wound–site DMD than keratome–assisted corneal incisions.

Poster No.: EX1–015
Panel No.: 15, Session 1

Transcleral Fixation of Closed Loop Haptic Acrylic Posterior Chamber Intraocular Lens in Aphakic Nonvictrectomized Eyes

First Author: Siddharth AGRAWAL
Co-Author(s): Vinita SINGH, Sanjiv GUPTA

Purpose: To evaluate the outcome of transcleral fixation of closed loop haptic acrylic posterior chamber intraocular lens (PCIOL) in aphakia in nonvictrectomized eyes.

Methods: Patients with aphakia after cataract surgery, trauma with posterior capsule injury, subluxated crystalline lens, and perioperative complications where sulcus implantation was not possible were included over a 1–year period. Scleral fixation of acrylic hydrophilic PCIOL was performed according to the described technique, and the patients were evaluated on day 1, 3, and 14 and at 3 and 12 months postoperatively for IOL centration, pseudophakodonesis, change in best corrected visual acuity (BCVA), and any other complications.

Results: Twenty–nine eyes of 24 patients completed the study. Twenty–five (86.2%) eyes had improved, 2 (6.9%) eyes showed no change, and 2 (6.9%) eyes had worsening of BCVA. Three (10.3%) eyes developed postoperative complications. A significant improvement in mean BCVA (P < 0.0001) was observed after the procedure. Mean duration of follow–up was 26.2 months (range, 22 to 35 months).

Conclusions: The use of closed loop haptic acrylic IOL for scleral fixation appears to be a safe and effective alternative to conventional scleral fixated PMMA intraocular lenses (SFIOLs).

Poster No.: EX1–016
Panel No.: 16, Session 1

Evaluation of a Trifocal Multifocal Intraocular Lens in a Bitoric and a Nontoric Version Over a 36–Month Follow–Up Period

First Author: Florian KRETZ
Co–Author(s): Matthias MUeller, Detlev BREYER, Matthias GERL, Ralf GERL, Gerd AUffARTH

Purpose: To evaluate the functional outcome after implantation of a trifocal multifocal intraocular lens (MIOL) in a bitoric (AT LISA 939MP, Carl Zeiss Meditech, Germany) and a nontoric (AT LISA 839MP, Carl Zeiss Meditech, Germany) version over a 36–month follow–up period.

Methods: Examinations included UDVA, UIVA, UNVA, CDVA, DCIVA, and DCNVA (logMAR). Additionally, a Salzburg Reading Desk (SRD) evaluation (uncorrected and distance corrected) was performed.

Results: In the toric group, the median postoperative binocular UDVA, UIVA, and UNVA were 0.02, 0.04, and 0.10 compared with CDVA, DCIVA, and DCNVA of 0.04, –0.10, and –0.10 (logMAR). The nontoric group showed UDVA, UIVA, and UNVA of 0.06, 0.09, and 0.06 compared with CDVA, DCIVA, and DCNVA of 0.04, 0.00, and 0.06 (logMAR), respectively.

Conclusions: Both MIOLs offer restoration of the visual function in multiple distances. The bitoricity of the toric version additionally offers a good compensation for corneal astigmatism.

Poster No.: EX1–017
Panel No.: 17, Session 1


First Author: Dan TRAN
Co–Author(s): Valentina VARGAS, Lisa GARBUtT

Purpose: To compare the Nd:YAG posterior capsulotomy rates after cataract surgery performed using a femtosecond laser (LenSx) versus the manual technique.

Methods: A retrospective chart analysis study of 1533 eyes that underwent cataract surgery (LenSx, n = 953;
Results: The femtosecond laser–assisted cataract surgery (FLACS) rate was lower than manual surgery (11.65% vs 14.48%). Accommodating IOLs had the highest Nd:YAG capsulotomy rates among all IOL groups (FLACS, 25.35%; manual, 24.14%) and YAG capsulotomies were performed earlier in this group. Patients with square–edges designs had significantly lower YAG capsulotomy rates when treated with FLACS multifocal IOLs (12.0% vs 18.4%, P < 0.01) and monofocal IOLs (8.6% vs 23.60%, P < 0.01).

Conclusions: Our study shows an overall reduction in YAG capsulotomy rates in patients undergoing femtosecond laser cataract surgery versus traditional phaco surgery. Patients with LenSx and IOL designs with square edges demonstrated lower capsulotomy rates and required more days to YAG capsulotomy than patients receiving manual surgery.

Poster No.: EX1–019  
Panel No.: 19, Session 1  
Comparison of Incidence of YAG Capsulotomy After Hydrophilic Rayner and Hydrophobic AcrySof Single Piece Acrylic Intraocular Lens Implantation in a Large Retrospective Cohort Analysis  
First Author: Zia MAZHRY  
Purpose: To compare the incidence of YAG capsulotomy after hydrophilic Rayner and hydrophobic AcrySof single piece acrylic intraocular lens (IOL) implantation in a large retrospective cohort analysis.

Methods: This was a retrospective comparative cohort study. A total of 510 eyes of cataract patients who were implanted with either foldable PCIOL between January 2009 and December 2013 were included. Preoperative, operative, and postoperative clinical data was collected. Best corrected distance visual acuity (BCVA) of 6/12 or less and clarity of posterior capsule with normal ocular examination otherwise were the factors used to make a decision for YAG capsulotomy.

Results: In our cohort, 291 eyes were implanted with hydrophilic Rayner single piece acrylic intraocular lenses. Hydrophobic AcrySof single piece acrylic intraocular lenses were implanted in 219 eyes. Follow-up ranged from 12–60 months. YAG capsulotomy was performed in 20 eyes (7%) in the Rayner and 9 eyes (4.0%) in the AcrySof group. Average postoperative time between surgery and application of YAG was 17 months in the Rayner and 35 months in the AcrySof group.

Conclusions: The hydrophobic single piece AcrySof IOL performed better in terms of the incidence of YAG capsulotomy and the time YAG was performed after phaco surgery. It appears that the incidence of PCO is related to the lens material, along with the square–edge design in both groups.

Poster No.: EX1–020  
Panel No.: 20, Session 1  
Intraocular Lens Power Calculation Using IOLMaster and Various Formulas in Chinese Patients With Axial Length Exceeding 30 mm  
First Author: Li XINGYU  
Purpose: To compare the accuracy of 5 intraocular lens (IOL) power calculation formulas in Chinese patients with axial length (AL) exceeding 30 mm.

Methods: Perspective clinical trial (No: Chi-CRT-IPC–15005890). Between February 2014 and December 2014, 34 eyes of 27 Chinese patients with AL exceeding 30 mm were recruited. The biometry of those patients was done with the IOLMaster preoperatively. Eyes with pathology, operative complications, or combined signal–noise ratio (SNR) of AL less than 32 and those with missing data were excluded. In each case, the power of the implanted IOL was used to calculate the predicted postoperative refraction with 5 IOL power calculation formulas: Haigis, SRK II, Hoffer Q, Holladay, and SRK/T. The actual postoperative refraction was measured more than 3 months postoperatively. Linear correlation between the predicted postoperative refraction and actual postoperative refraction, absolute predictive error distribution, and mean predictive error were analyzed for each formula.

Results: Twenty–five eyes (18 Chinese patients) were studied and 9 eyes (26.5%) were excluded. The correlation coefficients of the different IOL calculation formulas were as follows: Haigis formula, r = 0.858; SRK II formula, r = 0.501; Hoffer Q formula, r = 0.775; Holladay 1 formula, r = 0.898; SRK/T formula, r = 0.803. Absolute predictive error of those formulas was different. The Haigis and Holladay 1 formulas had better concentricity. All the formulas could cause hyperopic error, but the SRK II was the largest, with a mean of +2.01 D. The Haigis, Hoffer Q, Holladay 1, and SRK/T formulas showed a slight tendency of hyperopia, with respective means of +0.55 D, +1.31 D, +1.21 D, and +0.73 D.

Conclusions: In Chinese eyes with AL exceeding 30 mm, these 5 formulas caused a postoperative hyperopic refractive error. The Holladay 1 formula had the best correlation coefficient between predicted and actual. The Haigis and Holladay 1 formulas had better concentricity. The SRK II was the least accurate formula in the eyes studied.

Poster No.: EX1–021  
Panel No.: 21, Session 1
Toric Intraocular Lens in Cataract Patients With High Myopia

First Author: Li-ming TAO

Purpose: The aim of this article is to explore the application of the Acrysof toric intraocular lens in cataract patients with high myopia.

Methods: Forty-eight high myopia patients with more than 1.0 diopter (D) of preexisting corneal astigmatism having cataract surgery were selected. All the patients underwent similar phacoemulsification combined with Acrysof toric intraocular lens implantation, using IOLMaster to measure intraocular lens power. Corneal astigmatism was measured by IOLMaster combined with corneal topography. The degree and axial length of the intraocular lens was calculated. Toric intraocular lenses (+6.0 ~+16.0 D) were implanted to correct myopia and astigmatism, and the effects of surgery were observed.

Results: After 3 months, as many as 45 eyes were better than 0.8 in uncorrected visual acuity (UCVA), and the average degree of toric lens rotation in the capsular bag was 3.15 ± 1.26 degrees. None of these eyes revealed complications such as infection or glaucoma.

Conclusions: The pouches of high myopia patients are bigger than in normal people, but this is limited; and as long as the surgeon operates correctly, the rotation of the intraocular lens is limited, too. Toric intraocular lenses can provide cataract patients with better UCVA and reduce the risks and costs of operation.

Poster No.: EX1-023
Panel No.: 23, Session 1

Association of Cumulative Dissipated Energy With Postoperative Foveal Thickness After Routine Phacoemulsification in Patients With Age-Related Cataract

First Author: Joel PEREZ
Co-Author(s): Sherman VALERO, Manuel Benjamin IBANEZ

Purpose: Cumulative dissipated energy (CDE) is a phacoemulsification unit parameter designed to monitor the amount of energy delivered during phacoemulsification. Studies have already shown that lower CDE levels have better surgical outcomes, specifically in corneal recovery. However, little literature exists regarding CDE and foveal thickness.

Methods: In this prospective study, subjects with age-related cataract underwent cataract surgery by phacoemulsification. Central subfield thickness (CST), cube volume (CV), and cube average thickness (CAT) of the macula were measured by optical coherence tomography (OCT) at 3 separate time points: preoperatively, 1 day, and 14 days after cataract surgery. To determine the correlation between parameters, Pearson correlation coefficients and degree of association and coefficient of determination (r²) were used.

Results: One hundred eyes from 93 subjects were analyzed. Preoperatively, CST was 247.71 ± 21.44 µm, CV was 9.38 ± 0.82 mm, and CAT was 262.94 ± 22.15 µm. At 12.42 + 11.05 of CDE exposure, the fovea at all parameters increased in thickness. The relationships between CDE and the change in foveal thickness values from baseline to postoperative day 14 were examined. The correlation coefficients obtained between CST, CV, and CAT had low associations with CDE. However, only the first day and the difference between day 1 and day 14 observations of CST and CDE were significant (0.279 and -0.261; P= 0.005 and P = 0.009, respectively) with low degrees of association. The difference in CV was significant on day 14 (P = 0.040) and also had low association with CDE.

Conclusions: CDE was not associated with postoperative changes in foveal thickness.

Poster No.: EX1-023
Panel No.: 22, Session 1

Visual Performance of Small Aperture Intraocular Lens for Extending Depth of Focus in Cataract Patients

First Author: Matteo PIOVELLA
Co-Author(s): Barbara KUSA

Purpose: To demonstrate visual performance of the IC-8 small aperture intraocular lens (IOL) (AcuFocus, Irvine, CA) implanted in patients in whom a cataractous lens has been removed.

Methods: This is a prospective, multicenter (13 sites in Europe), open-label clinical study with mixed implantation of an IC-8 IOL in the nondominant eye and an aspheric monofocal IOL in the dominant eye. To date, 16 patients have been implanted at Centro Microchirurgia Ambulatoriale (CMA) in Monza, Italy, with all surgeries performed by 1 surgeon. Comparison of small aperture and monofocal IOL 3-month outcomes are presented here for 16 patients. Visual acuity results are reported in Snellen equivalents.

Results: At 3 months in the IC-8 eyes, uncorrected distance visual acuity (UDVA) was 20/26 ± 4.31, uncorrected intermediate visual acuity (UIVA) was 20/29 ± 3.64, and uncorrected near visual acuity (UNVA) was 20/26 ± 6.27. In the monofocal eye, UDVA was 20/18 ± 4.85, UIVA was 20/39 ± 17.27, and UNVA was 20/60 ± 17.33. Binocular UDVA was 20/18 ± 4.85, UIVA was 20/29 ± 3.68, and UNVA was 20/26 ± 8.56.

Conclusions: The IC-8 shows excellent visual performance at 3 months after implantation. The IC-8 IOL demonstrates better vision at intermediate and near
when compared with the monofocal IOL.

**Poster No.: EX1-024**  
**Panel No.: 24, Session 1**

**Clinical Evaluation of Femtosecond Laser—Assisted Phacoemulsification Combined With ReSTOR Intraocular Lens Implantation**  
*First Author: Shiming WANG*  

**Purpose:** To evaluate the clinical effect of femtosecond laser—assisted phacoemulsification combined with ReSTOR intraocular lens (IOL) implantation.

**Methods:** One hundred seven patients with cataract (107 eyes aged 61~83 years; mean, 72.3 ± 11.7 years) were recruited in this study. The femto group included 53 eyes, and the traditional group, 54 eyes. Clinical manifestations were summarized and analyzed, including age, sex, lens opacity classification, preoperative corneal endothelial cell count, and cumulative dissipated energy during surgery. Three months after surgery, postoperative corneal endothelial cell count, uncorrected and best corrected visual acuity for near and far vision, contrast sensitivity, aberrations, and the decentration and tilt of IOLs were measured. A questionnaire about satisfaction with visual outcome was also performed.

**Results:** Three months after surgery, uncorrected visual acuity for near vision (t = 2.19, P = 0.031), contrast sensitivity (t = 2.31, P = 0.023), and questionnaire responses (t = 2.50, P = 0.014) of patients in the femto group were better than in the traditional group, which was significant. Three months postoperatively, the mean endothelial cell loss was 7.01 ± 6.87% in the femto group and 15.16 ± 11.24% in the traditional group, which was significant (t = 2.85, P = 0.0053). Values of C3 ± 1 and C3 ± 3 and the decentration and tilt of IOLs were significantly lower in the femto group than in the traditional group (P < 0.05).

**Conclusions:** Femtosecond laser—assisted cataract surgery results in less damage to corneal endothelial cells compared with conventional surgery. It can also provide a full range of vision with good visual quality, and thus greater independence from glasses can be achieved.

**Poster No.: EX1-025**  
**Panel No.: 25, Session 1**

**Target IOP Control and Stability in Gravity Versus Active Phacoemulsification Infusion Fluidics**  
*First Author: Ramon DIMALANTA  
Co-Author(s): Kevin MILLER, C. Manuel NICOLI*  

**Purpose:** To compare the ability of phacoemulsification systems with gravity versus active infusion fluidics to maintain target intraocular pressures (IOPs) with varying aspiration flow rates.

**Methods:** The Alcon Infiniti and Centurion Vision Systems were tested. The handpiece of each machine was inserted into an acrylic test chamber with pressure measurement ports. Both machines were operated in gravity feed irrigation mode. The Centurion was also operated in an active control mode where a bag of irrigant is squeezed to generate infusion pressure. Bottle heights and/or bag pressures were selected to provide equal test chamber pressures at zero aspiration flow. Steady state IOPs were measured in the test chamber as a function of aspiration flow rate.

**Results:** When the 2 systems were operated with a raised bottle, the IOP in the test chamber decreased by approximately 15 mm Hg with each 15 mL/min increase in aspiration flow regardless of bottle height or starting IOP. The system with active fluidics maintained the target IOP at low to moderate flow rates (within 0.02 mm Hg per mL/min) but experienced a slight decrease in IOP at the highest flow rate tested (maximum drop was only 6.0 mm Hg).

**Conclusions:** At equivalent target IOPs, both gravity systems lost IOP as a function of increasing aspiration flow. By comparison, the system with active fluidics provided a constant steady state IOP across the flow rates tested. This finding may translate to better anterior chamber maintenance during cataract surgery using an active control system.

**Poster No.: EX1-026**  
**Panel No.: 26, Session 1**

**Visual Quality After Diffractive Multifocal Toric Intraocular Lens Implantation**  
*First Author: Guo KE*  

**Purpose:** To compare visual quality and patient satisfaction after diffractive multifocal toric intraocular lens (Acrysof IQ Restor toric, ART) and monofocal toric intraocular lens (IOL) implantation in patients with cataract and corneal astigmatism.

**Methods:** This was a nonrandomized clinical trial. Patients with cataract and corneal astigmatism between 1 diopter (D) and 2.50 D had phacoemulsification with implantation of ART or toric IOL. Fifty-six participants were divided into 2 groups: the ART group included 28 patients (31 eyes) and the reference group (toric group) included 28 patients (33 eyes). Three months postoperatively, uncorrected distance visual acuity (UDVA) at 5 m, uncorrected intermediate visual acuity (UIVA) at 70 cm, and uncorrected near visual acuity (UNVA) at 40 cm; corrected distance, intermediate, and near visual acuities; residual refractive astigmatism; defocus curve; rotational stability of the IOL; contrast sensitivity; and patient satisfaction were evaluated.
Results: At 3 months postoperatively, in the experimental group UDVA was 0.91 ± 0.09, UIVA was 0.58 ± 0.06, UNVA was 0.63 ± 0.03, and depth of focus was 5.5 D (+2.0−3.5 D). In the control group, UDVA was 0.84 ± 0.14, UNVA was 0.36 ± 0.10, DCNVA was 0.26 ± 0.08 and depth of focus was 2.5 D (+1.0−1.5 D). In the experimental group, UIVA and UNVA were markedly better than those in the control group. Spectacle independence was achieved by 84.6% of patients in the experimental group and 32.0% in the control group.

Conclusions: Both the ART and toric IOL can correct astigmatism. Implantation of the diffractive multifocal toric IOL in patients with cataract and corneal astigmatism provided excellent distance, intermediate, and near visual outcomes; predictability of the refractive result; rotational stability; and good optical performance, allowing all patients to achieve complete spectacle independence.

Poster No.: EX1–027
Panel No.: 27, Session 1

Causes and Clinical Observations of Accidental Events During Phacoemulsification

First Author: Mingxing WU
Co-Authors: Min HOU, Bo ZHANG, Yizhi LIU

Purpose: To observe and analyze the causes of accidental events during cataract phacoemulsification to prevent their occurrence and relevant complications.

Methods: Detailed clinical cases and surgery videos were collected to carry out this retrospective study. The process of the adverse accidental events during phacoemulsification and the causes were analyzed.

Results: The accidental events during phacoemulsification were mainly classified into the following types: 1, interruption of anterior chamber perfusion due to tube obstruction and untimely replacement of perfusion fluid; 2, fracture of phacotips caused by the repeat use and inappropriate sterilization of phacotips; 3, phaco power loss due to the looseness of phacotips caused by repeated sterilization under high pressure; 4, foreign bodies flowing into the eye through perfusion, which included exuviation of aged phacotips, residue in the tube during instrument preparation, and the crystal of viscoelastic after sterilization; 5, flushing needle ripping into the eye due to looseness or obstruction of the needle, which often resulted in intraocular hemorrhage; 6, posterior capsule rupture caused by rough surface of phacotips caused by damage in recycling and management before surgery.

Conclusions: The major cause of the accidental events in phacoemulsification was omissions in surgical instrument preparations preoperatively and intraoperatively. Careful preparation of surgical instruments is the principal and effective way to keep adverse events and accidents at bay.

Poster No.: EX1–028
Panel No.: 28, Session 1

Clinical Outcomes of Piggyback IOL Implantation

First Author: Manqiang PENG
Co-Authors: Ding LIN

Purpose: To investigate the clinical effect of piggyback intraocular lens (IOL) implantation.

Methods: A retrospective analysis was performed in 67 eyes of 59 patients with high myopia in January 2013 to January 2015. Forty-nine eyes were multifocal intraocular lens combined with single intraocular lens implantation. Eighteen eyes were toric intraocular lens combined with single intraocular lens implantation. Sixty-one eyes were parallel implantation of the 2 IOLs. Six eyes were vertical or oblique implantation. Patients were followed up for 4–18 months. Sixty single intraocular lens implantations followed up for 3–10 months with uncorrected visual acuity from 0.8 to 1.0 were randomly selected as the control group. Visual acuity, intraocular pressure, corneal endothelium, intraocular lens position, complications, and visual quality were analyzed.

Results: The postoperative visual acuity was 0.3–1.0, and the average was 0.69 ± 0.21. The IOP of all patients was normal during the follow-up period. Corneal endothelial cell counts decreased 24.3–266.7/mm², and the average was 89.56 ± 19.41/mm². There was no significant difference between the 2 groups in total higher order aberration, spherical aberration, coma aberration, trefoil, and modulation transfer function, which were detected by the visual function analyzer (iTrace).

Conclusions: The clinical outcomes of piggyback IOL implantation were great. Preoperative assessment, careful and repeated measurement, and meticulous operation are key to a good result.

Poster No.: EX1–029
Panel No.: 29, Session 1

A Prospective, Double-Masked, Placebo-Controlled Study of Oral Antioxidant Supplement Therapy in Patients With Dry Eye Syndrome
First Author: Yu-chih HOU
Co-Author(s): Jehn-yu HUANG

Purpose: To evaluate the efficacy and safety of oral antioxidant supplements containing anthocyanosides; astaxanthin; extracts of wolfberry fruit; vitamins A, C, and E; and several components extracted from herbal plants to treat dry eye patients.

Methods: A double-masked, placebo-controlled study of oral antioxidant supplements was performed in dry eye patients for 2 months. Subjective symptoms and general impressions were assessed. Objective evaluations included vision, biomicroscopy, fluorescein staining, tear film break-up time (TFBUT), Schirmer tests, reactive oxygen species (ROS) in tears, and the serum levels of anti–SSA/anti–SSB antibodies. The patients were followed up for a further 2 months after discontinuous treatment.

Results: Sixty–six patients were enrolled, and 43 patients completed the study. There was an adverse event of gastritis. The antioxidant supplement or placebo did not change blood pressure, heart rate, or liver function. There were no significant differences between the 2 groups in the scores of 5 subjective symptoms, but general impressions of the effect demonstrated significant improvement of dry eye symptoms in the treatment group. Corneal fluorescein stain revealed improvement after antioxidant treatment. TFBUT score and Schirmer test without anesthesia showed significant improvement in the treatment group. The ROS of tears and serum levels of anti–SSA/anti–SSB antibodies in the treatment group significantly decreased after treatment and increased after discontinuous treatment.

Conclusions: Oral antioxidant supplements can improve the tear film stability and reduce the ROS in tears. This oral vegetable antioxidant supplementation can be an adjuvant therapy for dry eye patients.

Poster No.: EX1–031
Panel No.: 31, Session 1

A Prospective Study of Scheimpflug Analysis of Corneal Haze After Corneal Collagen Cross-Linking in Keratoconus

First Author: Bio KIM
Co-Author(s): Charlotte JORDAN, Charles MCGHEE, Dipika PATEL

Purpose: To prospectively analyze corneal haze after corneal collagen cross-linking in patients with progressive keratoconus using Scheimpflug densitometry.

Methods: Thirty-six patients were treated with corneal collagen cross-linking as part of a randomized control study. Only 1 eye of each patient was treated, with the contralateral eye serving as control. Corneal densitometry, tomography, unaided (UAVA), and best corrected visual acuity (BCVA) were measured preoperatively and at 1, 3, 6, and 12 months postoperatively.

Results: Mean corneal densitometry increased after cross-linking but returned to baseline before 12 months. The change in densitometry was significant compared with contralateral untreated eyes (P < 0.05). The anterior and inner central zones of the cornea displayed the highest densitometry after treatment at all time points. Higher densitometry correlated with poorer BCVA (P = 0.01). Preoperative keratometry correlated with corneal densitometry preoperatively and at 12 months postoperatively (P < 0.05). However, there was no significant correlation between densitometry at 12 months after treatment and other preoperative corneal measurements, age, sex, ethnicity, allergies, eczema, asthma, or a family history of keratoconus (P > 0.05).

Conclusions: Patients develop transient corneal haze in the anterior central cornea after collagen cross-linking,
Time to Corneal Astigmatic Stability After Pterygium Surgery: A Preliminary Report

First Author: Duangratn NIRUTHISARD
Co-Author(s): Wasee TULVATANA, Vannarut SATITPITAKUL

Purpose: To determine the time to corneal astigmatic stability during a 6-month period after pterygium surgery and to identify factors associated with time to astigmatic stability after pterygium surgery.

Methods: This prospective observational study of 76 eyes (75 patients) undergoing pterygium excision was conducted from May 2014 to May 2015. The baseline demographic data, visual acuity, and pterygium data including grade and length were collected preoperatively. Keratometric data were recorded preoperatively and monthly after surgery using noncontact partial coherence interferometry (IOLMaster 500, Carl Zeiss Meditec). Corneal astigmatic stability was defined as 2 consecutive examinations in which the change of corneal cylinder was within ±0.25 diopters. Survival analysis was used to assess time to stability of corneal astigmatism. The factors associated with cylindrical stability were also evaluated by univariate and multivariate analyses.

Results: As of August 2015, keratometric records of 26 eyes out of 76 eyes (38.2%) showed corneal astigmatic stability during the 6-month postoperative period. Several factors were found to demonstrate significant association with time to corneal astigmatic stability in univariate analysis: length of pterygium exceeding 3.0 mm (P = 0.07), absolute preoperative corneal astigmatic power (P = 0.03), and absolute change in corneal astigmatism at postoperative month 1 (P = 0.03). However, no factors showed association with time to corneal astigmatic stability in multivariate analysis.

Conclusions: During 6 months postoperatively, 38.2% of eyes showed corneal astigmatic stability. No preoperative factors associated with time to corneal astigmatic stability were identified.

Poster No.: EX1–032
Panel No.: 32, Session 1

Wnt/Beta-Catenin Signaling Modulates Corneal Epithelium Stratification via Inhibition of Bmp4 During Mouse Development

First Author: Lung-kun YEH
Co-Author(s): Chia-yang LIU, Yujin ZHANG

Purpose: The Wnt/beta-catenin signaling pathway involves fundamental aspects of development through regulation of various growth factors. We tried to show that Wnt/beta-catenin signaling plays an important role on the modulation of corneal epithelium stratification via inhibition of Bmp4 during mouse development.

Methods: Compound transgenic mice were generated via natural mating [rtTA (KR); tetO–Cre; Ctnnb1flox; Ctnnb1floxE3; Bmp4flox; Axin2LacZ; Lrp5flox; and Lrp6flox]. The identification of each transgene allele was performed by PCR genotyping. Several analysis methods were included: histological analysis, transmission electron microscopy (TEM), mouse corneal stroma fibroblast primary cell culture, western blot analysis, immunohistofluorescence staining, quantitative RT-PCR (qRT-PCR), chromatin immunoprecipitation (ChIP) assay, and promoter–luciferase assay.

Results: Here, we show conditional ablation of beta-catenin in mouse stromal kerocytes results in precocious stratification of the corneal epithelium. In contrast, ectopic expression of a Ctnnb1 gain–of–function mutant (Ctnnb1cGOF) retards corneal epithelium stratification. We identified that Bmp4 is upregulated in kerocytes in the absence of beta-catenin, which triggers ERK1/2 and Smad1/5 phosphorylation and enhances p63 expression in basal epithelial cells. Interestingly, mouse neonates given a subcutaneous Bmp4 injection displayed a phenotype resembling Ctnnb1cKO. Conditional ablation of Bmp4 eradicates the phenotype produced in Ctnnb1cKO mice. Furthermore, ChIP and promoter–luciferase assays show that beta-catenin suppresses Bmp4 promoter activity.

Conclusions: These data support the concept that cross-talk between the Wnt/beta-catenin/Bmp4 axis (in the stromal mesenchyme) and Bmp4/p63 signaling (in the epithelium) plays a pivotal role in epithelial stratification during cornea morphogenesis.

Poster No.: EX1–034
Panel No.: 34, Session 1

The Role of TGF-α Cytokine on the Mouse Corneal Endothelium

First Author: Lung-kun YEH
Co-Author(s): Ching-hsi HSIAO, David Hui-kang MA, Chia-yang LIU, Yujin ZHANG

Purpose: Our previous work demonstrated that the overexpression of TGF-α cytokine in the corneal epithelium induces changes in anterior segment morphology. In this study, we tried to show that the role of TGF-α cytokine modulates the homeostasis of mouse corneal endothelium.

Methods: The eyeballs were obtained from C57BL/6 mice.
mice, aged 6 to 8 weeks, and cultured in organ culture medium with or without purified TGF-α, or EGF cytokine was added to the cultured eyeballs 1 hour before at different time courses of cultivation, respectively, in a humidified atmosphere of 5% CO2 at 37°C. After incubation, morphological analysis on the corneal endothelial cells and whole mount immunohistochemistry staining was performed. At the same time, binary Tet-On transgenic Krt12rtTA/tet-O–TGF-α mice were subjected to doxycycline (Dox) induction to overexpress TGF-α in the corneal epithelium. The identification of each transgene allele was performed by polymerase chain reaction (PCR) genotyping with tail DNA using specific primer pairs. Morphological analysis, immunohistochemistry staining analysis, and transmission electron microscopy (TEM) were performed.

Results: Here, we show the morphological changes of endothelial cells by H&E staining and immunohistochemistry staining (ZO-1, N–cadherin, E–cadherin). TGF-α may induce endothelial cell apoptosis (Tunnel assay) and increase caspase–3 positive cells. TEM showed that the increased large vacuoles in endothelial cells indicate the high possibility of corneal endothelium decompensation.

Conclusions: These data indicate that TGF-α may induce endothelial cell apoptosis, whereas EGF may not affect the homeostasis of mouse corneal endothelium. Therefore, TGF-α plays a pivotal role in maintaining corneal transparency.

Poster No.: EX1–035
Panel No.: 35, Session 1

Amantadine-Induced Reversible Bilateral Corneal Edema in Elderly Patients: Case Report and Literature Review

First Author: Po Yen LEE
Co-Author(s): Shiuhliang HSU

Purpose: Amantadine hydrochloride is an antiviral for treating Parkinson disease. Some cases of corneal alterations secondary to its use have been published. We reported 5 cases with Parkinson disease treated with amantadine, which suffered bilateral corneal edema with endothelial dysfunction.

Methods: These patients were females aged from 53 to 80 years old with Parkinson disease. They complained of gradual bilateral blurring of vision (decreased visual acuity) and denied ocular trauma or family history of corneal disease. No other ocular symptoms were observed. During slit-lamp examination, bilateral symmetric corneal edema with folds in Descemet membranes were found. No guttata was observed, and the anterior chamber was quiet. Polymerase chain reaction of aqueous humor denied virus infection. We reviewed their medication and found that amantadine were taken orally for Parkinson disease from 8 weeks to 12 months before the onset of ocular symptoms. Additionally, we used corneal pachymetry, anterior segment optical coherence tomography (AS–OCT), and specular microscopy to evaluate corneal thickness, clarity, and endothelial counts.

Results: Corneal edema in these cases resolved within 6 weeks to 3 months after the discontinuation of amantadine, and best corrected visual acuity recovered. Follow-up AS–OCT revealed recovered corneal thickness. However, in our cases, decreased endothelial cell count with increased polymorphism and polymegathism were noted under specular microscopy. The pathogenesis of amantadine was still unknown. We assumed the occurrence of corneal toxicity was a dose–dependent reaction, as we could not find the same clinical expression in low-dose users, such as influenza infection.

Conclusions: Therefore, corneal edema in our patients was associated with amantadine therapy and showed recoverable resolution after the medicine was discontinued. As reported in previous studies, corneal edema has occurred weeks, months, and even years after amantadine use, with most taking place within 2 years. Corneal edema and visual acuity improved within 4–6 weeks after cessation of amantadine. However, the final corneal endothelial cell density decreased irreversibly despite recovery of corneal edema.

Poster No.: EX1–036
Panel No.: 36, Session 1

Efficacy and Safety of Topical Azithromycin 1.5% Versus Oral Doxycycline in Meibomian Gland Dysfunction Patients: A Randomized Equivalence Trial

First Author: Kitiya RATANAWONGPHAIBUL
Co-Author(s): Vannarut SATITPITAKUL

Purpose: To determine the efficacy and safety of topical azithromycin 1.5% compared with oral doxycycline in meibomian gland dysfunction (MGD) patients.

Methods: One hundred sixty-nine patients with grade III or IV MGD were randomly assigned to receive treatment with topical azithromycin 1.5% (n = 85) twice daily for 2 days then once daily or oral doxycycline (n = 84) 200 mg daily for 4 weeks. Percentage of participants with improved meibomian gland secretion quality was assessed as a primary outcome. Secondary outcomes were MGD–related symptoms, meibum expressibility, Oxford ocular surface staining score, tear film break up time (TBUT), and safety. All measurements were taken at baseline and 4 weeks after treatment.

Results: Although there were significant improvements in all outcomes in both groups, there were no between–group differences in the percentage of participants with improved meibum quality (90% CI for
Panel No.: 38, Session 1

Conjunctival Acute Graft-Versus-Host Disease in Adult Patients Receiving Allogeneic Hematopoietic Stem Cell Transplantation

First Author: Nai-wen FAN
Co-Author(s): Pei-yu LIN, Yao-chung LIU, Jyh-kyung GAU, Jin-hwang LIU, Catherine LIU

Purpose: To investigate the factors associated with the development of conjunctival acute graft-versus-host disease (aGVHD) in patients after receiving allogeneic hematopoietic stem cell transplantation (HSCT).

Methods: We reviewed 139 adult patients undergoing allogeneic HSCT between January 2012 and December 2014. The risk factors for conjunctival aGVHD were analyzed by Cox proportional hazards model. The overall survival after receiving HSCT was evaluated by Kaplan–Meier estimates.

Results: The incidence of conjunctival aGVHD was 9.4% of all patients undergoing HTSC and 21.7% of patients with aGVHD, including 8 out of 13 patients (61.5%) identified as pseudomembranous conjunctivitis (≥grade 3). Median follow-up time after allogeneic HSCT was 353 days (range, 11–1184). The median age at HSCT was 47 years (range, 18–66) in all patients and 42 years in the 13 patients with conjunctival aGVHD. In aGVHD, the severity of ocular symptoms was generally correlated with systemic aGVHD and a marker for developing subsequent chronic GVHD (cGVHD). Kaplan–Meier survival analysis also demonstrated a decreased survival of patients with aGVHD with overall stage II–IV (P = 0.011). In univariate analysis for risk factors of conjunctival aGVHD, age at HSCT > 55 years (P = 0.098) and the European Group for Blood and Marrow Transplantation risk scores > 4 (P = 0.092) retained a trend of significance. In multivariate analysis, there was no significant difference between the 2 subgroups. High-grade skin aGVHD (P = 0.002) and advanced systemic aGVHD except skin aGVHD (overall stage III–IV) (P = 0.001) were significant predictors for conjunctival aGVHD in univariate analysis. However, in multivariate analysis, only aGVHD with skin involvement ≥ grade II was a significant risk factor (P = 0.044).

Conclusions: Skin aGVHD is a risk factor for developing conjunctival involvement. The tight correlation between conjunctival aGVHD and severe aGVHD/cGVHD suggests a comprehensive postransplant ocular evaluation to prevent advanced morbidity and mortality.

Poster No.: EX1–039

Analysis of Self-Reported Dry Eye Practices Among New Zealand Optometrists

First Author: Ally XUE
Co-Author(s): Jennifer CRAIG

Purpose: Dry eye, the most common ocular dysfunction encountered by primary eye care practitioners, causes chronic discomfort and requires ongoing treatment. Dry eye practices of New Zealand optometrists relative to internationally recognised guidelines remain unexplored. Our study evaluates the diagnostic and therapeutic dry eye practices of NZ optometrists compared with current evidence-based guidelines.

Methods: An anonymous online survey was administered to NZ optometrists (n = 614) seeking information about dry eye interest, optometric experience, practice modality, and preferred diagnostic and treatment strategies.

Results: Respondents (n = 165) reported meibomian gland dysfunction was the most common dry eye disease observed (present in 40% of all patients). Almost all respondents (98%) ranked patient symptoms and meibomian gland evaluation as the most valuable and common diagnostic techniques. Optometrists with self-declared dry eye interest (62%) used evidence-based diagnostic techniques more frequently, such as lissamine green (P = 0.028), phenol red test (P = 0.044), and McMonnies questionnaire (P = 0.046). Respondents (70%) considered eyelid hygiene and nonpreserved lubricants as mainstay therapies across all severity categories, whereas oral omega-3 fatty acid supplementation and topical corticosteroids were more frequently recommended in moderate to severe cases. Continuing education conferences were reported as the primary guide to dry eye management in practice.

Conclusions: In alignment with evidence-based guidelines, subjective and objective diagnostic techniques are being used to stratify management based on disease severity. However, inconsistent adoption of guidelines has created a lack of standardized protocols. The study results highlight the potential to improve dissemination of best-practice management of dry eye to NZ optometry practices through postgraduate education.

Poster No.: EX1–041
Panel No.: 41, Session 1

Antibiotic Resistance of Conjunctival and Nares Colonization and Risk Factor Analysis: A Comparison Among Preoperative Patients, Healthy People, and Healthcare Workers

First Author: Yun Hsuan LIN
Co-Author(s): Chiun Ho HOU, Yu-chuan KANG, Ji-ahn-shing LEE, Ching-hsi HSIAO

Purpose: To access the bacterial profiles and antibiotic susceptibility patterns of conjunctival and nasal flora isolated from preoperative patients, healthcare workers, and healthy people, and further analyze the underlying risk factors.

Methods: We enrolled 101 preoperative patients, 51 healthcare workers, and 201 healthy people. Conjunctival and nasal cultures were taken before application of any topical medications. Antibiotic susceptibility was tested with the disk diffusion technique. Risk factors were analyzed according to standardized data questionnaire.

Results: The bacterial culture rate from conjunctiva was 42.0%, 13.7%, and 43.0% in preoperative patients, healthcare workers, and healthy people, respectively (P = 0.006), whereas the positive culture rate for S. aureus from nares was 22.0–27.5% in all groups. The bacterial...
profiles were similar among 3 groups. Overall, the most common conjunctival isolate was coagulase-negative staphylococcus (CNS), accounting for 97 of the 188 isolates (50.4%), and 32.0% of CNS isolates were methicillin resistant. Five S. aureus isolates were found in all groups, and 2 were methicillin resistant isolated from healthy people. Only 1 person had S. aureus colonization on conjunctiva and nares at the same time. In addition, males and those with underlying cardiac disease were at higher risk of CNS colonization, whereas living in healthcare facilities was a risk factor of non-CNS colonization.

Conclusions: The culture rate and the identified microorganisms from conjunctiva and nares were similar in preoperative patients, healthy people, and healthcare workers. Among them, CNS was the most common isolate from the conjunctiva, one third of which was methicillin resistant. Male sex and cardiac disease were risk factors for CNS colonization. The rate of colonized S. aures on conjunctiva was very low. There was no correlation between S. aures colonization on conjunctiva and nares.

Poster No.: EX1–042
Panel No.: 42, Session 1

Ex Vivo Expansion of Bovine Corneal Endothelial Cells in Xeno-Free Medium Supplemented With Platelet Releasate

First Author: Tsung-jen WANG
Co-Author(s): Ming-li CHOU, Jau-der HO, Thierry BURNOUF

Purpose: Clinical-grade ex vivo expansion of corneal endothelial cells can increase the availability of corneal tissues for transplantation in corneal blindness. We hypothesized that human platelet releasates rich in multiple growth factors could potentially be a useful supplement for ex vivo expansion of corneal endothelial cells due to their neural crest origin.

Methods: Platelet releasates were prepared by calcium salt activation of apheresis platelet concentrates, subjected or not to complement inactivation by heat treatment at 56°C for 30 minutes. Platelet releasates were characterized for their content in proteins and were found to contain a high amount of growth factors including platelet-derived growth factor-AB and brain-derived neurotrophic factor neurotrophins. We compared the growth and viability of corneal endothelial cells in DMEM–F12 medium supplemented with different combinations of components.

Results: Corneal endothelial cells expanded in platelet releasates exhibited good adhesion and a typical hexagonal morphology. Their growth and viability were enhanced when using the complement-inactivated platelet releasate at a concentration of 10%.

Immunostaining and Western blots showed that CECs maintained the expressions of 4 important membrane markers: Na+-K ATPase a1, zona occludens–1, phospho–connexin 43, and N-cadherin.

Conclusions: Our study provides the first proof-of-concept that human platelet releasates can be used for ex vivo expansion of corneal endothelial cells. These findings open a new paradigm for ex vivo propagation protocols of corneal endothelial cells in compliance with good tissue culture practices and regulatory recommendations to limit the use of xenogenic materials.

Poster No.: EX1–043
Panel No.: 43, Session 1

Surgical Outcome of Chemical Peeling of Conjunctival Nevus With Alcohol

First Author: Sang-duck KIM
Co-Author(s): Jae-wook YANG

Purpose: To evaluate the efficacy of chemical peeling using 83% alcohol in patients with conjunctival nevus.

Methods: Chemical peeling using 83% alcohol was done in 13 patients (13 eyes) who were clinically diagnosed with conjunctival nevus. The effect of the procedure and recurrence were analyzed by reviewing medical records retrospectively. After topical anesthesia, alcohol was applied to conjunctival nevus, and conjunctival nevus was eliminated by rubbing with cotton bud. Conjunctival nevus close to the corneal limbus was removed by 15th blades.

Results: Eight male patients and 5 female patients yielded a total of 13 patients. Mean age was 27 years old. Eight patients had right eyes affected, and 5 patients had left eyes affected. No recurrence was shown in all patients during the follow-up period (mean, 54 months), and there was no conjunctival scar, granuloma, or permanent conjunctival injection. All patients were cosmetically satisfied with the results of surgery.

Conclusions: Chemical peeling using alcohol for conjunctival nevus has benefits. It has no postoperative complications or recurrence and is an easier method with good cosmetic results.

Poster No.: EX1–044
Panel No.: 44, Session 1

OCT-derived Epithelial Thickness Mapping in Corneal Ectasia Patients

First Author: Chiao-yu WANG
Co-Author(s): Pei-yu LIN, Yu-fan CHANG, Catherine LIU

Purpose: To study Fourier domain optical coherence tomography (FD–OCT)–derived epithelial thickness mapping in corneal ectasia patients. This study aimed to investigate epithelial minimum minus maximum
(Min–Max) cutoff and its role in recognition of keratoconus and pellucid marginal degeneration.

**Methods:** This retrospective study comprised 36 keratoconic eyes, 6 pellucid marginal degeneration (PD) eyes, and 38 normal eyes (NS). Ectasia inclusion criteria were presence of slit lamp findings or typical topography pattern without slit lamp findings. Keratoconic eyes were further stratified into keratoconus suspects (KS) and keratoconus diagnosis (KD) using Massachusetts Eye and Ear Infirmary (MEEI) criteria. The 4 groups of eyes were examined with automatic refractor, keratometer, Orbscan II, and FD–OCT. Epithelial Min–Max and standard deviation (SD) were generated automatically by FD–OCT.

**Results:** Data were analyzed for 38 NS, 6 PD, and 36 keratoconic eyes further stratified to 21 with keratoconus diagnosis and 15 keratoconus suspects. Statistically significant differences were identified among the NS, KS, and KD groups (P < 0.001 in each pair), but not between PD and KS. The ROC curve showed the accuracy of Min–Max (cutoff, 8.5 μm; sensitivity, 77%; specificity, 87%; test accuracy, 84%) and SD (cutoff, 1.55; sensitivity, 77%; specificity, 69%; test accuracy, 83%) in comparing normal subjects with the KS group.

**Conclusions:** FD–OCT–derived epithelial Min–Max and SD were useful in the differentiation of normal eyes from keratoconus suspects and keratoconus suspects from keratoconus eyes. This study also provided the cutoff of Min–Max and SD for distinction. A larger group population is needed to investigate a more accurate cutoff. Epithelial thickness mapping may act as a promising screening tool for the diagnosis of ectasia.

**Poster No.:** EX1–045  
**Panel No.:** 45, Session 1

**Prospective Study to Compare the Treatment Effects of High-Frequency Radio-Wave Electrosurgery and Simple Conjunctival Resection for Conjunctivochalasis**

**First Author:** Ju-wen YANG  
**Co-Author(s):** Chi-chin SUN, Lan-hsin CHUANG, Jerry HUANG, Ling YEUNG

**Purpose:** The purpose of this study was to present a minimally invasive procedure to treat symptomatic conjunctivochalasis (CCh) and evaluate its efficacy.

**Methods:** Twenty-four patients with symptomatic CCh were included in this study. Fifteen patients (29 eyes; 5 men and 10 women) underwent the new subconjunctival coagulation procedure with high–frequency radio–wave electrosurgery (group I). Nine patients (17 eyes; 5 men and 4 women) underwent simple conjunctival resection (group II). Ocular Surface Disease Index (OSDI) was used to evaluate the ocular symptoms.

**Results:** After treatment, the CCh gradings and OSDI scores in both groups were significantly better at 3 months compared with baseline. There were significant differences in CCh gradings between group I and group II after treatment (P < 0.05). No significant differences in OSDI scores after the treatment between the 2 groups were found. Simple conjunctival resection for CCh is still the gold standard treatment.

**Conclusions:** Subconjunctival coagulation by high–frequency radio–wave electrosurgery is minimally invasive but less effective than simple conjunctival resection.

**Poster No.:** EX1–046  
**Panel No.:** 46, Session 1

**Corneal Tomographic Changes After Accelerated Corneal Collagen Cross-Linking**

**First Author:** Sang Woo KIM  
**Co-Author(s):** Jae Bong CHA, Seunghwan LEE

**Purpose:** To evaluate the long-term corneal tomographic changes after accelerated corneal collagen cross-linking.

**Methods:** Twenty-three eyes from 38 keratoconus patients who underwent accelerated corneal collagen cross-linking (7.2 J/cm²) were evaluated at postoperative months 1, 3, 6, and 12 with a Scheimpflug camera system and spectral–domain optical coherence tomography. The accelerated cross-linking was performed with a 20–minute soaking of 0.1% riboflavin and then 2 minutes 40 seconds of 45 mW/cm² UVA irradiance.

**Results:** Both flat and steep keratometric (K) values within a 5–mm circle of the central cornea and Ambrosio relational thinnest maximal (ARTmax) value from Berlin Ambrosio enhanced ectasia display were decreased significantly at postoperative month 12 after a peak increase at postoperative month 1 compared with preoperative data. The K values on a 6–mm circle of the cornea and front and back best fit sphere radius were increased significantly at postoperative month 12. Thickness within a 6–mm circle of the central cornea had decreased over 12 months postoperatively, especially in inferior zones between 2–mm and 5–mm circles of the cornea, which was statistically significant.

**Conclusions:** Accelerated corneal collagen cross–linking (7.2 J/cm²) made the central cornea flatter and thinner, whereas it made the peripheral cornea steeper than before the procedure.

**Poster No.:** EX1–047  
**Panel No.:** 47, Session 1

**Investigation of Chitosan/Polycaprolactone Blends for Corneal Endothelial Tissue Engineering**

**First Author:** Yu-hsin WANG
Co-Author(s): Tai-horng YOUNG, Tsung-jen WANG

**Purpose:** In this study, the potential use of chitosan/polyacrylactone (PCL) blends in tissue engineering of corneal endothelial cells (CECs) was investigated. Several experiments were performed to survey the basic structural analysis of PCL blends and the possible underlying mechanism of cultivated CECs on the blends.

**Methods:** The chitosan/PCL blends, named PCL25, containing PCL at 25% by weight were prepared. The characterization of PCL25 was analyzed by FTIR and atomic force microscope (AFM). Bovine CECs were cultured on the blends. Cell behaviors in terms of cell morphology, phenotype expression, and extracellular matrix (ECM) protein production were surveyed.

**Results:** The blends were confirmed by FTIR–ATR at the absorption bands of the carbonyl (1727 cm–1) group. Moreover, the topography of PCL25 coating examined by AFM demonstrated the height from surface ranged between 74~445 nm, which was greater than chitosan–coated surface. CECs could illustrate normal appearance and reach confluence within 7 to 10 days of the culture period. On immunofluorescence study, physiological phenotypic expressions of membrane proteins including ZO–1, Na+/K+–ATPase, and Cx–43 were well realized. Western blot analysis verified the existence of collagen type IV proteins. Furthermore, the expression of TGF–β2 from CECs decreased on PCL25.

**Conclusions:** These results indicate that chitosan/PCL blends provided a favorable environment for CEC growth modified to absorb growth factors. We provided an attractive biomaterial for CEC tissue engineering applications, and this system might be a suitable alternative for cadaveric cornea transplantation in the future.

Poster No.: EX1–048
Panel No.: 48, Session 1


First Author: I-huang LIN
Co-Author(s): Yi-hsun HUANG

**Purpose:** To compare the clinical and microbiological profiles of late infectious keratitis after corneal transplantation at 1 tertiary medical center between 1989–1994 and 2009–2014.

**Methods:** The setting was National Cheng-Kung University Hospital, a referral center in southern Taiwan. We retrospectively reviewed the medical records of 210 eyes that underwent corneal transplantation between November 2009 and October 2014. We followed the postoperative condition and analyzed the prevalence and etiology of infectious keratitis after corneal transplantation. The main outcome measures were predisposing factors, isolated organisms, and clinical outcomes. We compared the results with our previous study conducted between November 1989 and October 1994.

**Results:** As in 1989–1994, the leading risk factor for late microbial keratitis after corneal transplantation from 2009–2014 was epithelial defect, followed by suture-related problems. The infection rate decreased to 5.7%, which was mainly attributed to the improvements in commercialized topical antibiotics. The infection rates of Gram–positive and Gram–negative bacteria significantly decreased from 51.1% and 40.4% to 8.3% and 16.67%. However, fungal infection increased from 8.5% to 50% in late microbial keratitis, which became the major pathogen after penetrating keratoplasty. The time interval of infection after penetrating keratoplasty did not change significantly between the 2 study periods.

**Conclusions:** Fungal infection after penetrating keratoplasty increased in the past 2 decades. Clinicians should be aware of the shifting trend of infection pathogens and pay more attention to fungal infection after penetrating keratoplasty.

Poster No.: EX1–049
Panel No.: 49, Session 1

**The Role of Thrombomodulin in Corneal Epithelial Wound Healing**

First Author: Yi-hsun HUANG

**Purpose:** To determine the role of thrombomodulin (TM) in corneal epithelial wound healing and to investigate whether recombinant TM epidermal growth factor–like domain plus serine/threonine-rich domain (rTMD23) has therapeutic potential in corneal epithelial wound healing.

**Methods:** TM localization and expression in the murine cornea were examined by immunofluorescence staining, and TM expression after injury was also studied. The effect of rTMD23 on corneal wound healing was evaluated by in vitro and in vivo assays.

**Results:** TM was expressed in the cornea in normal adult mice. TM expression increased in the early phase of wound healing and decreased after wound recovery. In the in vitro study, platelet–derived growth factor–BB (PDGF–BB) induced TM expression in murine corneal epithelial cells by mediating E26 transformation–specific sequence–1 (Ets–1) via the mammalian target of rapamycin (mTOR) signaling pathway. The administration of rTMD23 promoted corneal epithelial wound healing.

**Conclusions:** TM expression in corneal epithelium was modulated during the corneal wound healing pro-
cess and may be regulated by PDGF–BB. In addition, rTMD23 has a therapeutic potential in corneal injury.

**Poster No.:** EX1–050  
**Panel No.:** 50, Session 1

**Detection of Herpesviruses DNA in Recipient Corneal Buttons and the Clinical Outcomes in Penetrating Keratoplasty**

*First Author: Meng-sheng LEE*  
*Co-Author(s): I-lun TSAI, Li-lin KUO, Ching-yao TSAI, Shiow-wen LIOU, Lin-chung WOUNG*

**Purpose:** To assess the influence of latent virus infection on the prognosis of penetrating keratoplasty (PKP) by using polymerase chain reaction (PCR) to detect virus DNA in the recipient cornea sample.

**Methods:** This was a retrospective review. Sixty-four patients (67 eyes) underwent PKP at Zhongxing Branch of Taipei City Hospital in Taiwan from September 1, 2003, to December 31, 2013. The excised corneal buttons were tested for herpes simplex virus I (HSV-I), II (HSV-II), and cytomegalovirus (CMV) DNA by nested PCR method. One group received prophylactic oral famciclovir or acyclovir 400 mg twice daily for 6 months, and there was a nonprophylactic group.

**Results:** Thirty-four eyes (50.8%) had 1 or more latent virus DNA. Sixteen eyes (23.9%) had a positive virus infection history. Four (66.7%) of 6 rejected grafts had latent virus DNA. Thirty-five eyes (52.2%) had keratitis/uveitis after the operation, which decreased the graft survival rate significantly ($P = 0.001$). Positive latent virus DNA tended to have a higher keratitis/uveitis rate ($P = 0.113$) and lower graft survival rate ($P = 0.254$). Prophylactic antiviral medications decreased the keratitis/uveitis rate significantly ($P = 0.028$).

**Conclusions:** Latent herpetic virus infection can change the outcome of the graft. Nested PCR can provide valuable information. Prophylactic antiviral medications can decrease the keratitis/uveitis rate significantly after surgery.

**Poster No.:** EX1–051  
**Panel No.:** 51, Session 1

**Semi-Permanent Smartphone Eyepiece Adapter: Less Effort, Smoother Workflow**

*First Author: Chieh-hung YEN*

**Purpose:** To design and test a universal smartphone eyepiece adapter for fast and semi-permanent use, with a flipping mechanism to switch between phoneography and ordinary inspection with the human eye within seconds. Additional improvements included adjustable camera-to-eyepiece distance and an adjustable phone holder that memorizes the dimension of the phone for easy repeated use of the same phone.

**Methods:** Dimensions of smartphones on the market were reviewed with online databases such as phonearena.com. The adapter was designed with CAD software and 3D-printed for testing. Tests of the adapter were done with conventional slit lamp biomicroscopes without any modification such as division of light path for photography. The examiner was asked to focus on the target by direct viewing with his eyes, connect the adapter (or flip the semi-permanent adapter), take a photo, and then return to direct viewing with his eyes. The time taken to switch to camera preview, take a photo, and switch back to viewing with human eyes was measured. The same measurement was done using traditional adapters (commercial products on the market and DIY adapters) for comparison.

**Results:** The average times measured in the traditional adapter groups and the semi-permanent groups were 11.5–13 seconds and 7.5 seconds, respectively. The time difference represents the time saved by reducing the effort needed to connect and disconnect the adapters. The semi-permanent design can minimize the time with the use of adapters.

**Conclusions:** A smartphone eyepiece adapter can make every slit lamp an external eye photography system and has been described as a low-cost solution that provides image quality comparable with conventional anterior segment cameras. This new semi-permanent design further enhances the system by simplifying and accelerating the process of deployment. It can enable a smoother phoneography workflow and make daily practice more efficient.

**Poster No.:** EX1–052  
**Panel No.:** 52, Session 1

**Survival Outcome and Prognostic Factors of Corneal Transplantation: A 15-Year Retro-Prospective Cohort Study at a Single Tertiary Care Center**

*First Author: Parinya SRIHATRAI*  
*Co-Author(s): Usanee REINPRAYOOON, Ngamjit KASET-SUWAN, Vilavun PUANGSRICHARERN*

**Purpose:** To evaluate survival outcome and determine the prognostic factors of corneal transplantation performed between January 2000 and December 2013 at a single tertiary care center.

**Methods:** This study was a retrospective cohort study. One graft per patient was randomly selected using a computer-generated technique. Graft failure was defined as either opacity of the graft from recurrence of the disease or endothelial cell dysfunction. Survival analysis was determined using Kaplan–Meier test. The log–rank test was used to compare the median time to failure, and a $P$ value $< 0.05$ was statistically significant. The Cox proportional hazard model was used to identi-
**Purpose:** This study investigated the toxicity of commercial nonsteroid anti-inflammatory drug (NSAID) eye solutions against corneal epithelial cells in vitro.

**Methods:** The biologic effects of 1/100-, 1/50-, and 1/10-diluted bromfenac sodium, pranoprofen, diclofenac sodium, and fluorometholone on corneal epithelial cells were evaluated after 1, 4, 12, and 24 hours of exposure compared with corneal epithelial cells treated with balanced salt solution as control. Cellular metabolic activity, cellular damage, and morphology were assessed. Corneal epithelial cell migration was quantified by the scratch-wound assay.

**Results:** Compared with bromfenac and pranoprofen, the cellular metabolic activity of diclofenac and fluorometholone significantly decreased after 12-hour exposure, which was maintained for 24 hours compared with control (P < 0.05). With 1/10-diluted eye solution for 24-hour exposure, the LDH titers of fluorometholone and diclofenac sodium markedly increased more than those of bromfenac and pranoprofen (P < 0.05). In diclofenac sodium, the Na+ concentration was lower and amount of preservatives was higher than the other NSAID eye solutions tested. However, the K+ and Cl– concentration, pH, and osmolarity were similar for all NSAID eye solutions. Bromfenac and pranoprofen significantly promoted cell migration and restored wound gap after 48-hour exposure compared with diclofenac or fluorometholone (P < 0.05). With 1/50-diluted eye solution for 48-hour exposure, the corneal epithelial cellular morphology of diclofenac and fluorometholone induced more damage than that of bromfenac or pranoprofen.

**Conclusions:** Overall, the cytotoxicity of corneal epithelial cells in bromfenac and pranoprofen NSAID eye solutions were less damaged compared with diclofenac, including fluorometholone as a steroid eye solution.
**Purpose:** To compare surgical outcomes of penetrating keratoplasty (PKP) between patients receiving imported and domestic donor corneas.

**Methods:** Records of patients receiving PKP were retrospectively reviewed. Demographic data of donors, clinical characteristics of recipients, causes of graft failure, percentages of endothelial cell density (ECD) loss, and graft survival rates 18 months after surgery were analyzed between imported and domestic donor corneas.

**Results:** One hundred eighty donor corneas (137 imported and 43 domestic) transplanted in penetrating keratoplasty were enrolled. Primary graft failure was observed only in patients using imported donor corneas, with a failure rate of 5/43 (11.6%) in contrast to 0% of primary graft failure using domestic donor corneas. The causes of primary graft failure included persistent infection after therapeutic PKP for microbial keratitis (3 cases), poor donor quality (1 case), and MRSA contamination of donor cornea. The overall graft failure rate 18 months after surgery was 21.1%. The ECD was higher in domestic corneas (1419 ± 888/mm²) than in imported corneas (1239 ± 685/mm²) after 18 months of follow-up although it did not reach statistical significance. There was no significant difference in mean time of graft failure between imported (8.3 ± 7.2 months) and domestic (8.9 ± 7.5 months) donor corneas (P = 0.82). Transplantation for infectious keratitis had significantly lower graft survival rates than those for noninfectious keratitis (P < 0.001).

**Conclusions:** Better primary surgical success was observed in corneal transplants using domestic donor corneas. However, long-term graft survival rates were not significantly different between transplants with imported or domestic donor corneas.

**Poster No.:** EX1-056  
**Panel No.:** 56, Session 1

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**Therapeutic Penetrating Keratoplasty for Microbial Keratitis From 2001 to 2013**

*First Author: Fung-rong HU  
Co-Author(s): Teck Boon TEW, Yu-chih HOU, Wei Li CHEN, I-jong WANG*

**Purpose:** To investigate the surgical outcome of therapeutic penetrating keratoplasty (PKP) in the management of microbial keratitis.

**Methods:** Records of 136 patients undergoing therapeutic PKP for microbial keratitis were reviewed. Patients were divided into 3 groups: bacterial keratitis, fungal keratitis, and acanthamoebic keratitis. Graft clarity 1 month and 1 year postoperatively, cure rate, and anatomical success rate were analyzed.

**Results:** A total of 104 therapeutic PKP patients met the inclusion criteria. Therapeutic PKP eradicated the infection in 53/59 (89.8%) patients with bacterial keratitis, 32/40 (80.0%) patients with fungal keratitis, and 9/10 (90.0%) patients with acanthamoebic keratitis. Twenty-one of 41 (51.2%) grafts for bacterial keratitis, 21/27 (77.8%) for fungal keratitis, and 5/7 (71.4%) for acanthamoebic keratitis remained clear 1 year postoperatively. The leading causes of graft failure were decompensation of graft and recurrent infection. A higher percentage of graft clarity at 1 year postoperatively was achieved in all groups when grafts were 8.5 mm or less compared with larger grafts. All 9 patients with secondary endophthalmitis observed at the time of therapeutic PKP experienced a progression of infection despite aggressive surgical treatment, and 5 of them had to be enucleated or eviscerated.

**Conclusions:** Therapeutic PKP is valuable in the management of medically refractory microbial keratitis, although the cure rate in fungal keratitis was relatively lower than in the other 2 groups. The 1-year graft survival rate had no significant difference among these 3 groups. A higher percentage of clear grafts was observed with smaller grafts.

**Poster No.:** EX1-057  
**Panel No.:** 57, Session 1

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**Moxifloxacin Modulation of COX-2 Expression Contributes to Interleukin-8 Secretion in Corneal Fibroblasts**

*First Author: Shu-wen CHANG  
Co-Author(s): Tsan-chi CHEN, Ruo-wei HONG, San-fang CHOU*

**Purpose:** To investigate how moxifloxacin (MOX) modulates interleukin–8 (IL–8) secretion in corneal stromal cells.

**Methods:** Human corneal fibroblasts (HCFs) were incubated with MOX at 0, 10, 50, and 100 μg/mL in the presence of interleukin–1α (IL–1α) or interleukin–1β (IL–1β) at 1 ng/mL for 0, 1, 2, and 3 days. Transcription level of IL–8 and COX–2 was determined by real-time PCR. Endogenous COX–2 expression was analyzed by immunoblotting. Secretory IL–8 was analyzed by ELISA. Lentivirus–based silence system was used to decrease the endogenous COX–2 expression.

**Results:** Both IL–1α and IL–1β significantly induced IL–8 secretion in a time–dependent manner. In contrast, MOX concentration– and time–dependently reduced transcriptional and secretory expressions of IL–1α– or IL–1β–induced IL–8 in HCFs. Furthermore, MOX also reduced transcriptional and endogenous protein expressions of IL–1α– or IL–1β–induced COX–2 in a concentration–dependent manner. Using lentivirus–based silence system, secretory IL–8 was obviously suppressed in COX2–silenced HCFs with IL–1α or IL–1β stimulation.

**Conclusions:** MOX diminished IL–8 secretion in HCFs by suppression of intracellular COX–2 expression in HCFs.
Surface Modification of Collagen-Based Material by Grafting of Chondroitin Sulfate to Improve the Moisturizing Properties for Corneal Repair

First Author: Yang LIU

Purpose: Cornea disease is the second leading cause of blindness, and keratoplasty is the most commonly performed option for visual rehabilitation of patients with corneal blindness. However, clinical treatment has been drastically limited due to a severe shortage of high-quality donor corneas. Although collagen film with outstanding biocompatibility has promising applications in corneal tissue engineering, the moisturizing properties of collagen-based materials must be further improved to satisfy the requirements of clinical applications.

Methods: The chondroitin sulfate was grafted onto the surface of collagen film by making use of 1-Ethyl-3-(3-dimethyl aminopropyl) carbodiimide (EDC) and N-hydroxysuccinimide (NHS) as the cross-linking agents in this research. The collagen–chondroitin sulfate (Col–CS) membrane was analyzed with Fourier transform infrared spectroscopy (FTIR) and X-ray photoelectron spectroscopy (XPS), and its hydrophilic property, moisture retention, optical property, and mechanical performance were tested. The cytocompatibility of the Col–CS film with human corneal epithelial cells (HCEC) was also evaluated.

Results: The moisture-retaining capacity was found to be improved with the introduction of chondroitin sulfate, and the Col–CS membrane had better mechanical properties than the collagen film. Moreover, the modified film displayed excellent biocompatibility for the proliferation of human corneal epithelial cells (HCECs) in vitro.

Conclusions: This Col–CS film with good moisturizing properties can reduce the risk of xerophthalmia and is expected to increase the implant success rate in patients with corneal defects.

Learning Descemet Membrane Endothelial Keratoplasty: Is Prior Experience With Descemet Stripping Endothelial Keratoplasty Essential?

First Author: Mohammed ZIAEI
Co-Author(s): Maninder BHOGAL, Bruce ALLAN

Purpose: This study aims to report the initial Descemet membrane endothelial keratoplasty (DMEK) outcomes of 2 trainee surgeons operating under supervision with no significant prior experience with Descemet stripping endothelial keratoplasty (DSEK) (<10 cases).

Methods: This was a prospective single center study of 40 eyes of 35 patients with endothelial failure undergoing DMEK or combined phaco-DMEK. Unicameral eyes, eyes with previous glaucoma shunt surgery, and vitrectomized eyes were excluded. Grafts 8–8.5 mm in diameter were prepared using the peripheral scoring technique and injected into the eye using a glass cannula. A cohesive ophthalmic viscoelastic device was utilized in 95% of cases for descemetorhexis. All patients had complete anterior chamber air fill for 1 hour postoperatively before air fill adjustment to prevent pupil block. The rates of intraoperative complications, peripheral detachment, repeat air fill, and primary graft failure were recorded.

Results: Graft preparation was successful in all cases with no loss of tissue. Surgery was uneventful in 90% of cases. One case required intraoperative restaining of the DMEK graft, whereas another case was complicated by significant iris bleeding from the peripheral iridotomy. Partial detachments were seen in 25% (10/40) of cases. In 12.5% of eyes, a single rebubbling procedure with air was required, which resulted in complete graft attachment in all cases. Primary graft failure occurred in 5% of cases.

Conclusions: Our clinical outcomes are in keeping with that reported in the literature from a multicenter study evaluating the initial DMEK case series of 18 experienced corneal surgeons. Lack of experience with older endothelial keratoplasty techniques such as DSEK is therefore not a significant barrier toward learning DMEK using a standardized technique and case selection criteria.

Eye Donation Awareness Among Medical and Paramedical Staff at a Tertiary Care Hospital in India: Where Do We Stand?

First Author: Sumit GUPTA
Co-Author(s): Rekha KHANDELWAL

Purpose: To evaluate awareness and knowledge about eye donation among medical and paramedical staff working in a tertiary care hospital in central India.

Methods: A validated, brief, structured, open-ended questionnaire was designed and introduced to collect information from 300 participants who were tertiary care health workers. The study was an observational study, and a random sampling method was used. Data was analyzed using SPSS version 11.0 software.

Results: It was observed that more than half (n = 300) of the participants were unaware of the magnitude of
corneal blindness in India. Although the majority (91%) had heard about eye donation, knowledge of the ideal time of eye donation was poor. Lack of awareness about eye donation among the masses was quoted as an important reason for not donating eyes by 65.67% of the participants.

Conclusions: Medical and paramedical staff should be educated regarding this noble gesture so as to improve corneal transplantation rates and thereby reduce the burden of corneal blindness in developing countries like India.

Poster No.: EX1–061
Panel No.: 61, Session 1

Efficacy and Tolerability of an Oil-Based Lubricant Eye Drop in Dry Eye Patients With Lipid Deficiency

First Author: Abayomi OGUDELE
Co-Author(s): Marc LBETTOULLE, Gemma ROSSI, Ewa MRUKWA-KOMINEK, Daniel BOEHRINGER, Christophe BAUDOIN

Purpose: To demonstrate the efficacy of a propylene glycol–based, microemulsion eye drop (SYSB; Systane Balance) over preservative–free 0.9% saline (PFS) solution in patients with lipid–deficient dry eye.

Methods: This was a multicenter, observer masked, parallel-design study (powered to show superiority). Subjects were randomized to receive SYSB or PFS QID for 35 days (phase 1) and then as needed for 55 days (phase 2). Eligible subjects had lipid–deficient dry eye with meibomian gland dysfunction. The primary outcome was change from baseline in tear film break-up time (TFBUT) at day 35. Staining and subjective assessment (IDEE) scores were also assessed.

Results: In total, 279 patients were enrolled; 214 were randomized and 210 received study treatment. Baseline and demographic characteristics were similar between the SYSB (n = 110) and PFS (n = 100) groups. At the end of the study, the mean change from baseline (±SEM) in TFBUT at day 35 was 1.5 (0.2) and 0.5 (0.2) for SYSB and PFS, respectively, representing a difference of 1.0 (0.3) significantly in favor of SYSB (P = 0.0011). Twenty-one (19.1%) patients receiving SYSB and 8 (8.0%) patients receiving PFS experienced ocular treatment–emergent adverse events (AEs). The most frequently reported ocular AEs with SYSB were eye irritation (11 events in 6 patients) and eye pain (36 events in 3 patients). Foreign body sensation was the most frequently reported ocular AE with saline (3 events in 2 patients).

Conclusions: SYSB demonstrated superior tear film stability compared with PFS in patients with lipid–deficient dry eye and was well tolerated over 90 days of treatment.

Poster No.: EX1–062
Panel No.: 62, Session 1

Safety and Efficacy of a Polyethylene Glycol/Propylene Glycol–Based Lubricant Eye Drop in Patients With Dry Eye

First Author: Abayomi OGUDELE
Co-Author(s): Marc LABETOULLE, Elisabeth MESSMER, Frédéric MOURIAUX, Christophe BAUDOIN

Purpose: The objective of this study was to compare the efficacy and safety of a polyethylene glycol/propylene glycol–based eye drop (PEG/PG; Systane Ultra) with an osmoprotective–carboxymethylcellulose–based eye drop (CMC/O; Optive) in patients with dry eye.

Methods: This was a multicenter, observer masked, parallel-design study. Subjects were randomized to PEG/PG or CMC/O 4 times per day for 35 days (phase 1) and then as needed for 55 days (phase 2). Eligible subjects were diagnosed with dry eye and exhibited signs and symptoms of dry eye at screening. Primary endpoint was change from baseline in total ocular staining score (TOSS) at day 35 (15-point Oxford scale).

Results: Baseline and demographic characteristics were similar between the PEG/PG (n = 46) and CMC/O (n = 48) groups. At day 35, mean (SE) change from baseline in TOSS was –2.16 units (0.33) in the PEG/PG group and –1.69 units (0.33) in the CMC/O group; the mean treatment difference was –0.47 units (95% confidence interval (CI), –1.41 to 0.47; P = 0.3181), which was below the upper NI margin of 2 units. No treatment-related serious adverse events were reported. Five subjects discontinued due to treatment–related adverse events (AEs) (2 PEG/PG and 3 CMC/O subjects). AEs that led to study discontinuation included dry eye, eye irritation, eye pain, eyelid edema, and pruritus. Best corrected visual acuity (BCVA) was generally unchanged from baseline throughout the study, with observed changes <2 letters.

Conclusions: The PEG/PG–based drop demonstrated comparable efficacy with the CMC/O–based drop after 35 days of treatment, with a favorable safety profile in patients with dry eye after 90 days of treatment.

Poster No.: EX1–063
Panel No.: 63, Session 1

Comparison of Subconjunctival and Intrastromal Injection of Bevacizumab in the Treatment of Corneal Neovascularization in Cases of Penetrating Keratoplasty

First Author: Swati CHAWLA
Co-Author(s): Gaurav KUMAR, Alka GUPTA, Sandeep MITHAL, Lokesh SINGH

Purpose: To examine the role of subconjunctival and intrastromal injection of bevacizumab in the treatment
of corneal neovascularization in penetrating keratoplasty and to compare results between the 2 modes of administration.

**Methods:** This was a prospective randomized interventional study done in 20 eyes of 20 patients of penetrating keratoplasty (PK) with vascularization in 1 or 2 quadrants that did not improve with regular treatment. Patients were randomly divided into 2 groups: in one, bevacizumab injection was given via the intrastromal route and in the other, by the subconjunctival route. Results of the postintervention group were compared with the preintervention group.

**Results:** There were more male subjects in our study. Most were in the age group >41 years (80%). The most common probable cause of corneal neovascularization was graft failure (50%), followed by viral keratitis (20%), chemical injury (20%), loose sutures (5%), and trauma (5%). Eighty percent of patients included were OPKs and 20% TPKs. We found no statistically significant change in intraocular pressure (IOP) and graft clarity after the injection of bevacizumab via the intrastromal route (group A) or the subconjunctival route (group B). Numerically, there was improvement in best corrected visual acuity (BCVA) (in terms of logMAR), but it was not statistically significant in both groups. There was a statistically significant decrease in vascularity in terms of the distance of corneal blood vessel from the limbus and the final vascularity score in both groups. There was a statistically significant decrease in CCT after injection of bevacizumab by the subconjunctival route (group B). On comparing both the groups, we found there was no significant difference in any of the variables [ie, BCVA, IOP, CCT, graft clarity, vascularity (distance of vessel from the limbus, score)] between the two. They were statistically nonsignificant.

**Conclusions:** Our study suggests injecting bevacizumab by either of 2 routes, the intrastromal and subconjunctival routes, is almost equally effective in treating corneal neovascularization in post–PK patients without any associated ocular or systemic side effects.

**Poster No.:** EX1–064  
**Panel No.:** 64, Session 1

**Clinical Evaluation of a Combination Carboxymethylcellulose and Hyaluronic Acid Eye Drop in Dry Eye**

**First Author:** Peter SIMMONS  
**Co-Author(s):** Haixia LIU, Joseph VEHIGE, Cindy CARL-ISEL-WILCOX, Pasquale ARAGONA, Minas CORONEO

**Purpose:** A new artificial tear combining both carboxymethylcellulose and high molecular weight hyaluronic acid (CMC–HA) was compared with an existing formulation containing carboxymethylcellulose alone (CMC).

**Methods:** Subjects with mild to moderate signs and symptoms of dry eye were enrolled in this double-masked, randomized multicenter trial and used either CMC–HA or CMC at least 2 times per day for 90 days. Follow-up visits were at days 7, 30, 60, and 90. The Ocular Surface Disease Index (OSDI) was the primary outcome measure. Tear breakup time (TBUT), ocular surface staining, Schirmer test, and visual analog scales (VAS) to measure dry eye symptoms, severity, and formulation acceptability were assessed, along with adverse events, biomicroscopy, and visual acuity. 

**Results:** Four hundred sixty subjects were enrolled at 45 centers in Europe and Australia, and 364 qualified for the preprotocol analysis. OSDI scores at day 90 improved (reduced) 16.9 ± 7.5 in the CMC–HA group and 16.6 ± 16.1 in the CMC group; CMC–HA was non-inferior to CMC. Both treatments produced significant improvements (paired t test, P < 0.001) from baseline at all follow-up visits for OSDI, ocular surface staining, TBUT, and symptom VAS scores. Acceptability scores were high (>70 on a 0–100 scale at day 90) and comparable between groups. The safety profiles of the 2 groups were similar, with the majority of adverse events typical in dry eye patients.

**Conclusions:** This study demonstrated that this novel combination of 2 polymers with distinct properties (CMC and HA) is safe and effective for dry eye treatment.
patients after PASCAL photocoagulation. Six months after treatment, complete reepithelialization of the overlying conjunctiva was noted. No signs of recurrence or scarring were found in any of the patients during the follow-up period.

Conclusions: Pure thermal denaturation is the main mechanism of PASCAL photocoagulation for removal of superficial conjunctival nevi. PASCAL can be considered as an alternative to conventional argon laser treatment or surgery.

Poster No.: EX1–066
Panel No.: 66, Session 1

The “Tire in the Rim” Concept in Penetrating and Predescemetic Keratoplasty

First Author: Anastasios CHARONIS

Purpose: To describe a revolutionary idea of replacing traditional suturing with a proprietary endoskeleton during PKP or DALK surgery.

Methods: A femtolaser is used to create specific intrastromal tunnels at midstromal depth during regular circular trephination of the donor and the recipient cornea. Before the posterior lamella is removed (in PKP cases) the device is introduced in the recipient peripheral cornea utilizing the natural elasticity of the cornea, in a way similar to how a tire is introduced into the rim in today’s automobiles, through sidecut incision tunnels. With the device in situ in PKP, the posterior lamella is removed with scissors. The graft is then introduced in the device through sidecut incision tunnels and again like a “tire in the rim,” creating a tight and superior wound construction.

Results: The feasibility of the procedure is discussed in an animated video and an eyebanking model.

Conclusions: Sutureless keratoplasty without any additional surface cuts is possible with additional stromal support. The provision of infinite points of graft support may prove to be invaluable in early visual rehabilitation, astigmatism control, ease and safety of the procedure, and possibility in introducing the world’s first cornea-supported intraocular lens (CORSIL project), thus creating the solid prerequisites for a “game changing” strategy in penetrating keratoplasty and predescemetic deep anterior lamellar keratoplasty.

Poster No.: EX1–067
Panel No.: 67, Session 1

Three-Dimensional Meibography to Diagnose Dry Eye

First Author: Choun-ki JOO
Co-Author(s): Young-sik YOO, Woong-joo WHANG

Purpose: This study aimed to confirm the efficacy of three-dimensional (3D) meibography to evaluate the structure of the meibomian glands.

Methods: This was a cross-sectional study of patients diagnosed with dry eye disease associated with dysfunction of the meibomian glands. To confirm the structure of the meibomian glands, 3D images using 3D OCT and 2D images using an infrared camera were obtained. Patients who had drop-out lesions in 3D and 2D images were divided into 2 groups, and the differences between them were analyzed. At the same time, to find the clinical signification for structural changes in the meibomian glands, all patients had the ocular surface and tear function examined to define the degree of dry eye.

Results: In 3D and 2D images for patients who had drop-out lesions on the meibomian glands, the more severe the dry eye, the more irregular the structure of the meibomian glands ($P < 0.05$). However, the tendency of disappearing glands, focally or totally, was similar between them. In a mild degree of drop-out (grade A by 2D images), the classification based on 3D images had a stronger correlation with the clinical parameters for dry eye than that based on 2D images.

Conclusions: Our study confirmed that the structural change of the meibomian glands was proportional to the degree of dry eye. 3D meibography was more powerful than 2D infrared camera to find out the actual structure of drop-out lesions for meibomian glands.

Poster No.: EX1–068
Panel No.: 68, Session 1

Limbal Stem Cell and Oral Mucosal Epithelial Transplantation From Ex Vivo Cultivation in LSCD-Induced Rabbits: Histology and Immunologic Study of the Transplant Epithelial Sheet

First Author: Napaporn TANANUVAT
Co-Author(s): Kanokkan BUMROONGKIT, Chainarong TOCHARUSA, Umnat MEVATEE, Apisek KONGKEAW, Somsanguan AUSAYAKHUN

Purpose: To evaluate the results of cultivated limbal and oral mucosal epithelial transplantation (CLET and COMET) in limbal stem cell deficiency (LSCD)–induced rabbits.

Methods: Six rabbits were divided into 2 groups of 3 rabbits each. In the first group limbal tissue was harvested, and the second group received oral mucosal biopsy. The specimens were cultured using explants technique with amniotic membrane as a substrate. The right eye of each rabbit was induced to have LSCD by using alkali burns. After 3 weeks, the LSCD–induced rabbit eyes were transplanted with CLET and COMET in the first and second group, respectively. All eyes were evaluated weekly after operation. After 2 months, all
transplanted eyes were enucleated, and the epithelial morphology and phenotype of ocular surfaces were studied and compared with normal cornea and oral mucosa tissue.

**Results:** At 2 months posttransplantation, all except 1 animal in the COMET group recovered with corneal transparency and complete epithelialization. Histology of most transplanted eyes showed stratified layers of corneal epithelia similar to normal rabbit cornea with some different findings. Phenotypic characterization of transplanted eyes showed a similar pattern of marker expression with the absence of p63 expression at the limbal and corneal epithelium in the COMET group.

**Conclusions:** The histology and phenotypic characterization of transplanted eyes with cultivated limbal and oral mucosal epithelial sheets were most likely to have similar characteristics to normal rabbit eyes, though the COMET eyes had some inferior characteristics to the CLET eyes.

**Poster No.: EX1–069**  
**Panel No.: 69, Session 1**

**Comparison of 3 Different Types of DSAEK Lenticule Insertion Techniques and Their Anatomical and Visual Outcomes**

*First Author: Bhupesh SINGH*  
*Co-Author(s): Sudhank BHARTI*

**Purpose:** To compare the different surgical techniques of performing Descemet stripping endothelial keroplasty (DSAEK) with the Tan EndoGlide (Coronet, UK), Sheets glide, and taco–fold technique.

**Methods:** DSAEK was performed in 21 eyes from January 2014 to November 2014. Cases were divided based on the method of lenticule insertion. There were 7 cases in each group. Indication for surgery, postoperative lenticule attachment, visual acuity, and endothelial cell count at day 1, 1 week, 1 month, and 3 months were recorded.

**Results:** The Tan EndoGlide provided a much more stable anterior chamber, and the donor tissue unfolding process was better controlled. Surgically induced refractive error 3 months after surgery was 1.5 to 1.75 Dsph in the Tan EndoGlide group, 1.25 ± 1.50 Dsph in the Sheets glide group, and 1.25 ± 1.12 Dsph in the taco–fold technique (*P* < 0.05). The endothelial cell loss was 18% in the Tan EndoGlide group, 19% in the Sheets glide group, and 24% in the taco–fold group. Mean best corrected visual acuity was 0.65 ± 0.27 logMAR, 0.63 ± 0.25 logMAR, and 0.69 ± 0.52 logMAR in the Tan EndoGlide, Sheets glide, and taco–fold technique groups, respectively. Statistically significant differences in intra- and postoperative complications among the groups were not found.

**Conclusions:** The Tan EndoGlide used during DSAEK is a better alternative to the other 2 methods used. It provides better stabilization of the anterior chamber and minimal manipulation of donor tissue. The visual outcomes and endothelial cell loss 3 months after the surgery were similar in the Tan EndoGlide and Sheets glide groups compared with the taco–fold group.

**Poster No.: EX1–070**  
**Panel No.: 70, Session 1**

**Thermal Pulsation Treatment for MGD and Dry Eye to Optimize Tear Film for Better Quality of Vision After Advanced Technology Lens Implantation**

*First Author: Barbara KUSA*  
*Co-Authors: Matteo PIOVELLA*

**Purpose:** To evaluate a new system for the thermal pulsation treatment of meibomian gland dysfunction (MGD) in evaporative dry eye patients.

**Methods:** Ninety-six eyes of 48 patients (mean age, 54.65 ± 14.98 years) were diagnosed with MGD based on the following criteria: results of a symptom questionnaire and quantification of the lipid layer thickness using interferometric color units (ICU) as determined by the LipiView (TearScience, Morrisville, NC) and standardized meibomian gland expression to determine the functionality. Criteria for treatment eligibility were LipiView score ≤ 70 ICU and meibonian gland function evaluation. Patients received a LipiFlow treatment (TearScience, Morrisville, NC) designed to remove obstructions and restore meibomian gland function. Patients were reassessed at 1, 3, and 6 months and 1, 2, and 3 years posttreatment.

**Results:** In all eyes, the symptoms had decreased at 1 month posttreatment. The mean pretreatment ICU score increased from 53.70 ± 19.36 to 67.64 ± 18.13 at 3 years posttreatment. The AVG ICU showed a 20.6% increase. Patients reported no discomfort or pain during or after treatment.

**Conclusions:** This new system provides an effective and efficient means of treatment for MGD and evaporative dry eye. For patients with MGD, this treatment should be considered before laser–assisted refractive surgery or advanced technology lens implantation to optimize the tear film and thus optimize surgical outcomes.

**Poster No.: EX1–071**  
**Panel No.: 71, Session 1**

**Ocular Surface Epithelial Thickness Evaluation in Dry Eye Patients: Clinical Correlations**

*First Author: Qingfeng LIANG*

**Purpose:** To evaluate the relationship between corneal and conjunctival epithelium thickness and ocular sur-
face clinical tests in dry eye (DED) patients.

Methods: Fifty-four patients with DED and 32 healthy age- and sex-matched control subjects were included. Each patient underwent an evaluation of ocular surface disease symptoms using the Ocular Surface Disease Index (OSDI), tear film break–up time (TBUT), corneal conjunctival staining, tear film lipid layer analysis, and Schirmer test. The central corneal epithelium thickness (CET) and the limbal (LET) and bulbar conjunctival epithelium thickness (BET) in 4 quadrants were acquired using spectral-domain optical coherence tomography (SD–OCT). Correlation of ocular surface epithelial thickness with the results of ocular surface clinical tests was analyzed.

Results: There was no difference in terms of sex ($P = 0.699$) and age ($P = 0.503$) between the DED and control groups. Compared with control subjects, the mean BET was significantly thicker ($P < 0.001$) and the mean LET was significantly lower ($P = 0.009$) in the DED group. There was no significant difference in CET between the 2 groups ($P = 0.103$). The LET was correlated with OSDI and TBUT ($r = -0.305$, $P = 0.047$ and $r = 0.378$, $P = 0.012$), and the BET was correlated with OSDI ($r = 0.362$, $P < 0.001$) and TBUT ($r = -0.428$, $P < 0.001$) but not with Schirmer I test ($r = -0.165$, $P = 0.290$) or the Oxford score ($r = 0.134$, $P = 0.392$).

Conclusions: Anterior segment SD–OCT can provide noninvasive evaluation of ocular surface epithelial thickness. The thinner LET and thicker BET were modified in the dry eye group and the LET was correlated with OSDI and TBUT.

Poster No.: EX2-331
Panel No.: 331, Session 2

Measuring Tear Film Lipid Layer Thickness by Interferometry to Predict the Clinical Signs and Symptoms of Dry Eye Syndrome and Meibomian Gland Dysfunction

First Author: Yu-bai CHOU
Co-Author(s): Nai-wen FAN, Pei-yu LIN, Catherine LIU

Purpose: To measure quantitative lipid layer thickness (LLT) by LipiView interferometry and to correlate the measurement with clinical symptoms of dry eye syndrome and several signs of obstructive meibomian gland dysfunction.

Methods: We performed a prospective analysis of 118 patients (234 eyes). Dry eye symptoms were quantified by the Ocular Surface Disease Index (OSDI) and Standard Patient Evaluation of Eye Dryness (SPEED). Clinical signs (including meibomian gland loss, meibomian gland expression by device or cotton swab, mucocutaneous junction displacement, telangiectasia) were observed and recorded under slit lamp microscopy. Linear regression and ANOVA were performed on the data.

Results: There was a significant correlation between lipid layer thickness with SPEED questionnaire ($n = 108$, $P = 0.005$, $r = -0.268$) and OSDI questionnaire ($n = 108$, $P = 0.0095$, $r = -0.249$). Additionally, lipid layer thickness was significantly correlated with meibomian gland expression by cotton swab ($n = 228$, $P = 0.0354$) and mucocutaneous junction displacement ($n = 227$, $P = 0.0004$) by linear regression analysis.

Conclusions: Quantitative measurement of tear film lipid layer thickness by interferometry was significantly thinner in subjectively dry eye patients. Interferometry is also adequate to predict clinical signs of meibomian gland dysfunction, especially in meibomian gland expression and mucocutaneous junction displacement.

Poster No.: EX2-333
Panel No.: 333, Session 2

Risk Factors and Microbiological Features of Patients Hospitalized for Microbial Keratitis: A 10-Year Study in a Referral Center in Taiwan

First Author: Tzu-yu LIN
Co-Author(s): Yeong-fong CHEN, Lung-kun YEH, David Hui-kang MA, Hsin-yuan TAN, Ching-hsi HSIAO

Purpose: To analyze predisposing factors, clinical features, and microbiological characteristics of patients with microbial keratitis hospitalized over 10 years.

Methods: We retrospectively reviewed the medical records of 558 patients who were diagnosed with microbial keratitis and admitted to Chang Gung Memorial Hospital (CGMH), a referral center in Taiwan, from January 1, 2003, to December 31, 2012. Demographics, predisposing factors, isolated organisms, treatment, and hospital stay were recorded. Yearly trends were tested using a linear-by-linear association.

Results: Contact lens wear was the most common predisposing factor (31.4%), followed by ocular and systemic diseases (26.3%) and trauma (23.5%). Contact lens–related infectious keratitis increased year by year ($P = 0.011$). Pseudomonas aeruginosa was the most commonly isolated organism (28%), followed by fungi (17.6%) and coagulase-negative Staphylococcus (5.4%). Except for Serratia marcescens, the identified organisms did not change over 10 years. Most bacterial infections were controlled using antimicrobial treatment, but more than half of patients with fungal keratitis required surgical intervention. The mean hospital stay was 13.7 ± 11.5 days. Previous ocular surgery, large ulcer size, nontuberculous Mycobacterium infection, and surgery during admission were related to prolonged hospital stay.

Conclusions: In Taiwan, contact lens–related pseudomonal keratitis remained the most common cause of microbial keratitis in patients hospitalized from 2003 to 2012.
Prevention of Evisceration or Enucleation in Endogenous Bacterial Panophthalmitis With No Light Perception

First Author: Kuan-jen CHEN
Co-Author(s): An Ning CHAO, Wei-chi WU, Yen-po CHEN, Chi-chun LAI

Purpose: To assess the prevention of evisceration or enucleation in patients with endogenous bacterial panophthalmitis (EBP) and no light perception (NLP) after multiple intravitreal and periorcular injections of antibiotics and dexamethasone.

Methods: Medical records were retrospectively reviewed in 18 eyes of 18 patients with EBP and NLP at Chang Gung Memorial Hospital, Taoyuan, Taiwan between January 2005 and December 2013. Eighteen eyes received multiple intravitreal and periorcular injections of antibiotics and dexamethasone. Evaluation included spread of infection to contiguous or remote sites, subsequent evisceration or enucleation, fitting of prosthesis, and sympathetic ophthalmia.

Results: Eighteen patients were diagnosed with EBP, with liver abscesses in 8 patients, renal infection in 3, pneumonia in 2, infective endocarditis in 1, cellulitis in 1, retroperitoneal (nonrenal) abscess in 1, drug abuse in 1, and mycotic pseudoaneurysm in 1. Culture results were positive for Klebsiella pneumoniae in 12 patients, Streptococcus species in 3 patients, Pseudomonas aeruginosa in 1 patient, Escherichia coli in 1 patient, and Staphylococcus aureus in 1 patient. The average number of periorcular injections was 2.2, and the average number of intravitreal injections was 5.8. All eyes except 1 showed resolution of infection and inflammation within 10 days to 1 month. No eye required evisceration or enucleation or developed the spread of infection to contiguous or remote sites during follow-up. No sympathetic ophthalmia was observed in the fellow eye of any patient during follow-up. All eyes had successful fitting of the prosthesis.

Conclusions: Prevention of evisceration or enucleation in patients with EBP and NLP can be achieved by multiple intravitreal and periorcular injections of antibiotics and dexamethasone.

Poster No.: EX1-072
Panel No.: 72, Session 1

Anti-Inflammatory Effect of Emodin on Lipopolysaccharide-Induced Keratitis

First Author: Guoling CHEN

Purpose: To investigate the effects of emodin as an anti-inflammatory agent on lipopolysaccharide (LPS)-induced keratitis in rats.

Methods: Clinical score and slit-lamp microscope were used to determine the corneal inflammatory response. Corneal structure was observed by hematoxylin–eosin staining and transmission electron microscopy. Messenger ribonucleic acid levels of tight junction protein and cytokines were determined by reverse transcrip-
Conclusions: Among patients with blunt facial trauma who underwent isolated orbital CT as part of ocular trauma assessment, the diagnostic performance of CT in detecting globe rupture is more accurate in patients with orbital wall fractures. Nevertheless, isolated orbital CT alone does not have a high enough diagnostic performance to reliably rule out all globe ruptures.

Poster No.: EX1-076
Panel No.: 76, Session 1

Regional Relationship Between Macular Retinal Thickness and Corresponding Central Visual Field Sensitivity in Glaucoma Patients

First Author: Chun Hsiu LIU
Co-Author(s): Shirley CHANG

Purpose: To investigate the relationship between the macular retinal thickness (MRT), as determined by spectral domain–optical coherence tomography (SD–OCT), and central visual field sensitivity (VFS), as measured by standard automated perimetry (SAP), in patients with glaucoma.

Methods: Sixty-nine eyes of 69 patients with glaucoma were included. All subjects underwent SAP testing (Humphrey field analyzer, central 10–2 of Swedish interactive thresholding algorithm standard) and SD–OCT scans (Spectralis, posterior pole asymmetry analysis). Posterior pole retinal thickness map and 10–2 visual field threshold map were divided into 16 corresponding zones. The correlation between average MRT and threshold sensitivity in each corresponding zone or average hemisphere value was evaluated. Structure function correlation was performed for total values, hemisphere values, and values of 16 divided zones. The areas under the receiver operating characteristic curve (AUROC) were calculated to assess the discriminating power of MRT for glaucoma.

Results: We observed a significant correlation between the VFS and MRT in each hemifield and in corresponding divided zones except a few perifoveal retinal areas: superior hemifield (r = 0.503, P = 0.000), inferior hemifield (r = 0.369, P = 0.002), and divided zones (r = 0.266–0.432, P < 0.05). The AUROCs for hemisphere MRT were significant (range, 0.706–0.793; P < 0.05). The discriminating MRT values with the best sensitivity–specificity balance were 273.5 µm in the superior retina (sensitivity = 0.833, specificity = 0.538) and 259.5 µm in the inferior retina (sensitivity = 0.660, specificity = 0.842).

Conclusions: MRTs measured with SD–OCT were significantly correlated with central visual field sensitivity. The change in MRT can predict central visual field defects in early glaucoma patients.
Optical Coherence Tomography Angiography for Glaucoma Diagnosis

First Author: Henry CHEN

Purpose: Vascular factors may have important roles in the pathophysiology of glaucoma. Optical coherence tomography angiography (OCTA) is a new, high-quality, noninvasive technique that employs motion contrast imaging to high-resolution volumetric blood flow information generating angiographic images. We investigated optic disc and peripapillary retinal vascular changes in glaucoma with OCTA and determined the relationship of nonperfusion measurements with traditional measures of function and structure.

Methods: This was an observational, cross-sectional study. The optic disc region was scanned using a 3 × 3-mm scan with a 70-kHz, 840-nm-wavelength spectral OCT system. The split-spectrum amplitude-decorrelation angiography (SSADA) algorithm was used to compute 3-dimensional optic disc angiography. The clinical features, optic disc images, and perimetric defects of both normal subjects and glaucoma patients were analyzed. Wide-field OCT scans over the discs were used to measure retinal nerve fiber layer (NFL) thickness and macular area.

Results: In normal eyes, a dense microvascular network around the disc was visible on OCT angiography. In glaucomatous eyes, this network was visibly attenuated globally and focally. Peripapillary retinal nonperfections are associated with and also correspond with areas of nerve fiber layer thinning, ganglion cell complex thinning, and visual field defects, and these diagnostic modalities are synergistic.

Conclusions: We demonstrated that OCTA based on the SSADA can detect reduced peripapillary retinal perfusion in glaucomatous eyes and can be visualized as focal defects in vivo. OCTA may add valuable new information for glaucoma assessment and has the potential to reveal the ONH blood flow mechanism related to glaucoma.

Detection of Retinal Nerve Fiber Layer and Macular Ganglion Cell—Inner Plexiform Layer Loss in Eyes With Early Localized Glaucomatous Visual Field Defects by Cirrus HD-OCT

First Author: Mei-ju CHEN
Co-Author(s): Yu-fan CHANG, Chih-chien HSU, Yu-chieh KO, Catherine LIU

Purpose: To evaluate the ability of peripapillary retinal nerve fiber layer (RNFL) and macular ganglion cell—inner plexiform layer (GCIPL) measurements to detect early localized glaucomatous visual field defects in glaucoma patients using Cirrus spectral domain OCT.

Methods: This prospective cross-sectional study included patients with primary open angle glaucoma (POAG) and age- and refraction error–matched control eyes. POAG eyes had characteristic changes of the optic nerve head and/or RNFL, and reliable glaucomatous visual field defects. Subjects underwent a complete ophthalmic examination, automated visual field examination (Humphrey 24–2 SITA standard algorithm), and Cirrus HD-OCT (RNFL and GCIPL program). Only eyes with mean deviation of visual field defect less than −6.0 dB and confined to 1 hemifield were recruited. Data of RNFL program (average, quadrants, and 12 clock hours RNFL thickness) and GCIPL program (average, minimum, and sectors GCIPL thickness) were recorded. The ability to detect early localized RNFL defects was assessed by calculating the areas under receiver operating characteristics curves (AUROC).

Results: A total of 65 POAG eyes and 65 control eyes were enrolled. All the RNFL thickness and GCIPL thickness parameters (except nasal quadrant and clock hours) were significantly reduced in POAG eyes compared with control eyes. The 7 clock hour RNFL thickness showed the largest AUROC value (0.944) among RNFL parameters, followed by inferior RNFL thickness (AUROC 0.911). For GCIPL programs, GCIPL minimum thickness showed a superior capability (AUROC 0.921) for the detection of early localized glaucomatous visual field defects when compared with other parameters.

Conclusions: The 7 clock hour RNFL thickness, GCIPL minimum thickness, and inferior RNFL thickness provided better ability for the detection of early localized glaucomatous visual field defects.

Regulation of Myosin Light Chain Phosphorylation in the Trabecular Meshwork and its Role in the Treatment of Steroid-Induced Ocular Hypertension

First Author: Chien-chia SU
Co-Author(s): Fu-ti PENG, Tsing-hong WANG, Jehn-yu HUANG, I-jong WANG

Purpose: To evaluate the therapeutic effect of a myosin light chain kinase inhibitor, ML-7, in dexamethasone–induced pathological changes of the trabecular meshwork.

Methods: We compared the inhibitory effects of cross-linked actin networks (CLANs) and total fluorimetric matrix metalloproteinase (MMP) activity in dexamethasone–treated human trabecular meshwork cell (HTMC)
culture. Western blot analysis evaluated fibronectin, collagen, laminin, and different MMP expressions.

**Results:** ML–7 significantly prevented dexamethasone–induced CLAN formation. In dexamethasone–treated HTMC culture, total MMP activity significantly decreased compared with control medium. 2uM and 10uM ML–7 significantly increased total MMP activity. ML–7 treatment also significantly decreased expression of fibronectin, collagen IVα2, collagen Iα1, and laminin in HTMC culture.

**Conclusions:** Myosin light chain kinase inhibitor, ML–7, shows therapeutic potential in dexamethasone–induced ocular hypertension.

**Poster No.: EX1–080**  
**Panel No.: 80, Session 1**  
**Intraocular Pressure Monitoring Using Moiré Patterns Generated From a Contact Lens**  
**First Author: I-jong WANG**  
**Co-Author(s): Lon WANG**

**Purpose:** The monitoring of intraocular pressure (IOP) variations and the measurement of IOP diurnal peaks are important for the diagnosis and management of glaucoma. Continually obtaining IOP values may therefore help identify variations and spikes. In this work, a contact lens sensor with double–layer microstructures is demonstrated to produce moiré fringes for the continual characterization of IOP variations.

**Methods:** The microstructure on each layer of the contact lens was made by molding. One rigid layer served as reference, and the other was soft to adhere to the corneal surface so that the resultant moiré fringes could be used to detect the change in curvature caused by IOP fluctuation. The functionality of the contact lens sensor was verified and the sensitivity to IOP fluctuation was characterized on a porcine eye. The variations in the moiré fringes were correlated with the IOP variations, which were generated from standard model eyes and porcine eyes.

**Results:** The radius of the porcine eye was controlled by injected water pressure. The radius variations with water pressure were measured by using a shape profiler and were around 3 μm per mm Hg, which is close to variation in the human eye. For every 2 mm Hg IOP increment in the porcine eye, the number of the moiré fringes in the 0 degree from the center of the pattern varied by 1. It was noted that the spacing of moiré fringes could be varied continuously with IOP variation. IOP variations as small as 1 mm Hg could be resolved, which we believe is good enough for monitoring the IOP spikes from glaucoma disease.

**Conclusions:** The contact lens sensor was made as a fully passive and noninvasive optical device with dynamic range more than 20 mm Hg and 1 mm Hg resolution in IOP variation measurement. The effectiveness of the contact lens sensor was confirmed in a porcine eye experiment. Using such a contact lens could provide a new and safe diagnostic method for monitoring and managing glaucoma.

**Poster No.: EX1–081**  
**Panel No.: 81, Session 1**  
**Dynamic Changes of Anterior Segment Parameters Under Physiological Pupil Dilation in the High Risk Eyes of Primary Angle Closure**  
**First Author: jialiu LIN**  
**Co-Author(s): Zhonghao WANG, Jingjing HUANG**

**Purpose:** To analyze and compare the dynamic changes of anterior segment parameters among the fellow eyes of acute primary angle closure (APAC) eyes with primary angle closure suspects (PACS) and normal controls.

**Methods:** APAC fellow eyes, PACS eyes, and normal control eyes were recruited. AS–OCT examinations were performed under dark and light conditions. Anterior segment parameters including pupil diameter (PD), anterior chamber depth (ACD), anterior chamber width (ACW), anterior chamber cross–sectional area (ACA), angle opening distance (AOD), angle recess area (ARA), iris thickness (IT), iris curvature (IC), iris cross–sectional area (I–area), lens thickness (LT), and lens vault (LV) were measured.

**Results:** Forty–eight APAC fellow eyes, 32 PACS eyes, and 30 normal eyes were recruited. In dark and light conditions, compared with normal eyes, the ACD, ACW, and ACA were smaller; AOD and ARA were narrower; and IC, LT, and LV were larger in the APAC fellow eyes and PACS eyes (P < 0.001). There was no significant difference in ACD, ACW, ACA, IT, I–area, PD, LT, and LV between the APAC fellow eyes and PACS eyes. Although AOD and ARA were narrower, larger IC was shown in the APAC fellow eyes than in the PACS eyes (P < 0.05). From light to dark, changes of ACD, ACW, ACA, AOD, ARA, IT, I–area, LT, and LV did not differ significantly among the 3 groups. IC decreased in the APAC fellow eyes and PACS eyes but increased in normal eyes. In addition, less change in PD was found in PACS eyes compared with normal eyes (1.797 ± 0.518 mm vs 2.088 ± 0.500 mm, P = 0.028).

**Conclusions:** The differences in dynamic iris behavior among the APAC fellow eyes, PACS eyes, and normal eyes may help provide insight into the pathogenesis of angle closure.

**Poster No.: EX1–082**  
**Panel No.: 82, Session 1**  
**Risk of Macular Edema After Using Different Antiglaucoma Eye Drops: A Nationwide Case–
Control Study
First Author: Jieh-yu HUANG
Co-Author(s): Chien-chia SU, Tsing-hong WANG

Purpose: To investigate the risk of macular edema after the use of different antiglaucoma eye drops in glaucoma patients.

Methods: From the Longitudinal Health Insurance Database in Taiwan, we included 7628 glaucoma patients treated with a single topical antiglaucoma agent [beta blockers, sympathomimetics, parasympathomimetics, carbonic anhydrase inhibitors (CAIs), or prostaglandin analogs (PGs)] in the case group and randomly selected 10293 patients with glaucoma–related diagnoses but without use of topical antiglaucoma agents as the control group, matched by age and sex. Hazard ratio (HR) of macular edema after the use of different topical antiglaucoma agents was estimated by multivariate logistic regression.

Results: The incidence rate (per 1000 person–years) was 2.58, 3.22, 6.14, 5.62, and 2.90 for beta blockers, sympathomimetics, parasympathomimetics, CAIs, and PGs, respectively. The strength of drug exposure was 106.5 ± 254.5, 77.6 ± 159.3, 43.9 ± 98.8, 26.1 ± 108.4, and 278.9 ± 471.3 days for beta blockers, sympathomimetics, parasympathomimetics, CAIs, and PGs, respectively. After adjustment for age, sex, other comorbidities, and recent cataract or retinal surgeries, HR of macular edema related to beta blockers, sympathomimetics, parasympathomimetics, CAIs, and PGs was 0.83 [95% confidence interval (CI), 0.57–1.21], 0.87 (95% CI, 0.48–1.59), 1.78 (0.86–3.67), 1.21 (0.76–1.92), and 1.01 (95% CI, 0.41–2.49), respectively.

Conclusions: Theoretically, use of PGs may increase the risk of macular edema. However, this study shows that use of PGs does not increase the risk of macular edema.

Poster No.: EX1–083
Panel No.: 83, Session 1

Silibinin Inhibited Platelet-Derived Growth Factor–Induced Cell Proliferations in Human Tenon Fibroblasts Via Regulation of N-Glycosylation in a Proteasome Dependent Manner
First Author: Yi-hao CHEN
Co-Author(s): Ching-long CHEN, Chang-min LIANG, Da-wen LU

Purpose: To investigate the effects and mechanisms of silibinin on proliferations of human Tenon fibroblasts (HTFs) in response to platelet–derived growth factor (PDGF).

Methods: Cell proliferation was measured in HTFs by 4-[3-(4-iodophenyl)-2-(4-nitrophenyl)-2H-5-tetrazolio]-1, 3-benzene disulfonate (WST–1) assay and expression of proliferating cell nuclear antigen (PCNA). The effect of silibinin on the activation of the PDGF receptor–related pathway was evaluated by Western blotting. The modulation of N–glycosylations on PDGF receptor beta (PDGFRb) and the related mechanisms were also examined by Western blotting. A rat model of trabeculectomy was established to assess the effect of silibinin in vivo.

Results: PDGF induced cell proliferations and elevated the expression of PCNA in HTFs; these phenomena were inhibited by silibinin. The effects of silibinin on PDGF–stimulated HTFs were mediated via the downregulation of PDGFR–related signaling pathways such as extracellular signal–regulated kinases (ERKs) and signal transducer and activator of transcriptions (STATs). The level and branching of N–glycans on PDGFRb were also modulated by silibinin, which was inhibited by a proteasome inhibitor, MG–132. In the rat model of trabeculectomy, silibinin decreased the expression of PCNA in subconjunctival areas in vivo.

Conclusions: Silibinin inhibited PDGF–induced cell proliferations in HTFs via inhibitions of PDGFR–related downstream signaling pathways. This effect appeared to be achieved through downregulation of N–glycosylations of PDGFRb in a proteasome dependent manner.

Poster No.: EX1–084
Panel No.: 84, Session 1

Impact of Socioeconomic Status on the Diagnosis of Primary Open-Angle Glaucoma and Primary Angle Closure Glaucoma in Taiwan—A Nationwide Cross-Sectional Study
First Author: Yu-chieh KO
Co-Author(s): De-kuang HWANG, Catherine Jiu-ling LIU

Purpose: To understand the impact of socioeconomic status (SES) on the diagnosis of primary open–angle glaucoma (POAG) and primary angle closure glaucoma (PACG) in Taiwan.

Methods: Subjects with glaucoma were identified from the National Health Insurance Database (NHIRD) of 2006. Individuals who had ≥4 ambulatory visits within 1 year with a diagnosis code of POAG (ICD–9–CM 365.11 or 365.12) or PACG (365.23) and concurrent prescription of antiglaucoma medication or surgery were selected. Individual SES was represented by monthly income calculated from insurance premium. Neighborhood SES was based on neighborhood household income averages. Urbanization level of habitation was categorized into 3 levels. The odds ratio of having POAG or PACG in subjects with different SES was evaluated using multivariate logistic regression analysis.

Results: In total, 752 and 561 subjects with POAG and PACG were identified, respectively. The diagnosis of
glaucome was affected by age, sex, health care utilization, individual SES, and urbanization level of habitation. With adjustment for age, sex, health care utilization, and level of urbanization, subjects with lower SES were more likely to be diagnosed as having PACG, but less likely as POAG.

Conclusions: Subjects with more frequent health care utilization were more likely to be diagnosed with glaucoma. SES affected the diagnosis of POAG and PACG differently; subjects with lower SES were more likely to be diagnosed as having PACG, but less likely as POAG. Glaucoma education and screening should be stratified according to SES to maximize the efficacy in identifying susceptible subjects.

Poster No.: EX1–085
Panel No.: 85, Session 1

Asymmetric Central Corneal Thickness and Retinal Nerve Fiber Layer Thickness in Patients With Primary Open-Angle Glaucoma

First Author: Wen-jeng (melissa) YAO
Co-Author(s): Rob FARGIONE

Purpose: Central corneal thickness (CCT) has been identified as an independent risk factor for the development and progression of primary open-angle glaucoma. No studies to date have evaluated the difference in retinal nerve fiber layer (RNFL) thickness between eyes in patients with asymmetric CCTs. The aim of our study is to evaluate the difference in glaucomatous nerve damage between eyes in patients with asymmetric CCTs with attention to the inferior quadrant, where the earliest glaucoma damage tends to occur.

Methods: This study is a retrospective cohort study that included all patients seen by a single surgeon from July 1 to September 30, 2014, with a diagnosis of primary open-angle glaucoma. Subjects with a history of keratoplasty, refractive surgery, or corneal pathology or surgery affecting CCT were excluded. Average RNFL measurements were obtained with Spectralis ocular coherence tomography (OCT).

Results: One hundred forty-three patients met the inclusion criteria, of whom 60 (41%) were male. The mean age was 67.2 years. Among patients with a CCT asymmetry of 30 μm or more, the average RNFL in the eyes with thicker CCT was 80.07 μm and in the thinner eyes was 65.15 μm (P = 0.02). Patients with a CCT difference of 30 μm or more showed a mean OCT difference of 14.92 μm, a statistically significant difference compared with that of patients with a CCT difference of less than 30 μm, with an average OCT difference of 0.90 μm (P = 0.01). Spearman correlation coefficient was calculated to assess the relationship between CCT asymmetry and RNFL asymmetry, showing a positive correlation at 0.13, although not statistically significant (P = 0.12). In analysis of the inferior quadrant of the RNFL, patients with CCT asymmetry ≥30 μm had OCT of inferior quadrant difference of 17.98 μm, whereas those with CCT asymmetry <30 μm had a difference of 2.48 μm (P = 0.05).

Conclusions: Our results demonstrate that primary open-angle glaucoma patients with asymmetric central corneal thickness between eyes, especially those with a high degree of asymmetry, are at risk for more advanced nerve fiber layer loss in the eye with the thinner CCT, including in the inferior quadrant. Because OCT RNFL is an objective measure that can frequently be used in identifying preperimetric nerve damage, this has clinical implications for the treatment and monitoring of such patients.

Poster No.: EX1–086
Panel No.: 86, Session 1

Verification of a Formula Developed to Predict Postoperative Intraocular Pressure After Cataract Surgery in Primary Angle-Closure Glaucoma

First Author: Yu-fan CHANG
Co-Author(s): Yu-chieh KO, Ling-ing LAU, Catherine LIU

Purpose: To verify the accuracy of a formula predicting postoperative intraocular pressure (IOP) after phacoemulsification and intraocular lens implantation (PHCE-IOL) in primary angle-closure glaucoma (PACG).

Methods: This study took place in Taipei Veterans General Hospital. In a retrospective chart review of patients with PACG who underwent PHCE-IOL between 2011 and 2014, we collected preoperative IOP, axial length, anterior chamber depth (ACD), number of pre-PHCE glaucoma medications, and IOP and glaucoma medications at 1 and 3 months post-PHCE. Post-PHCE IOP values at 1 and 3 months were compared with that predicted using the formula: postoperative IOP = 6.354 + 0.186 pre-PHCE IOP × pre-PHCE ACD. Agreements between measured and predicted IOP values were analyzed using correlation coefficients and Bland–Altman plots.

Results: Of the included 62 eyes, the average pre-PHCE IOP was 19.47 ± 5.84 mm Hg. Post-PHCE IOP values were 14.94 ± 4.03 mm Hg at month 1 and 14.21 ± 3.51 mm Hg at month 3. Patients using more preoperative medications tended to show greater postoperative declines in medication usage. Predicted IOP significantly correlated with post-PHCE IOP measured at 1 (R = 0.314, P = 0.013) and 3 months (R = 0.325, P = 0.01). Bland–Altman plots of difference against the average measured and estimated IOP revealed 2 cases falling outside ±1.96 SD at 1 month and 5 cases at 3 months, indicating good consistency between measurement and prediction.
**Conclusions**: This formula is useful for predicting IOP at 1 and 3 months after PHCE-IOL in PACG. It aids clinicians in preoperative assessment of whether PHCE-IOL alone is likely to achieve acceptable postoperative IOP control.

**Poster No.**: EX1-087  
**Panel No.**: 87, Session 1

**Comparing the Performance of RS-3000 and Cirrus High-Definition Optical Coherence Tomography in Glaucoma Diagnosis of Eyes With High Myopia**

**First Author**: Yu-fan CHANG  
**Co-Author(s)**: Catherine LIU, Yu-chieh KO, Chih-chien HSU, Mei-ju CHEN

**Purpose**: We compared the false-positive and false-negative rates of glaucoma diagnosis in high myopic eyes using 2 different optical coherence tomography (OCT) devices. The RS-3000 5D-OCT has 2 normative databases (axial length [AL] above or below 26 mm). The Cirrus HD-OCT has 1 normative database without built-in AL adjustment.

**Methods**: We prospectively enrolled 40 control eyes and 41 primary open-angle glaucoma (POAG) eyes with AL ≥ 26 mm from September 2014 to May 2015. The circumpapillary RNFL (cpRNFL) was measured. Macular area measurement and parameter definition differ between these 2 devices. Receiver operating characteristic (ROC) curve was calculated, and the false-positive rate in the healthy myopic group and false-negative rate in the POAG myopic group were compared based on the color coding of each device.

**Results**: Both devices showed that the average RNFL and clock-hour 7 RNFL performed better than other parameters in cpRNFL analysis. In macular map imaging, the AUROC of all parameters were greater in RS-3000 OCT (0.778 to 0.873) than that in Cirrus-HD OCT (0.683 to 0.840). The nasal-inferior outer sector (AUROC = 0.873) and the inferior-temporal sector (AUROC = 0.840) were the best parameters in RS-3000 OCT and Cirrus-HD OCT, respectively. The macular map in RT-3000 OCT had a lower false-positive rate in glaucoma detection than Cirrus HD-OCT.

**Conclusions**: RS-3000 OCT outperformed Cirrus HD-OCT in macular map parameters. The built-in long AL normative database in RS-3000 is useful in reducing the false-positive rate of macular parameters in glaucoma diagnosis for eyes with AL ≥ 26 mm.

**Poster No.**: EX1-088  
**Panel No.**: 88, Session 1

**Body Positions Affect Intraocular Pressure in Primary Open-Angle Glaucoma Patients With Recurrent Optic Disc Hemorrhage**

**First Author**: Tsing-hong WANG  
**Co-Author(s)**: Chi-juei JENG, Jehn-yu HUANG, Chienia SU

**Purpose**: To investigate the effects of different body positions on intraocular pressure (IOP) measurement in primary open-angle glaucoma (POAG) patients with recurrent optic disc hemorrhage (DH).

**Methods**: This was a prospective observational study. Forty-four POAG patients with unilateral recurrent DH were recruited. IOP was measured by iCare rebound tonometer (Tiolat Oy, Helsinki, Finland) in both eyes before and 5 minutes after body position changes. Position changes included sitting, supine, right, and left lateral decubitus. IOP measurements at different body positions and mean deviation (MD) from Humphrey visual field were analyzed and compared between DH eyes and fellow eyes.

**Results**: Compared with sitting and supine positions, all eyes showed a higher IOP measurement in lateral decubitus position (P < 0.05). However, the DH eyes did not reveal a higher IOP measurement in lateral decubitus posture than that of their fellow eyes (P = 0.091). MD from the visual field examination was positively correlated with sitting position IOP in all eyes (P < 0.05).

**Conclusions**: IOP elevated in lateral decubitus position in POAG patients. DH eyes did not demonstrate more IOP alteration after postural changes.

**Poster No.**: EX1-089  
**Panel No.**: 89, Session 1

**The Relationship of Bleb Morphology and the Outcome of Needling Revision of Failing Trabeculectomy Bleb With 5-Fluorouracil**

**First Author**: Yung-sung LEE  
**Co-Author(s)**: Shiu-chen WU, Shirley CHANG

**Purpose**: To identify predictive factors and the morphology of failing trabeculectomy blebs for the outcome after needling revision with 5-fluorouracil (5-FU).

**Methods**: We prospectively recruited patients who had failed trabeculectomy and received bleb revision at our hospital between July 2011 and June 2014. The minimum follow-up after revision was 1 year. Preoperative bleb morphology was classified using Moorfields Bleb Grading System. Kaplan–Meier plots and Cox proportional hazards regression were used to assess the association between survival and study factors. Main outcomes were intraocular pressure (IOP) < 22 mm Hg without medication (qualified success) or with medication (qualified success). Secondary outcomes were ocular conditions and complications associated with failure.
**Results**: Thirty-six eyes of 36 patients were included. The mean follow-up was 13.9 ± 7.3 months. Eighteen patients (50%) were failed after the first 5-FU revision, and the mean time to failure was 3.6 ± 3.7 months. Overall 15 of 18 (83.3%) patients of failed revision could maintain normal IOP at last follow-up after repeated needling, laser cyclophotocoagulation, trabeculectomy, or drainage device implantation. Bleb height and peripheral bleb vascularity were identified to be associated with success ($P = 0.041$ and 0.024, respectively). Further trend analysis showed positive correlation between bleb height and success ($P = 0.038$). Patients with diabetes mellitus, neovascular glaucoma, or operative complications were associated with low survival rates ($P = 0.028$, 0.059, and 0.030, respectively).

**Conclusions**: Bleb morphology with higher bleb height predicts higher long-term survival rate after revision.

**Poster No.**: EX1-090
**Panel No.**: 90, Session 1

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**Tetramethylpyrazine, an Active Ingredient of the Chinese Herbal Medicine Chuanxiong, Attenuates the Degeneration of Trabecular Meshwork Through SDF-1/CXCR4 Axis**

First Author: Jing ZHUANG
Co-Authors: Pei CHEN

**Purpose**: We aimed to explore the potential function and pharmacological mechanism of tetramethylpyrazine (TMP) during the treatment of primary open angle glaucoma (POAG).

**Methods**: CXCR4 expression was examined by real-time PCR in trabecular species from POAG patients and nonglaucomatous donors. Western blot and RT-PCR were employed to examine CXCR4 expression in primary cultured human trabecular meshwork (PHTM) cells treated with glaucoma-related cytokines in the presence of TMP or PBS. The TMP-mediated activity on cytoskeletal arrangements and extracellular matrix accumulation in PHTM was evaluated using actin polymerization assay and real-time PCR, and the results were compared with those from cells treated with AMD3100. Moreover, scratch-wound and transwell assay were performed to investigate the effect of TMP on cell migration. Furthermore, flow cytometry and MTT assay were used to quantify the potential toxicity of TMP.

**Results**: Our data revealed markedly elevated CXCR4 expression in the trabecular meshwork of POAG patients compared with that of controls. Moreover, our data showed that glaucoma-related cytokines also significantly upregulated CXCR4 expression in PHTM cells. The TGF–β1–mediated induction of CXCR4 expression in PHTM cells was markedly downregulated by TMP compared with control treatment and the CXCR4 antagonist AMD3100. In addition, TMP could counteract the TGF–β1–induced effects on migration, stress fiber accumulation, and expansion of PHTM cells. TMP also suppressed the extracellular matrix accumulation induced by TGF–β2.

**Conclusions**: Our findings demonstrate that CXCR4 might be involved in the pathogenetic changes in the trabecular meshwork of POAG patients. Additionally, TMP might exert its beneficial effects in POAG patients by downregulating CXCR4 expression.

**Poster No.**: EX1-091
**Panel No.**: 91, Session 1

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**Lens Position Parameters as Predictors of Intraocular Pressure Reduction After Cataract Surgery in Nonglaucomatous Patients With Open Angles**

First Author: Chi-hsin HSU
Co-Authors: Shuai-chun LIN, Shan LIN

**Purpose**: To evaluate the relationship between lens position parameters and intraocular pressure (IOP) reduction after cataract surgery in nonglaucomatous eyes with open angles.

**Methods**: The main outcome of the prospective study was percentage of IOP change, which was calculated using the preoperative IOP and the IOP 4 months after cataract surgery in nonglaucomatous eyes with open angles. Lens position (LP), defined as anterior chamber depth (ACD) + 1/2 lens thickness (LT), was assessed preoperatively using parameters from optic biometry. Preoperative IOP, central corneal thickness, ACD, LT, axial length (AXL), and the ratio of preoperative IOP to ACD (PD ratio) were also evaluated as potential predictors of percentage of IOP change. The predictive values of the parameters we found to be associated with the primary outcome were compared.

**Results**: Four months after cataract surgery, the average IOP reduction was 2.03 ± 2.42 mm Hg, a 12.74% reduction from the preoperative mean of 14.5 ± 3.05 mm Hg. LP was correlated with the percentage of IOP reduction after adjusting for confounders ($P = 0.002$). Higher preoperative IOP, shallower ACD, shorter AXL, and thicker LT were significantly associated with the percentage of IOP decrease. LP was a better predictor of the percentage of IOP change compared with PD ratio, preoperative IOP, and ACD after adjusting for confounders.

**Conclusions**: The percentage of IOP reduction after cataract surgery in nonglaucomatous eyes with open angles is greater in more anteriorly positioned lenses. LP, which is convenient to compute by basic ocular biometric data, is an accessible predictor with considerable predictive value for postoperative IOP change.
Effects of siRNA-Mediated p38 MAPK Gene Silence on TGF-Beta—Induced Human Tenon Fibroblasts Transdifferentiation to Myofibroblast

First Author: Kun ZENG

Purpose: To explore the influence of siRNA–mediated p38 MAPK gene silence on transdifferentiation of human Tenon fibroblasts to myofibroblast induced by TGF–beta.

Methods: Three siRNA sequences targeting a special sequence of p38 MAPK gene were designed. HTFs were transfected by lipofectamine 2000. Western blot, flow cytometry, and MTT were employed to evaluate the changes in the TGF–beta–induced p38 MAPK expression, the cell apoptosis, and viability for screening the most effective siRNA. The p38 MAPK siRNA which was selected out was transfected into the cultured human Tenon fibroblasts, and a nontargeted siRNA was transfected as a negative control. TGF–beta–induced p38 MAPK and Smad2 expression was analyzed with Western blot. TGF–beta–induced mRNA expression of collagen Iα2, CTGF, and α–SMA was analyzed by real–time RT–PCR. Protein expression of α–SMA and fibronectin were tested by ELISA. Cell viability was determined from IOP in the supine position with and without a 10–g weight added to the tonometer. Correlations between the ocular rigidity coefficient and other variables were tested by Pearson correlation, and significances were determined by using generalized estimating equation models.

Results: The inhibitory rates of siRNA–1, 2, and 3 were 71.01%, 68.65%, and 86.87%, respectively, among which siRNA–3 was the highest. The apoptosis differences compared with TGF–beta stimulated alone were 2.01%, 1.72%, and 3.59%, respectively. There was no significant difference in cell viability. Blocking p38 MAPK signal in the fibroblasts by siRNA, TGF–beta–induced p38 MAPK signaling decreased rapidly, whereas Smad3 pathway decreased slightly and increased later. Both mRNA expression of collagen Iα2, CTGF, and α–SMA and protein levels of α–SMA and fibronectin were decreased. After siRNA transfection, TGF–beta stimulating time interacted with α–SMA, CTGF, COL1A2 mRNA expression, and α–SMA, FN protein levels. The interactions were linear or quadratic trend. TGF–beta–induced cell viability was significantly inhibited after transfection. RNA interference p38 MAPK had a significant effect on the morphology and ultrastructure of fibroblasts.

Conclusions: All 3 types of siRNA showed gene silencing effects on p38 MAPK, among which siRNA–3 was the most effective. siRNA targeted on p38 MAPK gene silence inhibited transdifferentiation of human Tenon fibroblasts to myofibroblast induced by TGF–beta.

Conclusions: The relationships between these biomechanical variables suggest that CRF is dominated by tissue elasticity, whereas CH is dominated by tissue viscosity. In nonglaucomatous eyes, decreased ocular rigidity with elevated IOP suggests a compensatory response. Relationships between these biomechanical parameters must be further explored in glaucomatous eyes to understand their roles in the pathogenesis of glaucoma.

Comparison of Spectral-Domain and Time-Domain Optical Coherence Tomography in Glaucoma Patients and Glaucoma Suspects

First Author: Pei-wen LIN
Co-Author(s): Mei-ching TENG, Ing-chou LAI, Jen-chia TSAI, Yi-chieh POON

Conclusions: The ocular rigidity coefficient was negatively correlated with CRF (r = –0.44, P = 0.01), sitting IOP (r = –0.48, P < 0.001), and axial length (r = –0.36, P = 0.005), but not with CH (P = 0.59). Sitting IOP was positively correlated with the CRF (r = 0.44, P < 0.001), but not with CH (P = 0.27). CRF and CH were negatively correlated with age (r = –0.38, P = 0.042 for CRF; r = –0.49, P < 0.001 for CH). Subjects with hypertension had lower CRF and CH compared with subjects without hypertension (P = 0.017 and 0.001, respectively). Mean ocular perfusion pressure was negatively correlated with CRF (r = –0.03, P = 0.031).
**Purpose:** To compare the differences of peripapillary retinal nerve fiber layer (RNFL) thickness and macular thickness parameters measured by time–domain (TD, Stratus) and spectral–domain (SD, Spectralis) optical coherence tomography (OCT) in glaucoma patients and glaucoma suspects.

**Methods:** This cross-sectional comparative study included 58 glaucomatous patients and 49 glaucoma suspects. The correlations of RNFL thickness and macular thickness between the 2 OCT modalities were evaluated by Pearson correlation. Areas under the receiver operating characteristic curves (AUROCs) were calculated to summarize diagnostic accuracies of SD–OCT and TD–OCT.

**Results:** The superior and temporal quadrants of RNFL thickness obtained by TD–OCT were significantly less than those obtained by SD–OCT in glaucoma suspects ($P = 0.019$ and $0.012$, respectively). The superior quadrant of RNFL thickness obtained by TD–OCT was significantly less than that obtained by SD–OCT in glaucoma patients ($P = 0.003$). All the macular thickness measurements were significantly thinner in TD–OCT than in SD–OCT in glaucoma suspects and glaucoma patients (all $P < 0.0001$). Correlations of global RNFL thickness, 4 quadrants of peripapillary RNFL thickness, and all macular parameters between TD–OCT and SD–OCT were significant ($r = 0.496$ to $0.923$, all $P < 0.0001$). The largest AUROC obtained with SD–OCT was global RNFL thickness (0.864), followed by inferior RNFL thickness (0.857) and superior RNFL thickness (0.808). The largest AUROC obtained with TD–OCT was average RNFL thickness (0.896), followed by inferior RNFL thickness (0.865) and superior RNFL thickness (0.842).

**Conclusions:** The RNFL assessments with SD–OCT and TD–OCT performed well in detecting glaucomatous damage. Although the correlation of the 2 devices was good, differences in RNFL measurements obtained by the 2 devices indicate that these measurements would not be interchangeable in clinical evaluations.

**Poster No.:** EX1–095  
**Panel No.:** 95, Session 1

**Spectralis Optical Coherence Tomography—Derived Parameters in Assessing Glaucoma**

**First Author:** Chia Ying LIN  
**Co-Author(s):** Ing-chou LAI, Jen-chia TSAI, Mei-ching TENG

**Purpose:** To compare the Spectralis optical coherence tomography (OCT) parameters, including the Bruch membrane opening–based minimum neuroretinal rim width (BMO–MRW), peripapillary retinal nerve fiber layer (RNFL) thickness, and macular thickness, between glaucomatous eyes and normal eyes and to investigate the diagnostic performance of these parameters for glaucoma detection.

**Methods:** In a cross-sectional observational study, 2 groups (normal and glaucoma) who satisfied the inclusion and exclusion criteria were recruited. OCT parameters of BMO–MRW, RNFL thickness, and macular thickness were compared between the glaucoma group ($n = 21$) and the control group ($n = 23$). Areas under the receiver operating characteristic curves (AUROCs) were used to assess the diagnostic capabilities of the various parameters.

**Results:** Among the BMO–MRW parameters, the inferotemporal sector showed the highest AUROC (0.943, $P < 0.001$), followed by the inferior quadrant (0.942, $P < 0.001$), inferonasal sector (0.924, $P < 0.001$), and global average (0.869, $P < 0.001$). For the RNFL parameters, the inferotemporal sector showed the highest AUROC (0.950, $P < 0.001$), followed by the global average (0.941, $P < 0.001$), inferior quadrant (0.919, $P < 0.001$), and inferonasal sector (0.902, $P < 0.001$). For the macular thickness parameters, the outer inferior sector showed the highest AUROC (0.828, $P < 0.001$), followed by the inner inferior sector (0.721, $P < 0.001$). Globally and in all sectors, BMO–MRW and RNFL thickness parameters performed better than macular thickness parameters.

**Conclusions:** BMO–MRW parameters yielded comparable diagnostic performance with RNFL thickness parameters. Generally, Spectralis OCT parameters of BMO–MRW and RNFL thickness performed better than macular thickness.

**Poster No.:** EX1–096  
**Panel No.:** 96, Session 1

**Investigation of the Association Between Breast Cancer Chemotherapy and Glaucoma in Taiwan**

**First Author:** Ju-kuo LIN

**Purpose:** Chemotherapy is currently a major treatment modality or accompanied treatment choice for primary locally or recurrently advanced breast cancer before or after surgery. The side effects of chemotherapy medication on the incidence of glaucoma disease are still debatable. We aimed to elucidate the impact and association between breast cancer chemotherapy and glaucoma in Taiwan.

**Methods:** The Taiwan Health Insurance Research Database contains all health insurance claims made by the Taiwanese population, serving as a useful resource to conduct this type of population–based study. We analyzed 34,236 female breast cancer patients (diagnosed between January 1, 2002, and December 31, 2011). Longitudinal exposure to chemotherapy regimens and steroids was compared. A total of 30,741 people were administered a single or a combination of chemotherapy drugs. Controls were 3494 breast cancer patients.
who were treated without any further chemotherapy but with only surgery performed.

**Results:** A total of 1.93% of chemotherapy patients developed glaucoma compared with surgery-only patients (0.29%) within 5 years of being diagnosed with breast cancer.

**Conclusions:** The risk of glaucoma development may increase yearly due to treatment with certain polychemotherapy regimens.

**Poster No.: EX1–097**

**Panel No.: 97, Session 1**

**Comparison of Size Modulation and Conventional Standard Automated Perimetry With 10–2 Test Program in Glaucoma Patients**

**First Author:** Kazunori HIRASAWA  
**Co-Authors:** Nobuyuki SHOJI, Kazuhiro MATSUMURA, Ayaka IJIMA, Kimiya SHIMIZU

**Purpose:** To compare the test results of size modulation standard automated perimetry (SM–SAP) performed with the Octopus600 10–2 test program, in which stimulus size is modulated based on stimulus intensity during testing, and conventional SAP (C–SAP) performed with the Humphrey Field Analyzer (HFA) 10–2 test program in glaucoma patients.

**Methods:** Eighty-seven eyes of 87 glaucoma patients underwent SM–SAP with dynamic and C–SAP with SITA–standard strategy in this prospective observational case–control study. Global indices, pointwise threshold, reliability indices, test durations, and visual field defect size and depth of SM–SAP were compared with those of C–SAP, respectively.

**Results:** Global indices were significantly correlated with those of C–SAP ($r = 0.628$ to $0.981$, all $P < 0.01$). Although pointwise threshold values obtained with SM–SAP were moderately to strongly correlated with C–SAP ($r = 0.477$ to $0.926$, all $P < 0.01$), correlation coefficients of the central zone were significantly lower than those of the middle to peripheral zone ($P < 0.05$). The reliability indices, especially false negative response, of SM–SAP were worse than those of C–SAP ($P < 0.01$). Test duration with SM–SAP was 11.7% shorter than with C–SAP ($P = 0.02$). The visual field defect size and depth on SM–SAP were 5 points smaller ($P < 0.01$) and 1.2 dB shallower ($P < 0.01$) than on C–SAP, respectively.

**Conclusions:** Although a small difference was demonstrated in visual field sensitivity at the central zone, size and depth, and reliability indices between SM–SAP and C–SAP, global indices were generally correlated between the 2 testing modalities.

**Poster No.: EX1–098**

**Panel No.: 98, Session 1**

**Relationship Between Spectralis Optical Coherence Tomography—Derived Parameters and Visual Field Severity Indices in Glaucoma**

**First Author:** Mei-ching TENG  
**Co-Authors:** Chia Ying LIN, Jen-chia TSAI, Yi-chieh POON, Pei-wen LIN

**Purpose:** To evaluate the relationship between visual field (VF) severity indices and Spectralis optical coherence tomography (OCT)–derived parameters, including Bruch membrane opening–based on minimum nevoretinal rim width (BMO–MRW), peripapillary retinal nerve fiber layer (RNFL) thickness, and macula thickness.

**Methods:** In this cross-sectional observational study, 37 eyes from 37 glaucoma patients were included. The participants underwent Spectralis OCT for the measurement of BMO–MRW, circumpapillary RNFL thickness, and macular thickness. Glaucoma VF severity indices, including mean deviation (MD) and pattern standard deviation (PSD), were calculated using Humphrey Field Analyzer, central 30–2 SITA–standard. The correlations between VF severity indices and OCT parameters were evaluated using Pearson correlation test.

**Results:** Among the BMO–MRW parameters, global and all sectors, except for the temporal and nasal quadrants, showed significant correlation with MD ($r = 0.379$ to $0.521$, $P < 0.05$) and PSD ($r = -0.513$ to $-0.750$, $P < 0.05$). For the RNFL parameters, global and all sectors, except for the temporal and nasal quadrants and superonasal sector, showed significant correlation with MD ($r = 0.382$ to $0.513$, $P < 0.05$); and except for the temporal and nasal quadrant, superonasal and inferonasal sectors, showed significant correlation with PSD ($r = -0.510$ to $-0.690$, $P < 0.05$). For the macular thickness parameters, global and all sectors showed no significant correlation with MD and PSD.

**Conclusions:** Both BMO–MRW and RNFL thickness parameters were significantly correlated with VF severity indices, and similar correlations were found with MD and PSD. There was a trend toward stronger correlations with PSD.

**Poster No.: EX1–099**

**Panel No.: 99, Session 1**

**Efficacy of Limited Goniosynechialysis on Patients With Chronic Angle-Closure Glaucoma**

**First Author:** Guoping QING

**Purpose:** To evaluate the efficacy of limited gonioclysis (GCL) for advanced chronic angle–closure glaucoma (CACG).
**Methods:** Patients with CACG, with 1 severely affected eye with a vertical cup/disc ratio of 1.0 and best corrected visual acuity (BCVA) below 20/200 and a mildly or functionally unaffected fellow eye, underwent detailed ophthalmologic examinations followed by anterior chamber (AC) paracentesis–guided limited GCL for nasal peripheral anterior synechiae (PAS) in the eye with severe CACG.

**Results:** Thirty consecutive patients (18 men, 12 women) were diagnosed with CACG with an initial mean intraocular pressure (IOP) of 47.1 ± 6.7 mm Hg (range, 39–61) in the severely affected eye. One week after GCL, the mean IOP of the treated eyes decreased to 19.3 ± 2.8 mm Hg (range, 14–26) without antiglaucoma medication (average decrease, 27.7 ± 6.5; range, 16–41), which was significant ($P = 0.000$) compared with baseline. After an average follow-up period of 36.6 ± 1.0 months (range, 35–38), the mean IOP stabilized at 17.4 ± 2.2 mm Hg (range, 12–21). The corneal endothelial cell density decreased to an average of 260 ± 183 cells/mm$^2$ (range, 191–328) after the procedure, which was significant ($P = 0.000$) compared with baseline.

**Conclusions:** AC paracentesis–guided limited GCL lowers IOP in advanced cases of CACG.

**Poster No.:** EX1–100  
**Panel No.:** 101, Session 1  
**Ocular Surface Disorder in Glaucoma Patients on Topical Antiglaucoma Medications**

**First Author:** John AKKARA  
**Co-Author(s):** Subashini KALIAPERUMAL, Soundravally R

**Purpose:** To study the prevalence of and risk factors for ocular surface disorder (OSD) in glaucoma patients on topical antiglaucoma medications using a questionnaire, clinical evaluation, and dry eye biochemical markers.

**Methods:** One hundred fourteen eyes of 62 patients with glaucoma and ocular hypertension were evaluated. All the patients underwent ophthalmic clinical evaluation for dry eye, which included Schirmer I and II, tear breakup time, fluoresecin, and lissamine green staining. They completed the Ocular Surface Disease Index (OSDI) questionnaire to subjectively evaluate their dry eye symptoms. Conjunctival cells were also collected using impression cytology for flow cytometry analysis of CCR4, CCR5, and HLA-DR. Relevant history of duration and type of glaucoma, number and type of medications, and duration and number of medications were also recorded.

**Results:** The mean age of the patients was 54.85 ± 12.42 years. Out of 114 eyes, 77.14% had primary open angle glaucoma (POAG). A total of 54.7% of male patients had dry eye, compared with 52% of females, which was almost similar. Of those with diabetes mellitus, 62.5% had dry eye by OSDI. A total of 65.1% of POAG patients had dry eye, whereas only 17.9% of other patients had dry eye. Median duration of treatment with topical medications was significantly longer in the patients who developed dry eye according to the OSDI questionnaire (36 months; IQR, 9 to 72 months) compared with those who did not develop dry eye (8 months; IQR, 4 to 30 months).

**Conclusions:** The prevalence of OSD in glaucoma patients using topical antiglaucoma medications was 53.51% by the OSDI questionnaire and 36.84% by clinical grading. OSD is more common in POAG than in other glaucomas. Longer duration of treatment, presence of diabetes mellitus, preservative benzalkonium chloride, and the number of medications used are significant risk factors for the development of dry eye in glaucoma patients on topical medications.

**Poster No.:** EX1–102  
**Panel No.:** 102, Session 1  
**Asymmetry Analysis of Macular Inner Retinal Layers for Glaucoma Diagnosis: Swept-Source Layers for Glaucoma Diagnosis: Swept-Source
**Optical Coherence Tomography Study**

**First Author:** Sang-yoon LEE  
**Co-Author(s):** Eun Kyoun LEE, Ki Ho PARK, Dong Myung KIM, Jin Wook JEOUNG

**Purpose:** To report an asymmetry analysis of macular inner retinal layers using swept-source optical coherence tomography (OCT) and to evaluate the utility for glaucoma diagnosis.

**Methods:** Three-dimensional scans were acquired from 70 normal subjects and 62 glaucoma patients by swept-source OCT. The thickness of the retinal nerve fiber layer, ganglion cell–inner plexiform layer (GCIPL), ganglion cell complex, and total retina were calculated within a 6.2 × 6.2-mm macular area divided into a 31 × 31 grid of 200 × 200-μm superpixels. For each of the corresponding superpixels, the thickness differences between the included and contralateral eyes, and between the upper and lower macula halves were determined. The negative differences were displayed on a grayscale asymmetry map. Black superpixels were defined as thickness decreases over the cut-off values.

**Results:** The average negative interocular and inter-hemisphere differences of GCIPL thickness were −2.78 ± 0.97 μm and −3.43 ± 0.71 μm in the normal group and −4.26 ± 2.23 μm and −4.88 ± 1.46 μm in the glaucoma group. The overall extent of the 4 layers’ thickness decrease was larger in the glaucoma group than in the normal group (all P < 0.05). The numbers of black superpixels on all the asymmetry maps were larger in the glaucoma group than in the normal group (all P < 0.05). The areas under receiver operating characteristic curves of average negative thickness differences in macular inner layers for glaucoma diagnosis ranged from 0.748 to 0.894.

**Conclusions:** The asymmetry analysis of macular inner retinal layers showed significant differences between the normal and glaucoma groups.

**Poster No.:** EX1–103  
**Panel No.:** 103, Session 1

**Surgical Treatment Effects on Vision-Related Quality of Life in Primary Angle-Closure Glaucoma**

**First Author:** Yu-hsuan HUANG  
**Co-Author(s):** Yu-chieh KO, Yih-shiuau KUO, Hui-chen CHENG, Mei-ju CHEN, Catherine Jiu-ling LIU

**Purpose:** To evaluate vision-related quality of life (QOL) in patients with primary angle-closure glaucoma (PACG) and the impact of surgical interventions on it.

**Methods:** In this cross-sectional study, 106 PACG patients were recruited. All subjects had best corrected vision of the better eye no worse than 20/60. The vision-related QOL was evaluated using a Mandarin version of the 25-item National Eye Institute Visual Functioning Questionnaire 25 (NEI-VFQ-25). Demographics, clinical data, and history were recorded. Subjects were classified into 3 surgical groups: none indicated those who had medication only, trabeculectomy included those who ever received trabeculectomy in either eye with or without subsequent lens extraction, and cataract were those who received lens extraction in either eye. Analysis of variance and linear regression analyses were used to identify factors affecting NEI-VFQ-25.

**Results:** For surgical intervention, 5 patients (23.6%) received cataract extraction, 35 (33.0%) received trabeculectomy, and 46 (43.4%) received no surgery. The NEI-VFQ-25 composite score was correlated with binocular vision and integrated visual field defect but was not different among different surgical interventions. Among the 13 subscales, only dependence score differed by surgical intervention. The dependence subscale was significantly lower in subjects who received cataract extraction than in those without surgical intervention after adjusting for binocular visual acuity (VA) and visual field deficit.

**Conclusions:** Vision-related QOL of PACG patients was affected by binocular vision and visual field deficit. Different surgical interventions had no significant impact on vision-related QOL in these patients. Preservation of visual function with various treatments benefits vision-related QOL in PACG patients.

**Poster No.:** EX1–104  
**Panel No.:** 104, Session 1

**Correlation Between Macular Ganglion Cell—Inner Plexiform Layer Thickness, Visual Field, and Retinal Nerve Fiber Layer Thickness in Primary Open Angle Glaucoma**

**First Author:** Xiaoyu XU

**Purpose:** To study the correlation of macular ganglion cell–inner plexiform layer (GCIPL) thickness measured by spectral-domain optical coherence tomography (Cirrus HD-OCT), mean defect (MD) of visual field, and retinal nerve fiber layer (RNFL) thickness in primary open angle glaucoma (POAG) patients, and to evaluate the performance of GCIPL in the early diagnosis of POAG.

**Methods:** The average, minimum, superotemporal, superior, superonasal, inferonasal, inferior, and inferotemporal GCIPL thickness and the average RNFL thickness of 272 eyes with POAG (123 early-stage eyes, 47 moderate-stage eyes, and 102 advanced-stage eyes) were measured. Visual field was examined by Humphrey perimeter. The correlation of GCIPL thickness with MD and RNFL thickness was investigated using Pearson correlation coefficients.

**Results:** The average GCIPL thickness (mean ± devi-
Human Leukocyte Antigens–A, -B, and -C Loci in the Genetic Susceptibility to Develop Glaucomatocyclitic Crisis

First Author: Jun ZHAO

Purpose: To investigate the association of human leukocyte antigens (HLA)-A, -B, and -C gene polymorphisms at high-resolution with susceptibility to glaucomatocyclitic crisis (GCC) in Guangdong Chinese.

Methods: Eighty-eight randomly selected patients with GCC and 128 independent nonrelated hematopoietic stem cell donors from the Han population in Guangdong, southern China as healthy controls were genotyped by polymerase chain reaction sequence–based–typing method for their HLA–A, -B, and -C genes, and then the allele frequencies and haplotype frequencies were respectively analyzed by statistics.

Results: No significant difference was found between GCC patients and controls for the frequencies of HLA–A. The allele frequency of HLA–B*1301 in GCC patients was lower than that in the control group. The allele frequency of HLA–C*1402 in GCC patients was significantly higher than that in controls. In GCC patients, the haplotype frequencies of B*5101–C*1402 were higher than that in controls.

Conclusions: Based on the association, our results suggest that gene polymorphisms at the HLA–B and HLA–C loci might contribute to developing GCC. Specifically, HLA–C*1402 and B*5101–C*1402 might predispose to GCC, whereas HLA–B*1301 might be protective against GCC in Guangdong Chinese.

Poster No.: EX1–106
Panel No.: 105, Session 1

Surgical Outcome of Congenital Glaucoma—A 10-Year Follow-Up of 60 Cases

First Author: Minyu HUANG
Co-Author(s): Han-yi TSENG, Kwou-yeung WU

Purpose: To evaluate the long-term outcome of different surgeries in congenital glaucoma.

Methods: Our retrospective study was done with a chart review from 2003 to 2014. There were 108 eyes of 36 male and 24 female patients included under the diagnosis of primary congenital glaucoma, buphthalamos, and glaucoma with anterior segment disorder. Eighty eyes (44 patients) received trabeculotomy, and 28 eyes (16 patients) received combined trabeculotomy and trabeculectomy (combined group). Surgical success was defined as intraocular pressure (IOP) lower than 22 mm Hg, with or without medication, after primary surgery.

Results: Ninety-eight percent of the trabeculotomy group and 85% of the combined group reached surgical success at 1-year follow-up (P = 0.04). Others underwent trabeculectomy (for trabeculotomy group) and trabeculectomy at a different site (for combined group) upon failure of IOP control after 2–month follow-up. Surgical success rates at 1 year, 2 years, 5 years, and 10 years in the trabeculotomy group were 98%, 87%, 85%, and 78%, and in the combined group were 85%, 71%, 61%, and 50%. Good vision and longer follow-up duration were seen in patients who reached surgical success after primary surgery.

Conclusions: Our study revealed that patients receiving trabeculotomy had better long-term IOP control, especially in those who achieved success with 1 surgery. Patients receiving combined surgery, or multiple surgeries, had variable long-term outcome, which may relate to complex anterior segment disorder. However, by careful examination of ocular structure and possible systemic disorder, choosing individualized surgery to maximize success in 1 surgery may provide better vision for our patients.
Comparison of Medical Comorbidities Between Primary Angle Closure Glaucoma Patients and a Control Cohort: A Population-Based Study From Taiwan

First Author: Hsin-yi CHEN
Co-Author(s): Cheng-li LIN, Chia-hung KAO

Purpose: To determine whether some common medical comorbidities were more prevalent in primary angle closure glaucoma (PACG) patients and if these comorbidities were associated with an increased risk of PACG compared with controls.

Methods: We retrieved the data analyzed in this study from the National Health Insurance Research Database (NHIRD) in Taiwan. We included 3322 PACG subjects and randomly selected and matched 13,288 subjects as the comparison cohort. Univariable and multivariable unconditional logistic regression models were used to estimate the effect of comorbidities on the risk of PACG as indicated by the odds ratio (OR) with a 95% confidence interval (CI).

Results: The PACG group was 61.1% female, and the mean age was 65.2 ±12.7 years. Among the 29 comorbidities, PACG patients were significantly more likely to have hypertension, ischemic heart disease, hyperlipidemia, cardiac arrhythmias, peripheral vascular disorders, headaches, chronic obstructive pulmonary disease, asthma, diabetes, renal failure, liver diseases, peptic ulcers, hepatitis B, depression, and solid tumor. In the multivariate model, the risk of PACG was greater for patients with the comorbidities of hypertension, hyperlipidemia, headaches, diabetes, liver diseases, peptic ulcers, and depression. Among male subjects, hypertension, headaches, diabetes, liver diseases, and depression were significantly associated with an increased risk of PACG. Among female subjects, hypertension, hyperlipidemia, headaches, peptic ulcers, and depression were significantly associated with an increased risk of PACG.

Conclusions: The risk of PACG was greater in patients with the comorbidities of hypertension, hyperlipidemia, headaches, diabetes, liver diseases, peptic ulcers, and depression.

Variability of 24-Hour Blood Pressure and Disease Progression in Primary Angle Closure Glaucoma

First Author: Shaoying TAN
Co-Author(s): Nafees BAIG, Poemen CHAN, Clement THAM

Purpose: To study the influence of 24-hour blood pressure (BP) variability on glaucomatous progression in primary angle closure glaucoma (PACG) patients.

Methods: Every hour, 24-hour BP was recorded by ambulatory 24-hour blood pressure measurement (ABPM) in 29 PACG patients who were followed up for over 24 months with at least 5 prior visual field (VF) tests by Humphrey automated perimetry (HAP). Glaucoma progression was documented with serial changes in visual field index (VFI). The variability of BP including weighted means, maximum and minimum readings, standard deviation (SD), number of high and low readings (HR and LR), hypertensive time index (PTE), hypotensive time index (PTD), hypertension load (Load), and hypotensive load (Leese) in systolic blood pressure (SBP) and diastolic blood pressure (DBP) was noted during 24 hours, daytime (8:00–22:00), and nighttime (22:00–8:00), respectively. The variability was compared between the progressive and stable groups with Mann–Whitney U test.

Results: The 24-hour SBP weighted mean and minimum readings were statistically significantly lower in the progressive group than in the stable group (P = 0.041 and P = 0.005), especially during daytime (P = 0.019 and P = 0.009). A greater number of LR, higher PTD, and Leese were found in the progressive group during 24 hours (LR, P = 0.005; PTD, P = 0.004; Leese, P = 0.005) and daytime (LR, P = 0.005; PTD, P = 0.009; Leese, P = 0.014).

Conclusions: Significantly lower SBP was found in progressive PACG patients. Hypotension or over-treated hypertension, especially in the daytime, may be a risk factor for glaucomatous progression in PACG patients.

Comparison of Self-Measured Diurnal Intraocular Pressure Profiles Using Rebound Tonometry Between Primary Angle Closure Glaucoma and Primary Open Angle Glaucoma Patients

First Author: Shaoying TAN
Co-Author(s): Nafees BAIG, Linda HANSAPINYO, Vishal JHANJI, Clement THAM

Purpose: To document the diurnal intraocular pressure (IOP) profile with rebound tonometry performed by primary glaucoma patients in a nonclinic environment.

Methods: Fifty-three medically treated eyes of 31 primary angle closure glaucoma (PACG) and 22 primary open angle glaucoma (POAG) patients with no previous eye surgery were recruited. Diurnal IOP was measured 5 times per day at 4-hour intervals from 08:00 to 24:00 for 1 week in study eyes using rebound tonometry in a nonclinic environment. The diurnal IOP profiles were
compared between PACG and POAG eyes.

**Results:** For both PACG and POAG eyes, mean patient–measured IOP was highest in the morning, gradually decreased over the course of a day, and was lowest by midnight ($P < 0.001$). The diurnal IOP fluctuation ± 1 SD, as documented by SD in daily IOP values, was lower in the PACG group ($1.6 ± 1.1$ mm Hg) than in the POAG group ($2.0 ± 1.2$ mm Hg; $P = 0.049$). The mean trough IOP ± 1 SD was higher in the PACG group ($12.9 ± 2.8$ mm Hg) compared with the POAG group ($11.5 ± 3.8$ mm Hg; $P = 0.041$). The mean IOP level at midnight ± 1 SD in the PACG group ($14.0 ± 3.2$ mm Hg) was higher than that in the POAG group ($12.1 ± 3.7$ mm Hg; $P = 0.013$).

**Conclusions:** IOP in primary glaucoma patients was highest in the morning and decreased over the course of a day in a nonclinic environment. Treated diurnal IOP fluctuation seemed to be greater in POAG than in PACG eyes.

**Poster No.:** EX1–110  
**Panel No.:** 110, Session 1

**Early Ahmed Glaucoma Valve Implantation After Penetrating Keratoplasty Leads to Better Outcomes in an Asian Population With Preexisting Glaucoma**

**First Author:** Da-wen LU

**Purpose:** To evaluate the efficacy of Ahmed glaucoma valve (AGV) surgery and the optimal interval between penetrating keratoplasty (PKP) and AGV implantation in a population of Asian patients with preexisting glaucoma who underwent PKP.

**Methods:** In total, 45 eyes of 45 patients were included in this retrospective chart review. The final intraocular pressure (IOP), graft survival rate, and changes in visual acuity (VA) were assessed to evaluate the outcomes of AGV implantation in eyes which AGV implantation occurred within 1 month of post–PKP IOP elevation (group 1) and in eyes which AGV implantation took place more than 1 month after post–PKP IOP evaluation (group 2). Factors that were associated with graft failure were analyzed, and the overall patterns of complications were reviewed.

**Results:** By their final follow–up visits, 58% of the patients had been successfully treated for glaucoma. After the operation, there were no statistically significant differences between the groups with respect to graft survival ($P = 0.98$), but significant differences for IOP control ($P = 0.049$) and the maintenance of VA ($P < 0.05$) were observed. One year after surgery, the success rates of IOP control in group 1 and group 2 were 80% and 46.7%, respectively, and these rates fell to 70% and 37.3%, respectively, by 2 years. Factors that were associated with a high risk of AGV failure were a diagnosis of preexisting angle-closure glaucoma, a history of previous PKP, and a preoperative IOP that was >21 mm Hg. The most common surgical complication, aside from graft failure, was hyphema.

**Conclusions:** Early AGV implantation results in a higher probability of AGV survival and a better VA outcome without increasing the risk of corneal graft failure as a result of post–PKP glaucoma drainage tube implantation.

**Poster No.:** EX1–111  
**Panel No.:** 111, Session 1

**Outcomes of Ahmed Glaucoma Valve Implantation in the Management of Refractory Pediatric Glaucomas**

**First Author:** Sirisha SENTHIL

**Purpose:** To report the efficacy and safety of Ahmed glaucoma valve (AGV) implantation in the management of refractory pediatric glaucoma.

**Methods:** Between 2007 and 2015, 76 eyes of 64 consecutive children aged ≤ 16 years underwent AGV implantation for refractory glaucoma; we included 65 eyes of 53 children with follow–up > 6 months. The primary and secondary outcome measures were intraocular pressure (IOP) control and complications, respectively. Success was defined as IOP ≤ 21 mm Hg with or without topical antiglaucoma medications.

**Results:** The median age at AGV implantation was 3 years (interquartile range, IQR: 2, 12). Out of 65 eyes, 24 had primary congenital glaucoma (PCG) and 41 had secondary pediatric glaucoma (SPG). The median follow–up was 27 months (IQR: 15, 39). The overall cumulative probability of success was 88% from 1 to 5 years. The cumulative probability of success at 1 year was 96% in PCG and 83% in SPG, which was maintained until 5 years ($P = 0.46$) in both groups. The number of previous intraocular surgeries [hazard ratio, 3.76; 95% confidence interval, 1.24–11.45; $P = 0.02$] was significantly associated with failure. Tube–related complications requiring intervention were seen in 6 (9%) eyes. Vision–threatening complications seen were endophthalmitis and suprachoroidal hemorrhage, 1 eye each.

**Conclusions:** AGV implantation was successful in 96% of eyes with refractory primary congenital glaucoma and in 83% with secondary glaucoma at the end of 5 years. The number of previous intraocular surgeries was significantly associated with failure. One tenth of the eyes had tube–related complications needing intervention.

**Poster No.:** EX1–112  
**Panel No.:** 112, Session 1

**Laser Peripheral Iridotomy Versus...**
**Trabeculectomy as an Initial Treatment for Chronic Primary Angle-Closure Glaucoma: A Nonrandomized Comparative Study**

*First Author: Yanyun CHEN*

**Purpose:** To compare the efficacy of laser peripheral iridotomy (LPI) versus trabeculectomy as an initial treatment for chronic primary angle-closure glaucoma (PACG) in China.

**Methods:** Seventy-seven eyes from 54 chronic PACG patients who were initially treated with LPI were divided into 2 groups: group 1 comprised 23 eyes with peripheral anterior synechia (PAS) <6 clock hours and group 2 included 54 eyes with PAS ≥6 clock hours. One hundred eleven eyes from 111 chronic PACG patients with PAS ≥6 clock hours who had undergone primary trabeculectomy formed group 3. All patients underwent a comprehensive ophthalmic examination including visual acuity, refraction, Goldmann applanation tonometry, gonioscopy, slit lamp examination, fundus examination, and automated perimetry. These examinations were performed at baseline and at selected postoperative visits after LPI or trabeculectomy. Medications and complications were also recorded after LPI or trabeculectomy. All patients were followed-up for a minimum of 1 year.

**Results:** Mean intraocular pressure (IOP) during follow-up in group 3 (14.0 ± 3.1 mm Hg) was significantly lower than in group 1 (17.0 ± 3.2 mm Hg, *P* < 0.001) and group 2 (22.3 ± 7.5 mm Hg, *P* < 0.001). Long-term IOP fluctuation (defined as maximum minus minimum IOP) in group 2 (10.7 ± 9.1 mm Hg) was larger than that in group 3 (6.6 ± 3.8 mm Hg, *P* < 0.001). Eight of 23 [34.8%; confidence interval (CI), 14.3%–54.2%] eyes in group 1 and 23 of 54 (42.6%; CI, 29.4%–55.8%) eyes in group 2 required a mean of 1.3 and 1.8 IOP-lowering medications, respectively, compared with 7 of 111 (6.3%; CI, 1.8%–10.8%) eyes in group 3 needing a mean of 1.1 medications.

**Conclusions:** Primary trabeculectomy is more effective than LPI at lowering IOP and controlling long-term IOP fluctuation in chronic PACG. In developing countries such as China, trabeculectomy may need to be considered a primary option for chronic PACG with PAS ≥6 clock hours.

**Poster No.:** EX1–113  
**Panel No.:** 113, Session 1

**Preparation and Evaluation of HPMC-Based Pirfenidone Solution In Vivo**

*First Author: Yangfan YANG*

**Purpose:** Pirfenidone (PFD) has shown therapeutic potential in treating cell proliferative disorders. For ocular administration, our research team developed 0.5% PFD eye drops, which exhibited antiscarring effectiveness and ocular safety but short half-life and poor bioavailability. The aim of this paper was to increase the bioavailability of PFD eye drops. We prepared a PFD gel solution by adding hydroxypropyl methylcellulose F4M (HPMC), which acted as a viscosity enhancer; then, we compared it with the PFD eye drops.

**Methods:** The PFD gel solution of 1% HPMC (w/v) was prepared, and the viscosity under different shear rates was measured to investigate its rheology. PFD concentrations were detected by high performance liquid chromatography (HPLC) in New Zealand rabbit tears, aqueous humor, conjunctiva, cornea, and sclera at different time points after a single instillation of 0.5% PFD (w/v) eye drops or gel solution.

**Results:** Compared with eye drops, the gel solution increased the PFD level in tears and prolonged the residence time from 10 to more than 20 minutes (*P* < 0.01). Consequently, it also enhanced the concentrations of PFD in aqueous humor, conjunctiva, cornea, and sclera at varying degrees until 90 minutes after topical administration.

**Conclusions:** The developed formulation has the same ready administration and simple preparation as the PFD eye drops, whereas its bioavailability is higher.

**Poster No.:** EX1–114  
**Panel No.:** 114, Session 1

**Pressure Elevation Induces Upregulation of Allopregnanolone-Synthesizing Enzyme in an Ex Vivo Rat Glaucoma Model**

*First Author: Makoto ISHIKAWA  
Co-Author(s): Takeshi YOSHITOMI, Charles ZORUMSKI, Yukitoshi IZUMI*

**Purpose:** Allopregnanolone (AlloP) is a neurosteroid and powerful modulator of neuronal excitability. The neuroprotective effects of AlloP against glutamate excitotoxicity involve potentiation of γ-aminobutyric acid (GABA) inhibitory responses. The aim of this study was to determine whether key proteins for neurosteroid synthesis, translocator protein 18 kD (TSPO) and 5α-reductase (5αRD), are enhanced by high pressure in the retina.

**Methods:** Ex vivo rat retinas were exposed to hydrostatic pressure (10 mm Hg, 35 mm Hg, and 75 mm Hg) for 24 hours. Endogenous AlloP production was determined by tandem mass spectrometry (LC–MS/MS) and immunochemistry. The expression of TSPO and 5αRD alloenzymes (type 1, 2, 3) was also examined by real-time PCR and ELISA.

**Results:** A significant increase in AlloP levels by pressure elevation compared with 10 mm Hg (control pressure) was confirmed with LC–MS/MS. Pressure
Acute Primary Angle Closure Eyes and Fellow Eyes

First Author: Xingyi Li

Purpose: The objective of this study was to evaluate anterior and posterior ocular biometric parameters concurrently and to determine the relationship among different parts of the uvea (iris, ciliary body, and choroid) in patients with unilateral acute primary angle closure (APAC).

Methods: Thirty-four patients with unilateral APAC attack were enrolled in this prospective, cross-sectional study. Anterior and posterior ocular biometric parameters were measured sequentially using anterior segment optical coherence tomography (AS-OCT), swept-source optical coherence tomography (SS-OCT), and ultrasound biomicroscopy (UBM).

Results: Thirty patients were included in the final analyses. Compared with fellow eyes, APAC eyes had narrower anterior biometric parameters that presented with smaller anterior segment parameters (including anterior chamber depth (ACD) and anterior chamber width (ACW); \(P < 0.01\)); smaller iris area (IAREA) and iris curvature (ICURV) \(P < 0.001\); and larger lens vaults (LV) \(P = 0.035\), thinner ciliary bodies, and smaller anterior ciliary processes \(P < 0.01\). After adjustment for the potential confounders of axial length and pupil diameter, anterior placement of the ciliary body (APCB) was identified as a positive predictor of choroidal thickness (CT) and ciliary body thickness (CBT).

Conclusions: Compared with fellow eyes, APAC eyes had narrower anterior biometric parameters, thinner ciliary bodies, and smaller iris areas and iris curves. APCB was identified as a positive predictor of CT and CBT. No significant association between other parameters in different parts of the uvea was detected. However, further studies are necessary to verify this conclusion.

Comparison of Uveal Parameters Between Eyes

First Author: Faisal Thattaruthody

Co-Author(s): Rohit Gupta, Sushmita Kaushik, Surinder Pandav

Purpose: To analyze the outcomes of trabeculectomy and the use of a subconjunctival biodegradable collagen implant (Ologen, Aeon Astron Europe, the Netherlands) soaked with bevacizumab.

Methods: A retrospective study of 9 eyes of 8 patients who underwent trabeculectomy with an Ologen implant soaked with bevacizumab. The outcomes were measured using variables like visual acuity, intraocular

Conclusions: These results indicate that the synthesis of AlloP is enhanced by upregulation of TSPO and 5αRD type 2 in the pressure-loaded retina. AlloP may serve as a potential therapeutic target for the prevention of pressure-induced retinal damage in glaucoma.

Association Between Self-Reported Bupropion Use and Self-Reported Glaucoma: A Population-Based Study

First Author: Marissé Masís

Co-Author(s): Caitlin KagiGi, Kuldev Singh, Louis Pasquale, Shan Lin

Purpose: To investigate the relationship between self-reported bupropion use and self-reported glaucoma in a nationally representative sample of the United States population.

Methods: This cross-sectional study included 6750 participants in the National Health and Nutrition Examination Survey (NHANES) between 2005 and 2008, age ≥40 years, who responded to the question regarding whether they had glaucoma. Participants were interviewed regarding the use of prescription medications, and those ascertained as having used bupropion were further divided into groups based on duration of usage. Other relevant information, including demographics, comorbidities, and health-related behaviors, was obtained via interview. Multivariate logistic regression was performed to determine the association between bupropion use and glaucoma prevalence.

Results: Four hundred fifty-three participants self-reported a diagnosis of glaucoma, and 110 reported bupropion medication use. Participants who reported using bupropion for more than 1 year had decreased odds of self-reporting a diagnosis of glaucoma (unadjusted odds ratio (OR), 0.07; 95% confidence interval (CI), 0.01–0.50; adjusted OR, 0.10; 95% CI, 0.01–0.77) compared with those not using bupropion or using it for less than a year.

Conclusions: Bupropion use, particularly for an extended period of time, may be associated with a reduced risk of glaucomatous disease.
pressure (IOP), postoperative medications, and complications. The patients with a follow-up of more than 1 year were included.

**Results:** The mean age was 66.56 ± 11.63 years (43–83 years) and 8 (88.9%) eyes were male. The diagnosis was NVG in 4 (44.4%); POAG, SOAG, and SACG in 1 each (11.1%); and the remaining 2 (22.2%) were of mixed mechanism. The baseline best corrected visual acuity (BCVA) was 0.50 ± 0.21, which was not changed significantly at 2 years mean follow-up. The baseline IOP was 24.88 ± 9.58 mm Hg (11–38 mm Hg). The mean IOP at day 1, 1 week, 3 months, 6 months, 1 year, and 2 years were 16.66 ± 11.86, 9.77 ± 3.49, 12.33 ± 7.38, 12.37 ± 8.17, 11.42 ± 3.95, 11.57 ± 4.50, and 13.428 ± 3.392 mm Hg, which were significantly reduced (P < 0.05) at all visits except at day 1. The mean number of preoperative topical antiglaucoma medications used were 2.77 ± 0.97, and only 1 patient (11.1%) received topical antiglaucoma medication postoperatively to control IOP. One eye (11.1%) each had fibrin and hyphema at day 1 and received injection of 5FU and bevacizumab at 1 week. One (11.1%) patient underwent bleb revision at 3 months.

**Conclusions:** Collagen implants can be safely combined with bevacizumab to improve the outcome of trabeculectomy.

**INTRAOCULAR INFLAMMATION, UVEITIS & SCLERITIS**

**Poster No.: EX1–119  
Panel No.: 119, Session 1**

Clinicoetiological Presentation of Posterior Uveitis in Bangladesh

*First Author: Pankaj ROY  
Co-Author(s): Dipak NAG, Ava HOSSAIN*

**Purpose:** To find the cause of unexplained vision loss in patients attending the uvea and retina clinic and to raise interest in the causation of posterior uveitis by mycobacterium tuberculosis (MT). Posterior uveitis presents as focal, multifocal, or diffuse areas of retinitis or choroiditis, with varying degrees of vitreous cellular activity and/or involvement of the retinal vasculature.

**Methods:** This was a prospective case control study conducted from July 2012 to December 2014. A total of 98 posterior uveitis patients of unknown etiology were included in this study. In the study group, 60 patients were MT positive (>15 mm) and received antituberculosis drugs. No recurrences were found during the follow-up period. In the control group, 38 patients were MT negative.

**Results:** A total of 84 eyes of 60 patients were affected. This included vasculitis with or without retinal hemorrhage in 20 eyes (24%), multifocal choroiditis in 18 eyes (21%), disseminated choroiditis in 17 eyes (20%), vitreous hemorrhage in 8 eyes (10%), single focal choroiditis in 6 eyes (7%), vasculitis with branch retinal vein occlusion in 5 eyes (6%), serpiginous choroiditis in 4 eyes (5%), vasculitis with tractional retinal detachment in 3 eyes (4%), and exudative detachment due to choroiditis in 3 eyes (4%).

**Conclusions:** Sixty patients (61%) of a group of 98 patients with primarily unexplained visual loss due to chronic posterior uveitis had tuberculosis. Early diag-
nosis and treatment is needed to reduce mortality and morbidity due to posterior uveitis.

Poster No.: EX1–120
Panel No.: 120, Session 1

Application of Revised International Diagnostic Criteria for Diagnosis of Vogt-Koyanagi-Harada Disease

First Author: Pankaj ROY
Co-Author(s): Dipak NAG, Ava HOSSAIN

Purpose: To describe applications of the revised international diagnostic criteria for the diagnosis of Vogt-Koyanagi-Harada (VKH) disease.

Methods: This prospective study was conducted from January 2012 to December 2014. All bilateral uveitis patients who attended the uvea clinic were scrutinized, and the revised diagnostic criteria for VKH was applied for diagnosis. A total of 44 patients were included in this study. The 24 patients who attended the uvea clinic within 1 month of clinical features appearing were regarded as the early group, and the 20 patients who attended 1 month after the appearance of clinical features were regarded as the late group.

Results: Out of 44 patients, 29 (66%) were male and 15 (34%) were female. Mean age was 36 ± 12 years, ranging from 16–49. After applying the revised international diagnostic criteria, 23 of 24 patients in the early group were diagnosed as incomplete VKH and 1 was diagnosed as probable VKH. During follow-up, 2 patients were finally diagnosed as complete VKH disease. In the late group, all 20 patients initially were diagnosed as incomplete VKH, and during follow-up 1 patient was diagnosed as complete VKH. Vitiligo, poliosis, and alopecia appeared after an average of 125 days from the onset of signs and symptoms.

Conclusions: The revised diagnostic criteria are effective tools for making the final diagnosis of VKH disease.

Poster No.: EX1–121
Panel No.: 121, Session 1

Adalimumab Administration Led to Cytomegalovirus Uveitis Episode in a Case of Ankylosing Spondylitis

First Author: Ming-ling TSAI
Co-Author(s): Shih-min LIN, Ping-feng TSAI, Meng-ju TSAI, Chi-ting HORNG

Purpose: To report a patient with ankylosing spondylitis (AS) who developed cytomegalovirus (CMV) anterior uveitis after treatment with adalimumab.

Methods: A case report.

Results: A 51-year-old Taiwanese female was referred to our outpatient department due to blurring vision for years. She had a history of AS under medication. Additionally, episodes of chronic uveitis with intraocular pressure (IOP) elevation in the right eye occurred off and on. On examination, pre-senile cataract with posterior subcapsular opacity was found. In addition, moth-eaten iris appearance was observed. Assuming posterior subcapsular cataract and CMV anterior uveitis, cataract surgery was performed and antiviral and antiglaucomatous treatments given. PCR of the aqueous fluid was positive for CMV DNA and confirmed the diagnosis of CMV anterior uveitis. The ocular condition remained stable for 1 year after treatment. The patient was referred to our clinic for a new uveitis episode with high IOP up to 40 mm Hg after treatment with adalimumab for AS by a rheumatologist. Antivirals and antiviral medications were given. The clinical symptoms were relieved within 2 months.

Conclusions: CMV anterior uveitis may be induced after the administration of adalimumab. Careful diagnosis and prompt treatment is necessary.

Poster No.: EX1–122
Panel No.: 122, Session 1

Ocular Tuberculosis—The Bug Caught Red-Handed

First Author: Reddy Y C

Purpose: To report a microscopy-proven case of Mycobacterium tuberculosis in scleral necrotic ulcer in an immunocompetent patient.

Methods: A 27-year-old male patient was referred for chronic nonhealing scleral ulcer in the left eye of 3 months’ duration. He had a history of taking anti-tuberculosis therapy (ATT) 2 years previously. Scleral scrapings from the edge of the ulcer were subjected to Gram stain, Zielh-Neelsen 20% acid fast bacilli (AFB) stain, and 10% KOH mount. The patient was evaluated for other systemic involvement of tuberculosis and HIV status.

Results: AFB stain of scleral scrapings on microscopy showed 3 acid fast bacilli in 1 high power field (HPF). Erythrocyte sedimentation rate was high. Mantoux was negative. Sputum staining showed 3+ AFB per HPF. Chest x-ray showed evidence of pulmonary tuberculosis. HIV was negative. Patient was started on ATT and followed up. The ulcer healed.

Conclusions: To the best of our knowledge, this could be the first case in which M. tuberculosis was demonstrated directly in the scleral scrapings of necrotizing ulcer by AFB stain.

Poster No.: EX1–123
Panel No.: 123, Session 1

Results of Early Vitrectomy for Endogenous...
**Klebsiella pneumoniae Endophthalmitis**

First Author: Chiamin WU  
Co-Author(s): Yun-dun SHEN, Ting-ju WU, Allen LIN

**Purpose:** The visual outcome has been extremely poor and results in the loss of light perception or enucleation in most cases of endogenous *Klebsiella pneumoniae* endophthalmitis, despite maximal systemic antibiotic therapy. Our purpose was to evaluate the role of early vitrectomy in the treatment of endogenous *K. pneumoniae* endophthalmitis in our case with bilateral involvement.

**Methods:** A case report and literature review.

**Results:** A case diagnosed as *K. pneumoniae* septicemia later developed into bilateral endogenous endophthalmitis. In the first ophthalmology consultation, visual acuity (VA) was 20/60 bilaterally. However, VA worsened to counting fingers in the right eye the next day and in the left eye in the follow-up period. First (early) vitrectomy was performed in successive order according to VA deterioration and vitreous opacity. Systemic antibiotics and frequent intravitreal antibiotic injections were used continuously. Secondary vitrectomy was performed later bilaterally for complicated retinal detachment. Final VA was 20/100 in the right eye and 20/50 in the left eye.

**Conclusions:** Superior final visual outcomes and infection control may be achieved with both early vitrectomy and intravitreal antibiotic injection, and even after a secondary vitrectomy.

**Poster No.:** EX1–124  
**Panel No.:** 124, Session 1

**Effects of Intravitreal Bevacizumab on Active Punctate Inner Choroidopathy and Its Autofluorescence Patterns**

First Author: Jerry HUANG  
Co-Author(s): Yih-shiou HWANG

**Purpose:** To investigate the clinical effects of intravitreal bevacizumab in eyes with active punctate inner choroidopathy (PIC) and on autofluorescence patterns of active PIC lesions.

**Methods:** Three eyes in 3 consecutive patients with active PIC as demonstrated by exacerbation of visual acuity and scotoma size received an intravitreal injection of bevacizumab (1.25 mg/0.05 mL). Best corrected visual acuity, autofluorescence imaging, and Humphrey 30–2 visual field tests were performed before and after the injection as a measure of disease activity.

**Results:** After the injection of bevacizumab, best corrected visual acuity and the perception of scotoma size as measured by Humphrey 30–2 visual field tests of the patients both improved. Hyperautofluorescence surrounding the PIC lesions decreased after the injection of bevacizumab.

**Conclusions:** After the injection of bevacizumab, best corrected visual acuity and the perception of scotoma size as measured by Humphrey 30–2 visual field tests of the patients improved, and hyperautofluorescence surrounding the PIC lesions decreased.

**Poster No.:** EX1–125  
**Panel No.:** 125, Session 1

**The Caspase-11–Dependent Noncanonical Inflammasome Activation in Retinal Ischemia/Reperfusion Injury**

First Author: Yun QI

**Purpose:** The caspase–11–dependent noncanonical inflammasome triggers caspase–1–dependent IL–1β and IL–18 production in response to a subset of noninflammasome activators. Whether sterile damage can activate caspase–11–dependent noncanonical inflammasome is not clear. In the present study, we investigated the activation of caspase–11–dependent noncanonical inflammasome in retinal ischemia/reperfusion (IR) injury.

**Methods:** Retinal IR injury was induced by raising the intraocular pressure of wild–type and caspase–11 knockout C57BL/6 mice to 110 mm Hg for 60 minutes. The caspase–11, NALP3, ASC, caspase–1, IL–1β, and IL–18 protein levels were determined by Western blot analysis after different reperfusion times. The surviving retinal ganglion cells (RGCs) were quantified by RBPMS protein immune staining.

**Results:** The caspase–11, caspase–1, IL–1β, and IL–18 proteins were activated in wild–type mice after IR injury. However, the NALP3 and ASC proteins were not activated after IR injury. In the caspase–11 knockout mice, caspase–1, IL–1β, and IL–18 protein levels were significantly decreased and RGC survival was enhanced by approximately 46% compared with wild–type mice.

**Conclusions:** The caspase–11–dependent noncanonical inflammasome was activated after retinal IR injury, and it induced RGC death.

**Poster No.:** EX1–126  
**Panel No.:** 126, Session 1

**Calcium Pyrophosphate Pihydrate Deposition in Anterior Chamber With Concurrent Panuveitis**

First Author: Jia-rong ZHANG  
Co-Author(s): Yuan-chieh LEE

**Purpose:** To present a case of calcium pyrophosphate dihydrate (CPPD) deposition in the anterior chamber (AC) with concomitant panuveitis.

**Methods:** An interventional case report.
Results: A 72-year-old male complained of progressive blurred vision in the left eye for 6 months. He had received cataract surgery in both eyes 2 years previously and had no history of ocular trauma. On initial examination, best corrected visual acuity of the left eye was 0.16. Biomicroscopy revealed a floating ovoid body in the anterior chamber, 1+ aqueous cell, and 2+ vitreous cells. Indirect ophthalmoscopic examination showed vitreous opacity with a blurred fundus. Optical coherence tomography revealed thickened retina at the macula. Fluorescence angiography (FAG) revealed dye leakage around the disc and along the vessels. The laboratory work-up showed normocytic anemia, mild elevated erythrocyte sedimentation rate, and mild elevated glycohemoglobin. Removal of the floating ovoid body was done, and the pathologic result revealed calcium pyrophosphate dihydrate deposition. After surgery and topical and systemic steroid application, intraocular inflammation was resolved, and vision improved to 0.3.

Conclusions: We report the first case of intraocular CPPD with uveitis. The cause of CPPD deposition in the AC remains unknown.

Poster No.: EX1–127
Panel No.: 127, Session 1

Bilateral Cytomegalovirus Retinitis in a Non-AIDS Case

First Author: Te HU
Co-Authors: Gow-lieng TSENG, Lin-chung WOUNG, Shiow-wen LIOU

Purpose: To present a case of bilateral cytomegalovirus (CMV) retinitis without AIDS.

Methods: A 56-year-old male with a history of stage 4 follicular B-cell lymphoma had previously received 7 courses of systemic chemotherapy. Left eye blurred vision with best corrected visual acuity (BCVA) of 12/20 was noted initially. Panuveitis with hemorrhagic necrotizing retinitis in the left eye (OS) was found. Diagnostic vitrectomy was positive for CMV by PCR. Vitreous cytology and serologic test for HIV were both negative.

Results: Intravitreal injection (IVI) of gancyclovir OS per week and systemic gancyclovir were given for about 4 weeks. The lesion became inactive but macular atrophy on optical coherence tomography (OCT) was seen. One month later, however, right eye blurred vision with retinitis over the parafoveal area was noted. Due to the still elevated viral load checked by serology, IVI of gancyclovir in both eyes per week and systemic gancyclovir were given once again. The lesion in the right eye (OD) subsided gradually but residual retinal scarring remained. The final vision at 6 months’ follow-up was 18/20 OD and counting fingers at 60 cm OS.

Conclusions: CMV retinitis is a common eye complication in patients with AIDS. However, it can also occur in other immunocompromised states. The clinical course may be different in AIDS and non–AIDS cases. Prompt diagnosis is very important. In our case, masquerade syndrome caused by lymphoma was the first impression, which was disproved by laboratory tests. Ophthalmologists should do examinations thoroughly and give the patient correct treatment.

Poster No.: EX1–128
Panel No.: 128, Session 1

Non-syphilitic Punctate Inner Retinitis—Two Case Reports

First Author: Hui-hsien CHEN
Co-Authors: Chang-ping LIN

Purpose: Punctate inner retinitis (PIR) is known to be associated with syphilis. Here we report 2 cases of PIR with etiology other than syphilis.

Methods: A retrospective report of 2 cases.

Results: An 18-year-old male presented with vitritis and scattered white superficial retinal dots 1/5 disc diameter in size throughout the retina, with the macula spared in both eyes. Vision remained good. There was an episode of flu-like symptoms with fever and chills 2 weeks before the onset of blurred vision. Spectral domain optical coherence tomography (SD–OCT) exam revealed focal swelling of the superficial retina. Outer segment, RPE, and choroid were of normal appearance. FAG showed no disc or retinal vessel leakage. Serological tests were negative for syphilis and toxoplasma. CXR were unremarkable. The dots resolved in 3 weeks and vitritis in 6 weeks. Follow-up SD–OCT showed no residual markings. The other case was a 32-year-old female. The PIR in the latter case ran a similar course as the in former one.

Conclusions: PIR can be of an etiology other than syphilis. No medication is required. The prognosis is good. A transient and self-limited course of PIR may imply a viral etiology.

Poster No.: EX1–129
Panel No.: 129, Session 1

Aerobic and Anaerobic Flora of Conjunctival Sac and Meibomian Gland of Patients Undergoing Intraocular Surgery

First Author: Jingna HE

Purpose: To determine the presence of aerobic and anaerobic flora of the conjunctival sac and meibomian gland in patients undergoing intraocular surgery.

Methods: Both conjunctival sac and meibomian gland samples were collected from the eye undergoing surgery in each patient, then incubated aerobically
and anaerobically. All the isolates were identified and stored at –80°C.

**Results:** Ninety-five of 212 (44.81%) conjunctival sac specimens were positive for aerobic bacteria and 29/212 (13.68%) for obligate anaerobic bacteria. Of the 212 meibomian gland specimens, 102 (48.11%) were positive for aerobic bacteria and 19 (8.96%) for obligate anaerobic bacteria. There were 19 types of aerobic bacteria isolated from the conjunctival sac, including *Staphylococcus epidermidis, Staphylococcus sciuri ss. lentus, Staphylococcus aurens, Corynebacterium tuberculostearicum,* and so on. The majority were *S. epidermidis* (63.27%). Five types of obligate anaerobic bacteria were identified from conjunctival sac specimens. Of 26 isolates, 21 were *Propionibacterium acnes,* 3 *Finegodia magna,* 1 *Actinomyces naeslundii,* and 1 *Propionibacterium granulosum.* From meibomian glands, 18 types of aerobic bacteria were isolated, including *S. epidermidis,* *S. sciuri ss. lentus,* *S. aurens,* *C. tuberculostearicum,* and so on. The majority were *S. epidermidis* (57.29%). There were 3 types of obligate anaerobic bacteria. Of 21 isolates, 17 were *P. acnes,* 3 *F. magna,* and 1 *Clostridium sporogenes.*

**Conclusions:** Aerobic and anaerobic bacteria of the ocular surface are not just from the conjunctival sac; the meibomian gland is another potential source. Sterilizing the meibomian gland is useful in decreasing the occurrence of postoperative infection and endophthalmitis.

**Poster No.: EX1–130  
Panel No.: 130, Session 1**

**Visual Prognosis and Associated Factors of Cataract Surgery in Different Clinical Entities of Uveitis in Han Chinese**

First Author: Meifeng ZHANG

**Purpose:** To address the visual prognosis and associated predictors of cataract surgery in different clinical entities of uveitis in Han Chinese.

**Methods:** This was a retrospective review of the patients who underwent uveitic cataract surgery in our center between 2004 and 2014.

**Results:** The 158 patients (226 eyes) included comprised cases of anterior uveitis (45 eyes), posterior/panuveitis (61 eyes), Vogt–Koyanagi–Harada disease (79 eyes), and Behcet disease (41 eyes). At 6 months after surgery, best corrected visual acuity significantly improved in all uveitis groups with 134 (59.3%) eyes achieving 20/40 or better. The anterior uveitis and Behcet disease groups had significantly better and worse visual outcomes than other groups, respectively. Poor preoperative best corrected visual acuity, macular lesions, and secondary glaucoma were independent variables that predicted a poor visual outcome.

**Conclusions:** Our current study revealed a generally favorable outcome and associated predictors of uveitic cataract surgery in Han Chinese.

**Poster No.: EX1–131  
Panel No.: 131, Session 1**

**A Case Report: Ocular Syphilis With Recurrent Vitreous Hemorrhage Secondary to Proliferative Retinopathy**

First Author: Nor Ismarudi ISMAIL  
Co-Author(s): Zaililawati MOHMAD, Nor Azita AHMAD TARMIDZI

**Purpose:** To report a case displaying rare clinical features of ocular syphilis with recurrent vitreous hemorrhage secondary to proliferative retinopathy.

**Methods:** A case report.

**Results:** A 25-year-old man presented with a 7-month history of gradual painless bilateral blurring of vision associated with intermittent eye redness. Best corrected visual acuity (BCVA) of the right eye was 6/18, whereas left eye BCVA was only 6/24. Both eyes showed cells in the anterior chamber and anterior vitreous phase. Funduscopy of both eyes showed evidence of intermediate uveitis with hyperemic disc, cystoid macular edema (CMO), and mild vitritis. Both eyes had florid new vessels at disc (NVD). Neurological examination was normal. Serology tests for human immunodeficiency virus and syphilis were positive. Fluorescein angiography was not performed in view of history of allergy and the patient being relatively contraindicated for steroid prophylaxis. The patient was diagnosed as ocular syphilis with proliferative retinopathy. Lumbar puncture revealed involvement of the cerebrospinal fluid. He was treated as neurosyphilis and was given intravenous penicillin. He was given panretinal photoocoagulation in both eyes. Unfortunately, he developed recurrent vitreous hemorrhage in the right eye, which hindered further treatment. Hence, the patient was advised for right eye vitrectomy. Meanwhile, his left eye vision improved to 6/12 with regressed NVD.

**Conclusions:** This is a variant presentation of ocular syphilis in a retroviral–positive patient. It illustrated an example of a visual-threatening complication of ocular syphilis–related proliferative retinopathy.

**Poster No.: EX1–132  
Panel No.: 132, Session 1**

**Quantiferon Gold—Guided Anti-TB Treatment in Patients With Chronic Refractory Uveitis**

First Author: Nishant KUMAR

**Purpose:** To report outcomes of patients with chronic refractory uveitis who were reinvestigated and treated after the advent of Quantiferon Gold (QfG).
Methods: A retrospective case review.

Results: Twenty-three patients with normal chest x-ray had a positive QfG result and were started on antituberculosis (anti-TB) treatment. The mean delay between the QfG test and presentation was 41 months. Disease remission was achieved in all patients with a significant improvement in visual acuity (pretreatment 0.54 ± 0.7 logMAR; posttreatment 0.33 ± 0.6 logMAR; P = 0.001). Systemic immunosuppression was significantly reduced in this cohort (P = 0.02).

Conclusions: Patients undiagnosed in the pre-QfG era achieve visual benefit and are able to withdraw immunosuppression with anti-TB therapy.

**NEURO-OPHTHALMOLOGY**

**Poster No.:** EX1–133
**Panel No.:** 133, Session 1

**Relationship Between MRI Signal Intensity and Volume of Extraocular Muscles in Thyroid-Associated Ophthalmopathy With Methylprednisolone Pulse Therapy**

*First Author:* Tomoaki HIGASHIYAMA
*Co-Author(s):* Yasuhiro NISHIDA, Sanae MURAKI, Masahito OHJI

**Purpose:** To reveal the relationship between magnetic resonance imaging (MRI) signal intensity and volume of extraocular muscles in thyroid-associated ophthalmopathy (TAO) after methylprednisolone pulse therapy (MPT).

**Methods:** The signal intensities and volumes of the superior rectus (SR), inferior rectus (IR), lateral rectus (LR), medial rectus (MR), and superior oblique (SO) muscles were measured with MRI in 25 eyes of 25 patients with TAO before and after MPT. The signal intensity ratio (SIR) of the signal intensity in muscles to that in brain white matter was calculated.

**Results:** The mean SIRs before treatment were 2.28 ± 0.74 in SR, 2.66 ± 0.57 in IR, 2.03 ± 0.42 in LR, 2.45 ± 0.49 in MR, and 1.98 ± 0.48 in SO. Those after treatment were 1.82 ± 0.62, 1.84 ± 0.52, 1.70 ± 0.35, 1.95 ± 0.46, and 1.60 ± 0.36, respectively, which decreased significantly (P < 0.001) in all muscles compared with those before treatment. The mean volumes before treatment were 1.35 ± 0.67 cm³ in SR, 1.21 ± 0.39 in IR, 0.66 ± 0.13 in LR, 0.94 ± 0.31 in MR, and 0.58 ± 0.14 in SO. Those after treatment were 1.12 ± 0.45, 0.91 ± 0.31, 0.61 ± 0.12, 0.85 ± 0.28, and 0.49 ± 0.11, respectively, which decreased significantly (P < 0.05) in all muscles compared with those before treatment. The SIRs showed significant positive correlations with volumes both before and after treatment in SR (before, r = 0.77; after, r = 0.69), IR (r = 0.65, r = 0.60), MR (r = 0.69, r = 0.73), and SO (r = 0.52, r = 0.50). The changes in SIRs showed significant positive correlations with those of volumes in SR (r = 0.63), IR (r = 0.50), MR (r = 0.55), and SO (r = 0.42).

**Conclusions:** The signal intensities and volumes of extraocular muscles in TAO were correlated and changed cumulatively with treatment.

**Poster No.:** EX1–134
**Panel No.:** 134, Session 1

**Ocular Complications of Dengue Fever**

*First Author:* Naqaish SADIQ
*Co-Author(s):* Anjum IMDAD

**Purpose:** We report the first documented case of a patient with dengue fever who developed ophthalmoplegia, orbital cellulitis, central retinal artery occlusion, and other ocular complications.

**Methods:** A 50-year-old woman developed acute onset high grade fever, myalgia, and arthralgia. History and investigation established diagnosis of dengue fever. A week later she presented with sudden visual loss, ptosis, ophthalmoplegia, and central retinal artery occlusion in the left eye. Despite all treatment, her visual acuity remained light perception after 3 months. This case will be presented with the help of photographs and short, live video clips.

**Results:** Dengue fever can affect ocular structure from the vitreous to retina.

**Conclusions:** Due to increasing travel and emerging serotypes, the incidence of dengue fever is on the rise. Awareness of ophthalmic complications would aid in timely referral, assessment, and management.

**Poster No.:** EX1–135
**Panel No.:** 135, Session 1

**Inhibition of p62/SQSTM1 With siRNA Reveals Neuroprotective Effects of Retinal Ganglion Cells in a Rat Model of Optic Nerve Crush**

*First Author:* Jia-rong ZHANG
*Co-Author(s):* Yao-tseng WEN, Rong Kung TSAI

**Purpose:** P62, which is also called sequestosome 1 (SQSTM1), is commonly found in inclusion bodies containing polyubiquitinated protein aggregate in neurodegenerative diseases. It is an induction marker of autophagy. The purpose of this study was to investigate the role of p62 and the effects of p62 modulation in a rat model of optic nerve (ON) crush and the complicated mechanisms of autophagy machinery in ON degeneration after crush.

**Methods:** Seventy adult Wistar male rats (150–180 g) were randomly divided into 2 groups: ON crush-injured...
rats treated with either intravitreal injections of phosphate-buffered saline (PBS) or p62 small interfering RNA (siRNA). The ON in the right eyes were crushed by a standardized method and the ON in the left eyes received a sham operation. Rats were euthanized at 2 weeks after surgery. Retinal ganglion cell (RGC) density was measured by retrograde labeling with FluoroGold.

**Results:** Two weeks after surgery, the RGC densities in both the central and midperipheral retinas were significantly higher in the ON crush in both the central and midperipheral retinas were measured by retrograde labeling with FluoroGold.

**Conclusions:** We demonstrated that the inhibition of p62/SQSTM1 is able to protect RGCs in the rat model of ON crush. Further studies are needed to elucidate the exact mechanism of autophagy machinery on ON degeneration.

**Poster No.: EX1–136**  
**Panel No.: 136, Session 1**

**Boosting Recovery of Vision Loss After Acute Stroke With Combined tDCS and Vision Restoration Training: An Exploratory Efficacy and Safety Study**

**First Author:** Bernhard SABEL  
**Co-Author(s):** Hermann MOSER, Carolin GALL, Raimund ALBER

**Purpose:** Visual field defects after posterior cerebral artery stroke can be improved by vision restoration training (VRT), but when combined with transcranial direct current stimulation (tDCS), which alters brain excitability, vision restoration can be potentiated in the chronic stage. Because it is possible that such therapy may be most effective during the early recovery phase after the stroke, we wished to explore the applicability, efficacy, and safety of early intervention with combined tDCS/VRT treatment.

**Methods:** Seven acute stroke homonymous hemianopia patients were prospectively treated with a tDCS (2mA, 10 daily sessions of 15–20 minutes) and VRT regimen for 9 days on average, but no more than 10 days. Visual field recovery was compared with retrospective data of 7 lesion–age and defect–size matched controls who had received standard rehabilitation with compensatory eye movement and exploration training. The primary outcome criterion was the pre–post change in perimetric detection thresholds.

**Results:** All patients, irrespective of their treatment, showed improved detection accuracy, but the benefits were greater in tDCS/VRT patients (36.9 ± 36.7%) than in controls (10.8 ± 9.5%). Detection improvements were comparable in both relative and absolute defect areas of the visual field. Safety was excellent, with patients reporting only occasional skin itching beneath the electrodes but no other adverse events.

**Conclusions:** Our open label, exploratory trial shows that the application of combined tDCS/VRT in subacute stroke is safe and helps patients to recover their vision better than standard compensatory rehabilitation. A confirmatory, larger sample, controlled, randomized, double–blind trial is now warranted to compare real versus sham tDCS–supported vision training.
al function. Microcystic inner nuclear layer pathology occurs in a bigger proportion of patients with AQP4-Ab positivity.

**Poster No.: EX1–138**  
**Panel No.: 138, Session 1**  
**Frequency and Prognostic Impact of Antibodies to Aquaporin-4 in Chinese Patients With Optic Neuritis**  
*First Author: Hao KANG*

**Purpose:** To assess the frequency of AQP4-Ab in patients with optic neuritis (ON) and to investigate the prognostic implications of AQP4-Ab seropositivity in such patients.

**Methods:** We determined the presence of aquaporin-4 (AQP4) antibodies by indirect immunofluorescence in human AQP4-transfected cells and evaluated the diagnostic and prognostic relevance of AQP4 antibodies in 215 Chinese patients with optic neuritis. Patients were enrolled from the General Hospital of the Chinese People’s Liberation Army and followed up for a median of 3 years. We used Kaplan–Meier survival analysis to investigate visual outcomes and prognostic characteristics of 70 patients who were aquaporin-4 antibody-seropositive including 115 eyes.

**Results:** AQP4-Ab were detectable in 70/215 (32.6%) patients with acute monosymptomatic optic neuritis. These AQP4-Ab seropositive patients had neuromyelitis optica (NMO) (n = 10), NMO spectrum disease (NMOSD) (n = 41), multiple sclerosis (MS) (n = 1), and acute optic neuritis (AON) (n = 18). AQP4-Ab were undetectable in Leber hereditary optic neuropathy (LHON) (n = 8) and in 20 healthy controls. AQP4-Ab levels did not vary between seropositive AON and NMO–ON and did not correlate with disease severity. Female sex, older age at onset, number of relapses, concomitant autoimmunity antibodies, and optic lesions on MRI were associated with AQP4-Ab seropositive status and risk of developing NMO.

**Conclusions:** In China, acute optic neuritis has a higher incidence of anti–aquaporin-4 antibody than Western countries, and AQP4 antibody is a sensitive and specific biomarker for discriminating NMO–ON from other types of optic neuritis in the early stage of the disease.

**Poster No.: EX1–139**  
**Panel No.: 139, Session 1**  
**Clinical Features of Aquaporin-4 Antibody Seronegative Chinese Patients With Atypical Optic Neuritis**  
*First Author: Huanfen ZHOU*

**Purpose:** To evaluate the unique clinical features and visual outcomes of atypical optic neuritis (ON) with seronegative aquaporin-4 (AQP-4) antibody in Chinese patients.

**Methods:** All patients were recruited from the ophthalmology department of the Chinese People’s Liberation Army General Hospital (PLAGH) in the period from March 2014 to May 2015. The inclusion criteria for patients in this study required fulfillment of at least 1 of (1) and (2), whereas exclusion criteria were if they had 1 of (3) and (4): (1) pain or visual loss progressing for more than 2 weeks since onset; (2) no visual recovery over 3 weeks after onset; (3) ON with AQP-4 antibody seronegative; (4) existing MS/NMO before or simultaneously with the first onset of ON.

**Results:** From PLAGH records, we identified 252 patients with ON. Forty-eight patients who fulfilled the inclusion and exclusion criteria were included in the final analysis. The mean age of onset was 45.3 years, with male predilection (70.8%). The patients were followed up for an average of 24.5 months, ranging from 6 months to 10 years. In the first episode, with 62 eyes involved, simultaneous bilateral involvement occurred in 14 patients (29.2%). Only 6 eyes (9.7%) recovered to ≥0.5 after the first ON attack, and 31 (50%) eyes had poor visual recovery (<0.1). At the final visit with 80 eyes involved, 47 eyes (58.8%) had a VA of 0.1 or worse. Thirty-two of 48 (67.3%) cases were legally blind in 1 eye, and 13/48 (27.1%) were blind in both eyes. Moreover, 19 (39.6%) patients experienced at least 1 episode of recurrence of ON, and 32 (66.7%) cases had bilateral ON. Among the 26 patients with orbit MRI at acute onset, 20 (76.9%) patients had abnormalities [19 (95%) lesions in the infraorbital segment, 9 (45%) lesions in the canal segment, and 5 (25%) lesions in the intracranial segment]. During follow-up, none developed to MS or NMOSD.

**Conclusions:** We observed unique features of atypical ON with AQP-4 seronegativity in this Chinese cohort, including male predominance, common bilateral and anterior optic nerve involvement, seriously poor VA recovery, and resistance to corticosteroid therapy. This condition may be a distinct nosological entity with an unusual clinical and therapeutic profile.

**Poster No.: EX1–140**  
**Panel No.: 140, Session 1**  
**Antithyroid Antibodies and Thyroid Function in Optic Neuritis: Chinese Experience**  
*First Author: Shuo ZHAO*

**Purpose:** To retrospectively analyze the frequency of antithyroid antibodies (AT-Abs) and thyroid function of optic neuritis (ON) patients in a single Chinese center.

**Methods:** Clinical data were reviewed for ON screened for AT-Abs in the Chinese People’s Liberation Army General Hospital (PLAGH) from May 2014 through June
2015. All patients underwent intensive ophthalmologic examinations and paraclinical tests. The tests of serum thyroglobulin (TG) and thyroid peroxidase (TPO) antibodies and thyroid function, including thyroxine (T4), triiodothyronine (T3), free T4 (FT4), free T3 (FT3), and thyroid stimulating hormone (TSH), were performed. Blood was drawn for aquaporin 4-antibody (AQP4–Ab) using the approach of cell–based assay. Enzyme–linked immunosorbent assay was used in evaluation of serum AQP4–Ab level. The comparisons of frequencies of AT-Ab, thyroid diseases, and thyroid function were made relying on AQP4–Ab status.

**Results:** A total of 97 patients (168 involved eyes) with disease duration from 3 months to 23 years were selected and reviewed. The mean age at ON onset was 36.7 years, and the general ratio of females to males was 3.4:1. Seropositive AQP4–Ab was 36.7 years, and the general ratio of females to males was 3.4:1. Seropositive AQP4–Ab were found in 47 (48.5%) patients. The frequencies of AT–Ab were 35.1% in all patients, and 46.8% and 24.0% in AQP4–Ab+ and AQP4–Ab– patients, respectively. Significant differences were found between the AQP4–Ab+ and AQP4–Ab– groups for frequencies of TG–Ab (P = 0.004) and TPO–Ab (P = 0.011), level of FT3 (P = 0.006) and FT4 (P = 0.025), and definite Hashimoto thyroiditis (P = 0.005). Among patients with positive AQP4–Ab, the concentration of AQP4–Ab showed no significant difference between AT–Ab+ and AT–Ab– groups (P = 0.516).

**Conclusions:** TG–Ab and TPO–Ab were the 2 most frequent autoantibodies among AQP4–Ab+ ON, which also presented abnormal thyroid function or Hashimoto thyroiditis more frequently when compared with AQP4–Ab– ON.

### Poster No.: EX1–141
### Panel No.: 141, Session 1

**Agreement for Optic Nerve Head and Retinal Nerve Fiber Layer Measurements Obtained From Two Spectral-Domain Optical Coherence Tomography Devices**

**First Author:** Dhanaraj RAO
**Co-Authors:** Narendra KP, Harsha RAO, Sujatha VK, Suria SUDHAKARAN, A.V. Sathi DEVI

**Purpose:** To determine the agreement for optic nerve head (ONH) and retinal nerve fiber layer (RNFL) measurements obtained from 2 spectral–domain optical coherence tomography (SD–OCT) devices, namely, Cirrus HD and the Avanti RTVue XR.

**Methods:** This was a prospective, observational study. Sixty-nine eyes of 38 subjects with glaucoma, ocular hypertension, and disc suspect underwent visual fields, Cirrus OCT, and Avanti RTVue XR imaging. Bland Altman (BA) plots were used to assess agreement.

**Results:** Disc area and vertical cup-to-disc ratio (CDR) measurements were significantly greater (P < 0.001) on Avanti (2.46 mm² and 0.76) compared with Cirrus OCT (2.12 mm² and 0.71), whereas the average CDR was significantly greater on Cirrus OCT (0.73 vs 0.60). All the RNFL parameters were significantly thicker (P < 0.05 for all comparisons) with Avanti compared with Cirrus OCT. The 95% limits of agreement for average RNFL, temporal RNFL, superior RNFL, nasal RNFL, and inferior RNFL were –6.3 to 19.7, –6.6 to 27.9, –14.0 to 30.0, –22.4 to 27.6, and –17.1 to 29.2, respectively. The BA plots also demonstrated significant proportional bias for most ONH and RNFL parameters.

**Conclusions:** This study demonstrated clinically significant wide limits of agreement for most ONH and RNFL measurements, implying that the values obtained by the Cirrus and Avanti SD–OCT devices are not interchangeable.

**Poster No.: EX1–142
Panel No.: 142, Session 1**

**Two-Photon Autofluorescence Imaging of the Retina**

**First Author:** Chen-hsin SUN
**Co-Author(s):** Xin Yi SU, Hao LI, Caroline CHEE, Lingam GOPAL

**Purpose:** Two–photon autofluorescence imaging has been shown to be able to perform live functional imaging of the retina, in particular metabolites of the photo–transduction cycle such as all transretinal dimers. This may enable us to monitor the pathogenesis of retinal diseases such as age–related macular degeneration. We aimed to develop a system to validate the results published by previous studies and develop a system for clinical use.

**Methods:** We developed a scanning laser ophthalmoscope (SLO) equipped with a 90–MHz femtosecond Ti:sapphire laser, with the wavelength of laser pulse tunable from 705 to 980 nm. An excitation wavelength of 780 nm with emission wavelengths of 500–550 nm and 575–640 nm were used to acquire images. Two–photon excited fluorescence was collected by photo–multiplier tube. Swine eyes were enucleated and dissected to remove the cornea, lens, and vitreous cavity to expose the retina. The ex vivo sample was placed in a cup holder under the microscope objective for imaging.

**Results:** Imaging of ex vivo samples of swine retina showed numerous 2–photon autofluorescence signals that resembled the photoreceptor layer.

**Conclusions:** We succeeded in obtaining a 2–photon autofluorescence signal from ex vivo retina tissue. However, the imaging technique is limited by long im-
Microstructural Effects of Intravitreal Bevacizumab in Idiopathic Choroidal Neovascularization

First Author: Syed Nasir SHAH

Purpose: We evaluate the microstructural effects of intravitreal bevacizumab in eyes with treatment-naive idiopathic choroidal neovascularization (ICNV).

Methods: In this retrospective interventional case series, 40 symptomatic eyes received an intravitreal injection of bevacizumab (1.25 mg/0.05 mL) followed by additional doses based on optical coherence tomography findings, including intraretinal fluid, subretinal fluid, or pigment epithelial detachment. We analyzed best corrected visual acuity, central retinal thickness, neovessel size (thickness and diameter), and disrupted photoreceptor length at baseline and at the final visit with paired t test. The difference in best corrected visual acuity was correlated with the difference in optical coherence tomography parameters by Pearson correlation.

Results: Mean logarithm of the minimum angle of resolution best corrected visual acuity improved from 0.60 initially to 0.24 after treatment (P = 0.01). The differences in mean central retinal thickness (82.65 ± 44.1 µm), choroidal neovessel thickness (149.58 ± 71.1 µm), choroidal neovessel diameter (1250.8 ± 145.1 µm), and photoreceptor disruption length (2141.20 ± 318.8 µm) were all statistically significant (P = 0.01). The difference in best corrected visual acuity was correlated with optical coherence tomography parameters and presented no statistically significant difference.

Conclusions: Intravitreal bevacizumab therapy is safe and well tolerated in ICNV eyes. Restoration of disrupted photoreceptor length and decreases in central retinal thickness and choroidal neovessel size are associated with visual improvement in idiopathic choroidal neovascularization.
Ocular Tumors
Outcomes of Plaque Brachytherapy for Ocular Tumors
First Author: Sonal CHAUGULE
Co-Author(s): Santosh HONAVAR, Raksha RAO, Vijay Anand PALKONDA

Purpose: To study the tumor response, vision, and eye salvage in cases of ocular tumors treated with plaque brachytherapy.

Methods: This was a retrospective, noncomparative, interventional case series including 35 consecutive patients presenting with orbital rhabdomyosarcoma. Management included incisional biopsy, debulking or excisional biopsy, confirmation of diagnosis by histopathology and immunohistochemistry, followed by 3 cycles of chemotherapy using vincristine + actinomycin-D + cyclophosphamide alternating with ifosfamide + etoposide, stereotactic radiotherapy, and 3 additional cycles of chemotherapy.

Results: Mean age was 8.8 years. Proptosis was the most common symptom. Embryonal variant was most common. There was 86% primary tumor control, 100% secondary control control, and 94% life salvage at a mean follow-up of 3.3 years.

Conclusions: Multimodal treatment including initial surgery, followed by multidrug chemotherapy and stereotactic radiotherapy provides excellent chances of local control and life salvage.

Poster No.: EX1–147
Panel No.: 147, Session 1

Orbital Rhabdomyosarcoma—Clinical Profile and Outcome After Multimodal Management
First Author: Sonal CHAUGULE
Co-Author(s): Santosh HONAVAR, Kaustubh MULAY, Vijay Anand PALKONDA

Purpose: To study the clinical presentation, histopathological features, and outcome after multimodal management of primary orbital rhabdomyosarcoma.

Methods: This was a retrospective, noncomparative, interventional case series including 35 consecutive patients presenting with orbital rhabdomyosarcoma. Management included incisional biopsy, debulking or excisional biopsy, confirmation of diagnosis by histopathology and immunohistochemistry, followed by 3 cycles of chemotherapy using vincristine + actinomycin-D + cyclophosphamide alternating with ifosfamide + etoposide, stereotactic radiotherapy, and 3 additional cycles of chemotherapy.

Results: Mean age was 8.8 years. Proptosis was the most common symptom. Embryonal variant was most common. There was 86% primary tumor control, 100% secondary control control, and 94% life salvage at a mean follow-up of 3.3 years.

Conclusions: Multimodal treatment including initial surgery, followed by multidrug chemotherapy and stereotactic radiotherapy provides excellent chances of local control and life salvage.

Poster No.: EX1–148
Panel No.: 148, Session 1

Subconjunctival Myxoma: Case Report and Review of the Literature
First Author: Pei-shin HU
Co-Author(s): Chien-chi TSENG, San-ni CHEN

Purpose: To describe the clinicopathologic and immunohistochemical features of a rare case of subconjunctival myxoma.

Methods: A case report.

Results: A 70-year-old Taiwanese male sought treatment for a slowly progressive mass beneath the central superior bulbar conjunctiva in the right eye for several years. The tumor measured 2.0 × 1.0 × 0.7 cm in size and appeared as a yellow, mobile soft solid mass without signs of inflammation. Visual acuity was not affected by the tumor. The mass was excised totally. Histopathologic examination revealed features of myxoma with characteristic spindle- and stellate-shaped tumors. It provides vision, eye, and life salvage in malignant tumors.
cells in an extensive myxoid stroma with inconspicuous nucleoli, rare mitotic figures, areas of inflammatory cell infiltrate, and prominent vasculature. The immunohistochemical stain of S-100 demonstrated equivocal staining. Alcian blue stain showed mucinosis. There was no evidence of tumor recurrence after 5-year follow-up.

Conclusions: Myxoma is a rare diagnosis of epibulbar tumor. This was a rare case of subconjunctival myxoma, with the largest size in the literature reviewed.

Poster No.: EX1–149
Panel No.: 149, Session 1

Primary Ductal Adenocarcinoma of Lacrimal Gland: A Case Report and Review of Literature

First Author: Hsin-yu YANG
Co-Author(s): Chieh Chih TSAI, Wei Kuang YU, Shu Ching KAO, Catherine LIU

Purpose: Primary ductal adenocarcinoma of the lacrimal gland is a rare lacrimal gland tumor, and the management is usually a clinically vexing problem because of its aggressive nature. Here we present a case of primary ductal adenocarcinoma of the lacrimal gland that underwent orbital exenteration and adjuvant chemoradiotherapy. In addition, we reviewed 19 cases previously reported in the literature regarding clinical presentation, immunohistological findings, treatment, and outcome.

Methods: A case report and literature review.

Results: A 64-year-old male presented with progressive proptosis of the left eye. Ophthalmic examination revealed a palpable left lacrimal gland mass. Orbital CT demonstrated a 3.9-cm ill-defined infiltrative mass over the superotemporal quadrant of the left orbit. Histopathological study of a biopsy specimen of the left lacrimal gland revealed a ductal adenocarcinoma of the lacrimal gland which was positive for androgen receptor and cytokeratin 7. The patient received orbital exenteration and adjuvant chemoradiotherapy. No evidence of recurrence or metastasis was noted at 7 months after treatment. Combining the present and previously reported cases, the mean patient age was 58 years. Immunological examinations often were positive to androgen receptor, cytokeratin 7, and Her-2. Seven patients died of disease. Among them, 1 patient died of disease 17 years after diagnosis. Most causes of death were distant metastasis including cervical lymph node, brain, bone, and lung.

Conclusions: Primary ductal adenocarcinoma of the lacrimal gland is a high-grade epithelial tumor similar to salivary ductal carcinomas. Early diagnosis, combination therapy, and long-term follow-up are required for this invasive tumor.

Poster No.: EX1–150
Panel No.: 150, Session 1

Comparison of the Clinical Characteristics and Outcomes of Benign and Malignant Eyelid Tumors: An Analysis of 4521 Eyelid Tumors at a Tertiary Medical Center

First Author: Yu-yun HUANG
Co-Author(s): Wen-yih LIANG, Chieh Chih TSAI, Shu Ching KAO, Hui-chuan KAU, Catherine LIU

Purpose: Eyelid skin is the thinnest skin on the body and can be the origin of various benign or malignant tumors. We aimed to compare the clinical features and outcomes of benign and malignant eyelid tumors at a tertiary medical center.

Methods: We retrospectively reviewed the medical records of all patients with histologically confirmed eyelid tumors from 1995 to 2015 at a tertiary medical center. Data were collected on age, sex, location and size of the lesions, and especially the treatment and outcome of malignant eyelid tumors.

Results: A total of 4521 histologically confirmed eyelid tumors were included. Of these, 4294 (95.0%) were benign tumors and 227 (5.0%) were malignant tumors. The mean age at diagnosis was significantly higher in patients with malignant lid tumors than in those with benign lid tumors (72.5 years and 55.4 years, respectively; P < 0.001). The most common benign eyelid tumors were intradermal nevus (21.1%), followed by seborrheic keratosis (12.6%) and xanthelasma (11.2%). The most common malignant eyelid tumors were basal cell carcinomas (57.8%), followed by sebaceous gland carcinomas (21.1%) and squamous cell carcinomas (10.1%). There was a relative male predominance in malignant lid tumors as compared with benign lid tumors (63.4% and 49.2%, respectively; P < 0.001). In addition, malignant eyelid tumors tended to present as an ill-defined lesion (89.2% and 7.6%, respectively; P < 0.001) located in the lower eyelid (59.4% and 42.9%, respectively; P < 0.001), as compared with benign eyelid tumors. Importantly, tumor recurrence was significantly higher in patients with malignant lid tumors than in those with benign lid tumors (11.9% and 4.4%, respectively; P < 0.001). Most patients with malignant lid tumors required wide excision and reconstructive surgery, and 22 patients (9.7%) received orbital exenteration or enucleation. Eight patients (3.5%) with malignant lid tumors died of disease. Patients with eyelid melanoma were associated with a high mortality rate (25.0%).

Conclusions: It is important to differentiate between benign and malignant eyelid tumors because they may cause cosmetic disfigurement and severe morbidity, especially in cases of malignant eyelid tumors.

Poster No.: EX1–151
Intravitreal Bevacizumab in the Treatment of Choroidal Metastasis From Esophageal Cancer: 3 Case Reports and Literature Review

First Author: An Ning CHAO
Purpose: To investigate the outcomes of different treatments on choroidal metastasis from esophageal cancer.
Methods: Interventional case reports.
Results: There were 3 patients with choroidal metastases from esophageal cancer in our series. They were already on intravenous chemotherapy and radiotherapy for esophageal tumors. The mean interval between esophageal cancer diagnosis and choroidal metastasis was 6 months (range, 3–11 months). The mean survival time was 3 months (range, 2–6 months). The mean period of survival and mean interval of diagnosis of choroidal metastases were similar to reported cases. However, all of our cases had pain relieved, and 2 of them experienced a small amount of visual recovery within 2 weeks after intravitreal bevacizumab injection (IVB). There were 13 reported cases of choroidal metastases from esophageal cancer in the literature. Of the patients, 10 were men (77%), and 3 were women (23%). Six patients received radiotherapy, 2 received systemic chemotherapy, 3 had enucleation, and 2 were observed because of advanced disease. The mean survival time for patients with choroidal metastasis was 7 months (range, 1–30 months). Only 1 patient who received radiation and 1 patient who received systemic chemotherapy had improved vision.
Conclusions: Patients with choroidal metastasis from esophageal cancers have poor life prognosis. IVB is an alternative treatment with rapid effects on choroidal metastasis from esophageal cancer.

Retinoblastoma in Mongolia: Clinical Characteristics and Survival From 1987 to 2014

First Author: Tsengelmaa CHULUUNBAT
Co-Author(s): Jamiyanjav BAASANKHUU, Baylag MUNKHUU, Altankhuu MOLOM, Ling-yuh KAO, Wei-chi WU
Purpose: To describe the incidence, clinical characteristics, and treatment outcomes of retinoblastoma in Mongolian children.
Methods: Data of all children diagnosed with retinoblastoma at the National Center for Maternal and Child Health of Mongolia from 1987 to January 2014 were reviewed retrospectively. The information on laterality of tumor, clinical presentation, immunohistochemical analysis, and mode of treatment was obtained. Survival characteristics of the cohort were analyzed.
Results: Retinoblastoma was diagnosed in 79 eyes of 64 children during the study period. Median age of diagnosis was 24.5 ± 15.8 months. There were no differences in sex ratio, and 15 cases (23%) were bilateral. Forty-three patients (67%) were from rural areas. The more frequent clinical presentations were leukocoria in 50 (78%) patients, strabismus in 24 (38%) patients, and glaucoma in 21 (33%) patients. Sixty-one patients (95%) were diagnosed with classification D or worse when presenting to us. Due to late diagnosis in the majority of cases, unilateral and bilateral enucleations were performed in 52 (81%) cases and 8 (12%) cases, respectively; enucleation was done in 3 cases (3%). Fifty-two (81%) patients received chemotherapy, and 13 (8.3%) patients underwent external beam radiation after enucleation. After a mean follow-up of 10 years, 40 (63%) patients were alive, 4 (6%) patients were dead, and 20 (31%) patients had unknown vital status. Median survival time was 121.5 months. In 5 cases with immunohistochemistry analysis in the eye specimen, neuron-specific enolase (NSE), Ki-67 protein (Ki-67), and B-cell lymphoma 2 (Bcl-2) positive cells were found in all of 5 (100%) cases and Rb protein was detected in 3 (60%) cases.
Conclusions: Retinoblastoma in Mongolia is frequently diagnosed at late stages and has poor outcomes. These data show the importance of pediatric eye examinations in children aged less than 3 years in Mongolia and the need for better treatment in cases of retinoblastoma.

Limitations of Fluorodeoxyglucose Positron Emission Tomography Computed Tomography Scan for Diagnosis of Choroidal Malignant Melanoma in Indian Eyes

First Author: Narendran VENKATAPATHY
Co-Author(s): Parag SHAH
Purpose: Fluorodeoxyglucose (FDG) positron emission tomography computed tomography (PET–CT) scan is fast becoming a very useful tool in diagnosing and staging of several malignancies that affect the human body. We report 3 cases of ocular choroidal malignant melanoma wherein FDG PET–CT scan did not show as good of an uptake as seen in other cancers.
Methods: Three eyes of 3 patients, who presented with a pigmented intraocular mass lesion, were included in the study. All patients were males with a mean age of 54 years. Clinically, all eyes had a macula sparing choroidal mass lesion with a mean largest basal diameter of 14.1 mm and mean apical diameter of 9.4 mm.
Complete ocular examination was done including best corrected visual acuity assessment, slit lamp examination, indirect ophthalmoscopy, and B-scan ultrasonography before doing the FDG PET-CT scan.

**Results:** PET scan for all 3 cases showed a low to moderate activity with minimal to moderate FDG uptake for the intraocular tumors. The mean standardized uptake value (SUV) was 2.3 (range, 1.3–3.4). None had any systemic metastasis. Treatment given was enucleation for case 1, whereas the other 2 cases underwent ophthalmic brachytherapy using I-125 seeds. Histopathological examination of the enucleated eye of case 1 showed mixed cell type of choroidal melanoma. The mean follow-up was 14 months (range, 12–18 months) and none developed any systemic metastasis.

**Conclusions:** Our study suggests that PET-CT scan may not be very reliable in diagnosing malignant choroidal melanomas in Indian eyes.

**Poster No.:** EX1–154  
**Panel No.:** 154, Session 1

### New Discovery of an Old Antihelminthic Agent: Pyrvinium Pamoate Inhibits the Proliferation and Migration of Uveal Melanoma Cells Through Wnt/β-Catenin Signaling Pathway

**First Author:** Lei ZHENG  
**Co-Authors:** Jinxuan PAN

**Purpose:** Uveal melanoma (UM) is the most common primary malignant intraocular tumor in adults and can threaten a patient’s life. Pyrvinium pamoate (PP) is an antihelminthic drug previously approved by the US Food and Drug Administration, also identified as an anticancer agent in recent years. Thus, we evaluated the therapeutic functions of PP on UM cells in vitro.

**Methods:** Western blots demonstrated the relative protein levels of β-catenin in UM cells. Further studies determined the effect of PP treatment on cell growth, apoptosis, and migration.

**Results:** PP decreased the protein levels of β-catenin and downstream molecules (Cyclin D1, C-myc). It also inhibited the proliferation and migration of UM cells. Apoptosis of UM cells was induced by triggering the mitochondrial pathway.

**Conclusions:** PP can inhibit proliferation and migration of UM cells, and the Wnt/β-catenin signaling pathway could be considered a promising therapeutic or interventional target in UM.

**Poster No.:** EX1–155  
**Panel No.:** 155, Session 1

### Nanophthalmos Complicated With Uveal Effusion and Glaucoma

**First Author:** Jing TAO

**Purpose:** Nanophthalmos is the leading cause of blindness in hereditary eye diseases, characterized by abnormal remodeling of the scleral stroma. The purpose of this study was to investigate the clinical and pathologic features and treatment of nanophthalmos complicated with uveal effusion and glaucoma.

**Methods:** Eighty eyes of 40 patients with nanophthalmos were studied between 1995 and 2015. Fifty eyes from 25 patients with nanophthalmos complicated with uveal effusion and/or angle-closure glaucoma were studied. The clinical and pathologic data, treatment, and follow-up results were analyzed retrospectively. Twenty-nine eyes with complications were treated by improved sclerectomy and sclerotomies, combined with laser peripheral iridectomy. Pathologic characteristics of the excised sclera were analyzed by immunohistochemical and electron microscopic examinations.

**Results:** Nanophthalmos is characterized by short axial length and hyperopia, complicated with uveal effusion and/or angle-closure glaucoma during the progressive stage. The sclera was thicker than normal and the collagen fibril was swollen and disordered. Ciliochoroidal detachments disappeared soon after surgery, and retinal detachments resolved later on. Patients’ visual acuity recovered well.

**Conclusions:** Nanophthalmos is a congenital anomaly. The thick sclera and iris bombe seemed to be the basic pathophysiology of the complication of uveal effusion and/or angle-closure glaucoma. Improved sclerectomy and sclerotomies combined with laser peripheral iridectomy at an early stage was an effective treatment for preventing and curing the complications of nanophthalmos.

**Poster No.:** EX1–156  
**Panel No.:** 156, Session 1

### Evaluating the Reliability and Validity of a Cataract Surgery Assessment Tool—ICO-OSCAR: Phacoemulsification

**First Author:** Katherine LUN  
**Co-Authors:** Clement TAN

**Purpose:** This tool is designed to facilitate assessment and teaching of phacoemulsification. We aimed to establish the reliability and validity of the tool by studying its interobserver and intraobserver variability and construct validity.

**Methods:** This masked survey study was carried out...
among consultant ophthalmologists from our department. Ophthalmologists were asked to grade our residents’ phacoemulsification videos. No prior training or instructions on form use were given. Videos were coded, made anonymous, and randomized. Part 1 and part 2 of the study were done in the same setting. In part 1, ophthalmologists were asked to grade segments of phacoemulsification videos. In part 2, they graded 1 complete phacoemulsification video from the same resident. Part 3 was carried out 3 months afterward, and graders were asked to regrade the same video seen in part 2.

**Results:** Seven consultant ophthalmologists participated as graders. There was no significant intergrader variability in responses seen in all but 1 question, where they were asked to grade residents’ ability to insert the probe and second instrument into the eye. There was no significant intragraded variability. No significant differences were seen when looking at each grader’s response in parts 1 and 2, or when regrading the same video in parts 2 and 3. Mean scores of videos given by graders tallied with residents’ surgical experience, with the senior residents scoring higher than junior residents.

**Conclusions:** ICO–OSCAR: phaco is a valid and reliable phacoemulsification evaluation tool used in residents’ teaching.

**Poster No.:** EX1–157  
**Panel No.:** 157, Session 1

**Managing Ophthalmological Emergencies: Attitudes and Perceptions of Medical Undergraduates at a South Asian University**

*First Author: Madhuwanthi DISSANAYAKE  
Co-Author(s): Harsha DISSANAYAKE, Vithoosan SAHATHEVAN, Minura HAPUGODA, Gayathri BARANASURIYA*

**Purpose:** To assess attitudes and perceptions regarding ophthalmological emergencies among medical undergraduates at a South Asian university.

**Methods:** One hundred twenty–seven (n = 127) fourth year medical students from a medical faculty in Sri Lanka, who had completed the module and clinical appointment in ophthalmology, were studied using a self–administered questionnaire regarding attitudes and practices in ophthalmological emergencies. Data were analyzed using SPSS version 20.0.

**Results:** Mean age was 24.47 ± 0.844 (mean ± SD) years (males = 46, females = 81). Regarding ophthalmological emergencies, 64.6% of the medical students had not encountered acute angle closure glaucoma during their clinical practice. Only 24.4% and 33.3% had encountered retinal detachment and chemical injuries to the eye during the appointment. A total of 72.4% were not confident regarding management of acute angle closure glaucoma, and 51.2% were not confident regarding corneal foreign body management. A total of 59.1% strongly agreed that ophthalmology should be part of the undergraduate curriculum, and 70.9% disagreed with the adequacy of the current 2–week clinical appointment in ophthalmology. An ophthalmology appointment of 1 month was recommended by 48%.

**Conclusions:** Most of the medical undergraduates had not encountered ophthalmological emergencies in clinical practice and were not confident in managing them. Most suggested increasing the duration of clinical exposure to improve their confidence in managing ophthalmological emergencies.

**Poster No.:** EX1–158  
**Panel No.:** 158, Session 1

**Secular Trends of Myopia Prevalence in Singapore**

*First Author: Pavan VERKICHARLA  
Co-Author(s): Seang Mei SAW*

**Purpose:** The epidemic of myopia in East Asian countries increased gradually over generations. The steep increases in prevalence rates in the past few decades indicate the major influence of environment on myopia. The aim of this study was to investigate secular trends in the prevalence of myopia and correlate these with changes in the Singaporean education system.

**Methods:** The prevalence rates of myopia in parents whose children were enrolled in 3 major population–based studies was determined. The obtained results were compiled with the evidence–based literature on myopia prevalence rates from military conscripts and the adult population–based Singapore Epidemiology of Eye Diseases (SEED) program. Presence of myopia was diagnosed based on the participant’s spectacle wear for distance vision using a yes/no answer on a questionnaire or autorefracti on. Based on the assumption that people will start school education from 6 years of age in Singapore (on average), the approximate calendar years they attended school was predicted (back calculated) using the birth year of the participant.

**Results:** The prevalence of myopia in fathers and military conscripts who were predicted to have started/attended school during or before the period of independence of Singapore in 1965 was less (39% in SEED, 36% and 26% in military conscripts) compared with those who attended school after independence (48% in STARS, 77% in GUSTO, and 81% in military conscripts). People born after 1965 had higher odds of having myopia compared with people born before 1965 [odds ratio (OR), 2.87]. The prevalence of myopia increased from 26% in the 1970s to 79% in the 1990s, followed by only a slight change in prevalence rates from 79% in 1996.
to 81% in 2009. Myopia prevalence was less in those who were predicted to have attended school during or before the period of independence of Singapore in 1965 compared with those who attended school after independence.

**Conclusions:** Myopia prevalence peaked after independence and it has plateaued in the recent couple of decades. In Singapore, one of the most notable societal changes that could have contributed to an increase in near vision activity is changes in the education system due to various postindependence reforms. Postindependence strict/competitive educational reforms might have led to an increase in indoor/near work and decrease in outdoor activities.

**Poster No.:** EX1–159  
**Panel No.:** 159, Session 1  
**Current Status of Ophthalmology in Taiwan**  
**First Author:** Wen-ming HSU  
**Purpose:** To report the current status of ophthalmology in Taiwan.

**Methods:** We describe the current status of ophthalmology in Taiwan through a review of the current literature and other relevant data sources from publications of the National Health Insurance Bureau (NHB) of Taiwan, the Taiwan Medical Association (TMA), and the Ophthalmological Society of Taiwan (OST).

**Results:** In 2014, there were a total of 1728 ophthalmologists in Taiwan serving a population of 23.4 million people. From 1985 to 2014, Taiwan ophthalmologists published approximately 4800 academic papers [some 1520 articles in Science Citation Index (SCI) journals]. Ophthalmic services are adequately available, with an average cataract surgery rate of 6120 per million people per year (2005 to 2014). The major areas of biomedical research in ophthalmology in Taiwan are ophthalmic epidemiology, glaucoma, vitreoretinal diseases, cornea, and stem cells.

**Conclusions:** Taiwan is a free and open society with large numbers of medical manpower to provide rich resources and excellent medical care. There are 1728 ophthalmologists in Taiwan (as of 2014) with an average of 7.38 eye specialists per 100,000 people. Taiwan is adequate in both basic and continuing education. The development of ophthalmology in Taiwan has continued for over a hundred years. Currently, ophthalmology in Taiwan has reached its peak era. In Taiwan, abundant medical manpower and the highest levels of clinical treatment are available.

**Poster No.:** EX1–160  
**Panel No.:** 160, Session 1  
**First Author:** Doni WIDYANDANA  
**Co-Authors:** Syam SUHARYONO, Sri WIDIASTUTI, Agus SUPARTOTO, Suhardjo PRAWIRORANU  
**Purpose:** To evaluate the outcome of phacoemulsification surgery and to compare patient visual acuity outcomes between ophthalmology residents and phaco fellows during training in community services from 2012–2014.

**Methods:** A retrospective study of patient medical records during phacoemulsification surgery training in community services by residents (n = 105) and fellows (n = 169) from 2012–2014. Comparison of patient progress in visual acuity (VA) before and after phacoemulsification surgery (days 2, 5, and 28) between residents and fellows was analyzed using Mann–Whitney U test.

**Results:** Both groups of operators were able to provide significant progress in patient visual acuity after phacoemulsification surgery (P > 0.05). The results showed excellent progress in visual acuity (from before to after surgery on days 2, 5, and 28), with percentage of good vision (VA 6/6–6/18) increasing from 0% to 10%, 22%, and 39%; borderline vision (VA 6/24–6/60) from 0% to 23%, 32%, and 27%; and poor vision (VA < 6/60) decreasing from 100% to 67%, 47%, and 34%. Resident operators gave better results compared with phaco fellows in patient visual acuity outcomes on day 2 and day 5 after surgery (P < 0.05); however, final outcomes were equal.

**Conclusions:** Phacoemulsification surgery in community services was able to give excellent improvements in patient visual acuity. Ophthalmology residents were able to give better outcomes compared with phacoemulsification fellows on day 2 and 5 after surgery, but the final outcomes were equal for both groups.

**OPHTHALMIC EPIDEMIOLOGY**

**Poster No.:** EX2–161  
**Panel No.:** 161, Session 2  
**Risk of Degenerative Dementia in Patients with Age-Related Macular Degeneration—A Retrospective Cohort Study**  
**First Author:** Der-chong TSAI  
**Co-Authors:** Shih-jen CHEN, Hsin-bang LEU  
**Purpose:** To study the relationship between age-related macular degeneration (AMD) and the future development of Alzheimer disease (AD) or senile dementia.

**Methods:** Using the Taiwan National Health Insurance
Research Database from 2001 to 2009, the newly diagnosed AMD cases aged ≥65 years were recruited as the AMD cohort (n = 4993). Of those, there were 540 with and 4453 without exudative AMD diagnoses. Subjects without any AMD, matched for age, sex, and time of enrollment, were randomly sampled as the control cohort (n = 24,965) for comparison. AD/senile dementia-free survival analysis was assessed using a Kaplan–Meier method. Cox proportional hazard regressions were performed to calculate the hazard ratios (HR) of AD or senile dementia for the 2 cohorts after adjusting for preexisting comorbidities and number of clinical visits.

**Results:** Of the 29,958 sampled subjects, 1589 (5.3%) were diagnosed with AD or senile dementia during a mean follow-up period of 4.4 years, including 294 (5.9%) from the AMD cohort and 1295 (5.2%) from the control cohort. The incidence of AD or senile dementia was higher in AMD patients than in the controls (P = 0.044), with a HR of 1.44 [95% confidence interval (CI), 1.26 to 1.64] after adjusting for covariates. The stratified analysis showed that the adjusted HR for AD or senile dementia was 1.35 (95% CI, 0.89 to 2.06) for exudative AMD versus the controls and 1.44 (95% CI, 1.26 to 1.65) for nonexudative AMD versus the controls.

**Conclusions:** AMD, especially nonexudative AMD, is independently associated with an increased risk of subsequent AD or senile dementia development.

**Poster No.:** EX2-163
**Panel No.:** 163, Session 2

**Prevalence and Risk Factors for Myopia in Second-Grade Primary School Children in Taipei: A Population-Based Study**

**First Author:** Chih-chien TSAI  
**Co-Author(s):** Pei-yu LIN, Der-chong TSAI, Ching-yao TSAI, Lin-chung WOUNG, Catherine LIU

**Purpose:** To evaluate the prevalence of myopia and associated risk factors in second-grade primary school children in Taipei.

**Methods:** This population-based, cross-sectional study is a part of the Myopia Investigation Study in Taipei (MIT), which is a 3-year follow-up cohort study starting from June 2013, with all the second-grade children in Taipei invited to participate. A questionnaire was distributed to the participants’ parents, and their written informed consent was obtained before performing eye examinations that included visual acuity testing and cycloplegic autorefraction. Multiple logistic regression models were applied to assess possible risk factors associated with myopia. Myopia was defined as spherical equivalent ≤ -0.50 diopters in either eye.

**Results:** In total, 11,590 children completed the eye examinations. The prevalence of myopia in the second graders was 36.4%. After adjustment for other characteristics, the following variables were significantly associated with a higher risk of myopia: male sex (odds ratio (OR), 1.24; P < 0.001), suburban residence (vs urban; OR, 1.10; P = 0.02), lower maternal education level (OR, 1.25; P < 0.001), the presence of myopia in 1 parent (OR, 1.66; P < 0.001) or both parents (OR, 2.82; P < 0.001), time spent on near work every day (OR, 1.21; P < 0.001), shorter visual distance when doing near work (OR, 1.17; P = 0.000), and participation in an after-school tutorial program (OR, 1.20; P < 0.001). In contrast, resting after 30 minutes of near work (OR, 0.84; P = 0.000) and spending more time participating in outdoor activities on weekends (OR, 0.91; P = 0.03) were significantly associated with a lower risk of myopia. Unexpectedly, the use of cellphones, computers, and tablet computers in the past year were not associated with a higher risk of myopia (OR, 0.82; P = 0.001).

**Conclusions:** The prevalence of myopia in second-grade children in Taipei was 36.4%, which is the highest rate in Taiwan. Our findings indicate that lifestyle and reading habits impact the development of myopia during early childhood. Behavior modification, such as more time spent outside during the day and limited near work, may be a feasible strategy for curbing the increasingly high prevalence of myopia in Taipei.
who remained nonmyopic during follow-up. After controlling potential confounding factors, Cox hazard proportional regression analysis revealed that participants who had higher maternal education [hazard ratio (HR), 1.14; 95% confidence interval (CI), 1.01–1.28], 2 myopic parents (HR, 1.31; 95% CI, 1.10–1.55), and more near work activities (HR, 1.18; 95% CI, 1.06–1.32) had greater risk for incident myopia.

Conclusions: This study provides population-based data on the annual incidence of myopia in Taipei and suggests baseline SE, parental myopia, maternal education, and near work activities are associated with myopic risk.

Poster No.: EX2–164
Panel No.: 164, Session 2

Age-Related Differences in Ocular Biometry in Adult Korean Population

First Author: Hee-kyung YANG
Co-Author(s): Joon Young HYON, Sang Beom HAN

Purpose: To evaluate the relationship between age, axial length (AL), anterior chamber depth (ACD), and corneal steepness (K).

Methods: Medical records of 800 patients (800 eyes) who underwent cataract surgery were reviewed. Data including age and ocular biometric data including AL, ACD, and K were collected and analyzed using univariate and multivariate analyses.

Results: Univariate analysis showed advancing age has significant correlation with shorter AL (P < 0.001), shallower ACD (P < 0.001), and steeper K (P < 0.001). K value has a negative correlation with AL (P < 0.001). In multivariate analysis, increasing age had a significant association with shorter AL (P < 0.001) and ACD (P < 0.001), although the association between age and K was not significant (P = 0.398). Negative correlation between AL and K remained significant in multivariate analysis (P < 0.001).

Conclusions: Increasing age had significant association with shorter AL and ACD. AL and K had negative correlation.

Poster No.: EX2–165
Panel No.: 165, Session 2

The Aotearoa Research Into Keratoconus (ARK) Study Part I—Epidemiology, Demographics, and Basic Clinical Characteristics of Keratoconus in New Zealand

First Author: Akilesh GOKUL
Co-Author(s): Stuti MISRA, Dipika PATEL, Charles MCGHEE

Purpose: To investigate the epidemiologic, demographic, and basic clinical characteristics of patients with keratoconus managed by optometrists in New Zealand (NZ)/Aotearoa.

Methods: Part I of the ARK study consists of a prospective, longitudinal, nationwide survey of optometrists in NZ. Participating optometrists (n = 100) agreed to complete the survey protocol for every patient with keratoconus that underwent a consultation in a 2-year period (2014–2016). Data for each patient includes date of birth, sex, self-reported ethnicity, new or existing diagnosis, types of refractive correction employed, keratometry, uncorrected (UVA), and best corrected visual acuity (BCVA). Data collected at 20 months (up to September 2015) has been analysed.

Results: In 615 patients, the mean age was 38.1 ± 15.3 years (59.0% male), and 81.6% had an existing diagnosis. The distribution of cases across NZ was skewed toward Auckland (25.9%), Wellington (32.8%), and Bay of Plenty (23.1%). Self-reported ethnicities were predominantly NZ European (54.3%), Māori (23.3%), and Pacific Island Nations (12.0%), disproportionate compared with the 2013 NZ census (74.0%, 14.9%, and 7.4%, respectively). Most eyes were managed with contact lenses (25.0% rigid, 18.0% semi-scleral, 6.0% hybrid). The mean Kmax, Kmin, and Kmean were 50.2 ± 5.1 D, 46.3 ± 4.1 D, and 48.25 ± 4.4 D, respectively. The mean UVA was 6/45 and BCVA was 6/9.

Conclusions: Preliminary results indicate that the majority of patients with keratoconus managed by optometrists in NZ have mild-moderate disease and their number likely exceeds 650 over the complete study period. An ethnic predilection is apparent, with Māori and Pacific Island Nations ethnicities overrepresented relative to their population proportions, reinforcing a long-held clinical suspicion.

Poster No.: EX2–166
Panel No.: 166, Session 2

Increased Healthcare Service Utilization for Open-Angle Glaucoma: A Population-Based Study

First Author: Jau-der HO
Co-Author(s): Tsung-jen WANG, Hsiao-pei GUO, Chun-mei HSUEH, Ju-yi HUNG, Herng-ching LIN

Purpose: To explore differences in the utilization of healthcare services between subjects with open-angle glaucoma (OAG) and comparison subjects without OAG using Taiwan’s national health insurance population-based database.

Methods: In total, 2204 subjects with OAG and 2204 sex- and age-matched subjects without OAG were included. We individually followed each subject for a 1-year period to evaluate their healthcare resource uti-
Visual Impairment as an Independent Risk Factor for Falls in Hospitalized Patients

First Author: Toshimitsu KASUGA
Co-Author(s): Fumiko ARUGA, Koichi ONO, Akira MURAKAMI

Purpose: To investigate the association between visual impairment and risk of falls in hospitalized patients.

Methods: This was an individually matched case-control study. The medical records of the patients who fell during hospitalization in Juntendo Tokyo Koto Geriatric Medical Center from January to December 2014 were retrospectively reviewed. Among them, 36 subjects who had records of visiting the ophthalmology outpatient clinic from 1 year before to 1 year after the date of the fall were included in the study as cases. For the control subjects, 36 individually matched subjects who were hospitalized in the same bed were chosen. Visual impairment was defined based on the US criteria. Conditional logistic regression analysis was used for both univariate and multivariate analysis. According to previous reports, age, sex, history of falls, and walking aid use were adjusted for multivariate analysis.

Results: Crude odds ratio (OR) for visual impairment was 6.0 [95% confidence interval (CI) 0.72–49.9]. For history of falls and walking aid use, crude OR and 95% CI were 2.5, 0.97–6.4 and 2.8, 0.88–8.6, respectively. After adjusting for age, sex, history of falls, and walking aid use, the association between falls and visual impairment became significant (OR, 13.9; 95% CI, 1.00038–194.4).

Conclusions: The results suggest that visual impairment could be an independent risk factor for falls among hospitalized patients.

Poster No.: EX2–168
Panel No.: 168, Session 2

Longitudinal Changes in Visual Function in Junior High School Students: Effects of Myopia and Myopic Treatment

First Author: Ming-hung HSIEH
Co-Author(s): Jen-chieh LIN

Purpose: To determine the predictive factors associated with longitudinal changes of the visual function in junior high school students.

Methods: The Visual Functioning Questionnaire–25 (NEI VFQ–25) and cycloplegic refraction were obtained from 149 students, who were 13 years old, at baseline and 2 years. The data of cycloplegic refraction was calculated as spherical equivalent of the right eye. Longitudinal changes in patient self-reported visual function and cycloplegic refraction were defined as the difference between data at baseline and 2 years. The family conditions, including income and parents’ education status, and myopic treatment were collected at baseline. Changes over the 2 time points were assessed for statistical significance using paired t test. Linear regression was used to assess the associations between NEI VFQ–25 scores and cycloplegic refraction and myopic treatment.

Results: Among these 149 students, with 77 girls and 30 students under myopic treatment, paired t tests showed statistically significant increases in VFQ–25 composite, near activities, distance activities, social functioning, color vision, and peripheral vision scores at 2 years (P < 0.05). There was no statistically significant difference between cycloplegic refraction at baseline and 2 years. In a model with sex, myopic treatment, and cycloplegic refraction, sex was the only statistically significant predictor of mental health subscale scores (P < 0.05).

Conclusions: VFQ–25 composite scores increasing during the 2-year study period was noted, and the progression of myopia was not significant. Myopic treatment has no significant effect on visual function.

Poster No.: EX2–169
Panel No.: 169, Session 2
Assessment of Functioning in Patients With Visual Impairment and Hearing Impairment: Application of the World Health Organization Disability Assessment Schedule 2.0

First Author: I-chan LIN
Co-Author(s): Wen-ming HSU

Purpose: To assess the level of functioning in patients with visual impairment (VI) and hearing impairment (HI) by using the International Classification of Functioning, Disability, and Health.

Methods: A nationwide, cross-sectional study of 312 people with VI and 540 people with HI. We used the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0) to evaluate each participant’s degree of functioning and disability. The standardized scores on the WHODAS 2.0 range from 0 points (least difficulty) to 100 points (most difficulty).

Results: Patients with VI achieved a mean ± standard error 32-item WHODAS 2.0 score of 42.4 ± 2.9, and patients with HI achieved a mean ± standard error score of 27.1 ± 1.6. The degree of restriction had a positive relationship with the level of VI. People with VI who obtained a 32-item score of 33.7 to 35.3 points or higher were likely to experience barriers to accessing mobility products, communication products, and education products. In addition, people whose 32-item score was 42.9 points or higher might further experience barriers to accessing ingestion products and living products.

Conclusions: Scores on the WHODAS 2.0 were strongly correlated with the severity of visual impairment. Mild visual impairment should be targeted for treatment and referral as early as possible.

Poster No.: EX2-170
Panel No.: 170, Session 2

Epiretinal Membrane: Prevalence and Risk Factors From the Korea National Health and Nutrition Examination Survey, 2008 Through 2012

First Author: Si Dong KIM
Co-Author(s): Kuhl HUH, Kunho BAE, Se Woong KANG

Purpose: To investigate the prevalence and risk factors for an epiretinal membrane (ERM) in the Korean population.

Methods: Using the database of the Korea National Health and Nutrition Examination Survey from 2008 through 2012, 14,772 participants 40 years of age or older with gradable fundus photographs were included. The presence of ERM was determined using fundus photographs. The prevalence of ERM was estimated, and possible risk factors including systemic factors, nutritional status, and blood tests were analyzed via multiple logistic regression analyses.

Results: The prevalence of ERM was 2.9% [95% confidence interval (CI), 2.6%–3.3%]. On multiple logistic regression analysis, the prevalence of ERM was affected by age. The odds ratios (OR) against the 40s were 2.70, 5.48, and 5.69 in the 50s, 60s, and 70s, respectively. ERM was also significantly affected by cataract surgery (OR, 2.82; 95% CI, 2.08–3.81) and by the increase in intake of 100 mg calcium (OR, 1.05; 95% CI, 1.00–1.11). ERM had negative associations with red blood cell count (OR, 0.66; 95% CI, 0.45–0.95).

Conclusions: The estimated nationwide prevalence of ERM in Korea is 2.9%. The presence of ERM in the general population is associated with age, cataract surgery, increased dietary calcium, and a low red blood cell count.

Poster No.: EX2-171
Panel No.: 171, Session 2

Changes in Refractive Status in an Elderly Chinese Population in a 7-Year Follow-Up: The Shihpai Eye Study

First Author: Tung-mei KUANG
Co-Author(s): Su-ying TSAI, Catherine Jiu-ling LIU, Shui-mei LEE, Yu-chieh KO, Pesus CHOU

Purpose: To report the 7-year incidence of myopia and hyperopia, the refractive error change, and the associated risk factors in a metropolitan Chinese elderly population.

Methods: The Shihpai Eye Study 2006 included 460/824 (55.8%) subjects (age range, 72–94 years old) of 1361 participants in the 1999 baseline survey for a follow-up eye examination. A structured questionnaire was conducted by intensively trained interviewers. Subjects who were interviewed were invited to participate in a comprehensive ophthalmic examination conducted at Taipei Veterans General Hospital, which included autorefraction, presenting and best corrected visual acuity, slit lamp biomicroscopy, tonometry, and fundus photography. Ophthalmologists conducted examinations according to a standardized protocol.

Results: Of the 1361 participants who attended the baseline examination in the 1999 study, 725 (87.4%) agreed to be interviewed for the questionnaire. Among those interviewed, 460 (55.8% of those eligible or 39.8% of survivors) participated in the ophthalmic examination. At the 7-year follow-up, 90 subjects had emmetropia, 61 had myopia, and 190 had hyperopia. The mean refractive error of the right eye at 7-year follow-up was 0.49 ± 2.19 D, and the average change in refractive error was −0.13 ± 1.03 D. The left eye showed similar results. The incidence of myopia at 7-year follow-up was 26.8% [95% confidence interval (CI), 22.8%–30.9%] and the incidence of hyperopia was 19.7% (95% CI, 23.3%–16.1%). Nuclear sclerosis (>2
vs ≤2) [odds ratio (OR), 3.18; 95% CI, 0.40–5.96], lens thickness (β = 22.4; P = 0.01), and anterior chamber depth (≥2.4 vs <2.4) (OR, 1.89; 95% CI, 0.03–3.81) were significantly associated with myopic shift. Age, sex, educational level, axial length, and pachymetry were not significantly associated with myopic shift. On the other hand, axial length (β = 0.24; P = 0.04) was significantly associated with hyperopic shift.

**Conclusions**: The incidence of myopia at 7-year follow-up was 26.8% (95% CI, 22.8%–30.9%) and 19.7% (95% CI, 23.3%–16.1%) for hyperopia. Nuclear sclerosis, lens thickness, and anterior chamber depth were significantly associated with myopic shift. On the other hand, axial length was significantly associated with hyperopic shift.

**Poster No.**: EX2–172  
**Panel No.**: 172, Session 2  
**Risk Factors of Self-Perceived Vision Impairment in the Elderly in Taiwan: A Cohort Study**  
**First Author**: Jyh-cheng LIOU  
**Co-Author(s)**: Chofan YANG

**Purpose**: Few epidemiological data of cohort studies are available on risk factors of visual impairment in the elderly Taiwanese population. The purpose of this study was to determine the risk factors associated with visual impairment in a nationwide elderly population in Taiwan.

**Methods**: Data were obtained from the “Survey of Health and Living Status of the Elderly in Taiwan,” which was launched in 1989. We used data from 1996 as the baseline to form a cohort of 2159 persons aged 65 to 103 years who participated in the interview. There were 1812 persons who participated in follow-up interviews in 1999. Visual impairment was defined by self-reported difficulty in seeing. Independent variables, including sex, age, education, ethnicity, income, chronic diseases, depression status (evaluated by CES-D), health behaviors, food, and nutrition supplement, were gathered at baseline. A χ² test was used for univariate analysis. Statistically significant (P < 0.05) univariate relationships were entered into a logistics regression model.

**Results**: In the 3 years of follow-up, low education level [elementary vs illiterate: odds ratio (OR), 0.5; confidence interval (CI), 0.4–0.7]; medium vs illiterate: OR, 0.21; CI, 0.12–0.36; high vs illiterate: OR, 0.18; CI, 0.007–0.47), aboriginal ethnicity (OR, 5.1; CI, 2.1–12.4), and cataract (OR, 1.5; CI, 1.1–2.0) were predictive factors for visual impairment.

**Conclusions**: Those who are at high risk of visual impairment should receive detailed assessment and active management to prevent visual disability.

**Poster No.**: EX2–173  
**Panel No.**: 173, Session 2  
**Prevalence and Associations of Anisometropia With Demographics, Ametropia, and Parental Myopia in School Children in Taipei City**  
**First Author**: Chia-wei LEE  
**Co-Author(s)**: Der-chong TSAI, Chih-chien HSU, Shao-you FANG, Pei-yu LIN, Catherine LIU

**Purpose**: To report the prevalence of anisometropia among 8-year-old school children in Taipei City and explore the associations between anisometropia and demographics, refractive error, and parental myopia status.

**Methods**: This survey was conducted on a citywide, population-based cohort study, the Myopia Investigation Study in Taipei (MIT). Two cohorts of grade 2 school children (fall 2013 and fall 2014 semesters) in Taipei City were recruited. Cycloplegic refraction was determined by the average of at least 3 autorefraction readings. Baseline data was collected by parent–administered questionnaires covering demographics, medical history, and parental myopia. The prevalence of anisometropia and associations between the prevalence of anisometropia with sex, spherical equivalent, astigmatism, amblyopia, area of residence, maternal education level, and parental myopia status were assessed. Anisometropia was defined as the spherical equivalent difference ≥ 1.0 diopter between eyes.

**Results**: The prevalence of anisometropia in predominantly 8–year–old children (n = 23,114) was 5.27%. In multiple logistic regression analyses, anisometropia was associated with amblyopia [odds ratio (OR), 2.53; 95% confidence interval (CI), 2.05–3.12], astigmatism (OR, 1.005; 95% CI, 1.005–1.006), and sex (OR, 0.87; 95% CI, 0.78–0.98). Low maternal education level had a lower adjusted OR (OR, 0.86; 95% CI, 0.76–0.98). The presence of parental myopia was inversely related to the prevalence of anisometropia with both parental myopia groups reaching a significant association (OR, 0.71; 95% CI, 0.57–0.88). The relationship between area of residence and anisometropia was insignificant (OR, 0.97; 95% CI, 0.86–1.09).

**Conclusions**: The prevalence of anisometropia in 8–year–old children was reported. We found a strong association between amblyopia and anisometropia as previous study had demonstrated. The significant association between anisometropia and sex, maternal education level, and parental myopia status could establish the baseline characteristics to facilitate further studies for investigation of pathophysiologic mechanism and longitudinal changes in anisometropia in school–age children.
**Five-Year Incidence of Near Vision Impairment in Adults in Urban Southern China**

**First Author:** Xiaotong HAN  
**Co-Author(s):** Mingguang HE

**Purpose:** Near vision impairment (NVI) limits daily activity and reduces quality of life but is poorly investigated. We conducted a population–based longitudinal study to investigate the 5-year incidence of NVI.

**Methods:** Participants aged 35 years or older were recruited using cluster random sampling from Yuexiu District, Guangzhou in 2008. All participants were invited for the 5-year follow-up, and both visits included binocular near visual acuity (NVA) measurement and noncycloplegic autorefraction. NVA was measured at 40 cm using a logMAR near vision tumbling E chart. Subjects with uncorrected binocular NVA ≤ 20/40 were corrected to obtain best corrected NVA. Logistic regression analysis was used to assess the relationship of potential risk factors with the incidence of NVI.

**Results:** Data were available for 1287 (73.50%) of 1751 survivors (96.4%) in the follow-up, and the mean age was 55.2 ± 11.2 years. The 5-year incidence of binocular uncorrected NVI (uncorrected NVA ≤ 20/40) and best corrected NVI (best corrected NVA ≤ 20/40) were 56.2% [95% confidence interval (CI), 51.8–60.6%] and 5.6% [95% CI, 4.3–7.0%], respectively. Logistic regression analysis showed that older age [odds ratio (OR) = 1.08, \( P < 0.001 \)] and worse baseline uncorrected NVA (OR = 0.02, \( P < 0.001 \)) were significantly associated with higher incidence. Higher educational level (OR = 0.63, \( P = 0.036 \)) and more myopic spherical equivalence (OR = 1.43, \( P < 0.001 \)) were associated with a lower risk adjusted for age and baseline NVA.

**Conclusions:** The incidence of uncorrected NVI is higher among people with older age, worse baseline NVA, and more severe hyperopia. Most NVIs are correctable. How to deliver appropriate correction is important in the future.

**The Prevalence of Myopia and Unmet Needs of Vision Care Among Schoolchildren in Rural and Underserved Areas of Taiwan**

**First Author:** Li-ju LAI

**Purpose:** The prevalence of myopia in Taiwan is the highest in the world, and the onset of myopia is at the youngest age. Evaluation and treatment for myopia control are important to prevent further complications. Myopia progression was associated with excessive near reading work and fewer outdoor activities with sun exposure. However, the prevalence of myopia is still high in rural areas with less academic pressure and more outdoor activity in the southern part of Taiwan.

**Methods:** There were 2426 schoolchildren aged from 7 to 16 years old with informed consent from their parents assessed during September 2012 to May 2013. The ophthalmologic examination included visual acuity, autorefraction status, intraocular pressure (IOP), ste-
performance was eyelid sparing technique. The mean age of the schoolchildren was 11.2. Myopia was found in 55% of the schoolchildren. More than 32% of the students wearing glasses for myopia had improper spectacle fitting. Fourteen percent of children had visited an eye care provider in the past 12 months. Our results suggested that myopia was undercorrected in rural areas with limited health care resources. Effective strategies are needed to eliminate the cause of a significant visual problem and to address the unmet needs of vision care in rural and underserved communities.

Conclusions: In rural areas with insufficient ophthalmologists and optometry technicians, the treatment of myopia was undercorrected. Good-fitting spectacles provided good visual function, and improper spectacle fitting showed accelerating myopia. The incidence of exophoria and exotropia in Taiwan was higher than those in Western countries. Exotropia showed a significant correlation with myopia and stereoscopic. Ophthalmologists should be aware of ocular alignment in myopic patients.

### ORBITAL AND OCULOPLASTIC SURGERY

**Poster No.: EX2–177**

**Panel No.: 177, Session 2**

**Orbital Exenteration: Clinicopathological Profile of Patients and Outcome**

**First Author:** Raksha RAO  
**Co-Authors:** Santosh HONAVAR, Kaustubh MULAY

**Purpose:** To describe the clinicopathological profile of patients undergoing orbital exenteration and outcome, with an emphasis on the eyelid-sparing technique.

**Methods:** A retrospective interventional case series.

**Results:** All 83 patients underwent unilateral surgery. The mean age was 51.3 years (range, 7 months–81 years). The most common indications for exenteration included orbital extension of ocular surface squamous neoplasia (OSSN) (48%), followed by orbital extension of eyelid sebaceous gland carcinoma (13%) and fungal granuloma (8%). The most common type of surgery performed was eyelid-sparing technique (95%). Postoperative complications included wound gape in 7 (9%) patients. With the eyelid-sparing technique, the mean time from exenteration to wound healing and readiness for a prosthesis was 4 weeks (range, 2 to 24 weeks).

**Conclusions:** Orbital exenteration in our series was mainly for orbital extension of OSSN and sebaceous gland carcinoma. The eyelid-sparing technique enables early wound healing and cosmetic rehabilitation thus minimizing patient morbidity.

**Poster No.: EX2–178**

**Panel No.: 178, Session 2**

**Long-Term Follow-Up of Orbital Implants and Management of Large Area Implant Exposure With Dermis Fat Graft**

**First Author:** Chao Wen LIN  
**Co-Authors:** Shu-lang LIAO

**Purpose:** To analyze the long-term outcomes of orbital implants and report the procedure and results of autogenous dermis fat grafts for the management of large area implant exposure.

**Methods:** This was a retrospective case series. Patients who received orbital implants after evisceration or enucleation were recruited. For patients with extensive implant exposure (diameter of tissue defect >2 cm), dermis fat graft was performed. Dermis fat was harvested and trimmed. The margin of dermis fat was secured to the recipient sclera or Tenon capsule and approximated with conjunctiva. Success and complications of the operation were investigated.

**Results:** A total of 539 cases were reviewed. Two hundred sixty patients were excluded due to insufficient follow-up. The exposure rate was higher in patients with eviscerated globes, pegged implants, and prior ocular surgery. Twenty-five eyes with large area implant exposure were managed with autogenous dermis fat grafts. Twenty cases were successfully treated with single graft surgery. The other 5 cases developed fornix loss and needed an additional full thickness skin graft. All the patients have been fitted with prostheses and no re-exposure was noted thereafter.

**Conclusions:** Exposure of orbital implants was associated with evisceration, pegging, and prior ocular operations. The implantation of an autogenous dermis fat graft can be an effective procedure for the management of large orbital implant exposure. The graft provides durable coverage with a high success rate. Some complications such as fornix loss can be treated with further surgery.
Search for Putative Novel Autoantigens in Thyroid Orbitopathy by Proteomic Approach

First Author: Kai CHENG
Co-Author(s): Cheng-hsien CHANG

Purpose: Thyroid orbitopathy (TO) is an autoimmune inflammatory disorder characterized by several ocular manifestations. Several autoantigens have been proposed to be involved in the pathogenesis of TO, but the autoantigen system and the mechanism of TO are rather complex. In this study, an immunoproteomic method was conducted to survey novel autoantigens expressed in the orbital fat tissue of TO patients.

Methods: We used immunoproteomic, ELISA, and immunohistochemical staining methods to survey novel autoantigens expressed in the orbital fat tissue of TO patients.

Results: Six protein spots showing high reactivity with the serum from the TO patients were detected as candidate orbital autoantigens, and 2 of them [carbonic anhydrase 1 (CA1) and alcohol dehydrogenase 1B (ADH1B)] were further verified by ELISA and immunohistochemical staining. We found CA1 and ADH1B could attribute target autoantigens in this autoimmune disease. We discovered anti–CA1 and anti–ADH1B antibody prevalence to be higher in patients with TO (68.57%, 51.43%) or Graves disease (GD) (72%, 48%) than healthy controls, respectively. Immunohistochemical staining revealed the significantly enhanced expressions of CA1 and ADH1B in orbital fat of TO patients compared with healthy controls.

Conclusions: We found carbonic anhydrase 1 and alcohol dehydrogenase 1B could attribute target autoantigens in this autoimmune disease. The high prevalence of these autoantibodies against CA1 and ADH1B in TO and GD patients clarifies the potential clinical role for anti–CA1 and anti–ADH1B antibodies as biomarkers for GD and TO.

Poster No.: EX2–180
Panel No.: 180, Session 2

Botulinum Toxin A Treatment for Marin-Amat Syndrome

First Author: Che-yu LIN
Co-Author(s): Chieh Chih TSAI, Hui-chuan KAU, Shu Ching KAO, Catherine LIU

Purpose: Marin–Amat syndrome is an unusual facial synkinesis. This often occurs after aberrant connection between the trigeminal nerve and the facial nerve. We present a patient successfully treated with botulinum toxin injection.

Methods: A case report and literature review.

Results: A 67–year–old man came to our clinic with the complaint of left eyelid drooping once when he was eating. Two years earlier, he had an attack of Ramsay–Hunt syndrome that involved the cranial nerve on the left side. On examination, involuntary eyelid closure of his left eye happened on mouth opening or lateral movements of the lower jaw. He was diagnosed with Marin–Amat syndrome, and botulinum toxin A was injected in the orbicularis muscle of his upper and lower eyelids. One week later, he had dramatic improvement of his oral–to–ocular facial synkinesis.

Conclusions: Treatment of Marin–Amat syndrome includes botulinum toxin injection and eyelid surgery. Low–dose botulinum toxin injection in the orbicularis left side. Initial CT findings showed severe depression fractures involving the anterior skull base and facial bones with Le Forte level III fracture and bilateral type III NOE open fracture (bilateral orbital walls, left zygomatic arch, walls of frontal sinuses, left maxillary sinus walls, medial wall of right maxillary sinus, walls of ethmoidal sinuses, nasal bone, bony nasal septum, bilateral pterygoid plates, bilateral styloid processes). The left eyeball was ruptured with hemotoma formation and leakage of the cerebrospinal fluid from the anterior skull base. The patient received repair of the orbital floor with prefabricated titanium plate in the left eye, eyeball evisceration, orbital reconstruction with bioceramic ball, bilateral NOE fracture reduction and transnasal wiring, left zygoma and malar fracture open reduction and fixation.

Poster No.: EX2–181
Panel No.: 181, Session 2
Methods: Forty-seven healthy single eyelid subjects between age 18 and 35 were included in this study from March 20 to May 29, 2015. Outcome measures included best corrected visual acuity, MRD1, MRD2, presence of epicanthal fold, and superior 64-point screening test visual field assessment by Humphrey perimetry. Subjects performed visual field testing with and without compensatory brow elevation in a randomised order. Subjects with unreliable visual field results were excluded.

Results: A total of 40 visual field results from the right eyes of 40 subjects were analyzed. Seven fields were excluded due to false negative error results. There were 22 female and 18 male subjects with a mean age of 23.3 years. Mean MRD1 with brow elevation and without brow elevation was 2.24 ± 1.04 mm and 1.41 ± 1.30 mm, respectively. Epicanthal fold was present in all subjects. Average visual field test time was 3.60 minutes. Superior visual field with and without compensatory brow elevation at 90-degree vertical meridian were 44.900 ± 4.860 and 39.360 ± 6.910, respectively (P < 0.0001). There was a positive correlation of MRD1 and superior 90-degree vertical meridian visual field (r = 0.69, P < 0.0001).

Conclusions: There is a superior visual field defect in the single eyelid population correlated with MRD1 value. Compensatory brow elevation might alleviate symptoms, but surgical correction for functional purposes should also be considered.

Poster No.: EX2–184  
Panel No.: 184, Session 2

Coexisting Orbital Mature B Cell Lymphoma and IgG4-Related Disease—A Case Report  

First Author: Han-chung LIU  
Co-Author(s): Chieh Chi TSAI, Che-yu LIN, Shu Ching KAO, Catherine Jiu-ling LIU

Purpose: To report a rare case of orbital mature B cell lymphoma with the coexistence of IgG4-related disease (IgG4–RD).

Methods: A case report.

Results: A 71-year-old female patient first came to our clinic with a 6-month history of left eye swelling. There was mild proptosis and conjunctival chemosis in the left eye with computed tomography (CT) and magnetic resonance imaging (MRI) revealing an infiltrating mass over the left inferotemporal orbit. The patient underwent biopsy and was initially diagnosed with idiopathic orbital inflammation but oral steroid only partially alleviated her symptoms, which recurred after dose tapering. Adjunctive radiotherapy successfully controlled...
her symptoms. Later, immunostaining of her prior biopsy specimens for IgG4 indicated intense IgG4–positive plasma cell infiltration. Diagnosis was then revised to be ocular adnexal IgG4–RD. Two years later, she presented with a palpable mass over the right upper lid. CT showed a soft tissue mass at the superonasal orbit of the right eye. Serum IgG4 elevation was noted. She underwent orbital biopsy again, which revealed a mature B cell neoplasm with light chain restriction of lambda. The histologic and immunophenotypic findings confirmed the diagnosis of an IgG4–producing MALT lymphoma. Systemic tumor survey showed negative results. She received radiotherapy to the right orbit fossa and the tumor, after which radiological abnormalities resolved. No tumor recurrence was noted during follow-up and her serum IgG4 concentration decreased.

Conclusions: We reported a rare case of idiopathic orbital inflammation with IgG4–positive plasma cells in 1 eye and mature B cell lymphoma infiltrated by IgG4–positive plasma cells in the other eye. Longer follow-up is suggested for patients of IgG4–RD, and biopsy should be done for new lesions in such patients to determine further treatment.

Poster No.: EX2–185
Panel No.: 185, Session 2

Ophthalmic Plastic and Orbital Surgery in Taiwan

First Author: Wen-ming HSU
Co-Author(s): Chi-hsin HSU, Yun-dun SHEN, I-chan LIN

Purpose: To describe the current status of ophthalmic plastic and orbital surgery in Taiwan.

Methods: The current literature and other relevant data sources from publications of the National Health Insurance Bureau (NHIB) of Taiwan, the Taiwan Medical Association (TMA), and the Ophthalmological Society of Taiwan (OST) were reviewed and analyzed.

Results: As of 2015, there are 112 oculoplastic surgeons, accounting for 6.5% of a total of 1728 ophthalmologists in Taiwan. From 1985 to 2014, Taiwanese ophthalmologists published approximately 230 academic papers [50 articles in Science Citation Index (SCI) journals] in the field of ophthalmic plastic and reconstructive surgery. Entropion correction was the most common oculoplastic surgery (average, 10,600 per year) followed by levator muscle/aponeurosis operation (6800 per year). In periorbital aesthetic procedures, there were about 400,000 botulinum toxin injections and 160,000 hyaluronic acid injections per year. The payment rates by Taiwan NHIB for oculoplastic surgeries were relatively low, compared with the payment for intraocular procedures; for example, the payment for levator muscle resection was nearly two-thirds of that for cataract surgery.

Conclusions: In Taiwan, the service level of oculoplastic and orbital surgeries has become higher and higher in the past 30 years, with more than 100 oculoplastic surgeons. The payment rates by the Taiwan national health insurance for oculoplastic and orbital surgeries are relatively low.

Poster No.: EX2–186
Panel No.: 186, Session 2

Management Outcomes of Pediatric Orbital Fractures

First Author: Su Ann TAY
Co-Author(s): Lay Leng SEAH

Purpose: Children who suffer orbital fractures often present with trapdoor fractures due to the greater elasticity of their orbital bones, and with the potential complications associated, considerations for early surgical intervention need to be made. There have been differing conclusions in studies that describe the management of pediatric orbital fractures; hence, we aimed to analyze the features and management of orbital blowout fractures in our local pediatric population.

Methods: This was a retrospective review of pediatric patients (<16 years old) treated for orbital blowout fractures from 2001–2011. Data studied included patient demographics, clinical presentation, mechanism of injury, best corrected visual acuity, exophthalmometry, motility assessment, and radiological findings. The indications for surgery, interval between injury and surgery, size of fracture, types of implants, and treatment outcomes were reviewed. Outcomes were defined as excellent when patients were asymptomatic with no observed limitation in ocular motility, fair when diplopia was present in positions of extreme gaze with mild limitation of ductions (≤30 degrees), and poor when limitation of ductions >30 degrees and strabismus were present in the primary position.

Results: Eleven patients were recruited. Common presenting symptoms were vertical diplopia (100%) and nausea and vomiting (64%). One hundred percent (11 patients) presented with a white eye and none had enophthalmos. Computed tomography showed orbital blowout fractures involving the floor and/or medial wall with no evidence of muscle entrapment in all patients. The mean interval from injury to surgery was 14 days (range, 1–29). Three patients had surgery within 48 hours (early), 4 patients within 14 days (intermediate), and 4 patients >2 weeks (late). Outcomes were excellent in 7 patients, fair in 1 patient, and poor in 1 patient.

Conclusions: We observed that in the case where the inferior rectus was entrapped, the surgical outcome was poor when surgery was performed late. In the other cases, the time interval from injury to surgery did
not affect the final surgical outcome after orbital fracture repair.

**Poster No.: EX2–187**  
**Panel No.: 187, Session 2**  
**Noninterventional Computed Tomographic Dacryocystography Using Iodixanol Drops**  
*First Author: Vishal SHARMA*  
*Co-Author(s): Sonai CHAUGULE, Raksha RAO, Sunitha LINGAREDDY, Sunitha LINGAREDDY*  
**Purpose:** To illustrate the role of computed tomography dacryocystography (CT–DCG) using iodixanol drops in the evaluation of the lacrimal drainage apparatus (LDA).

**Methods:** A prospective study of 18 LDA of 9 patients with clinical correlation. Baseline axial and coronal CT scan of the LDA was performed, followed by instillation of iodixanol (water-soluble nonionic contrast) drops in the conjunctival cul-de-sac every minute for 5 minutes, with immediate postcontrast CT scan and digital subtraction image processing.

**Results:** Age range was 5 to 61 years. Image quality was excellent in all cases. Ten of 18 LDA were patent, whereas the other 8 comprised 3 with block at the sac–nasolacrimal duct (NLD) junction, 2 with lacrimal sac fistula, and 1 each with traumatic NLD obstruction, encysted mucocele, and compressive medial canthal tumor. There was 100% correlation clinically and/or with intraoperative findings.

**Conclusions:** Drop CT–DCG using iodixanol is a simple, noninvasive, and effective mode of evaluating the LDA when indicated.

**Poster No.: EX2–188**  
**Panel No.: 188, Session 2**  
**Orbital Dimensions—A Preliminary Direct Measurement Study Using Dry Skulls in a Sri Lankan Population**  
*First Author: Sajith EDIRISINGHE*  
*Co-Author(s): Hasitha DISSANAYAKE, Damitha DE FONSEKA, Surangi YASEWARDENE, Harsha DISSANAYAKE*  
**Purpose:** Anatomical proportion and osteometric measurements in orbits are vital for clinical assessment and treatment of patients, which vary considerably among nations worldwide. These measurements are of value in a variety of specialities such as craniofacial reconstructive surgery, genetic counseling, and forensic medicine. This study was carried out to assess the osteometric measurements of orbits of Sri Lankans.

**Methods:** Twenty–seven bony skulls were obtained from the Department of Anatomy of the University of Sri Jayewardenepura, which were categorized into either sex according to external characteristics. Measurements were obtained using a manual vernier caliper by 2 authors independently. Each measurement was done 3 times, and the mean value was taken.

**Results:** Mean orbital index (MOI) varied from 0.84 ± 0.06 cm, with half of the sample [50% (27/54)] and 27.7% (15/54) belonging to the microsome and megasome categories, respectively. Both categories had equal sex distribution and were higher than the present literature. Microsome and megasome categories were commonly right [59.3% (16/27)] and left [66.7% (10/15)] orbits, respectively. Mean orbital width (3.83 ± 0.28 cm) was greater than mean orbital height (3.21 ± 0.16 cm). Biorbital distance and intraorbital distance had a mean value of 9.51 ± 0.47 cm and 2.09 ± 0.36 cm, respectively, with equal sex distribution. Interfronto-malar-temporal mean distance was 10.91 ± 0.41 cm with no sex difference.

**Conclusions:** Orbital parameters in the adult population provide a useful baseline and anthropometric data, which will be of clinical and surgical interest in ophthalmology, oral and maxillofacial surgery, and even neurosurgery. More extended research is needed to develop Sri Lankan reference values.

**Poster No.: EX2–189**  
**Panel No.: 189, Session 2**  
**A Novel Technique of Fornix Reformation**  
*First Author: Anjali KIRAN*  
*Co-Author(s): Parvathi HARI, Roshmi GUPTA, K Bhujang SHETTY*  
**Purpose:** To describe a new buried technique of fornix formation.

**Methods:** A prospective comparative intervention–series of 21 anophthalmic eyes undergoing fornix formation from May 2015 to June 2015. Patients were randomized alternatively into group A and B. In group A, 10 eyes underwent fornix formation in the conventional way with bolsters and external sutures, and group B had 11 patients who received the new buried technique. Five eyes were anophthalmic postenucleation for retinoblastoma, of which 2 of them did not receive radiation. Fourteen patients were posttraumatic; 2 patients had undergone enucleation for panophthalmitis and painful blind eye. One had undergone earlier failed fornix formation. Mean follow–up was 12.7 weeks (2–63 weeks).

**Results:** Eighteen patients had good outcomes with good anatomical outcomes with well formed fornices and good retention of prosthesis. In group A, 1 patient required a repeat procedure. In group B, 1 patient underwent repeat fornix formation, and another patient had shallowing of the fornix but prosthesis fitting could be done. Two patients in the conventional group
showed suture granuloma and skin excoriation below bolsters.

**Conclusions:** This new buried technique is a good alternative with better cosmesis, better maintained hygiene, reduced morbidity, and equal anatomic success.

**Poster No.:** EX2–190  
**Panel No.:** 190, Session 2  
**Predicting and Improving Upper Eyelid Blepharoplasty Outcomes**  
**First Author:** Anne **BARMETTLER**

**Purpose:** In some upper blepharoplasties, maximal skin removal may not result in desired outcomes and raising crease height can be considered. Currently, there is no method to determine the amount of skin excision and/or crease elevation required to achieve a specific outcome. This study extrapolates an equation to determine the amount of skin excision and/or lid crease elevation needed to achieve a specific eyelid margin–to–fold distance (MFD).

**Methods:** This IRB–approved, HIPAA compliant study was a prospective, nonrandomized clinical trial. Patients were included if aged 30–100 years old and undergoing upper blepharoplasty with 1 surgeon between 2012 and 2014. Exclusion criteria were thyroid eye disease, myasthenia gravis, myotonic dystrophy, pregnancy, blepharoptosis, prior eyelid surgery or trauma, concurrent brow surgery, and topical alpha agonists. The following data were collected preoperatively and at postoperative months 1 and 6: age, sex, body mass index (BMI), brow position, MFD, margin–to–crease distance (distance between eyelid margin and crease, MCD), and vertical skin distance (distance between eyelid margin and brow, VSD).

**Results:** Three hundred twenty–two eyelids of 164 patients underwent 208 excisions of skin, 26 crease elevations, and 88 combined excisions of skin and crease elevations. Age, sex, and BMI were all nonsignificant and excluded from the final model. This equation was extrapolated with regression analysis: change in MFD = 0.40 + (0.28 x change VSD) + (0.53 x change MCD) with R = 0.53.

**Conclusions:** To better predict and obtain desired upper eyelid blepharoplasty outcomes, an equation has been created.

**Poster No.:** EX2–191  
**Panel No.:** 191, Session 2  
**Analysis of Influential Factors for Globe Projection in the Han Nationality**  
**First Author:** Yinwei **LI**

**Purpose:** To analyze orbital morphological parameters that could potentially influence globe projection, which would provide reference for orbital reconstruction and make results more predictable.

**Methods:** To generate a reference database, a CT-based study was performed in 56 normal persons of Han nationality (112 orbits), among which 27 were males, aged from 21–87 years old, and 29 females, aged from 22–88 years old. The following parameters were chosen: orbital soft tissue volume (OSTV), bony orbital volume (BOV), index of OSTV/BOV, globe projection, orbital middle length (OML), angle between roof and floor (ARF), angle between medial wall and lateral wall (AML), orbital height, orbital breadth, and globe length (GL). Correlation test was performed to analyze the influential factors of globe projection.

**Results:** There were positive correlations between OSTV (r = 0.56, P < 0.001), index of OSTV/BOV (r = 0.88, P < 0.001), orbital breadth (r = 0.49, P < 0.001), orbital height (r = 0.36, P < 0.001), GL (r = 0.51, P < 0.001), and globe projection. There were negative correlations between OML and globe projection.

**Conclusions:** The most influential factor for globe projection is the index of OSTV/BOV, followed by orbital shape, especially the orbital aperture shape and OML. The shape of the orbital apex influences globe projection the least.

**Poster No.:** EX2–324  
**Panel No.:** 324, Session 2  
**Normative Anthropometric Analysis and Aesthetic Indication of Ocular Region for Chinese Young Adults**  
**First Author:** Rong **LU**  
**Co-Author(s):** Qian **LI**, Xinchun **ZHANG**, Kang **LI**, Yadan **QUAN**, Xianxian **CAI**

**Purpose:** The ocular region is of prime importance to the facial aesthetic outlook. Various anthropometric analyses for the periorcular region have been developed to ensure a pleasing postoperative appearance. However, little information exists for Chinese young adults. In this study, the authors not only analyzed the periorcular anthropometric characteristics, but more importantly, researched the most meaningful aesthetic indicators of the population.

**Methods:** This cross-sectional study was executed using 2-dimensional photogrammetry acquired from 162 Chinese young adults (79 males, 83 females) between 20 and 30 years old. Anthropometric parameters including palpebral fissure length and height, intercanthal and outercanthal width, crease height, angle of endocanthion and exocanthion, axis of palpebral fissure, palpebral fissure index, canthal index, and angular index were acquired from standardized photographs. Then, 134 volunteers (20–30 years old) gave
each photograph a score within 1–5 points to evaluate their ocular aesthetic attractiveness. The correlation between anthropometric parameters and aesthetic assessment was analyzed.

Results: A statistical difference between sex was found for palpebral fissure length and height, outercanthal width, angle of exocanthion, palpebral fissure index, and canthal index (P < 0.05), whereas no statistical difference was found for crease height between sex. Moreover, the palpebral fissure index, canthal index, crease height, and angle of exocanthion were significantly associated with aesthetic assessment.

Conclusions: Normative anthropometric parameters are fundamental to interpreting the morphology of eyes and designing plastic surgery for Chinese young adults. The parameters of palpebral fissure index, canthal index, crease height, and angle of exocanthion are strong indicators of aesthetic assessment.
**Methods:** Twelve patients aged from 3 months to 8 years who presented with accommodative ET were seen between 2004 and 2014. The presenting esotropic deviations ranged from 10 to 40 prism diopters (D). All had atropine cycloplegia for 3 days, and all revealed hyperopia ranging from +1.5 D to +8.75 D. All patients were treated with full spectacle correction. High accommodative convergence/accommodation (AC/A) ratio was also characteristic in these patients. Amblyopia was frequently noted at the beginning.

**Results:** After a variable period of full cycloplegic correction, from 1 month to 5 years, ET shifted to exotropia (XT) ranging from 8 prism diopters to 30 prism diopters. Four patients received surgical correction, and all had successful results. Vision could be corrected to 6/6 in all but 1 eye. The others were kept orthophoric or mildly exotropic by adjusting the power of glasses.

**Conclusions:** XT with a high AC/A ratio can be misdiagnosed as accommodative ET. A sufficient amount of time for observation should be allowed after full cycloplegic correction for accommodative ET. Otherwise, overcorrection may result from surgical correction for ET.

**Poster No.:** EX2–195  
**Panel No.:** 195, Session 2

**Long-Term Outcome of Lateral Rectus Advancement in Patients With Consecutive Esotropia After Bilateral Lateral Rectus Recession for Intermittent Exotropia**

*First Author: Hae Jung PAIK*

**Purpose:** To investigate the long-term outcome of lateral rectus (LR) advancement for consecutive esotropia after bilateral LR recession for intermittent exotropia.

**Methods:** The medical records of 25 patients who underwent LR advancement for consecutive esotropia after bilateral LR recession who were followed up for more than 24 months postoperatively were reviewed. Patients were divided into 3 groups: group A consisted of 9 patients with consecutive esotropia smaller than initial exotropia who underwent unilateral LR advancement; group B consisted of 9 patients with consecutive esotropia of the same magnitude as initial exotropia who underwent bilateral LR advancement; and group C consisted of 7 patients with consecutive esotropia greater than initial exotropia who underwent bilateral LR advancement. Main outcome measurements were motor and sensory outcomes and the dose–effect relationship calculated from observed overall and group changes in the angle of deviation per millimeter. Motor success was defined as alignment from orthotropia to exodeviation less than 10 prism diopters (PD) at distance. Sensory outcome was described by comparing the Titmus stereoaucuity test before and after LR advancement. Sensory success was defined as 100 seconds of arc.

**Results:** Eighteen patients (72.0%) showed satisfactory long-term motor and sensory outcomes. Seventeen (77.3%) of 22 patients showed favorable stereopsis of 100 seconds of arc or more at final observation. The long-term motor success rates of groups A, B, and C were 100%, 33.3%, and 85.7%, respectively. There was no undercorrection in any group. The average observed change in the angle of deviation was 3.6 PD/mm at the final visit in all patients.

**Conclusions:** LR advancement showed favorable motor and sensory outcomes in the majority of patients with consecutive esotropia. The surgical outcome was not favorable in group B patients with consecutive esotropia of the same magnitude as initial exotropia. These results require further investigation for verification.

**Poster No.:** EX2–196  
**Panel No.:** 196, Session 2

**Prevalence of Strabismus and Amblyopia in a Population of Elementary School Children in Southwestern China**

*First Author: Zhujun FU*

**Purpose:** To determine the prevalence of strabismus and amblyopia in elementary school children aged 6 through 13 years in southwestern China.

**Methods:** A cross-sectional study was carried out on a sample of 6383 elementary school children in a representative city (Mangshi, Dehong Prefecture, Yunnan Province) of southwestern China. A comprehensive eye examination was conducted in eligible children. The examination included orthoptic assessment (visual acuity, ocular alignment, and ocular movements) and cycloplegic autorefraction. Strabismus was defined as heterotropia at near or distance fixation. Amblyopia was defined as best corrected visual acuity (BCVA) ≤ 20/32 in 1 or both eyes without any underlying structural abnormality of the visual pathway and the presence of an amblyogenic factor.

**Results:** Of these 6383 students, 4422 were available for complete examination. The mean age of the children was 8.74 ± 1.75 years (range, 6–13 years). Strabismus was present in 103 children (2.33%), of whom 83 (80.6%) had exotropia, 9 (8.7%) had esotropia, 8 (7.7%) had vertical strabismus, and 3 (2.9%) had a history of strabismus surgery. Strabismus rates were not statistically significantly different by sex (P = 0.62) or age (P = 0.32). Amblyopia was present in 91 children (1.90%), with no statistical differences in sex (P = 0.55) or age (P = 0.39). Anisometropic and ametropic were the main types of amblyopia observed in the study.

**Conclusions:** The prevalence of strabismus and amblyopia in elementary school children in southwestern China.
China were 2.33% and 1.90%, respectively. Results of the present study indicate that the prevalence rate of strabismus was in the middle range of other studies, and the prevalence of amblyopia was relatively high compared with most other studies reported in China.

Poster No.: EX2–197  
Panel No.: 197, Session 2  
**Consecutive Exotropia After Surgery for Esotropia: Oblique Muscle Dysfunction May Play an Important Role**  
**First Author:** Hong WEI  
**Purpose:** To evaluate clinical factors associated with the onset of consecutive exotropia after esotropia surgery.  
**Methods:** A retrospective review was performed on 48 patients who developed consecutive exotropia after initial esotropia surgery between January 2006 and December 2014. The acquired oblique muscle dysfunction, surgical dosage, adduction limitation, and the development period of consecutive exotropia were evaluated. Pearson χ² test was used to analyze relevant data.  
**Results:** In this study, oblique muscle dysfunction was found in 32 (66.7%) of the 48 patients with consecutive exotropia, including 19 of superior oblique muscle overaction and 13 of inferior oblique muscle overaction. The occurrence of adduction limitation was found to be significantly higher in larger recessions of medial rectus (6 mm or more) (P = 0.018). Nineteen of our 48 patients changed to exotropia after 1 year, and 11 patients changed to exotropia after 5 years.  
**Conclusions:** The presence of acquired oblique overaction should be a warning to the surgeon as an early sign or risk factor of developing consecutive exotropia, which may require close supervision or earlier intervention. The amount of surgery could be optimized to smaller recessions. A long-term follow-up period in patients without consecutive exotropia is also advised.

Poster No.: EX2–198  
Panel No.: 198, Session 2  
**Role of Mobile Game Exercises as an Adjuvant to Amblyopia Therapy in Children**  
**First Author:** Subhash DADEYA  
**Purpose:** To study the role of mobile game exercises as a form of near visual activity along with 2 hours of occlusion in the treatment of amblyopia.  
**Methods:** A randomized control trial was carried out in 30 subjects with all grades of amblyopia (age range, 4 to 12 years). Subjects with unilateral amblyopia having visual acuity in the amblyopic eye between 6/60–6/12 and in the sound eye >6/12, 2 or more lines of intereye visual acuity difference, and using refractive correction for at least 4 weeks were included in this study. Subjects were divided into 2 groups. Group 1 received 2 hours patching per day, whereas group 2 received 2 hours patching per day plus near visual activity in the form mobile game exercises (Stereo Blocks game) twice weekly for 8 weeks. Visual acuity was recorded using lines, letters, or picture charts. Visual acuity before and after each exposure session and during the follow-up period at 1 week, 1 month, 2 months, and 3 months was noted; the amblyopic eye was tested first. Statistical analysis was done using standardized software.  
**Results:** Mean visual acuity showed gradual improvement in group 1 and group 2. The improvement in group 2 was greater than in group 1, the difference being statistically significant (P < 0.05). The improvement in visual acuity was maintained for 3 months after the cessation of therapy.  
**Conclusions:** Mobile game exercises as a form of near visual activity along with 2 hours of occlusion allowed improved visual acuity, which was maintained even after the cessation of therapy.

Poster No.: EX2–199  
Panel No.: 199, Session 2  
**Ocular Manifestations of Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder in Kowloon East Cluster in Hong Kong**  
**First Author:** Man Kit TONG  
**Co-Author(s):** Emily TANG, Kenneth LI  
**Purpose:** Ocular abnormalities were easily overlooked in this group of patients. Uncorrected refractive errors and strabismus can lead to severe amblyopia. Our aim was to highlight the ocular manifestations of autism spectrum disorders (ASD) and attention deficit hyperactivity disorder (ADHD) among children in the Kowloon East Cluster.  
**Methods:** A retrospective observational case series of 65 patients diagnosed with ASD and ADHD between the year 2009 and 2015. Visual acuity, refractive error, ocular alignment, and surgical outcome were documented.  
**Results:** A total of 75.4% of patients were found to have strabismus, whereas 7.7% of patients were diagnosed with anisometropia and 18.5% with amblyopia. Thirty-seven percent of patients with exotropia had good convergence. The most common concomitant ocular structural abnormalities were epiblepharon (10.8%). Children with ASD more commonly had exotropia (27.7%), whereas those with ADHD were commonly found to have esotropia (12.3%) (P = 0.116). Twenty percent of cases received strabismus operation.
Panel No.: 325, Session 2

Characteristics of Premature Infants With Transient Corneal Haze

First Author: Yu-hung Lai
Co-Author(s): Hsiu-lin Chen

Purpose: Transient cloudy cornea in premature infants has been reported but not well studied. The characteristics of infants with transient cloudy cornea are also unknown. The purpose of this study was to investigate infants with transient cloudy cornea.

Methods: We performed a retrospective review of premature infants with transient cloudy cornea. Clinical characteristics were recorded. The cloudy cornea was subjectively graded as grade 0, clear; grade 1, delayed cloudy; grade 2, mild to moderately cloudy; and grade 3, severe and obscuring retinal examination.

Results: In total, 39 patients were identified. Mean gestational age was 28.9 weeks and mean birth weight was 1127.5 g. Male-to-female ratio was 1:0.7. Mean days on oxygen was 48.5 days. A total of 20.5% of patients experienced stage 3 retinopathy of prematurity (ROP), and 37.5% of the stage 3 ROP patients required laser treatment.

Conclusions: A significant portion of the infants with transient cloudy cornea experienced severe ROP, which may interfere with screening, examination, and/or treatment.

Panel No.: EX2–325

Ocular Disorders and Visual Dysfunction Among Children in Special Schools in Taipei

First Author: Ting-jia Chang

Purpose: The high prevalence of ocular disorders and visual dysfunction among children with special educational needs (SEN) is well reported, and guidelines for vision screening are in place. However, recent research has suggested that eye care for such children is neglected. We aimed to set out a model of school-based eye care services and to evaluate the current status of vision screening and eye care in special schools in Taipei.

Methods: A questionnaire on current vision screening practices and comprehensive eye examinations were conducted with 800 students of 4 special schools in Tai-
Panel No.: 202, Session 2

Causes of Blindness in Children at a Blind School

First Author: Alampur Goud

Purpose: The purpose of this study was to create a profile of the causes of blindness in children.

Methods: This study was undertaken at a nongovernmental organization (NGO)–run blind school in Hyderabad. The children were admitted from various parts of the country, representing all sections of society. Five hundred fifty children were examined for visual impairment, aged from 4 to 18 years. Initial screening was done to separate the totally blind from those with low vision. Detailed examinations were done.

Results: About 44% of the children were totally blind and 56% had low vision. Most of the blind children were born blind or become blind before their fifth birthday. Blindness due to vitamin A deficiency and measles had decreased, but survival of premature children had increased, resulting in an increase in childhood blindness. It was observed that 44% of childhood blindness was due to consanguineous marriages.

Conclusions: A total of 44% of the childhood blindness cases were due to consanguineous marriages, which is more common in India. This was a big eye opener for the community.

Panel No.: 203, Session 2

Influence of Flap Shape and Hinge Angle on Opaque Bubble Layer Formation in Femtosecond LASIK Surgery

First Author: Hung Yuan Lin
Co-Author(s): Yi Ting Fang, Chi-chin Sun

Purpose: To evaluate the effects of different flap shapes and hinge angles on opaque bubble layer (OBL) formation by using a femtosecond laser during flap creation in LASIK surgery.

Methods: A total of 73 patients who had undergone femtosecond laser–assisted LASIK surgery for myopic astigmatism were evaluated in a retrospective study to compare the difference between different flap shapes and hinge angles on opaque bubble layer (OBL) formation. The surgical procedures were videotaped, and the patterns and sizes of the OBLs noted during operations were analyzed. Preoperative and postoperative data including patient demographics, refractive status, keratometry, central corneal thickness, and intraoperative data (eg, flap size and pocket parameters) were recorded.

Results: A total of 139 eyes were included in this study. The eyes were divided into 4 groups according to the different corneal flap shapes (elliptical versus round) and hinge angles (50 degrees versus 60 degrees). The preoperative demographic data, mean spherical errors, cylindrical power, and central corneal thickness were not significantly different among groups. One hundred seven eyes (77%) developed an OBL covering a mean area of 13.8% ± 12.6% in all cases. The covered area of the OBL was significantly less in the group with an elliptical shape flap and 60-degree hinge angle ($P < 0.05$ for all comparisons).

Conclusions: An oval–shaped flap with a larger hinge angle tended to develop less OBL during femtosecond laser–assisted LASIK surgery.

Panel No.: 204, Session 2

Analysis of Effects of Laser Anterior Ciliary Excision on Dysfunctional Lens Syndrome in Presbyopic Eyes Using Ray-Tracing Wavefront Analysis

First Author: Annmarie Hipsley
Co-Author(s): Karoline Rocha, David Hui-kang MA, Daniel Goldberg

Purpose: To evaluate serial measurements of higher-order aberrations and depth of focus using ray-tracing aberrometry findings analyzed along with effects of the laser anterior ciliary excision (LaserACE) procedure on dysfunctional lens syndrome (DLS).
**Methods:** In a single arm clinical trial, a 2.94 µm Er:YAG laser was used to perform microablutions in the sclera in 3 critical anatomical zones to reduce ocular rigidity and restore natural accommodative function. A ray–tracing aberrometer was used to objectively measure 20 eyes of 10 patients preoperatively and at 1 week, 1 month, and 3 months after LaserACE treatment. The modular transfer function (MTF) of the internal optics and the dysfunctional lens index (DLI) were evaluated. Near (40 cm) and intermediate (60 cm) visual acuity, accommodation in diopters (D) for each eye, and changes in defocus, spherical aberration (SA), coma, trefoil, level of opacity, and DLI were recorded.

**Results:** The visual acuity improved in all subjects from 2–4 lines. There was no statistical change in UDVA or CDVA ($P < 0.01$). The accommodative range increased 1.25–1.5 D ($P < 0.034$) after LaserACE treatment. Changes in SA, coma, trefoil, defocus, and accommodation were noted. LaserACE showed a positive effect on DLI and MTF of the internal optics.

**Conclusions:** Ray–tracing technology can objectively measure dynamic accommodation and specific lens behavior. Changes after the LaserACE procedure were seen in both spherical aberration and depth of focus. Pseudoaccommodation from changes in spherical aberration and increased depth of focus may contribute to near vision functionality. LaserACE may prove a valuable therapy for patients who have dysfunctional lens syndrome. Further, ray–tracing wavefront analysis changes after the LaserACE procedure may explain some effects of the procedure.

**Poster No.:** EX2–205  
**Panel No.:** 205, Session 2

**Comparison of Contrast Sensitivity Loss Between Intrastromal Femtosecond Laser (INTRACOR) and LASIK**

*First Author: Elsa MAI  
Co-Authors: Chao-kai CHANG*

**Purpose:** To compare the loss of contrast sensitivity (CS) function in intrastromal femtosecond laser presbyopia procedure (INTRACOR) with conventional LASIK procedures.

**Methods:** A retrospective case review in a refractive center. Patients were recruited from a refractive surgery center for both INTRACOR and conventional LASIK. The INTRACOR procedure (Technolas 520F femtosecond laser; Technolas Perfect Vision GmbH, Munich, Germany) was performed on 8 eyes for a period of 6 months. Conventional LASIK was performed for 40 eyes in a period of 3 months overlapping the INTRACOR procedures. Preoperative evaluation was done with postoperative follow-up at 1 day, 1 week, 1 month, 3 months, 6 months, 1 year, and 3 years. Evaluation for contrast sensitivity function was done with CSV–1000E Vector Vision with and without glare stimulus, before and after the procedure at 1 week, 1 month, 3 months, 1 year, and 3 years and data was taken. A comparison of contrast sensitivity threshold drop in 4 spatial frequencies (SFs; 3 cpd, 6 cpd, 12 cpd, 18 cpd) between LASIK and INTRACOR was done. Statistical calculation was performed using Wilcoxon signed–rank test and Student t test.

**Results:** Comparing pre- and postoperative CS threshold data after INTRACOR, CS threshold showed a significant drop in both glare and nonglare conditions; the drop was seen in all 4 SFs, but was significant for SF of 12 cpd in the glare condition. In the nonglare condition, CS drop was significant at SF 6, 12, and 18 cpd. For LASIK procedures, the CS drop was most significant at 12 cpd SF. Comparing between INTRACOR and LASIK, a more severe drop of CS threshold was noted in INTRACOR patients.

**Conclusions:** Traditional LASIK procedures have gained popularity among the younger generation and have been used for hyperopia and presbyopia in older patients. The INTRACOR procedure, with the advantage of intrastromal laser treatment, can produce a gain of near vision for presbyopic patients but also introduces a high loss of CS plus worsening of vision quality compared with conventional LASIK procedures. As both surgeries produce a loss in CSF, especially in low light glare conditions, presurgical patient selection and informed consent should be given with specific regards to night driving and glare conditions.

**Poster No.:** EX2–206  
**Panel No.:** 206, Session 2

**Comparative Evaluation of Residual Astigmatism Between Elliptical and Circular Flap Creation in Femtosecond LASIK for Compound Myopic Astigmatism**

*First Author: Ya-jung CHUANG  
Co-Authors: Hung Yuan LIN, Pi-jung LIN*

**Purpose:** To compare the residual astigmatism outcome of 2 flap designs (temporal hinge with elliptical shape versus circular shape) in eyes using femtosecond laser–assisted LASIK for the correction of compound myopic astigmatism.

**Methods:** This retrospective study compared residual astigmatism outcomes between 2 groups of eyes with compound myopic astigmatism with the Intralase femtosecond laser (Abbott Medical Optic, Inc) and EX–500 excimer laser (Alcon Laboratories, Inc). These eyes were divided into group I (elliptical flap) and group II (circular flap). Elliptical flaps were created using 4% over-sizing of the horizontal diameter of the LASIK flap. The residual refractive cylinder was classified into
with-the-rule (0°–30°, 151°–180°), oblique astigmatism (31°–60°, 121°–150°), and against-the-rule (61°–120°). The rest of the surgical procedure remained the same in all the eyes.

**Results:** One hundred seventy-three eyes of 88 patients were reviewed. At 1 month postoperatively, refractive cylinder magnitudes were reduced significantly. The mean residual refractive cylinders were -0.19 D ± 0.29 D (with-the-rule), -0.10 D ± 0.27 D (oblique), and -0.50 D ± 0.45 D (against-the-rule) in group I (elliptical flap). The mean residual refractive cylinders were -0.26 D ± 0.29 D (with-the-rule), -0.55 D ± 0.97 D (oblique), and -0.23 D ± 0.45 D (against-the-rule) in group II (circular flap). Residual refractive cylinder was statistically significantly less in group I, especially in with-the-rule and oblique meridian.

**Conclusions:** In our study, femtosecond laser-assisted LASIK with an elliptical temporal hinge flap creation for treating compound myopic astigmatism resulted in significantly reduced refractive cylinder magnitude than a circular flap, especially in with-the-rule and oblique astigmatism correction. That might be because of the enlargement of the stromal bed along the with-the-rule and oblique meridian. In with-the-rule astigmatism, excimer ablation often extends beyond the circular flap’s margin horizontally, which may increase the risks of residual refractive error, irregular astigmatism, and greater HOAs.

**Poster No.:** EX2–207  
**Panel No.:** 207, Session 2  
**A Novel Technique to Improve Eye-Tracking Success in Femtosecond Laser—Assisted LASIK With WaveLight EX500 Excimer Laser**  
**First Author:** Han Chieh YU  
**Co-Author(s):** Hung Yuan LIN, Fengju ZHANG, Pi-jung LIN  
**Purpose:** To present a novel technique to improve the success of eye tracking in femtosecond laser—assisted LASIK with WaveLight EX500 excimer laser.

**Methods:** This retrospective case series comprised 104 eyes of 58 patients with myopia or myopic astigmatism who had LASIK with IntraLase 150–kHz femtosecond and WaveLight EX500 excimer laser. When the opaque bubble layer (OBL) near hinge interfered with eye tracking, using a flap lifter to cover the OBL along the limbus facilitated eye tracking. Preoperative and postoperative uncorrected visual acuity (UCVA) and astigmatism were analyzed.

**Results:** Eye tracking was successful in 102 (98%) eyes. The mean preoperative cylinder refraction was -0.90 diopters (D) ± 0.76 (SD). Three months postoperatively, cylinder refraction was -0.27 ± 0.30 D. Ninety-five (91%) eyes had cylinder within ±0.5 D, and 102 (98%) eyes within ±1.0 D. One hundred two (98%) eyes had UCVA 20/20 or better, and 104 eyes (100%) 20/40 or better.

**Conclusions:** Covering OBL along the limbus near hinge with a flap lifter can help achieve a high success rate of eye tracking. LASIK resulted in good efficacy and astigmatism improvement.

**Poster No.:** EX2–208  
**Panel No.:** 208, Session 2  
**The Effect of Short-Term Atropine on Higher-Order Aberrations in School-Age Children**  
**First Author:** Yih-shiu KUO  
**Co-Author(s):** May-yung YEN, Pei-yu LIN, Catherine LIU  
**Purpose:** To investigate the short-term effect of 0.25% atropine on higher-order aberrations (HOA) in school-age children.

**Methods:** Thirty eyes of children (11 boys and 19 girls) aged 5–15 years visiting our ophthalmology clinic for refractive status evaluation were included. Topical 0.25% atropine eye drops were administered at home for 3 consecutive nights. Data of autorefraction, spherical aberration (SA), and total root mean square (RMS) of HOA by iTrace aberrometer before and after medication were collected. The pupil size was corrected to measure the impact of cyclopellidgia on internal SA.

**Results:** Mean age of participants was 9 ± 2.5 years old, with an average cycloplegic spherical equivalent of -2.12 ± 1.99 D. Refractive error and measured total RMS of HOA (secondary astigmatism, trefoil, and coma aberrations) were significantly increased after atropine use. SA showed no significant change. After correction of pupil size, there was significant change of total and internal SA. Differences in corneal aberrations were insignificant.

**Conclusions:** Short term cyclopellidgia with 0.25% atropine significantly increases HOAs in school-age children. After correction of pupil size, cyclopellidgia with atropine has a significantly negative effect on SA.

**Poster No.:** EX2–209  
**Panel No.:** 209, Session 2  
**Effect of Opening Incision on Astigmatic Correction After Small Incision Lenticule Extraction for Low Astigmatism**  
**First Author:** Alex Lap Ki NG  
**Co-Author(s):** Tommy CHAN, George CHENG, Zheng WANG, Victor WOO, Vishal JHANJI  
**Purpose:** To compare the visual and refractive outcomes between 2 different incisional sites in small incision lenticule extraction (SMILE) for low myopic astigmatism.
Methods: A retrospective analysis of consecutive bilateral SMILE for low myopic astigmatism was performed. All cases were operated on by the same surgeon and had emmetropia as the target refraction. Procedures for both eyes were identical apart from the location of the opening incision. The incision was set on the temporal side for the right eye (group 1), whereas a superior incision was set for the left eye (group 2). Outcome analysis was performed at 3 months postoperatively. Astigmatic correction was analyzed using vector analysis of Alpins.

Results: Twenty-nine patients with a mean age of 35.0 ± 9.6 years were included. Preoperative visual and refractive parameters were comparable between the two groups (P > 0.250). At 3 months, the logMAR uncorrected distance visual acuity was 0.074 ± 0.090 in group 1 and 0.084 ± 0.130 in group 2 (P = 0.861). No difference was found in the postoperative manifest spherical equivalent (P = 0.501) and manifest cylinder (P = 0.178) between the two groups. The efficacy index was 0.85 ± 0.16 in group 1 and 0.85 ± 0.20 in group 2 (P = 0.828). Using vector analysis, astigmatic correction was not significantly affected by the location of opening incisions. The flattening effect was similar (flattening index: 0.75 to 0.85), but there was slight overcorrection (correction index: 1.05 to 1.17).

Conclusions: We demonstrated that both SMILE procedures, with temporal or superior opening incisions, offered no difference in visual and refractive outcomes.

Poster No.: EX2–210
Panel No.: 210, Session 2

Role of Phakic Implantable Posterior Chamber Contact Lens in Visual Rehabilitation of Children With High Refractive Errors—Five-Year Follow-Up

First Author: Naqaish SADIQ

Purpose: To evaluate anatomical and functional outcome of posterior chamber phakic implantable contact lens (Staar Surgical Visian ICL) in visual rehabilitation of children with high refractive errors.

Methods: Nine eyes of 8 children, aged 5 to 15 years, were treated with Staar Surgical Visian ICL. These children had high myopia, anisometropia, and amblyopia and did not improve with conventional therapy with spectacles and contact lenses. One child had anisotropic hypermetropia with mixed astigmatism. These cases were followed up for more than 5 years (to date).

Results: No ocular complications in terms of inflammatory reaction, cataract, or secondary glaucoma was seen. Marked improvement in visual acuity was seen, which created a high level of satisfaction in parents and tremendous improvement in quality of life of the children.

Conclusions: Implantable contact lens (Staar Surgical Visian ICL) seems to play a very important role in the visual rehabilitation of children with high refractive errors.

Poster No.: EX2–211
Panel No.: 211, Session 2

Scleral Contact Lens Management of Post-LASIK Complications

First Author: Hsaio-sang CHU
Co-Author(s): Grace TSENG, Wei Li CHEN, Fung-rong HU

Purpose: To report the treatment results of scleral contact lens fitting for post-LASIK complications.

Methods: This was a retrospective, interventional study that comprised the patients referred for management of post–LASIK complications to the contact lens clinic at National Taiwan University Hospital from July 2011 to July 2015. Visual acuity and higher-order aberrations (HOA) were compared before and after lens wearing.

Results: A total of 11 patients (15 eyes) were evaluated. One patient requested glasses prescription only, and 1 patient refused any further visual correction. The other 9 patients (11 eyes) were fitted with scleral contact lenses (NormalEyes 15.5, Paragon Vision Science). Among the scleral contact lenses–fitted patients, 7 patients (8 eyes, 72%) were satisfied with the visual results, including 6 eyes with post–LASIK ectasia, 1 eye with post–LASIK glare, and 1 eye with post–LASIK haze. The corrected visual acuity improved from logMAR 0.39 ± 0.33 to logMAR 0.06 ± 0.15. The HOAs reduced from 1.04 ± 0.96 to 0.22 ± 0.44 RMS, with synchronous reduction in spherical aberration, coma, and trefoil. Two patients (3 eyes, 28%), including 2 eyes with post–LASIK HOA and 1 eye with post–LASIK ectasia, refused contact lens fitting although their visual acuity improved from logMAR 0.38 ± 0.13 to 0.07 ± 0.13 after trial lens wear. The reason for not using contact lenses was subjectively unsatisfied visual quality.

Conclusions: Scleral contact lenses offered good visual correction for most patients suffering from post–LASIK complications. Both visual acuity and HOAs improved significantly after lens wear.

Poster No.: EX2–212
Panel No.: 212, Session 2

Factors Influencing Intraocular Pressure After Laser In Situ Keratomileusis With Flaps Created by Femtosecond Laser or Mechanical Microkeratome

First Author: Meng-Yin LIN
Co-Author(s): Yun-dun SHEN, I-jong WANG

Purpose: To describe factors that influence the mea-
Sured intraocular pressure (IOP) change and to develop a predictive model after myopic laser in situ keratomileusis (LASIK) with a femtosecond (FS) laser or a microkeratome (MK).

**Methods:** We retrospectively reviewed preoperative, intraoperative, and 6–month postoperative medical records for 2485 eyes of 1309 patients who underwent LASIK with FS or MK for myopia and myopic astigmatism. Data were extracted, such as preoperative age, sex, IOP, manifest spherical equivalent (MSE), central corneal keratometry, central corneal thickness (CCT), intended flap thickness, and postoperative IOP (post-IOP) at 1, 6, and 12 months. Linear mixed model (LMM) and multivariate linear regression method (MLR) were used for data analysis.

**Results:** In both groups, the postIOP at 1 week was significantly higher than the postIOP at 1, 6, and 12 months (all \( P < 0.001 \)). In both models, the preoperative CCT, MSE, and IOP had significant effects on predicting postIOP in the FS and MK groups (all \( P < 0.0001 \)). The intended flap thickness was also a significant predictor only in the FS laser group (\( P < 0.0001 \)) in both models. In the FS group, LMM and MLR could explain 93.53% and 44.29% of the variation in postIOP (\( R^2 = 0.9353 \) and 0.4429, respectively). In the MK group, LMM and MLR could explain 91.79% and 50.27% of the variation in postIOP (\( R^2 = 0.9179 \) and 0.5027, respectively).

**Conclusions:** The best model for IOP prediction was the LMM. Significant predictors included preoperative CCT, MSE, IOP, and intended flap thickness in the FS group.

**Poster No.:** EX2–214
**Panel No.:** 214, Session 2

**Emmetrope Achievement Time After Wavefront-Guided Photorefractive Keratectomy With Adjuvant Mitomycin C for School Proposing Candidates With Low and Moderate Myopia**

**First Author:** Suhardjo **PRAWIRORANU**
**Co-Author(s):** Agung **NUGROHO**, Sri **WIDI ASTUTI**

**Purpose:** To present the emmetrope achievement time of school proposing candidates who underwent photorefractive keratectomy.

**Methods:** This was a cross-sectional study that included 177 patients (155 male and 22 female) with 313 eyes (159 right eyes and 154 left eyes) who underwent photorefractive keratectomy. Follow-up time to reach the visual target was evaluated. Follow-up was scheduled at month 1, 2, and 3.

**Results:** There were 227 eyes with low myopia and 86 with moderate myopia. At 1-month follow-up, emmetrope refraction was achieved by 81.49% in the low myopia group and 67.44% in the moderate myopia group. At 2 months, emmetrope refraction was achieved by 94.71% in the low myopia group and 75.58% in the moderate myopia group. At 3-month follow-up, emmetrope refraction was achieved by 99.12% in the low myopia group and 88.37% in the moderate myopia group.

**Conclusions:** In this study, eyes with low myopia achieved emmetropia faster than those with moderate myopia. Emmetrope achievement time after photorefractive keratectomy was measurable and satisfactory. After 2 months, 95% of the low myopia group gained their best visual acuity.

**Poster No.:** EX2–215
**Panel No.:** 215, Session 2
Achieving the Perfection of 500 Hz With 400 Hz LASIK Laser System Using Verion Image Guided System

First Author: Bharti KASHYAP
Co-Author(s): Birendra KASHYAP, Bibhuti KASHYAP

Purpose: This study evaluated results after Allegretto 400 Hz Eye Q LASIK using the Verion Image Guided System as a reference marker in the treatment of myopic astigmatism.

Methods: This was a retrospective, comparative case series of 104 eyes of 54 patients from the period of June 2014 to October 2014. The patients were examined using the Verion Image Guided System in an upright seated position. The Verion reference unit captured minute details of the eye, and these images were used as reference. The cornea was marked under the microscope with a 30-G needle using a Verion digital marker, which projects the image captured by the Verion reference unit regenerated using tryphan blue. When the patient is lying down, the projected cross line is aligned with the reference mark before photo ablation by adjusting the patient’s head.

Results: Best corrected visual acuity (BCVA) showed improvement in the patients who underwent Allegretto 400 Hz LASIK assisted by Verion Image Guided System. Postoperative subjective and objective perception of quality of vision were found to be optimum.

Conclusions: We found striking similarities in the visual outcomes between the patients who underwent Verion-assisted 400 Hz and 500 Hz LASIK. With recent progress for zero error in toric cataract surgery, we applied the same principle of the Verion Reference Image Guided System and cross line projector for 400 Hz LASIK to compensate for the cyclorotation deviation of the 500 Hz iris registration system and achieved better results equivalent to those of 500 Hz.

Poster No.: EX2–216
Panel No.: 217, Session 2

Comparison of Visual Acuity With Glare After LASIK Between Femtosecond Laser and Microkeratome Flap Creation in Myopic Patients

First Author: Sesy WARSITA
Co-Author(s): Feti KARFIATI

Purpose: The aim of this study was to assess visual acuity with glare in the femtosecond laser and microkeratome flap groups.

Methods: This was a cross-sectional observational analytic study. Patients with mild to moderate myopia who underwent LASIK procedures in the LASIK Center at Cicendo Eye Hospital were divided into the femtosecond laser flap group and the microkeratome flap group. Each group consisted of 22 subjects that met the inclusion criteria. Glare was assessed with an Early Treatment Diabetic Retinopathy Study (ETDRS) chart in CSV–1000 before LASIK and 1 month after LASIK. Statistical analysis between the 2 groups was calculated with Mann–Whitney U test.

Results: Visual acuity with glare (logMAR) 1 month after LASIK treatment was better in the femtosecond laser flap group (0.024 ± 0.029) compared with the microkeratome flap group (0.054 ± 0.038) [P = 0.004; P < 0.05; 95% confidence interval (CI)].

Conclusions: Visual acuity with glare in the femtosecond flap group was better than in the microkeratome flap group.
**Combined Femtosecond Laser-Assisted Intracorneal Ring Implantation and Cross-Linking for Keratoconus Management**

*First Author: Osama IBRAHIM  
Co-Author(s): Moones ABDALLA*

**Purpose:** To evaluate the safety, efficacy, and corneal biomechanics change of combined intracorneal rings (ICR) implanted using femtosecond laser and cross-linking in keratoconus patients.

**Methods:** A prospective noncomparative case series. Patients were treated with the same setting ICR implanted by femtosecond laser and 5 minutes of epi-off cross-linking. Uncorrected visual acuity (UCVA), best spectacle corrected visual acuity (BSCVA), corneal curvature (K reading), corneal hysteresis (CH), and corneal resistance factor (CRF) were measured in all cases before surgery and after 3 months, 6 months, and 1 year of follow-up in 1182 eyes of 713 patients with moderate keratoconus.

**Results:** Mean preoperative UCVA, BSCVA, and K reading were 0.2, 0.5, and 53, respectively. Mean CH and CRF were 6.7 and 7.1, respectively.

**Conclusions:** ICR implanted using femtosecond laser and cross-linking in keratoconus patients is a safe and effective procedure with long-term stability and has a good impact on corneal biomechanics.

**Comparison of Astigmatic Correction After Wavefront-Guided Laser In Situ Keratomileusis and Small Incision Lenticule Extraction for Moderate to High Myopic Astigmatism**

*First Author: Jiamei ZHANG  
Co-Author(s): Yan WANG*

**Purpose:** To evaluate and compare the refractive outcomes for the correction of moderate to high astigmatism after wavefront-guided laser in situ keratomileusis (LASIK) and small incision lenticule extraction (SMILE).

**Methods:** This comparative study enrolled 22 eyes with wavefront-guided LASIK and 42 eyes with SMILE. The preoperative cylindrical diopeters (D) were ≤−2.25 D in the moderate and >−2.25 D in the high astigmatism subgroups. The refractive results were analyzed based on the Alpins vector method, including the correction index (CI), index of success (IOS), magnitude of error (MofE), angle of error (AofE), and the flattening index (FI). All subjects completed 3 months of follow-up.

**Results:** The postoperative astigmatism was −0.42 ± 0.45 D and −0.38 ± 0.42 D after wavefront-guided LASIK and SMILE, respectively. No significant differences were found in target induced astigmatism (TIA), surgically induced astigmatism (SIA), and difference vector (DV) between the 2 groups. However, the average value of AofE was −1.00 ± 3.16 in wavefront-guided LASIK and 1.22 ± 3.85 in SMILE, which was statistically significant (P < 0.05). The absolute value of AofE was statistically correlated with DV and IOS in both groups (P < 0.05). For the moderate astigmatism group, CI was 1.04 ± 0.15 in wavefront-guided LASIK and 0.88 ± 0.15 in SMILE (P < 0.05). However, for the high astigmatism group, CI was 0.87 ± 0.13 in wavefront-guided LASIK and 0.88 ± 0.12 in SMILE (P = 0.889).

**Conclusions:** Both procedures showed preferable outcomes in the correction of astigmatism. However, there was undercorrection both after SMILE and wavefront-guided LASIK with high astigmatism. The inaccurate correction of astigmatic axis was supposed to be one of the potential factors for undercorrection.
High Myopic Patient Satisfaction After Wearing Reverse Geometry Lenses for Seven Years

First Author: Lucia SUTEDJIA

Purpose: To describe the long-term satisfaction of a high myopic patient wearing reverse geometry (RG) lenses for orthokeratology.

Methods: A case report of a 22-year-old girl who has worn RG lenses since March 8, 2008. Comprehensive eye examination was performed at each visit. Initial refraction was $-8.00 \text{ D}$ in the right eye and $-10.00 \text{ D}$ in the left. K readings were taken in the right ($K = 7.35$, $k = 6.85$) and left eyes ($K = 7.40$, $k = 6.80$). Different OrthoFocus (OF) lenses were worn first in both eyes with base curve (BC) of 8.13 and RF 4.00 for 2 weeks. The second lenses were BC 8.54 and RF 6.00 in the right eye, with BC 8.54 and RF 5.50 in the left for 2 weeks. The third lenses were BC 8.65 and RF 6.50 in the right eye with the fitting curve (FC) 0.1 mm flatter; the patient has worn these until the present. The patient was advised to eat nutritious food, spend at least 2 hours outdoors, and decrease the amount of near work.

Results: In the retainer stage, the best unaided visual acuity (UVA) in the morning was 6/6 in the right eye and 6/9–6.7 in the left. In the evening around 16:00 pm, UVA was 6/7–6/9 (corr, $-1.50 \text{ D}$) in the right eye and 6/20 (corr, $-3.50 \text{ D}$) in the left. The lens parameters remained stable until now.

Conclusions: A high myopic patient benefited from wearing RG lenses, with better satisfaction and stable visual acuity. In the morning, she does not necessarily use glasses, and in the evening sometimes she needs her thinner glasses. Good UVA provides significant advantages to daily activities.

Long-Term Alterations of Pachymetry and Topography After Corneal Cross-Linking Treatment for Keratoconus

First Author: Sonu GOEL
Co-Author(s): Sonai MUKHERJEE

Purpose: To determine long-term alterations of corneal thickness and topographic outcomes after corneal cross-linking treatment (CXL) for keratoconus.

Methods: This was a retrospective case series of 46 eyes with progressive keratoconus, ranging in age from 15–26 years. All eyes underwent CXL in accordance with the standard protocol (Dresden) for treatment of ectatic corneal disorder between August 2011 and September 2012. Pachymetric and topographic outcomes were evaluated preoperatively and at 1, 3, 6, 12, 18, and 24 months postoperatively.

Results: A statistically significant decline in corneal pachymetric values (at the thinnest location) when compared with preoperative values ($476 \pm 42.78 \mu m$) was demonstrated at 1, 3, 6, 12, 18, and 24 months postoperatively. Steep and flat keratometric values decreased along with keratoconus during follow-up, signifying corneal stability after CXL. No statistically significant differences between preoperative and postoperative intervals were found ($P > 0.05$ for all values for all time points).

Conclusions: Corneal pachymetric values reduce significantly up to 24 months after treatment. No signif-
icant changes concerning topographic outcomes was demonstrated after CXL, indicating stability of parameters.

**Poster No.: EX2–224**  
**Panel No.: 224, Session 2**  
**A Novel Superior Classification System for Keratoconus: The VITAL Individualized Scoring System**  
*First Author: Cheng-Jen CHIU*

**Purpose:** To describe a novel individualized approach of classifying keratoconus based on 10 clinical parameters.

**Methods:** We graded each clinical parameter separately based on the philosophy of the world-renowned TNM cancer classification. Each eye of a single patient was graded according to 1, age; 2, eye dominance; 3, best spectacle corrected visual acuity (BSCVA); 4, wavefront-driven adaptive optics visual acuity (AOVA); 5, topography stability; 6, presence of a centralized opacity/subepithelial scar; 7, minimum pachymetry reading; 8, theoretical ablation volume that would regularize the surface toward emmetropia for a total ablation diameter of 8.3 mm (ORK–CAM of the Amaris–Schwind Excimer Platform was used for calculation); 9, anterior chamber (AC) depth; and 10, axial length.

**Results:** We derived an easy mnemonic device to individualize classification of the keratoconic eye called the VITAL system. “Vi” (vision) is graded from 1–4 and entails 2 subscripts, the first for BSCVA and the second for AOVA. “T” (thickness) is graded from 1–4 and entails 2 subscripts, the first for topographical stability (s for stable, p for progressing, u for unknown) and the second for presence of a centralized scar (o for opacity). “A” (ablation) is graded from 1–4 according to the theoretical volume needed to regularize the surface toward emmetropia. “L” (length) is graded from 1–4 and entails 2 subscripts, the first for AC depth and the second for axial length.

**Conclusions:** VITAL classification accurately describes 10 very important clinical parameters pertinent to contemporary treatment (wavefront guided CXL PRK, corneal rings, DALK, phakic IOLs) and future surgical options (AMART, Athens Minimal Additive Refractive Treatment, proposed by our group) for keratoconus.

**Poster No.: EX2–225**  
**Panel No.: 225, Session 2**  
**1-Year Results of Refractive Lenticule Extraction SMILE Compared With Femto-LASIK in Patients With Low Myopia From SEQ -1.0 to -3.0 D**  
*First Author: Hakan KAYMAK*

**Co-Author(s): Detlev BREYER, Karsten KLABE, Philipp HAGEN, Florian KRETZ, Gerd AUUFFARTH**

**Purpose:** The aim of this study was to compare whether patients with low myopic eyes (SEQ from -1.0 D to -3.0 D) and the wish for painless, flap-free refractive surgery could be treated with refractive lenticule extraction (ReLEx) SMILE as precisely as with Femto-LASIK.

**Methods:** The results of 200 eyes in the ReLEx SMILE group (cap thickness ranging from 130–150 μm) and 200 eyes treated with Femto–LASIK (flap thickness, 100 μm) in the control group were evaluated. Follow-up was performed between 1 day and up to 3 years after treatment. For clinical evaluation of visual acuity at far, subjective refraction and wavefront analysis were compared.

**Results:** Concerning the safety, predictability, and efficiency of each method, we could not detect significant differences. Both groups showed a mean UDVA of <0.05 logMAR 1 year after surgery. Visual recovery in the ReLEx SMILE group was as fast as in the Femto–LASIK group. There were significantly lower total higher order aberrations in the ReLEx SMILE group. Furthermore, fewer dry eyes along with better patient comfort and less pain sensation were observed.

**Conclusions:** Visual recovery and results were achieved without any deficits in comfort, safety, effectiveness, and predictability with the ReLEx SMILE procedure. No dry eyes were observed in the ReLEx SMILE group compared with the Femto–LASIK group. Therefore, we clearly favor the ReLEx SMILE technique.

**Poster No.: EX2–226**  
**Panel No.: 226, Session 2**  
**Ocular Aberrations After Implantable Collamer Lens With Central Hole in Myopia**  
*First Author: Murugesan VANATHI*  
*Co-Author(s): Shikha YADAV, Shiva GANTYALA, Noopur GUPTA, Radhika TANDON*

**Purpose:** To evaluate the changes in higher order aberrations (HOAs) after implantation of implantable collamer lenses (ICLs) with central hole (STAAR Surgical) in myopic patients.

**Methods:** This study included 14 eyes of 7 patients with myopia. ICLs with Centraflow were implanted with 3.2 clear corneal incision in both eyes of all patients. Ocular higher order aberrations (coma, trefoil, spherical aberrations, total HOAs) were measured using Tracey Visual Function Analyser (iTrace) before and 3 months after surgery.

**Results:** Mean age of the study patients was 23.14 ± 3.00 (range, 21–29) with female predominance (M:F = 1:6). Mean refractive spherical equivalent was −9.79 ±
3.54 diopters (D) (range, -4.75 to -14.75). Mean pupil diameter was 5.02 ± 0.66 mm and 4.93 ± 0.71 before and 3 months after surgery, respectively. Changes were noted in ocular higher order aberrations 3 months after surgery compared with before surgery. The changes in coma, trefoil, and total HOAs were statistically significant (P = 0.002, P = 0.001, and P = 0.002, respectively). Change in spherical aberration was not statistically significant (P = 0.63).

**Conclusions:** Changes in higher order aberrations are noted after ICL with Centraflow implantation.

**Poster No.:** EX2-227  
**Panel No.:** 227, Session 2

**Ultrasound Biomicroscopy Observation of Position Changes in V4c Versus V4 Posterior Chamber Phakic Lenses**

**First Author:** Ye SHEN  
**Co-Author(s):** Xinfang CAO

**Purpose:** To compare position changes in eyes implanted with V4c and V4 implantable collamer lenses (ICLs) using ultrasound biomicroscopy (UBM).

**Methods:** Sixty eyes of 30 patients implanted with V4c ICLs and 62 eyes of 31 patients implanted with V4 ICLs were enrolled and analyzed. Endothelium–anterior pIOL distance, central vault, and peripheral vault were evaluated using UBM postoperatively.

**Results:** No significant differences were noted in endothelium–anterior pIOL distance, central vault, or peripheral vault between the 2 groups.

**Conclusions:** The ICL with the CentraFLOW design seems to provide similar results compared with its predecessors.

**Poster No.:** EX2-228  
**Panel No.:** 228, Session 2

**Performance of Daily Disposable Contact Lenses in Symptomatic Wearers**

**First Author:** Jami KERN  
**Co-Author(s):** Cecile MAISSA, Stefan SCHWARZ FAAO

**Purpose:** To evaluate the performance of delefilcon A water gradient and narafilcon A silicone hydrogel daily disposable lenses in current soft contact lens (SCL) wearers symptomatic for lens discomfort.

**Methods:** In a multicenter, crossover study, patients (n = 117) wore the test (T) (delefilcon A) and the control (C) (narafilcon A) lenses for 2 weeks each, in random order. Assessments were performed at baseline (BL) with patients’ habitual SCLs and after 2 weeks’ wear of study lenses. Patient–reported (comfort-related) and investigator–rated outcomes (lens fit, contact lens surface assessments) were evaluated.

**Results:** All patient–reported outcomes were better for delefilcon A than for narafilcon A (P < 0.0001), including ratings (1 = poor, 10 = excellent) of end–of–day comfort (BL, 3.9 ± 1.9; T, 8.3 ± 1.9; C, 6.6 ± 2.2), reduced feeling of end–of–day dryness (T, 8.0 ± 2.2; C, 5.8 ± 2.6), and quality of vision (Day: BL, 8.0 ± 1.4; T, 8.9 ± 1.4; C, 7.9 ± 1.7; Night: BL, 6.3 ± 2.2; T, 8.5 ± 1.7; C, 7.4 ± 1.8), and average hours comfortable daily wear time (T, 11.6 ± 3.9; C, 9.3 ± 3.8). Overall lens fit was optimal in 90.6% of patients for delefilcon A versus 49.6% for narafilcon A. Approximately twice the proportion of patients had no front surface deposits or no dry or non-wetting areas on lens surfaces during delefilcon A wear than during narafilcon A wear (T, 79.5%; C, 39.3%; C, 86.3%; C, 43.6%). Investigator grading of surface wettability was better for delefilcon A (T, 9.3 ± 1.0; C, 7.4 ± 1.7; P < 0.0001).

**Conclusions:** In patients symptomatic for lens–associated dryness, delefilcon A lenses, compared with narafilcon A, showed superior subjective outcome ratings and better lens surface attributes after 2 weeks of wear.

**Poster No.:** EX2-229  
**Panel No.:** 229, Session 2

**Relationship Between Contact Lens Coefficient of Friction and Subjective Lens Comfort**

**First Author:** Jami KERN  
**Co-Author(s):** Joseph RAPPON, Erich BAUMAN

**Purpose:** To examine the relationship between comfort and contact lens coefficient of friction (CoF) among soft contact lens materials.

**Methods:** A meta–analysis was conducted on data of 5 soft contact lens materials (delefilcon A, lotrafilcon B, balafilcon A, balafilcon A2, etafilcon A+). Subjective data for insertion, overall, and end of day comfort were obtained from a trial database. Trials were included unless they met exclusion criteria (eg, extended/continuous wear, exclusively acute measures, small sample size). The last on–eye value for a lens was used, and the association between comfort and CoF, measured using the inclined plane method, was assessed. Each comfort assessment (insertion, overall, end of day) was analyzed separately in a mixed effect model with a fixed effect for CoF and random effects for trial and subject. Serial gatekeeping was used to adjust for multiple comparisons.

**Results:** The analysis included 157 subjects (117 females) with an average age of 32 years. CoF was highly predictive of comfort (all measures P < 0.001), with higher CoF associated with lower comfort. A highly significant association between the comfort measure and CoF was seen for each measure; estimates were very similar for all 3 comfort outcomes, with an approxi-
Comparison of Different Side-Cut Angles on Corneal Biomechanical Properties After Femtosecond Laser-Assisted Laser In Situ Keratomileusis

First Author: Hua LI

Purpose: To evaluate the effect of side-cut angles on corneal biomechanical properties after femtosecond laser-assisted laser in situ keratomileusis (FS-LASIK).

Methods: In this clinical control study, 97 right eyes of 97 patients with myopia and myopic astigmatism undergoing FS-LASIK surgery were included randomly and 2 types of side-cut angles were designed for the flap: 48 right eyes of 48 patients with side-cut angles of 90 degrees and 49 right eyes of 49 patients with side-cut angles of 130 degrees. The values of corneal resistance factor (CRF), corneal hysteresis (CH), and biomechanical waveform parameters were measured using the ocular response analyzer (ORA) preoperatively and 1 month and 3 months postoperatively.

Results: The mean CRF, CH, CH2, p1area, p2area, p1area1, p2area1, aspect1, slope1, h1, h2, h11, h21, dive1, dive2, w11, and w21 in both groups showed significant reductions at 1 month postoperatively (P < 0.01). The mean CRF, CH, p1area, p2area, p1area1, p2area1, w1, w2, w11, w21, h1, h2, h11, h21, dive1, and dive2 in both groups showed significant reductions at 3 months postoperatively (P < 0.01). The mean path1, path2, path11, and path21 in both groups showed significant increases at 1 month and 3 months postoperatively (P < 0.01). The mean aphi, bindex, dive2, and path2 between both groups at 1 month postoperatively showed significant differences (F = 8.609, P = 0.004; F = 7.482, P = 0.007; F = 5.238, P = 0.024; F = 4.885, P = 0.029). The mean path11 between both groups at 3 months postoperatively showed a significant difference (F = 6.160, P = 0.015).

Conclusions: Different side-cut angles have some effect on corneal biomechanical properties after FS-LASIK. The corneal deformation is more stable in flap creation with obtuse side-cut angles when the cornea is under stress. In combination with ORA waveform parameters, more subtle changes of corneal biomechanical properties can be found.

Correlation Between Hyperreflective Foci on SD-OCT and Visual Outcomes After Intravitreal Bevacizumab for Macular Edema in BRVO

First Author: Hyung Chan KIM

Purpose: To investigate the correlation between hyperreflective foci (HF) on SD-OCT at baseline and visual outcomes after intravitreal bevacizumab injection (IVB) in branch retinal vein occlusion (BRVO).

Methods: We retrospectively studied 97 eyes of 97 patients with macular edema secondary to BRVO, who were treated with IVB. The eyes were divided into 3 groups according to the location of HF: HF in outer retinal layers, HF in inner retinal layers, and no HF. The baseline and final BCVA, FT, ELM status, and the number of HF were evaluated and compared among the 3 groups.

Results: Baseline BCVA was correlated with baseline FT (R = 0.366, P < 0.001), but final BCVA was not correlated with final FT (R = −0.008, P = 0.942). Baseline BCVA was significantly better in eyes with intact ELM at baseline (P = 0.006), and final BCVA was significantly better in eyes with intact ELM and EZ at final visit (P < 0.001, P = 0.003, respectively). At the final visit, 15 of 37 eyes (40.5%) with HF in outer retinal layers had a disrupted ELM (P = 0.001), whereas 28 of 37 eyes (75.7%) with HF in outer retinal layers had a disrupted EZ (P < 0.001). Final BCVA was poorer in eyes with HF in outer retinal layers than those in the other 2 groups (P < 0.001), although baseline BCVA was not different among them.

Conclusions: HF on SD-OCT at baseline might predict the photoreceptor status and final visual acuity after IVB in BRVO.

Half-Dose Versus Half-Time Photodynamic Therapy for Central Serous Chorioretinopathy

First Author: Yi-ting HSIEH
Co-Author(s): Hsin-yu LIU, Chung-may YANG, Chang-hao YANG, Tzyy-chang HO, Chang-ping LIN
**Purpose:** To compare the efficacy between fluorescein angiography (FA)—guided half–time and half–dose photodynamic therapy (PDT) for the treatment of central serous chorioretinopathy (CSC).

**Methods:** Sixty–one eyes with acute or chronic CSC involving the fovea were retrospectively collected in this study; 35 eyes received half–dose PDT (verteporfin 3 mg/m², 83 seconds), and 26 eyes received half–time PDT (verteporfin 6 mg/m², 42 seconds). Best corrected visual acuity (BCVA) and optical coherence tomography (OCT) before and 1, 3, 6, and 12 months after PDT were measured. Logarithm of the minimal angle of resolution (logMAR) of BCVA and resolution of subretinal fluid (SRF) after PDT were compared between the 2 groups.

**Results:** The mean follow–up time after PDT was 16.5 ± 13.3 months. Both groups showed significant improvement in BCVA at months 1, 3, 6, and 12 after PDT (P < 0.05 for all). Multiple linear regression analysis showed that a poorer BCVA was significantly correlated with PDT type was not (P = 0.18). All eyes receiving half–time PDT showed complete resolution of SRF within 6 months after PDT, whereas 3 eyes receiving half–dose PDT had persistent SRF before loss to follow–up at months 5, 7, and 8, respectively (P = 0.21). Three out of 32 eyes in the half–dose group and 2 out of 26 eyes in the half–time group had recurrence during the follow–up period (P = 0.82); all recurrent cases had complete SRF resolution after further PDT treatment. In no eyes of either group were adverse systemic side effects or new atrophy of retinal pigment epithelium observed.

**Conclusions:** Half–time and half–dose FA–guided PDT were both effective and safe in treating CSC with similar efficacy in visual improvement.

**Poster No.:** EX2–234  
**Panel No.:** 234, Session 2

**Comparing Angio–OCT With Conventional Fundus Fluorescein Angiography in Idiopathic Choroidal Neovascularization**  
**First Author:** Xiaoling LIANG  
**Co–Author(s):** Shanshan YU, Tao LI, Lin LU

**Purpose:** To compare angio–OCT with fundus fluorescein angiography (FFA) in idiopathic choroidal neovascularization (ICNV) and describe the characteristic of ICNV on angio–OCT.

**Methods:** Fourteen naive ICNV patients (including 15 CNV lesions) were examined under FFA and angio–OCT. The maximum horizontal and vertical length of CNV lesions were compared on FFA and angio–OCT separately. The RPE–IS/OS changes were compared on FFA and angio–OCT. The activity of CNV was evaluated via 4 layers (superficial retina, deep retina, outer retina, choroidal capillary) on angio–OCT.

**Results:** The maximum horizontal and vertical length measured on FFA and OCT separately were not different (P = 0.806, P = 0.231). RPE depigmentation around the CNV was present in 40% (6/15) of patients, whereas on angio–OCT en face frame, a well–defined gray IS/OS discontinued ring around CNV lesions showed in 93.3% (14/15) of patients. In en face angiograms, all CNV lesions showed neovascularization flow in outer retinal layers, and active CNV showed areas of reduced choroidal flow adjacent to the CNV in all cases except 1 significantly reduced choroidal flow in a scar lesion. Three cases showed macular edema in the deep retinal layer.

**Conclusions:** Optical coherence tomography angiography could not only provide clear images of idiopathic CNV flow, but also highly matched the size of the lesion compared with FFA. The outer retinal and choroidal capillary layer flow indicated the CNV lesion. Choroidal flow may indicate CNV activity. The en face frame showed greater sensitivity in the IS/OS discontinued ring around the lesion, which correlated with the visual prognosis compared with FFA depigmentation.

**Poster No.:** EX2–234  
**Panel No.:** 234, Session 2

**Aflibercept Therapy for Neovascular Age–Related Macular Degeneration Resistant to Bevacizumab and Ranibizumab**  
**First Author:** Cheng–kuo CHENG  
**Co–Author(s):** Yi–yun SHEN

**Purpose:** To evaluate the anatomic outcome of intravitreal injection of aflibercept (Eylea, 40 mg/mL, Bayer) in cases of neovascular age–related macular degeneration (nAMD) with persistent subretinal fluid resistant to multiple injections of bevacizumab (Avastin, 100 mg/4mL, Roche) or ranibizumab (Lucentis, 10 mg/mL, Novartis).

**Methods:** A retrospective study of nAMD patients who were refractory or tachyphylaxis to treatments with ranibizumab or bevacizumab. The inclusion criteria was persistent subretinal fluid after 3 consecutive monthly injections lasting for at least 3 months by either ranibizumab or bevacizumab, or both. The demographic data, changes of central retinal thickness (CRT) on optical coherence tomography (OCT), visual acuity, and number of injections during the responsive period were reviewed.

**Results:** A total of 31 eyes in 24 patients (14 men, 58.3%) were included. The mean age was 73.79 years old (range, 52–91). The mean injection number in 1 eye with prior injections of either bevacizumab or ranibizumab was 13.58 times (range, 3–37 times).
After switching to aflibercept therapy, 25 eyes (80.64%) experienced a complete first dryness of both subretinal and intraretinal fluid. A significant decrease of 77.48 μm (from 285.60 ± 117.11 to 208.12 ± 50.17 μm, \( P = 0.001 \)) was observed in mean CRT at first dryness. The mean number of Eylea injections was 1.72 ± 0.93 during 8.12 ± 7.51 weeks. In the other 6 eyes, from the switch to the final OCT follow-up, no complete dryness was observed. The mean number of bevacizumab or ranibizumab injections was 14.5 times, and the mean number of Eylea injections was 2.33 during 21 weeks’ follow-up. The CRT change was −42.00 μm, from 382.33 μm to 424.33 μm, with mean final CRT increasing compatible with no total dryness noted. Meanwhile, 3 of these eyes were nAMD, and the other 3 eyes were PCV. Best corrected visual acuity (BCVA) before switching to aflibercept therapy was 0.7795 in logMAR; whereas BCVA was 0.6783 in logMAR when the first dryness was observed. There was also a significant difference in BCVA before and after switching to aflibercept (\( P = 0.0119 \)). The difference was compatible with EDTRS letters, with a mean of 46.04 ± 25.02 (range, 3–82) letters before and mean 51.00 ± 22.08 (range, 3–80) letters after switching to aflibercept therapy (\( P = 0.0118 \)).

Conclusions: Aflibercept therapy seems to be beneficial for anatomic outcome in a subset of patients with nAMD who had persistent intraretinal or subretinal fluid after multiple injections of either bevacizumab or ranibizumab.

Poster No.: EX2–235
Panel No.: 235, Session 2

Intravitreal Aflibercept for Myopic Choroidal Neovascularization in One Medical Center in Taipei

First Author: Jia-kang WANG
Co-Author(s): Chin-wei CHANG, Pei-shan WU

Purpose: To investigate the efficacy of intravitreal aflibercept for patients with myopic choroidal neovascularization (mCNV).

Methods: Patients with mCNV from October 2012 to September 2014 were retrospectively reviewed. The patients met the following criteria: more than ~6 dioptr in spherical equivalent or axial length greater than 28 mm, CNV found on spectral domain optic coherence tomography (SD-OCT), and active submacular leakage with or without accompanying submacular hemorrhage on fundus fluorescein angiography. The cases were treated with intravitreal aflibercept as needed with monthly follow-up for 12 months. The baseline demographics, lens status, and spherical equivalent were recorded. Primary outcome measures included change in central foveal thickness (CFT) of 1 mm on SD-OCT and best corrected visual acuity (BCVA) from baseline to month 12. Complications after injections were recorded. The changes in CFT and BCVA were compared with Wilcoxon signed-rank test.

Results: Nine eyes of 9 patients were included. The CFT was significantly reduced 12 months after aflibercept injections (\( P < 0.05 \)). The BCVA significantly improved 12 months after aflibercept treatment (\( P < 0.05 \)). All the patients only received 1 injection without recurrence within 12 months. There was no systemic thromboembolic event, elevated intraocular pressure, retinal detachment, or infectious endophthalmitis after the injections.

Conclusions: A single dose of intravitreal aflibercept was sufficiently beneficial for mCNV in this small case series in Taipei during a 12–month period. No serious systemic or ocular adverse events were reported.

Poster No.: EX2–236
Panel No.: 236, Session 2

Comparison of Intravitreal Bevacizumab and Laser Treatment for Advanced Retinopathy of Prematurity in One Medical Center in Taipei

First Author: Yen-yi CHEN
Co-Author(s): Yun-ju CHEN, Yung-ray HSU, Fang-ting CHEN, Jia-kang WANG

Purpose: To compare the efficacy of intravitreal bevacizumab and laser treatment for advanced retinopathy of prematurity (ROP).

Methods: This was a retrospective comparative study. From January 2002 to August 2009, patients with advanced ROP according to ETROP criteria were treated with peripheral retinal diode laser photocoagulation in nearly confluent pattern (JK Wang). From September 2010 to August 2015, we performed bevacizumab injection (0.625 mg/0.025 mL) for patients with advanced ROP (JK Wang, YJ Chen, FT Chen, and YR Hsu). Initially, the patients were closely followed until disappearance of retinal neovascularization in the laser group and regression of avascular zone in the bevacizumab group. The gestation age (GA), birth body weight (BBW), postmenstrual age (PMA) of treatment, and structural outcome at the last follow-up were recorded by chart review. The numerical difference between groups was compared with Wilcoxon rank-sum test.

Results: We collected 31 patients (62 eyes) in the laser group, composed of threshold ROP in 15 and type 1 ROP in 16 cases. There were 16 infants (32 eyes) all with type 1 ROP in the bevacizumab group. The mean follow-up period was 51.1 and 23.5 months in the laser and bevacizumab groups, respectively. The mean GA (26.1 weeks) and BBW (847.1 gm) were significantly less in the bevacizumab group than in those with threshold disease in the laser group (mean GA, 30.8 weeks; BBW, 1397.2 gm) (\( P < 0.01 \)), but comparable.
with those with type 1 ROP in the laser group (mean GA, 26.5 weeks; BBW, 985.8 gm). The mean PMA for treatment was comparable in the bevacizumab group (36.1 weeks) and the laser group (37.1 weeks) \( (P = 0.4) \). All the patients received a single session of laser or a single bevacizumab injection without recurrence of retinal neovascularization, except 1 eye (1/32, 3.1%) in the bevacizumab group that received 1 additional injection and adjuvant laser treatment. There were no unfavorable anatomical results such as retinal detachment or macular ectopia or complications such as cataract or endophthalmitis in either bevacizumab or laser management.

**Conclusions:** Laser treatment and intravitreal bevacizumab were both effective treatments for advanced ROP resulting in favorable anatomical outcomes. A single treatment with both methods was sufficient without recurrence of retinal neovascularization in most of our cases. Although smaller/younger neonates were prone to develop type 1 ROP and older/bigger ones threshold disease, the time of treatment was similar for both types of ROP.

**Poster No.:** EX2–237  
**Panel No.:** 237, Session 2  

**Foveal Contour in Advanced Retinopathy of Prematurity After Intravitreal Bevacizumab or Laser Treatment**  

**First Author:** Yen-yi CHEN  
**Co-Author(s):** Yun-ju CHEN, Yung-ray HSU, Fang-ting CHEN, Jia-kang WANG  

**Purpose:** To investigate the foveal contour (FC) in advanced retinopathy of prematurity (ROP) after intravitreal bevacizumab or laser treatment.  

**Methods:** From January 2002 to August 2015, we collected patients with threshold or type 1 ROP treated with intravitreal bevacizumab monotherapy or peripheral retinal diode laser photocoagulation. All patients did not have retinal detachment or macular ectopia. The patients were examined by macular spectral-domain optical coherence tomography, cycloplegic refraction, and best corrected visual acuity. Abnormal FC was defined as retention of inner retina structures, including retinal ganglion cell, inner plexiform, and inner nuclear layers. The gestation age, birth body weight, postmenstrual age for treatment, and follow-up periods were recorded by chart review. The numerical difference between groups was compared with Wilcoxon rank-sum test.  

**Results:** We collected 14 eyes of 7 patients, of whom 10 (71.4%) had abnormal FC and 4 had normal FC. In 6 eyes treated with bevacizumab, 2 eyes (33.3%) had abnormal FC measured at an average age of 4.6 years. In 8 eyes managed by laser, 8 eyes (100%) had abnormal FC measured at an average age of 7.2 years. Abnormal FC was associated with younger gestation age, smaller birth body weight, higher myopia, and poorer visual acuity.  

**Conclusions:** Abnormal FC can be found in advanced ROP with favorable anatomical structure, which is correlated with more premature birth history and poorer refractive and visual outcome.

**Poster No.:** EX2–238  
**Panel No.:** 238, Session 2  

**CpG-ODN Inhibits Angiogenesis by TLR9-Independent Regulation of Endothelial Cells and TLR9-Dependent Activation of Macrophages**  

**First Author:** Lei LIU  
**Co-Author(s):** Jiahui WU, Wenru SU, Michael POWNER, Marcus FRUTTIGER, Andrew DICK  

**Purpose:** To interrogate mechanisms of TLR9 agonist, CpG–ODN, suppression of angiogenesis.  

**Methods:** Regulation of angiogenesis by CpG–ODN was interrogated using suture–induced corneal neovascularization, laser–induced choroidal neovascularization, and in neonatal retina after local administration of CpG–ODN in vivo. Migration of pericytes or bone marrow–derived macrophages (BMDM) was determined after 16-hour co-culture with ODN–conditioned human umbilical vein endothelial cells (HUVECs) culture medium in transwell assays. HUVECs ability to form tubes when stimulated with CpG–ODN after culture on matrigel with or without inhibition of TLR9 signalling was determined. The role of macrophages was probed with CpG–ODN–treated BMDM supernatant ability to regulate HUVECs tube formation. Further, the antiangiogenic effect of CpG–ODN and dependency on TLR9 in suture–induced corneal neovascularization model either after macrophage depletion by clodronate or in TLR9–deficient mice, respectively.  

**Results:** Our data show that regulation of angiogenesis by CpG–ODN is pleiotropic. CpG–ODN to render and maintain endothelial stalk cells quiescent is TLR9 independent. CpG–ODN pretreated endothelial cells enhance macrophage migration but restrain pericyte mobilization. We found that macrophages were the principle inhibitors of angiogenesis mediated by CpG–ODN in vivo. This response requires intact TLR9 signaling.  

**Conclusions:** The data demonstrate that TLR9 agonist, CpG–ODN, paradoxically enhances inflammation but inhibits angiogenesis through TLR9–dependent macrophage activation. In contrast, endothelial regulation by CpG–ODN is TLR9 independent.  

**Poster No.:** EX2–239
POSTERS

Panel No.: 239, Session 2

The Risk of Retinal Vein Occlusion After Central Serous Chorioretinopathy
First Author: Hsin-ying LIN
Co-Author(s): Yuh-shin CHANG

Purpose: To investigate the risk of retinal vein occlusion (RVO) after central serous chorioretinopathy (CSCR).

Methods: This study included 2882 CSCR patients and 17,292 control patients matched by age, sex, number of visits to an ophthalmologist, diabetes mellitus, hypertension, and hyperlipidemia from January 2001 through December 2010 from the Taiwan Longitudinal Health Insurance Database 2000. Information for each patient was collected until December 2011. Cox proportional hazard regression analysis was used to obtain the adjusted hazard ratio (HR) for RVO. RVO-free survival rate was calculated using Kaplan–Meier analysis.

Results: There was a significantly higher risk of RVO in CSCR patients than in controls (incidence rate ratio (IRR), 3.07; 95% confidence interval (CI), 1.86–5.07). After adjustment for potential confounders, the adjusted HR for developing RVO in the CSCR patients was 3.15 times higher than that of the controls (adjusted HR, 3.15; 95% CI, 1.91–5.21).

Conclusions: CSCR increases the risk of RVO. For CSCR patients, we recommend thorough retinal vessel evaluation, regular follow-up, and education regarding RVO.

Panel No.: 240, Session 2

The Efficacy of Staining and Retinal Biocompatibility of Anthocyanins: Preclinical Study for Chromovitrectomy
First Author: Lan-hsin CHUANG
Co-Author(s): Chi-chun LAI, Nan-kai WANG, Yen-po CHEN, Laura LIU, Yih-shiou HWANG

Purpose: To evaluate the safety and efficacy of anthocyanins in dye-assisted internal limiting membrane (ILM) peeling by in vitro and in vivo preclinical study.

Methods: In vitro and in vivo preclinical study with 6 anthocyanins, including malvidin, delphinidin, cyanidin, peonidin, pelargonidin, and luteolinidin, was done. The efficacy of these natural dyes was tested by staining the lens capsule and ILM at the retinal surface of pigs in comparison with current clinical vital dyes. The safety was evaluated by retinal cell cultures and intravitreal and subretinal injection of these dyes to rats. Balanced salt solution was used as the control. Cell viability was determined by the MTS (1-solution methyl thiazolyl tetrazolium) assay and apoptosis by Bax expression on Western blot.

Results: For the efficacy, all anthocyanins showed the capability to stain the lens capsule and ILM of rabbits in the concentration of 1 mg/mL in different orders. In the retinal cell culture study, there were no toxic effects of any anthocyanins dye in the concentration of 1 mg/mL. In addition, all anthocyanins dyes showed their neuroprotective effect for RPE cells after challenged by H2O2. In the animal study of safety, all 5 dyes were injected intravitreally and subretinally, and histology and ERG did not show any toxic effects.

Conclusions: In this preclinical study, anthocyanins were effective and safe to serve as vital dyes for chromovitrectomy. They also showed a neuroprotective effect on RPE cells and a potential to be used in clinical application.
mized diabetic eyes. No patient required repeat vitrectomy for recurrent diabetic hemorrhage. No serious systemic or ocular adverse event was reported.

**Poster No.: EX2–242**
**Panel No.: 242, Session 2**

**Increased Incidence of Peptic Ulcer Disease in Central Serous Chorioretinopathy Patients**

*First Author: Wei-yang LU*  
*Co-Author(s): San-ni CHEN*

**Purpose:** To investigate peptic ulcer disease and other possible risk factors in patients with central serous chorioretinopathy (CSR) using a population-based database.

**Methods:** In this population-based retrospective cohort study, longitudinal data from the Taiwan National Health Insurance Research Database were analyzed. The study cohort comprised 835 patients with CSR and the control cohort comprised 4175 patients without CSR from January 2000 to December 2009. Conditional logistic regression was applied to examine the association of peptic ulcer disease and other possible risk factors for CSR, and stratified Cox regression models were applied to examine whether patients with CSR have an increased chance of peptic ulcer disease and hypertension development.

**Results:** The identifiable risk factors for CSR included peptic ulcer disease (adjusted odds ratio, 1.39; \( P = 0.001 \)) and higher monthly income (adjusted odds ratio, 1.30; \( P = 0.006 \)). Patients with CSR also had a significantly higher chance of developing peptic ulcer disease after the diagnosis of CSR (adjusted odds ratio, 1.43; \( P = 0.009 \)).

**Conclusions:** Peptic ulcer disease and higher monthly income are independent risk factors for CSR. Patients with CSR also had an increased risk for peptic ulcer development.

**Poster No.: EX2–243**
**Panel No.: 243, Session 2**

**Blood Pressure Evaluation Before and After Intravitreal Injection of Bevacizumab, Ranibizumab, and Aflibercept**

*First Author: Yun-chen CHEN*  
*Co-Author(s): Yei-ching CHEN, Chia-chen TSAI, Hsiiao Ming CHAO, Tao-hsin TUNG, Jorn-hon LIU*

**Purpose:** To explore blood pressure (BP) alteration in patients before/after intravitreal injection of antivascular endothelial growth factors (anti-VEGFs).

**Methods:** Two hundred eighty-one patients (449 injections) were reviewed for BP before and 10 minutes after the intravitreal injection of anti-VEGFs, namely bevacizumab (Avastin; IVIA; \( n = 186 \)), ranibizumab (Lucentis; IVIL; \( n = 193 \)), and aflibercept (Eylea; IVIE; \( n = 70 \)), for retinal diseases including PDR, DME, RVO, or wet ARMD between July 2013 and June 2015. Any systemic complications that developed within 1 month were also studied.

**Results:** In a total of 449 injections, the percentage of those patients who had both preinjection systolic blood pressure (SBP) under 140 mm Hg and postinjection SBP over 140 mm Hg were 33.3% in the IVIA, 34.5% in the IVIL, and 21.7% in the IVIE group. After adjustment for hypertension, CAD, and CVA, elevation of SBP was noted in the IVIL group (\( n = 99 \)), whereas postinjection stabilized BP was revealed in the IVIA (\( n = 99 \)) and IVIE (\( n = 38 \)) groups. For enrolled patients with underlying hypertension, SBP was significantly elevated in the IVIL group (\( n = 84 \), 36%) of which had more than 5% SBP elevation. Moreover, in the IVIE group (\( n = 27 \), 48.1%) had elevated diastolic blood pressure (DBP).

**Conclusions:** IVIL may cause transient SBP elevation. Furthermore, IVIE had a greater impact on DBP. Monitoring BP is recommended before/after intravitreal injection of anti-VEGFs.

**Poster No.: EX2–244**
**Panel No.: 244, Session 2**

**Microperimetry-1 and Fundus Autofluorescence Findings in Patients With Macular Dystrophy**

*First Author: Jung LO*  
*Co-Author(s): Jong-jer LEE, Hsi-kung KUO, Pei-chang WU, Yi-hao CHEN, Chih-hsin CHEN*

**Purpose:** To investigate microperimetry-1 (MP-1) and fundus autofluorescence (AF) in patients with macular dystrophy (MD).

**Methods:** Six patients (age range, 51–73 years) with MD were studied. MP-1, AF, and spectral-domain optical coherence tomography (SD-OCT) images were collected. Concentric rings with diameters of 1, 3, and 6 mm centered at fovea were superimposed onto MP-1 and AF images with Photoshop based on vascular landmarks, thereby estimating the position of the fovea and lesion areas.

**Results:** Mean sensitivity and mean defect of MP-1 were low (6.37 ± 4.79 dB, –10.87 ± 4.79 dB, respectively), and best corrected visual acuity was poor (20/400~20/100) in 4 patients. Hypofluorescence (hypoAF) on lesions with average maximal dimensions of 3300 μm was detected at inner and middle rings in all patients, whereas accompanied hyperfluorescence (hyperAF) at the margin of the hypoAF area was observed in 3 patients. The area of decreased sensitivity (7~10 dB) in MP-1 was observed outside the hypoAF/hyperAF region. Fixation shift was detected if the fovea was
involved. Loss of inner/outer segment junction layer and irregularity of retinal pigment epithelium layer at the macula were observed on SD-OCT scans and were compatible with hypoAF areas.

Conclusions: In patients with MD when presenting visual acuity is still good, AF images may reveal hypoAF lesions. MP-1 showed functional changes even in non-hypoAF areas. MP-1 could be more sensitive to macular abnormalities than AF, thereby assist in early detection of disease progression.

Poster No.: EX2–245
Panel No.: 245, Session 2

Posterior Subtenon Injection of Triamcinolone Acetonide for Pseudophakic Cystoid Macular Edema

First Author: Meng-ju TSAI
Co-Author(s): Yi-ting HSIEH

Purpose: To evaluate the effect and safety of posterior subtenon injection of triamcinolone acetonide (PSTA) as a first-line treatment for cystoid macular edema (CME) after cataract surgery.

Methods: Thirty eyes from 30 patients receiving PSTA as soon as pseudophakic CME was diagnosed were retrospectively recruited. Logarithm of the minimum angle of resolution (logMAR) of best corrected visual acuity (BCVA), central subfield thickness (CST), and intraocular pressure (IOP) before and after PSTA were compared. Linear regression analysis was used to evaluate the associating factors for time to onset and visual and anatomical improvements.

Results: The mean time to onset of pseudophakic CME was 45.5 ± 40.8 days (range, 15 to 178 days). Younger patients tended to have an earlier onset. After PSTA, the mean logMAR of BCVA improved from 0.80 ± 0.30 before treatment to 0.66 ± 0.38 at month 3 (P < 0.001 for both); the CST reduced from 431 ± 101 μm before treatment to 339 ± 161 μm at month 3 (P = 0.008). No patient experienced an IOP > 21 mm Hg after PSTA. One case with concomitant DME had visual and anatomical deterioration at month 3 after PSTA, which subsided after ranibizumab treatment. Younger patients tended to have a quicker recovery of vision (P = 0.040).

Conclusions: PSTA is effective and safe as a first-line treatment for pseudophakic CME. Younger patients tend to have an earlier onset and vision is restored more quickly. For cases with DR, antivascular endothelial growth factor agents should be considered if the response is poor or there is recurrence of CME after PSTA.

Poster No.: EX2–246
Panel No.: 246, Session 2

Endophthalmitis After Penetrating Keratoplasty in Northern Taiwan

First Author: Yi-hua CHEN
Co-Author(s): Kuan-jen CHEN, Ching-hsi HSIAO, David Hui-kang MA, Yeong-fong CHEN

Purpose: To investigate the characteristics, organisms, treatment, and visual outcomes in patients with endophthalmitis after penetrating keratoplasty.

Methods: Medical records were retrospectively reviewed in 60 patients with endophthalmitis after penetrating keratoplasty between 1996 and 2013 at Linkou Chang Gung Memorial Hospital in Taiwan.

Results: Sixty eyes (2.5%) of 2380 patients receiving penetrating keratoplasty developed endophthalmitis. There were 37 males and 23 females, and the mean age was 66 years (range, 2 to 86 years). In 43 (72%) vitreous tap samples, cultures had positive results, including Gram–negative organisms in 25 (58%), Gram–positive organisms in 16 (37%), and fungi in 5 (12%). The most common Gram–positive bacterial species was Streptococcus pneumoniae, and the most common Gram–negative bacterial species was Pseudomonas aeruginosa. Sixteen eyes (27%) had acute onset of endophthalmitis within 6 weeks after penetrating keratoplasty. All patients (eyes) received intravitreal injections of antibiotics, including vancomycin and either ceftazidime or amikacin. Pars plana vitrectomy was performed in 14 eyes (23%), and 27 (45%) eyes underwent evisceration. Only 2 eyes had visual acuity of 5/200 or better after treatment.

Conclusions: Endophthalmitis is a rare but serious sight–threatening infection with very poor visual outcomes. Poor visual outcomes might be related to delayed diagnosis or more virulent organisms such as P. aeruginosa and S. pneumoniae, which were also the most common organisms causing endophthalmitis after penetrating keratoplasty.

Poster No.: EX2–247
Panel No.: 247, Session 2

Hyperuricemia Is Associated With Anti-VEGF Response in Patients With Diabetic Macular Edema

First Author: Wei-yu CHIANG
Co-Author(s): Jong-jer LEE, Hsi-kung KUO, Pei-chang WU, Yi-hao CHEN

Purpose: Hyperuricemia is associated with diabetic nephropathy, cardiovascular diseases, and the progression of diabetic retinopathy. The aim of this study was to explore the role of serum uric acid (SUA) in response to intravitreous anti–VEGF treatment in patients with diabetic macular edema (DME).

Methods: A 24-week prospective study of DME pa-
patients who underwent at least 3 monthly intravitreal injections (IVI) of anti-VEGF was conducted at a medical center. Baseline SUA concentration and parameters such as visual acuity (VA), central foveal thickness (CFT), and glycemic control (HbA1c) were collected and analyzed to determine their contribution to the response to anti-VEGF treatment.

**Results:** A total of 27 patients, including 12 females and 15 males aged between 50 and 75 years old, were enrolled. Ten (37%) of them showed hyperuricemia (SUA > 7.0 mg/dL). No significant difference was observed in VA, CFT, and HbA1c levels at baseline and after additional laser and/or IVI treatment at the end of study. Patients with hyperuricemia showed better VA improvement (0.55 vs 0.06 logMAR, P = 0.019) at 12 weeks and thinner CFT (277 vs 361 µm) at 24 weeks than those without hyperuricemia after treatment. Hyperuricemia is an independent factor associated with CFT less than 300 µm at 24 weeks (P = 0.038; 95% confidence interval, 0.01–0.82), but not with recovery of VA.

**Conclusions:** High concentration of SUA is associated with the response to anti-VEGF treatment in patients with DME. These findings provide evidence for studying the role of uric acid in retinal VEGF production in patients with type 2 diabetes mellitus.

**Poster No.:** EX2–248
**Panel No.:** 248, Session 2

**Chronic Central Serous Chorioretinopathy Induced by Long-Term Testosterone Treatment**

**First Author:** Kai Ling PENG
**Co-Author(s):** Hsin-ying LIN

**Purpose:** We report a rare case of chronic central serous chorioretinopathy induced by long-term testosterone treatment.

**Methods:** A case report.

**Results:** A 52-year-old man had a history of diabetes mellitus, hypertension, and diabetes insipidus caused by hypogonadism. He presented to our ophthalmologic clinic with unstable blurred vision in the right eye for more than 5 years and vision loss in the left eye since childhood injury. Optical coherence tomography (OCT) showed subfoveal fluid in both eyes. Fluorescence angiography (FAG) presented fluorescein in multiple leaking points around the arcade area; hyperfluorescein appeared in the early phase and kept continuously pooling until the late phase in both eyes. Reviewing his medical charts, he was given intramuscular testosterone every 2 weeks for hypogonadism for many years, with its level in the blood higher than the normal range. He underwent focal photocoagulation in his right eye with less frequent testosterone intramuscular injections. Subfoveal fluid in both eyes totally resolved later with vision improvement.

**Conclusions:** Testosterone-related chronic central serous chorioretinopathy was rarely reported previously. It is very important to review medical conditions and medication usage if the episode of chronic central serous chorioretinopathy repeats several times or continues.

**Poster No.:** EX2–249
**Panel No.:** 249, Session 2

**Ginkgo biloba Leaf Extract Protects Against and Rescues Vision Loss in LED Lighting–Induced Retinal Degeneration Mice**

**First Author:** Bo-yie CHEN
**Co-Author(s):** En-chieh TENG, Yu-rong SIAO, Si-ping CHEN, Mei-ching LIN

**Purpose:** Ginkgo biloba leaf extract (GK; EGb761) exhibits various biological activities and is used as a medical supplement. GK effectively reduces retinal cell loss in mice exposed to intense visible light. Here we investigated the efficacy of GK in slowing and rescuing the rate of degenerative progression of visual acuity (VA) and visual contrast sensitivity (CS) in a mouse model of LED lighting–induced retinal damage.

**Methods:** Adult albino mice were randomized into the normal control group (NC group), light–induced retinal damage model group (M group), prophylaxis treated group (PT group), and rescue treated group (RT group). Mice in the PT group and RT group were treated orally daily with GK, respectively, before and after retinal damage occurrence. The dynamic levels of VA and CS in mice were determined. At the end of the experiment, histopathologic examination was carried out, and the outer nuclear layer (ONL) thickness in the superior and inferior retina was measured.

**Results:** Visual functional assays and histopathologic examination revealed that exposure to LED lighting resulted in functional damage to the mouse retina, histological changes, and photoreceptor loss in the M group. Dosing with GK protected and rescued visual function against the LED lighting–induced decline of VA and CS, respectively, in the PT group and RT group. The loss of photoreceptors was decreased after treatment with GK compared with untreated mice.

**Conclusions:** GK extract (EGb761) is beneficial in protecting against and rescuing LED lighting–induced visual functional damage to the retina. It is worthy of consideration for a human clinical trial against LED lighting–induced cell damage.

**Poster No.:** EX2–250
**Panel No.:** 250, Session 2
Fixation Behavior of Macular Dystrophy Patients Assessed by Microperimetry

First Author: Wei-yu CHIANG
Co-Author(s): Hsi-kung KUO

Purpose: Paravertebral function is crucial for patients with macular diseases. The aim of this study was to investigate the location and fixation stability of preferred retinal locations (PRLs) in macular dystrophy by using microperimetry (MP-1).

Methods: A retrospective study was performed to collect best corrected visual acuity (BCVA) and fixation behavior by MP-1 data in patients with a clinical diagnosis of macular dystrophy. Based on specific definition, fixation location was classified into predominantly central, poor central, and predominantly eccentric; stability was classified into stable, relatively unstable, and unstable.

Results: Totally, 55 eyes of 28 patients were enrolled, including 10 males and 18 females, with a mean age of 36.49 years, mean logMAR BCVA of 0.82, and fixation mean sensitivity of 7.93 dB. In the fixation test, 43 of 55 eyes (78%) showed “predominantly eccentric” and the shift direction of PRLs included 28 eyes to the superior side (65%), 4 eyes to the temporal side (9%), 4 eyes to the inferior-temporal side (9%), 2 eyes to the nasal side (5%), 2 eyes to the inferior-nasal side (5%), 2 eyes to the inferior-temporal side (5%), and 1 eye to the superior-nasal side (2%). Fixation stability revealed the results of 24 eyes as stable (44%), 20 eyes as relatively unstable (36%), and 11 eyes as unstable (20%). The mean LogMAR BCVA was 0.93 in the “predominantly eccentric” group, which was significantly different from 0.40 in the “predominantly central” and “poor central” groups (P = 0.003), but did not reach significance in mean sensitivity (7.95 vs 7.85, P = 0.967). Furthermore, in the “predominantly eccentric” group, both the comparisons of logMAR BCVA and mean sensitivities in shift to superior side and nonsuperior side were not significantly different (0.99 vs 0.83, P = 0.330; 8.25 dB vs 7.37 dB, P = 0.645).

Conclusions: In macular dystrophy, patients with poorer visual acuity were prone to develop PRLs and most were at the superior direction from the fovea.

Poster No.: EX2–251
Panel No.: 251, Session 2

Reduction of Endoplasmic Reticulum Stress via a Chemical Chaperone Decreases Acrolein-Induced Cytotoxicity in Retinal Pigment Epithelium

First Author: Yimin ZHONG

Purpose: Acrolein, a major component of cigarette smoke and also a product of lipid peroxidation, has been implicated in the damage to and the dysfunction of the retinal pigment epithelium (RPE) that accompanies age-related macular degeneration. However, the intrinsic mechanism is yet to be clarified. This study investigated the role of endoplasmic reticulum (ER) stress and unfolded protein response in acrolein-induced cytotoxicity in RPE cells.

Methods: Cultured primary human RPE cells were exposed to acrolein for 2 to 24 hours. The protein levels of the ER stress genes (GRP78, XBP1) and phosphorylation of eIF2α were determined by Western blot analysis. The expression of proapoptotic gene CHOP and caspase 4 were also determined. Levels of reactive oxygen species (ROS) and apoptosis were determined in cells exposed to acrolein in the presence or absence of phenylbutyric acid (PBA).

Results: The expression of GRP78 and p–eIF2α was induced in RPE cells exposed to acrolein for 2 hours. The protein level of XBP1 was increased after 6 hours of exposure. The apoptotic proteins, CHOP and caspase 4, were also upregulated in RPE cells exposed to acrolein for 4 hours. Suppressing ER stress by a chemical chaperone, PBA, attenuated ROS levels and TUNEL staining induced by acrolein in RPE cells.


Poster No.: EX2–252
Panel No.: 252, Session 2

Prognostic Factors for Visual Outcome of Myopic Choroidal Neovascularization After Antivascular Endothelial Growth Factor Treatment

First Author: Yen-po CHEN
Co-Author(s): Nan-kai WANG, Kuan-jen CHEN, An Ning CHAO, Wei-chi WU, Chi-chun LAI

Purpose: To investigate the prognostic factors for the visual outcome of myopic choroidal neovascularization (mCNV) after intravitreal anti–VEGF treatment.

Methods: This was a retrospective, consecutive, observational case series. This study included 128 eyes of 120 consecutive patients who had mCNV treated with intravitreal anti–VEGF and had been followed up for at least 12 months. Best corrected visual acuity (BCVA), refractive errors, axial length, grading of myopic maculopathy, presence of lacquer crack, size, and location of mCNV were recorded.

Results: The average age, refractive errors, and axial length in these patients were 49.0 ± 13.3 years, −13.05 ± 4.54 diopters, and 29.00 ± 1.67 mm, respectively.
The BCVA in logarithm of the minimum angle of resolution (logMAR) improved significantly from 0.93 ± 0.62 to 0.53 ± 0.52 after treatment (P < 0.001). Univariate analysis revealed that final BCVA was associated significantly with age, initial BCVA, location and size of mCNV, grading of myopic maculopathy, and presence of lacquer crack (P < 0.001). However, only initial BCVA (P < 0.001), location (P = 0.03) of mCNV, size (P = 0.003) of mCNV, and grading of myopic maculopathy (P < 0.001) were associated significantly with final BCVA after multiple linear regression analysis.

**Conclusions:** Intravitreal anti-VEGF treatment for mCNV showed significant improvement in visual outcome. The final visual outcome in patients with mCNV after anti-VEGF treatment was significantly associated with initial BCVA, the location and size of mCNV, and the grading of myopic maculopathy.

**Poster No.: EX2–253
Panel No.: 253, Session 2**

**One-Year Results of Aflibercept Treatment With As-Needed Regimen for Polypoidal Choroidal Vasculopathy**

**First Author:** Rei NEMOTO
**Co-Author(s):** Daisuke MURAMATSU, Setsuko KAWAKAMI, Yoshihiro WAKABAYASHI, Kazuhiko UMAZUME, Hiroshi GOTO

**Purpose:** To evaluate the 1-year efficacy of 3 monthly intravitreal injections of aflibercept (IVA) treatment followed by an as-needed retreatment regimen for treatment-naive Japanese polypoidal choroidal vasculopathy (PCV) patients.

**Methods:** A retrospective case series reviewed with medical records. Twenty-two eyes of 22 patients with treatment-naive PCV who received primary IVA at Tokyo Medical University Hospital were enrolled. Minimum follow-up period was 12 months. Eyes initially received 3 monthly IVA injections followed by an as-needed retreatment regimen for worsening as judged by the examining ophthalmologist. Additional IVA was given when best corrected visual acuity (BCVA) was decreased and any fluid in the macula was increased or remained. The main outcomes were BCVA and central retinal thickness (CRT) evaluated at 6 and 12 months after primary IVA. All patients were divided into 2 groups (group 1, decimal BCVA more than 0.5; group 2, under 0.5) according to BCVA for subgroup analysis.

**Results:** Baseline BCVA (logMAR) and CRT were 0.26 ± 0.31 and 345.9 ± 84.1 μm, respectively. At 6 months, BCVA improved to 0.14 ± 0.28, and CRT decreased significantly to 275.0 ± 114.5 μm (P < 0.05) compared with baseline. At 12 months, BCVA improved to 0.13 ± 0.30, and CRT decreased to 283.3 ± 99.2 (P < 0.05), respectively. The average number of IVA was 4.1 injections during 12 months. A subgroup analysis showed much more VA decrease in group 2 than group 1. Eight percent and 0% of group 1 had improved and decreased BCVA of 0.2 logMAR units or more. However, 67% and 22% of group 2 had improved and decreased BCVA, respectively.

**Conclusions:** Three times plus as-needed IVA improved macular structure during 12 months in patients with naive PCV. However, VA was decreased in patients with poor baseline BCVA. Further investigation is needed regarding suitable treatment regimens.

**Poster No.: EX2–254
Panel No.: 254, Session 2**

**Intravitreal Aflibercept for the Treatment of Refractory Diabetic Macular Edema**

**First Author:** Yih-shiu KUO
**Co-Author(s):** Ling-ing LAU, Shih-jen CHEN, Catherine LIU

**Purpose:** To report the clinical outcomes after shifting to aflibercept therapy in patients with diabetic macular edema refractory to other therapies.

**Methods:** This was a retrospective medical record review of patients receiving aflibercept for persistent or recurrent macular edema despite multiple previous treatments with other vascular endothelial growth factor (VEGF) inhibitors or steroids.

**Results:** Seven eyes of 6 patients had previously received a mean of 8.42 (range, 3–17) injections of anti-VEGF (ranibizumab and/or bevacizumab). Two eyes had also been treated with intravitreal injection or subtenon injection of triamcinolone. Best corrected visual acuity improved in 4 eyes and remained stable in 3 eyes. All eyes showed successful resolution of macular edema after aflibercept injections, with a mean central foveal thickness decrease of 206 μm (range, 86–422 μm).

**Conclusions:** Aflibercept may be an effective treatment for cases of diabetic macular edema with poor response to other VEGF inhibitors.

**Poster No.: EX2–255
Panel No.: 255, Session 2**

**Efficacy of Intravitreal Aflibercept in Patients With Polypoidal Choroidal Vasculopathy Subtype of Neovascular Age-Related Macular Degeneration in VIEW 2**

**First Author:** Yuichiro OGURA

**Purpose:** To compare the clinical effects of intravitreal aflibercept (IVT–AFL) in patients with the polypoidal choroidal vasculopathy (PCV) subtype of neovascular
age-related macular degeneration (nAMD) with nAMD patients without this subtype in the VIEW 2 study.

**Methods:** ICGA imaging before baseline was available for 88 of 101 Japanese patients in VIEW 2. These images were retrospectively analyzed. Mean changes in best corrected visual acuity (BCVA) and central retinal thickness (CRT) were evaluated.

**Results:** Twenty-nine eyes were diagnosed with the PCV subtype of nAMD, whereas 59 eyes were diagnosed without this subtype. The proportion of male patients was higher in the PCV group (79.3% vs 22.0%). Mean BCVA at baseline was 59.5 letters in eyes with PCV and 52.4 letters in non-PCV eyes. A total of 82.8% of PCV patients and 72.9% of non-PCV patients were treated with IVT–AFL (any of the 3 dose regimens). Mean change in BCVA from baseline to week 52 and week 96 in IVT–AFL–treated PCV patients was +7.9 and +9.0 letters, respectively, and in IVT–AFL–treated non-PCV patients was +13.3 and +10.6, respectively. Mean change in CRT from baseline to week 52 and week 96 in IVT–AFL–PCV patients was −147 and −136 μm, respectively, and −165 and −167 μm, respectively, in IVT–AFL–treated non–PCV patients. In VIEW 2, the most common ocular adverse event among IVT–AFL–treated patients was retinal hemorrhage (17%).

**Conclusions:** This analysis of 88 patients from VIEW 2 suggests that IVT–AFL is a clinically effective treatment for eyes with the PCV subtype of nAMD.

**Poster No.:** EX2–256  
**Panel No.:** 256, Session 2

### Trends in Visual Impairment Certification Due to Diabetic Retinopathy in North and Eastern Devon

**First Author:** Roland LING  
**Co-Author(s):** Siying LIN, Natalee JAMES, Bhaskar GUP-TA

**Purpose:** Diabetic retinopathy and maculopathy is the second most common cause of blindness in working age adults in England. Our study determined the trends in incidence of visual impairment certification due to diabetic retinopathy (DR) in a region that has conducted diabetic screening since 1992.

**Methods:** A retrospective review of all certifications of visual impairment (CVI) due to DR was conducted, with mid-year population estimates and a diabetes prevalence model used to determine the trends in incidence of certification secondary to DR from 2010–2013. For 2013, CVIs due to DR were also compared with all CVIs in the region.

**Results:** The total number of certifications due to DR was 75; 52 were sight impaired (SI) and 23 severely sight impaired (SSI) certifications. Twenty-five percent of patients had type 1 diabetes mellitus (T1DM), and 75% had type 2 diabetes mellitus (T2DM). The mean age at the time of CVI was 65.5 years. The mean duration of known diabetes at the time of CVI was 22.0 years. Seven patients (9.3%) were not screened for retinopathy before CVI through the national screening program. The incidence of CVI due to DR ranged from 30.8 to 77.4 per million population per year from 2010–2013. The incidence of CVI in the diabetic population was estimated at 0.47 to 1.21 per 1000 patients per year with diabetes for 2010–2013. In 2013, DR was a main or contributing cause in 4.3% of all CVIs but did not contribute to any SSI certifications in the working age population.

**Conclusions:** The incidence of CVI due to DR was comparable with that reported in other regions. Nationwide, DR was the second most common cause of blindness in working age adults, but it did not contribute to any SSI certifications in our population. Our results are consistent with the success of a long-standing retinal screening program.

**Poster No.:** EX2–257  
**Panel No.:** 257, Session 2

### Risk Factors of Pegylated Interferon–Associated Retinopathy—Associated Retinopathy in Patients With Chronic Hepatitis C: A Prospective Study

**First Author:** Chi-hsien PENG  
**Co-Author(s):** Yu-tien CHI, Cheng-kuo CHENG

**Purpose:** To assess the features, incidence, and risk factors of retinopathy in patients with chronic hepatitis C being treated with pegylated interferon–based regimens and estimate the rate of resolution.

**Methods:** A total of 322 chronic hepatitis C patients were selected and started on pegylated interferon and ribavirin combination therapy. Subjects were given a complete ocular examination including dilated fundoscopy, color fundus photography, and optical coherence tomography at the start of therapy and checkups every month until the end of therapy. Selected cases received visual field testing and fluorescein angiography. We also estimated the rate of discontinuation of treatment and resolution after treatment was stopped.

**Results:** Peripapillary discrete soft exudate, diffuse retinal hemorrhage, and sometimes vessel occlusion were observed in patients with pegylated interferon–associated retinopathy. The overall incidence was 21.1% (68/322). The incidence of retinopathy with pegylated interferon in diabetic and hypertensive patients (high-risk group) was 41% (32/78) and 32.6% (56/172), respectively. This was significantly higher compared with the incidence of retinopathy (9.0%, 11/122) in patients without these risk factors. Overall estimate for the resolution of retinopathy was 98%.
Conclusions: Use of pegylated interferon in patients with chronic hepatitis C can lead to retinopathy. The incidence of retinopathy with pegylated interferon in patients with hypertension and diabetes is higher. Routine fundoscopic screening may be warranted in patients with these risk factors.

Poster No.: EX2–259
Panel No.: 258, Session 2

Optical Coherence Tomography Angiography in Retinal Vascular Diseases and Choroidal Neovascularization

First Author: Yi-syun SHEN
Co-Author(s): Cheng-kuo CHENG

Purpose: To assess the ability of optical coherence tomography angiography (OCTA) to show and analyze the greatest lesion dimension (GLD) and the choroidal neovascularization (CNV) patterns in retinal vascular diseases.

Methods: Patients were imaged using the prototype AngioVue OCTA system (Optovue, Inc, Fremont, CA). The size using greatest linear dimension and presence of subretinal and intraretinal fluid before and after intravitreous antivascular endothelial growth factor (anti-VEGF) injection were measured. Split spectrum amplitude decorrelation angiography algorithm was used to identify the blood flow within the retina. Fluorescein angiography (FA) and indocyanine green angiography (ICGA) with Spectralis HRA and spectral domain OCT were also performed as ground truth.

Results: Forty-eight eyes from consecutive patients with retinal vascular diseases, either wet-ARMD or PCV, were examined before and after intravitreous anti-VEGF injection. OCTA images provided distinct vascular patterns, distinguishing and recognizing the presence, location, and size of CNV (GLD). All of the presence, subretinal fluid, and intraretinal fluid on the retina were seen. All eyes with OCTA and FA (or ICGA) were evaluated to determine the sensitivity and specificity of CNV detection on OCTA. Compared with FA and ICGA, the sensitivity and specificity for detecting neovascularization were 100% (48/48). The GLD decreased compared with the GLD before treatment in 43 eyes (89%). Best corrected visual acuity (BCVA) improved after treatment, compatible with the size of CNV (GLD) decrease.

Conclusions: OCTA allows the clinician to visualize CNV noninvasively and provides detailed images of retinal vascular plexuses and quantitative data of pathologic structures. The specificity of CNV detection on OCTA compared with FA seems to be high. All patients can be assessed with OCTA after treatment within a short period (average, 1–3 weeks). It provides a rapid screening and evaluation of the effect of treatment, making it easier for clinicians to immediately adjust their treatment protocols. Further studies are warranted to define the role of OCTA in the assessment of retinovascular diseases, with respect to conventional FA and ICGA.

Poster No.: EX2–259
Panel No.: 259, Session 2

Optical Coherence Tomography Angiography in Polypoidal Choroidal Vasculopathy

First Author: Yu-tien CHI
Co-Author(s): Cheng-kuo CHENG

Purpose: To describe the characteristics and structures of polypoidal choroidal vasculopathy (PCV) on optical coherence tomography angiography (OCTA) using spectral-domain optical coherence tomography.

Methods: Patients were imaged using the prototype AngioVue OCTA system (Optovue, Inc, Fremont, CA). Patients in whom PCV was identified on OCTA were evaluated to define characteristics and structures of polyps and branching vascular network (BVN) on OCTA. Concurrently, we compared the images of OCTA with the pustules of fluorescein angiography (FA) and indocyanine green angiography (ICGA).

Results: OCTA imaging of PCV eyes demonstrated the relationship between pigment epithelial detachments (PEDs) that correlated with the polypoidal lesions seen on ICGA in all PCV eyes. OCTA demonstrated the polyps and BVN in PCV eyes. We reviewed 3 eyes in the 3 patients with PCV. A BVN was noted above the Bruch membrane in 1 eye, below the Bruch membrane within the choriocapillaris in 1 eye, and in the larger choroidal vascular layer in 1 eye.

Conclusions: OCTA provides an in vivo tool to visualize the pathologic features and the choroidal vasculature in PCV.

Poster No.: EX2–260
Panel No.: 260, Session 2

Correlation Between Type 1 and 2 Peripapillary Detachment and Retinoschisis in Patients With High Myopia

First Author: Sheng-fu CHENG
Co-Author(s): Chi-Hsien PENG, Yi-syun SHEN

Purpose: Type 1 (intrachoroidal) and type 2 (intra- or subretinal) peripapillary detachment in pathologic myopia (PDPMs) are sometimes observed on optical coherence tomography (OCT). We tried to investigate the correlation between PDPM and other pathologic myopic features including foveoschisis in eyes with high myopia.

Methods: The definition of high myopia was a refrac-
Resveratrol Protects Retinal Stem Cells From Oxidative Stress via Expression of SirT1

First Author: Sheng-fu CHENG
Co-Authors: Chi-hsien PENG, Kuei-jung CHANG

Purpose: Silencing information regulator (SirT1) is an essential mediator for longevity. The level of SirT1 was evaluated for self-renewal and aging process abilities of retinal stem cells (RSCs).

Methods: The level of SirT1 mRNA expression in RSCs from rats of different ages were collected. We also treated RSCs with resveratrol and evaluated the neuroprotective defense from oxidative stress damage.

Results: SirT1 expression was significantly decreased in in vivo aged eyes, associated with poor self-renewal abilities. Additionally, SirT1 mRNA levels were dose-dependently increased in resveratrol-treated RSCs. The expression of SirT1 on oxidative stress–induced damage was significantly decreased, negatively correlated with the level of intracellular reactive oxygen species production. Treatment with resveratrol could effectively further reduce oxidative stress induced by H2O2 treatment in RSCs. Importantly, the antioxidant effects of resveratrol in H2O2-treated RSCs were significantly abolished by knockdown of SirT1 expression (sh–SirT1).

Conclusions: SirT1 expression provides a feasible sensor in assessing self-renewal and aging process in RSCs. Resveratrol can prevent reactive oxygen species–induced damages via increased retinal SirT1 expression.

Poster No.: EX2–261
Panel No.: 261, Session 2

Ganglion Cell—Inner Plexiform Layer Thinning in Retinitis Pigmentosa

First Author: Jay CHHABLANI
Co-Authors: Rayan ALSHAREEF, Qisheng YOU, Giulio BARTESELLI, Harsha RAO, Ashwin GOUĐ

Purpose: To investigate the topographic changes in macular ganglion cell–inner plexiform layer (GCIPL) thickness in eyes with retinitis pigmentosa (RP).

Methods: This was a retrospective analysis of 45 consecutive eyes with RP that underwent spectral-domain optical coherence tomography. Eyes with macular edema, high myopia greater than −6 diopters (D) or hyperopia greater than +3 D, poor image quality, and any clinical evidence of retinal or glaucomatous disease were excluded. Sixty–seven eyes of 48 age–matched healthy subjects were included as the control group. Average, minimum, and sectoral GCIPL, retinal nerve fiber layer (RNFL), and outer retina (OR) thicknesses were collected. Comparison of global and sectoral thickness measures between RP and control groups was performed.

Results: Mean age of RP subjects and control group was 30.4 ± 11.5 years and 46.9 years, respectively. The average and sectoral macular GCIPL thicknesses were significantly reduced in RP eyes compared with controls (P < 0.0001). Average macular RNFL thickness was reduced in RP eyes compared with controls (P < 0.054). The macular RNFL thicknesses in the superior, supertemporal, and superonasal areas were significantly lower when compared with corresponding areas in control patients (P < 0.0001). The mean OR thickness, minimum OR thickness, and the average thickness in the 6 sections were notably thinner in the RP group compared with the control group (P > 0.001).

Conclusions: This study demonstrates that eyes with RP display reduced GCIPL, RNFL, and OR thicknesses. The identification of alterations in RNFL, OR, and GCIPL thickness may be useful for future therapeutic implications.

Poster No.: EX2–263
Panel No.: 263, Session 2

Vision-Related Quality of Life After Intravitreal Afibercept in Treatment-Resistant Neovascular Age-Related Macular Degeneration Patients: 96-Week Results

First Author: Meidong ZHU
Co-Author(s): Wijeyanthy WIJEYAKUMAR, Thomas HONG, Andrew CHANG

Purpose: To evaluate vision–related quality of life (VR-QoL) in treatment–resistant neovascular age–related macular degeneration (TR–nAMD) patients treated with intravitreal aflibercept.

Methods: Forty–nine TR–nAMD patients were treated with 3 monthly loading doses of intravitreal aflibercept followed by injections every 8 weeks for 48 weeks. Then, a spectral–domain optical coherence tomography (SD–OCT)–guided “as–needed” regimen was given between 48 and 96 weeks. Ophthalmic examinations included best corrected visual acuity (BCVA) assessed in Early Treatment of Diabetic Retinopathy Study letters and central macular thickness (CMT) measured by SD–OCT at each visit up to week 96. The VR–QoL was measured with the National Eye Institute Visual Functioning Questionnaire–25 (NEI–VFQ25) at baseline, weeks 24, 48, 72, and 96. Changes in NEI–VFQ25 scores and correlations with BCVA and CMT were analyzed.

Results: NEI–VFQ25 composite scores improved at all time points compared with baseline (4.5 ± 9.2, 4.4 ± 11.8, 5.6 ± 11.2, and 4.6 ± 12.4; P < 0.05 for all). General vision, near activities, distance activities, role difficulties, and color vision subscales improved by week 96 (P < 0.05 for all). Compared with baseline, mean BCVA improved at week 24 and week 48 (6.9 ± 8.1, 4.6 ± 9.1 letters; P < 0.001) but not afterwards, and mean CMT reduced at all time points (P < 0.001). NEI–VFQ25 improvement was associated with BCVA changes up to week 48 (B = 0.431, P = 0.046). No correlation was found with CMT changes (P > 0.05 for all).

Conclusions: Overall VR–QoL improved in TR–nAMD patients after aflibercept treatment over 96 weeks. Correlation between VR–QoL improvement and BCVA changes was only in the first 48 weeks. This suggests that the effect of aflibercept on VR–QoL improvement in this TR–nAMD cohort was not restricted to BCVA changes only.

Poster No.: EX2–264
Panel No.: 264, Session 2

Is Current Evidence-Based Treatment For Myopic Choroidal Neovascularization Optimal? Factors Influencing Need for Retreatment and Long-Term Visual Outcome After Intravitreal Anti-VEGF

First Author: Danny NG
Co-Author(s): Alvin KWOK, Clement CHAN, Walton LI

Purpose: To evaluate the efficacy and the predictive factors associated with the need for retreatment and long–term visual outcome after intravitreal bevacizumab for myopic choroidal neovascularization (CNV).

Methods: This was a retrospective cohort study of 93 eyes with subfoveal or juxtapfoveal myopic CNV treated initially with either 3–monthly or single intravitreal bevacizumab injections followed by pro re nata (PRN) retreatment. The efficacy was evaluated by best corrected visual acuity (BCVA) during follow–up visits. Backward stepwise multiple linear regression analyses were performed to evaluate the potential predictive factors on final BCVA, change in BCVA, and number of injections. Multiple logistic regression was performed to evaluate the potential predictive factors for retreatment.

Results: The mean follow–up duration was 25.12 ± 11.18 months. The mean logarithm of the minimum angle of resolution (logMAR) BCVA at baseline was 0.72 ± 0.58 and was maintained at 0.39 ± 0.46 at the last follow–up (P < 0.001). The mean number of injections was 3.53 ± 1.70 (range, 3–10), and a total of 25 eyes (26.9%) received retreatment. Patients who received a single loading injection had significantly lower mean total number of injections (1.50 ± 0.73 vs 3.96 ± 1.53). Both subfoveal and juxtapfoveal myopic CNV eyes had significant improvement in BCVA (0.28 ± 0.43 vs 0.22 ± 0.32, P = 0.506), and juxtapfoveal myopic CNV eyes had significantly better BCVA at baseline and at the last follow–up than the subfoveal group. Treatment–naive eyes had significant improvement from baseline BCVA, and the amount of improvement was significantly greater than those that received previous photodynamic therapy (PDT) (0.31 ± 0.43 vs 0.06 ± 0.11, P < 0.001). Multivariate stepwise regression analysis showed that baseline CNV size (P < 0.05), baseline BCVA (P < 0.001), and duration of symptoms (P < 0.05) were significant predictive factors for final BCVA and BCVA improve-ment. Multiple logistic regression analysis identified CNV size (P = 0.014) and follow–up duration (P = 0.017) as significant predictive factors for retreatment. No sig-nificant association was found for number of injections.

Conclusions: Intravitreal bevacizumab seems to be an effective treatment for both subfoveal and juxtapfoveal myopic CNV in the long term. A shorter duration of symptoms and smaller CNV size before treatment are significant prognostic factors that predict better visual outcome. Eyes with longer follow–up duration and larger baseline CNV size may be at higher risk for retreatment.

Poster No.: EX2–265
Panel No.: 265, Session 2

Early Treatment for Laser-Induced Maculopathy

First Author: Yanyun CHEN

Purpose: To report the results of early treatment for laser–induced maculopathy.

Methods: Patients with a history of eye exposure to
laser beams were included. Evaluation included a full ophthalmic examination, fundus photography, and macular spectral-domain optical coherence tomography (OCT). The patients were divided into 2 groups: group 1 was the steroid treatment group (prednisolone 1 mg/kg, tapering 10 mg per week) and group 2 was the natural history group without any treatment (due to late presentation). The prognosis was compared between the 2 groups.

**Results:** Twelve patients (12 eyes) were included. In group 1 (5 eyes), the initial BCVA (LogMAR) was 0.40 ± 0.34, the final BCVA was 0.10 ± 0.12, and the mean follow–up duration was 162 ± 81 days. In group 2 (7 eyes), the initial BCVA was 0.54 ± 0.36, the final BCVA was 0.61 ± 0.35, and the mean follow–up duration was 190 ± 138 days. Four eyes (80%) increased by 2 or more lines of visual acuity in group 1, which was significantly better than in group 2 (1 eye, 14.3%) (P = 0.045). OCT showed complete IS/OS healing in 2 eyes in group 1 but none in group 2. Complications such as scar tissue (2 eyes) and epiretinal membrane (1 eye) occurred in group 2, whereas none occurred in group 1.

**Conclusions:** Early corticosteroid treatment might benefit laser–induced macular damage and lead to better visual prognosis.

**Poster No.: EX2–266**
**Panel No.: 266, Session 2**

**Recurrence of Retinopathy of Prematurity After Intravitreal Ranibizumab Treatment**

**First Author:** Tsengelmaa CHULUUNBAT  
**Co–Author(s):** Nan–kai WANG, An Ning CHAO, Kuan–jen CHEN, Chi–chun LAI, Wei–chi WU

**Purpose:** To evaluate the surgical results in premature infants treated with intravitreal ranibizumab injections for retinopathy of prematurity (ROP) over a period of 2 years.

**Methods:** This study was designed as an interventional case series. Premature infants with type 1 ROP who received intravitreal injections of ranibizumab from 2013 to 2015 were included. The primary outcome of treatment success was defined as regression of ROP. The secondary outcomes were ocular and systemic adverse effects.

**Results:** Twenty–two eyes of 12 children were included in the study and treated with intravitreal injections of ranibizumab. Among the 12 infants, there were 8 males and 4 females. Mean gestational age (GA) was 26.84 weeks (range, 24.3–29.1 weeks), and mean birth weight was 880 g (range, 488–1320 g). Among the treated eyes, 20 eyes (91%) were zone 2 ROP, and 2 eyes (9%) were zone 1 ROP. Nineteen eyes (86%) were stage 3 ROP, and 3 eyes (14%) were stage 2 ROP. Sixteen eyes (73%) from the 10 infants had complete resolution of ROP after a single injection. However, ROP progression occurred in 6 eyes (27%) of 4 children treated with ranibizumab an average of 3.1 weeks after treatment. Two eyes were treated with additional bevacizumab, 1 eye with additional laser treatment, 1 eye with laser and vitrectomy, and 2 eyes with additional vitrectomy. Finally, all of the eyes had resolution of ROP and attached retina. No additional ocular or systemic adverse effects were observed in these patients.

**Conclusions:** After 2 years of follow–up, our small series suggests that intravitreal ranibizumab injections are effective for type 1 ROP as monotherapy. However, additional intravitreal bevacizumab, laser, or vitrectomy treatment was required in 27% of patients. Further larger studies are needed to address the long–term safety and efficacy of ranibizumab in ROP.

**Poster No.: EX2–267**
**Panel No.: 267, Session 2**

**Real–Life Data of Anti–VEGF Treatment in Neovascular AMD: 5–Year Observation Using Ranibizumab and Afibercept**

**First Author:** Michaela WILKE  
**Co–Author(s):** Robert WILKE, Helmut SACHS

**Purpose:** To define the outcomes of anti–VEGF therapy under real–life conditions. Unlike prospective trials, everyday routines are challenged by late stage AMD, inability to adhere to treatment plans, and limitations in access to treatment. We were interested if these limitations affected the number of injections or number of visits, and eventually functional outcomes.

**Methods:** This was a retrospective evaluation of 1500 cases of neovascular AMD treated with an as–needed regimen of ranibizumab, bevacizumab, or aflibercept.

**Results:** Sixty–four percent of cases were women. Women tended to have higher age and lower visual acuity at baseline. An average of 9.7 injections, 23 visits, and 12 OCT scans per case during an average observation period of 2.5 years was found. Eight hundred sixty–three cases were treated only with ranibizumab and 106 cases only with aflibercept. Two hundred ninety–seven cases were switched from aflibercept to ranibizumab. Mean injections per year were 5.2 in year 1 and ~3.4 for years 2–5, with significantly higher injections in year 1 using aflibercept. Functional outcomes showed a gain in letter score for year 1, which was lost by the end of the second year (+1.4 and –0.8, respectively). Significant differences among treatment groups were mostly attributable to differences in the number of injections.

**Conclusions:** Anti–VEGF treatment in nAMD may exhibit a permanent strain for patients. Any means to alleviate this burden may lead to better adherence to treatment and better functional results. A fixed scheme
of injections or a more personalized regimen like treat and extend should be favored against pro re nata.

**Poster No.:** EX2–268  
**Panel No.:** 268, Session 2

**Protective Effect of Autophagy on Human Retinal Pigment Epithelial Cells Against Lipofuscin Fluorophore A2E: Implications for Age-Related Macular Degeneration**  
First Author: Yujing BAI  
Co-Author(s): Xiaxin LI, Jingjing ZHANG

**Purpose:** Age-related macular degeneration (AMD) is the leading cause of central vision loss in the elderly. Retinal pigment epithelial (RPE) cells play a key role in the pathogenesis of AMD. A2E, a major component of lipofuscin, is deposited in RPE cells with age. The present study aimed to explore the role of autophagy in the inflammatory response induced by A2E in RPE cells.

**Methods:** ARPE-19 cells were stimulated with A2E, and the cell viability was assessed with a Cell Counting Kit–8 (CCK–8) assay. After treatment with A2E (25 μM), transmission electron microscopy and immunofluorescence staining were performed to detect autophagosome formation and LC3 localization, respectively. The expression of LC3-II and beclin–1 was detected by Western blot analysis. Twelve different human inflammatory factors and angiogenic cytokines in RPE cell culture supernatants were detected using a Procarta Plex kit. The autophagy inhibitor 3-MA was increased in the RPE cell culture supernatants. In addition, the expression levels of mTOR, p-mTOR, Akt, and p-Akt were also examined after the treatment of RPE cells with rapamycin.

**Results:** A2E decreased cell viability in a dose–dependent manner (0, 10, 25, 50 μM). Within 15 minutes of treating RPE cells, 25 μM A2E induced the formation of autophagosomes and triggered punctate staining of LC3. After incubation with A2E, the expression levels of LC3-II and beclin–1 were increased. Moreover, the levels of intercellular adhesion molecule (ICAM), interleukin (IL)–1β, IL–2, IL–6, IL–8, IL–17A, IL–22, macrophage cationic peptide (MCP)–1, stromal cell–derived factor (SDF)–1, and vascular endothelial growth factor A (VEGFA) were increased in the RPE cell culture supernatants. The autophagy inhibitor 3-MA decreased the autophagosomes and LC3 puncta resulting from A2E treatment; increased the expression of inflammation–associated proteins, including ICAM, IL–1β, IL–2, IL–6, IL–8, IL–17A, IL–22, and SDF–1; and upregulated VEGFA expression in the RPE cells. As expected, rapamycin augmented the A2E–induced autophagy, attenuated the expression of inflammation–associated and angiogenic factors, and inhibited the Akt/mTOR pathway.

**Conclusions:** A2E induces autophagy in RPE cells, and this autophagy response can be inhibited by 3-MA or augmented by rapamycin via the mTOR pathway. The enhancement of autophagy plays a protective role in RPE cells that have been stimulated with A2E by reducing the secretion of inflammatory cytokines and VEGFA.

**Poster No.:** EX2–269  
**Panel No.:** 269, Session 2

**Beneficial Protective Effect of Saffron Extract Against LED Lighting—Induced Vision Loss in Mice**  
First Author: Jyh-cheng LIOU  
Co-Author(s): Si-ping LIN, Jia-lain WU, Jia-rung LIN, Bo-yie CHEN

**Purpose:** Oxidative photodamage and inflammation have key roles in the LED lighting damage model of retinal degeneration and in age-related macular degeneration (AMD). Clinical findings show that visual dysfunction deteriorates along with retinal degeneration. The aim of this study was to investigate the effects of saffron extract (SE), a pharmacologically active component, on protecting visual function against the decline of visual acuity (VA) and visual contrast sensitivity (CS) in mice.

**Methods:** Albino mice were divided into 4 groups: 1, blank control; 2, LED lighting exposure; 3, LED lighting exposure and treated orally with low dose SE; and 4, LED lighting exposure and treated orally with high dose SE. Mice were administered SE daily in groups 3 and 4 until they were sacrificed. The protective effect of SE was evaluated functionally by VA and CS analysis and histologically by measuring outer nuclear layer (ONL) thickness. The change of inflammatory factors in the retina were determined by bead–based ELISA assays.

**Results:** The mice exposed to LED lighting had substantial photoreceptor–specific cell loss. Dosing with SE protected photoreceptors against retinal tissue degeneration, protecting visual function against declining VA and CS. The retinal levels of oxidative damage and inflammation were more decreased after treatment with SE than in untreated mice.

**Conclusions:** Saffron extract is safe and protective against LED lighting–induced retinal damage and against declining VA and CS. It is worthy of consideration for a human clinical trial against retinal degeneration or AMD.

**Poster No.:** EX2–270  
**Panel No.:** 270, Session 2

**Focal Choroidal Excavation: Multi-Image Modality Characterization and Functional Correlation**
**Purpose:** To investigate the clinical manifestations and image features on near infrared autofluorescence (NIA), infrared reflectance (IR), fundus autofluorescence (FAF), indocyanine green angiography (ICGA), and fluorescent angiography (FA) in the detection of patients with focal choroidal excavation (FCE) identified by cross-sectional and en face spectral-domain optical coherence tomography (SD-OCT).

**Methods:** Patients with FCE were diagnosed on SD-OCT. Areas and depth of FCE in serial cross-sectional and en face OCT were compared with different image modalities to identify the most proper 2-dimensional image for detecting FCE. NIA, IR, FAF, ICGA, and FA were obtained using a confocal scanning laser ophthalmoscope. Best corrected visual acuity, subjective distortion area in Amsler grid, and history of complications were also collected.

**Results:** Thirteen eyes in 10 patients were enrolled. In areas where the choroid started to excavate as shown on en face SD-OCT, hypautofluorescence on NIA was the most specific imaging tool in defining the margin of FCE compared with IR, FAF, ICGA, and FA. LogMAR BCVA was associated with the volume of FCE. Eyes experiencing distortion were associated with greater FCE volume and thinner choroidal thickness. Eyes with complications were associated with greater areas of FCE.

**Conclusions:** NIA is the most sensitive tool in the identification of patients with FCE proven by SD-OCT, allowing for the progression of FCE. The volume of FCE is associated with poorer visual acuity and subjective distortion, whereas the area is associated with complications.

**Poster No.: EX2–271**
**Panel No.: 271, Session 2**

**Comprehensive Molecular Diagnosis of 67 Chinese Usher Syndrome Probands: High Rate of Ethnicity-Specific Mutations in Chinese Patients**

**First Author:** Ruifang CHEN
**Co-Author(s):** Yun-chen SHEN, Chia-chen TSAI, Han-chung LIU, Yu-fan CHANG, Shih-jen CHEN

**Purpose:** Usher syndrome (USH) is the most common condition of combined deafness and blindness. It is an autosomal recessive genetic disorder. Molecular diagnosis of USH patients is important for disease management. Few studies have tried to find the genetic cause of USH in Chinese patients. This study was designed to determine the mutation spectrum of Chinese USH patients.

**Methods:** We applied next generation sequencing to characterize the mutation spectrum of a total of 67 independent families diagnosed with USH from China collected by Peking Union Medical College Hospital. This is one of the largest USH cohorts reported. We utilized customized panel and whole exome sequencing, variant analysis, Sanger validation, segregation test, and genotype phenotype analysis.

**Results:** We identified biallelic disease-causing mutations in known USH genes in 68.5% (48) of our patients. As has been previously reported, MYO7A is the most frequently mutated gene for USH type I patients, whereas USH2A is the most mutated gene for USH type II patients. In addition, we identified mutations in CLRN1, DFNB31, GPR98, and PCDH15 for the first time in Chinese USH patients. Together, mutations in these genes accounted for 11.4% of disease in our cohort. Interestingly, although the spectrum of disease genes was quite similar between our Chinese patient cohort and other patient cohorts from different (and primarily white) ethnic backgrounds, the mutations themselves were dramatically different. In particular, 76% (52/68) of alleles found in this study have never been previously reported. Leveraging the large number of USH2A mutant alleles identified, we associated these new genotypes with their corresponding phenotypes. We observed a strong enrichment of severe loss of function mutations in USH patients compared with the reported mutation spectrum in RP patients, who often carry partial loss of function alleles.

**Conclusions:** Our study provides the first comprehensive characterization of a large collection of Chinese USH patients, providing additional insights into the disease at the molecular level.

**Poster No.: EX2–272**
**Panel No.: 272, Session 2**

**A Comparison Between the Efficacy of 577 nm Yellow Laser and 532 nm Green Laser in the Treatment of Diabetic Macular Edema**

**First Author:** Anand RAJENDRAN
**Co-Author(s):** Vignesh THOGULUVA, S RAMAMURTHY

**Purpose:** Yellow (577 nm) laser has less tissue toxic effects on the xanthophyll-containing macula than conventional green laser (532 nm). Hence, this study aimed to evaluate the efficacy of yellow 577 nm laser photocoagulation in comparison with the standard of care treatment with green laser (532 nm) photocoagulation for diabetic macular edema.

**Methods:** A prospective, randomized control trial of 71 eyes of 54 patients with diabetic macular edema was conducted. Treatment-naive patients were randomized to either focal macular laser with 577 nm yellow laser (YL) or 532 nm green laser (GL). LogMAR best corrected visual acuity (LCVA), thorough slit-lamp biomicroscopic...
exam, optical coherence tomography (OCT), and fluorescein angiography (FFA) or fundus photography were done before treatment and at subsequent 1, 4, and 6 months. STATA 11 software was used for statistical analysis.

**Results:** Of the 71 patients, 36 were males. The YL group had 37 eyes (52%), and the GL group had 34 eyes (48%). Mean age in the YL group was 56.9 years and in the GL group was 56.1 years. Mean improvement in LCVA from baseline to 6 months was similar: YL group (P < 0.001), GL group (P = 0.002). Mean laser power used was similar between the groups: YL group, 112 mW; GL group, 111 mW. Mean percentage reduction in foveal thickness was greater in the YL group (29%) than in the GL group (17%), though not statistically significant (P = 0.135). Mean parafoveal thickness percentage reduction was also greater in the YL group (35%) than in the GL group (P = 0.411).

**Conclusions:** These results demonstrate that the 577 nm yellow laser is as safe and efficacious as the standard 532 nm green laser. Longer term comparative studies may shed further light on their relative efficacy.

**Poster No.:** EX2–273  
**Panel No.:** 273, Session 2

**Study Design of an Innovative Phase III, Two-Year, Randomized, Double-Masked, Multicenter, Two-Arm Study Comparing the Efficacy and Safety of RTH258 6 mg Versus Aflibercept in Subjects With Neovascular Age-Related Macular Degeneration**

**First Author:** Jiann-torng CHEN

**Purpose:** RTH258 is a humanized, single-chain (scFV), high affinity binding antivascular endothelial growth factor (anti–VEGF). Completed phase II studies on safety and preliminary efficacy of its single ascending [C–10–083 (NCT01304693)] and repeat doses [C–12–006 (NCT01796964)] for neovascular age–related macular degeneration (nAMD) provided the basis for the ongoing phase III studies. This paper will present the design for RTH258–C002 NCT02434328.

**Methods:** C–10–083 was a prospective, double–masked, randomized, single–dose ascending, active–controlled, parallel–group study. C–12–006 was a 56–week, randomized, double–masked, active–controlled study that tested noninferiority against aflibercept at weeks 12 and 16. RTH258–C002 is a 2–year, randomized, double–masked, multicenter, 2–arm study comparing efficacy and safety of RTH258 6.0 mg with aflibercept 2.0 mg in nAMD.

**Results:** C–10–083 included 194 patients [RTH258 0.5 (n = 11), 3.0 (n = 31), 4.5 (n = 47), 6.0 (n = 44); ranibizumab 0.5 (n = 61) mg] and showed longer duration of effect and noninferiority to ranibizumab in CSFT mean change from baseline at month 1 for RTH258 4.5 mg and 6.0 mg. C–12–006 [n = 89; RTH258 6.0 (n = 44), aflibercept 2.0 (n = 45) mg] demonstrated BCVA non–inferiority at weeks 12 (P = 0.63) and 16 (P = 0.81) and successful Q12 treatment in ~50% of RTH258 patients with no new safety concerns for both. RTH258–C002 (n = 1200) will compare change in best corrected visual acuity (BCVA) from baseline and determine the proportion of patients with positive Q12 treatment at week 48. The full study design will be presented.

**Conclusions:** Preliminary results from 2 phase II studies provided the support for further development of RTH258. RTH258–C002 is an innovative trial designed to identify appropriate treatment regimen based on dynamic empirically validated assessment criteria.

**Poster No.:** EX2–274  
**Panel No.:** 274, Session 2

**Ozurdex for Macular Edema Due to Branch Retinal Vein Occlusion**

**First Author:** Shorya AZAD  
**Co-Authors:** Brijesh TAKKAR, Anil GANGWE, Rajvardhan AZAD

**Purpose:** To evaluate superiority/nonsuperiority of combination therapy of Ozurdex with laser against Ozurdex alone in patients with macular edema due to branch retinal vein occlusion (BRVO).

**Methods:** Forty eyes of 40 patients with BRVO of at least 6 weeks’ duration were randomized into 2 groups: group 1 received a single dose of intravitreal injection of Ozurdex (700 µg) alone and group 2 received a single dose of intravitreal injection of Ozurdex (700 µg) followed by grid laser treatment on the seventh day after injection. Primary outcome measures noted at 3, 6, 9, and 12 months’ follow–up were improvement in best corrected visual acuity (BCVA) and central macular thickness (CMT). Secondary outcome measures were rise in intraocular pressure (IOP), color vision, and contrast sensitivity at similar time intervals.

**Results:** Mean age of patients in group 1 was 60.30 ± 11.59 years and 52.30 ± 10.86 in group 2. Out of the total of 40 eyes in both groups, 24 received a single dose of Ozurdex, whereas 14 eyes required repeat injections. Seven patients in each group required only 1 reinjection at a mean of 2.95 (SEM 0.50) months and 2.90 (SEM 0.45) in group 1 and group 2, respectively, after their first injection. Mean BCVA (logMAR units) in group 1 and 2 were 0.72 (SEM 0.077) and 0.67 (SEM 0.065) at baseline (P = 0.286), 0.38 (SEM 0.077) and 0.34 (0.066) at 3 months (P = 0.99), 0.29 (SEM 0.050) and 0.36 (SEM 0.081) at 6 months (0.006), and 0.19 (SEM 0.025) and 0.38 (SEM 0.088) at 12 months (P = 0.001), respectively. Mean CMT (µ) in group 1 and 2 were 519.5 (SEM 32.66) and 491.1 (SEM 37.44) at baseline (P = 0.33), 285.8 (SEM 18.47) and 334.2 (SEM
30.65) at 3 months (P = 0.035), 343.1 (SEM 25.67) and 328.9 (SEM 29.96) at 6 months (P = 0.294), and 283.4 (SEM 26.49) and 316.42 (SEM 32.14) at 12 months (P = 0.231), respectively. Contrast sensitivity and color vision were significantly better in group 1 as compared with group 2 at 12 months. Raised IOP (>25 mm Hg) was noted in only 1 patient.

Conclusions: Visual outcomes at 12 months were significantly better with Ozurdex monotherapy as compared with combination therapy of Ozurdex with laser. There was no difference in the number of repeat injections or IOP after 1 year of therapy.

Poster No.: EX2–275
Panel No.: 275, Session 2
Intravitreal Aflibercept Versus Photodynamic Therapy in Chinese Patients With Wet Age-Related Macular Degeneration: 52-Week Outcomes of the SIGHT Study
First Author: Xiaoxin LI
Co-Author(s): Youxin CHEN, Junjun ZHANG, Xun XU, Olaf SOWADE, Oliver ZEITZ
Purpose: SIGHT evaluated intravitreal aflibercept (IVT-AFL) versus photodynamic therapy (PDT) in Chinese patients with predominantly classic choroidal neovascularization (CNV) secondary to wet age-related macular degeneration.
Methods: Patients were randomized 3:1 to IVT-AFL 2 mg every 8 weeks after 3 initial monthly injections/sham PDT or PDT/sham injections with a switch to IVT-AFL at week 28 (PDT→IVT-AFL). Primary outcome was the mean change in best corrected visual acuity (BCVA) at week 28. We report the week 52 results.
Results: Three hundred four patients were randomized to IVT-AFL (n = 228) or PDT→IVT-AFL (n = 76) (mean age, 65.1 years). At week 52, mean BCVA change (IVT-AFL vs PDT→IVT-AFL) was +15.2 versus +8.9 letters (between-group difference was 6.2 letters; P = 0.0009 descriptive), patients that lost <15 letters was 97.4% versus 90.8%, and reduction in mean central retinal thickness (CRT) was –189.6 versus –170.0 µm, respectively. After switching from PDT to IVT-AFL, there were improvements in BCVA (+5.4 letters) and CRT (~76.9 µm). The greatest BCVA benefits with IVT-AFL were in patients aged <65 years or with smaller active CNV lesions (<50% of lesion size). The most common ocular treatment–emergent adverse events (study eye) were macular fibrosis (10.5%) and reduced visual acuity (10.2%). Three treatment–emergent Antiplatelet Trialists’ Collaboration–defined arterial thromboembolic events were observed, but none were considered drug-related.
Conclusions: Visual and morphological benefits with IVT-AFL were maintained at week 52. Patients experienced additional benefits after switching from PDT to IVT-AFL. The safety profile was consistent with previous studies.

Poster No.: EX2–276
Panel No.: 276, Session 2
Comparison of Subfoveal Choroidal Thickness Among Three Subtypes of Exudative Age-Related Macular Degeneration
First Author: Hee-seong YOON
Co-Author(s): Sang-won KIM, Soh-eun AHN
Purpose: To compare the initial subfoveal choroidal thickness in eyes with treatment–naive typical neovascular age–related macular degeneration (nAMD), polypoidal choroidal vasculopathy (PCV), and retinal angiomatous proliferation (RAP).
Methods: One hundred fifty-three eyes with newly diagnosed exudative AMD were retrospectively collected. All study eyes were classified into 3 subtypes: typical nAMD, PCV, and RAP. Subfoveal choroidal thickness (SFCT) was measured using enhanced depth imaging optical coherence tomography (EDI-OCT). Best corrected visual acuity (BCVA), central macular thickness (CMT), and OCT features including subretinal fluid, pigment epithelial detachment, and intraretinal fluid cyst were also evaluated in all eyes. SFCT, BCVA, CMT, and OCT features were compared among the 3 subtypes of wet AMD, and the correlation between SFCT and CMT was analyzed.
Results: Seventy–one eyes (46.4%) of typical nAMD, 58 eyes (37.9%) of PCV, and 24 eyes (15.7%) of RAP were included. SFCT decreased significantly in PCV (297.5 ± 97.3 µm), typical nAMD (227.8 ± 103.1 µm), and RAP (150.5 ± 56.5 µm), in that order. In BCVA and CMT, there were no significant differences in the 3 subgroups. In OCT features, intraretinal fluid cyst was more frequently shown in RAP than others. There was no significant correlation of SFCT with CMT in study eyes.
Conclusions: This study demonstrates choroidal thickening in PCV and thinning in RAP as compared with that in typical nAMD. These findings suggest somewhat different pathogenic mechanisms in 3 subtypes of exudative AMD. Subfoveal choroidal thickness measurements could help differentiate the subtypes of exudative AMD.
**Purpose:** Retinitis pigmentosa (RP) refers to a group of outer retinal dystrophies characterized by the death of photoreceptors. Both oxidative stress and inflammation are involved in the pathogenesis of RP. We investigate whether vitamin D has a potential for the treatment of RP by evaluating the antioxidative stress and anti-inflammatory properties of the active form of vitamin D3, 1α, 25-dihydroxyvitamin D3, in a mouse cone cell line, 661W.

**Methods:** Mouse cone cells were treated with H2O2 or a mixture of H2O2 and vitamin D. Cell viability was determined by crystal violet assay. The production of reactive oxygen species (ROS) in treated and untreated cells was measured using a fluorescence dye, DCF-HDA. The expression of key antioxidative stress and inflammatory genes in treated and untreated cells was determined using endpoint point reverse transcription polymerase chain reaction and quantitative real-time PCR.

**Results:** Treatment with vitamin D significantly increased cell viability and decreased ROS production in 661W cells under oxidative stress induced by H2O2. H2O2 treatment in 661W cells can significantly downregulate the expression of antioxidant genes (Catalase, SOD1, SOD2, SOD3, GPX1, and GPX3) and upregulate the expression of neurotoxic cytokines. Vitamin D treatment significantly reversed these effects and restored the expression of antioxidant genes. Vitamin D treatment also can block H2O2-induced oxidative damages.

**Conclusions:** The treatment of 1α, 25-dihydroxyvitamin D3 showed protective effects against oxidative stress and inflammation, suggesting vitamin D may offer a therapeutic potential for RP patients.

**Poster No.: EX2–278**  
**Panel No.: 278, Session 2**

**Comparison and Quantitative Analysis of Fundus Autofluorescence Changes Among Bevacizumab, Ranibizumab, and Afiblercept in Exudative Age-Related Macular Degeneration**

*First Author: Jae Min KIM*  
*Co-Author(s): Eung-suk KIM, Hyung-woo KWAK, Seung Young YU*

**Purpose:** To compare and quantify fundus autofluorescence (FAF) changes occurring in patients with exudative age-related macular degeneration (AMD) after antivascular endothelial growth factor (anti-VEGF) treatment with intravitreal bevacizumab, ranibizumab, and aflibercept injection.

**Methods:** This was a retrospective study. Sixty-four eyes of 61 consecutive patients with naive exudative AMD who had received treatment with bevacizumab (15 eyes) or ranibizumab (25 eyes), followed for more than 48 months, and aflibercept (24 eyes), followed for 12 months, were enrolled. All patients received 3 consecutive injections of each anti-VEGF, followed by PRN treatment. At all visits, FAF images were analyzed using semiautomated software.

**Results:** All patients showed confluent hypoautofluorescence on FAF, and the mean size of hypoautofluorescence was not different in the 3 groups ($P = 0.710$). The mean size of the hypofluorescent area decreased after the loading phase of anti-VEGF ($1.007 \text{mm}^2$, $P = 0.101$). The aflibercept group showed a significantly large decrease ($P = 0.008$), which significantly increased by final follow-up at 48 months (3.861 mm$^2$, $P < 0.001$). The significant predictor in multivariate linear regression modeling for the dependent variable hypofluorescent area at 48 months was the hypofluorescent area after the loading phase of anti-VEGF ($P = 0.001$).

**Conclusions:** Hypoautofluorescence size decreased shortly after the loading phase of anti-VEGF and subsequently increased. The aflibercept group showed the largest decrease in hypoautofluorescence size. Hypofluorescence after the loading phase of anti-VEGF was a significant predictor of hypofluorescence at final follow-up.

**Poster No.: EX2–279**  
**Panel No.: 279, Session 2**

**Recent Status of Diabetic Mellitus—Related Ocular Complications in Japan**

*First Author: Atsuki KUME*  
*Co-Author(s): Tomohiro OHSHIRO, Yoichi SAKURADA, Kenji KASHIWAGI*

**Purpose:** To investigate the recent status of diabetes mellitus (DM) and its related ocular complications using health insurance claims in Japan.

**Methods:** Subjects were 3.11 million Japanese who were registered in the Japan Medical Data Center (JMDC) database from 2005 to 2014. Subjects with DM were defined as those who had any type of code for DM and/or DM-related complications classified by the International Classification of Diseases version 10 (ICD 10) and those prescribed any therapeutic agents for DM. The status of 3 major DM-related complications, including renal complications, neuronal complications, and ocular complications, was investigated. As DM-related ocular complications, diabetic retinopathy (DMR), proliferative diabetic retinopathy (PDR), diabetic macular edema (DME), neovascular glaucoma (NVG), and vitreous hemorrhage were also investigated.

**Results:** The total number of patients with DM was 66,923 in the study period, and the numbers of ocular complications, neuronal complications, and renal complications were 21,463 (32.1%), 5304 (7.8%), and 12,396 respectively.
(18.5%), respectively. Among subjects with ocular complications, there were 1,180 cases of PDR (1.8%), 762 of DME (1.1%), 195 of NVG (0.3%), and 1003 of vitreous hemorrhage (1.5%). Only DME showed a significant increase during the study period. Of subjects with type 1 DM (T1DM), 47.5% and 35.0% of those with type 2 DM (T2DM) had ocular complications. Age when ocular complications were diagnosed for the first time was younger among subjects with T1DM (45.8 ± 14.0 years) than in those with T2DM (55.4 ± 9.9 years).

Conclusions: Ocular complications were the most common among DM–related complications. DME showed a significant increase among ocular complications in recent years.

Poster No.: EX2–280
Panel No.: 280, Session 2

Dissecting Cell Death Mechanisms in an X-Linked Retinitis Pigmentosa Mouse Model
First Author: Xinhua SHU

Purpose: X–linked retinitis pigmentosa (XLRP) is the most severe retinal degeneration, accounting for up to 20% of all RP cases. Mutations in the RP GTPase regulator (RPGR) gene are the major cause of XLRP. In this study, we aimed to understand the mechanisms of retinal cell death in RPGR knockout (KO) mice.

Methods: Retinal degeneration of RPGR KO mice at different age points was examined by histology. Key elements of caspase–dependent apoptosis, caspase–independent apoptosis, and necrosis were examined by quantitative real–time PCR, immunohistochemistry, and Western blot.

Results: The photoreceptor degeneration of RPGR KO mice starts at 3M, and the number of dying photoreceptors peaks at 6M by TUNEL assay. By the age of 12 months, only 2 outer nuclear layers remained. The caspase–independent mediator apoptosis–inducing factor (AIF) was detected in the inner segments of 3M KO mouse retina, and its mRNA level also significantly increased. Meanwhile, the expressions of RIPK1 and RIPK3, which mediate the necrosis, were found in the photoreceptors of 3M KO mice, whereas no expression was detected in age–matched siblings.

Conclusions: The increased expression of mediators in caspase–independent apoptosis and necrosis pathways may contribute to photoreceptor death in RPGR KO mice.

Poster No.: EX2–281
Panel No.: 281, Session 2

Comparisons of Retinopathy of Prematurity by Race Over a Six-Year Period at a Single Tertiary Care NICU

First Author: Po-chen TSENG
Co-Author(s): Irena TSUI

Purpose: There have been studies showing that ethnic variations were not a risk factor for worse retinopathy of prematurity (ROP). The purpose of this study was to examine race and other factors that can affect ROP at a single tertiary care hospital in Los Angeles, California, where the patient population is racially diverse.

Methods: A retrospective chart review of infants screened for ROP at a single neonatal intensive care unit from March 2008 to May 2014 was performed. Risk factors were reviewed. Main outcome measures were rates of plus disease or treatment–requiring ROP. The impacts of race and up to 14 other covariates were simultaneously assessed using a backward (step down) ordinal logistic regression.

Results: Analysis on 288 of 299 infants screened for ROP was performed, adjusting for up to 14 factors. In multivariate analysis, gestational age, birth weight, and bronchopulmonary dysplasia were independent risk factors for both plus disease and treatment–requiring ROP. Hispanic babies did not have significantly worse ROP or a higher incidence of plus disease than white babies with or without controlling for potential risk factors.

Conclusions: In our population, gestational age, birth weight, weight gain at 28 days, and bronchopulmonary dysplasia were independent risk factors for ROP development and severity. Hispanic newborns did not have worse ROP or a higher rate of plus disease than white newborns when controlling for confounding risk factors.
Results: All 24-hour ABPM values except night mean SBP showed statistical differences when comparing the BRVO group with the control group. The odds of non-dippers against dippers in the BRVO group were 2.59 times greater than that in the control group. In the BRVO group, clinical SBP and diastolic blood pressure (DBP) did not present significant differences between the hypertension group and the nonhypertension group. By contrast, there were statistically significant differences for 24-hour mean SBP and mean DBP depending on hypertension.

Conclusions: The BRVO group had a tendency to maintain high blood pressure at nighttime. Nondipping can be a risk factor for BRVO, even if a patient does not have hypertension. Clinical BP measurement does not reflect the diurnal variation of BP over 24 hours. Otherwise, 24-hour ABPM has an effect on the management of hypertension and the diagnosis of hypertension in the BRVO. Lastly, we expect that positive management of hypertension with 24-hour ABPM may give rise to better prognosis of BRVO.

Poster No.: EX2-327
Panel No.: 327, Session 2

5-Year Follow-Up of Intravitreal Injections of Ranibizumab for Myopic Choroidal Neovascularization

First Author: Tsung-tien WU
Co-Author(s): Ya-hsin KUNG

Purpose: To evaluate the 5-year outcomes, efficacy, and safety of intravitreal ranibizumab injections for myopic choroidal neovascularization (CNV).

Methods: We retrospectively reviewed the medical records of 17 consecutive eyes that received intravitreal injections of ranibizumab for myopic CNV with a follow-up of at least 5 years. Retreatment was performed as needed in eyes with persistent or recurrent CNV during follow-up. Patient demographic data, best-corrected visual acuity (BCVA), CNV findings on fluorescein angiography (FA), central macular thickness (CMT) on optical coherence tomography (OCT), total number of treatments, and complications were recorded.

Results: Mean baseline BCVA improved significantly from 0.57 ± 0.47 logMAR [Snellen equivalent (SE), 6/23] to 0.32 ± 0.36 logMAR (SE, 6/13) at 1 year and to 0.39 ± 0.43 logMAR (SE, 6/15) at 2 years (P = 0.002 and 0.041, respectively). Although mean BCVA maintained better than baseline after 2 years, there was no statistical significance. The average number of total injections over 5 years was 4.65 (SD 3.61). A mean of 2.94 injections were performed in the first year, 0.47 in the second year and the third year, 0.35 in the fourth year, and 0.41 in the fifth year. Nine eyes (52.94%) had no need for treatment after the first year. At 5 years, 10 eyes (58.82%) showed a gain of at least 1 line after treatment and 5 eyes (39.3%) showed a gain of more than 3 lines. There were 2 eyes with final VA worse than baseline due to disease activity and profound chorioretinal atrophy. Increased areas of chorioretinal atrophy were noted in 5 eyes at 5-year follow-up. No complications were noted after treatment.

Conclusions: Intravitreal ranibizumab injection was safe and effective in treating myopic CNV. More than half of the eyes had a visual gain over 5 years.

Poster No.: EX2-328
Panel No.: 328, Session 2

The Use of Eye Care Among Persons With Diabetes and Diabetic Retinopathy in Jogjakarta, Indonesia: The JOGjakarta Eye Diabetic Study in the COMmunity (JOGED.COM)

First Author: Angela AGNI
Co-Author(s): Muhammad SASONGKO

Purpose: To assess the use of eye care among persons with diabetes and diabetic retinopathy (DR) in Jogjakarta, Indonesia.

Methods: This was a community-based cross-sectional study involving all adults with diabetes. Two-stage, clustered random sampling was used to select the community health centers included in this study. We obtained all sociodemographic characteristics, behavior toward general and eye care, physical activities, eating habits, history of past illnesses, and eye examination at the baseline visit. Two-field, dilated fundus photographs were taken from each participant. DR grading was performed by a trained grader. Severity of DR was determined following modified Airlie house classification.

Results: There were 540 adults with diabetes included in this analysis. The general prevalence of DR was 36.6% [9.7% mild, 17.8% moderate nonproliferative DR, and 8.9% vision-threatening DR (VTDR)]. Overall, only 3.4% of all participants had ever visited an ophthalmologist for eye care. Of these, only 2.2% reported having regular eye checks on a monthly basis, and the remaining 1.4% were on a 3-month basis. The prevalence of any DR and VTDR among those who never had eye checks was 40% and 12% respectively, and 25% and 0% among those who had regular eye checks.

Conclusions: Nearly all the population with diabetes in Jogjakarta has never used eye care, despite the severity of DR. Barriers to eye care services in this population need to be identified, and further efforts to promote the importance of having regular eye care among persons with diabetes will be a top priority.

Poster No.: EX2-330
Panel No.: 330, Session 2

**Treatment of Myopic Choroidal Neovascularization With Posterior Subtenon Bevacizumab Injection (Avastin)**

*First Author: I Chia LIANG*
*Co-Author(s): Yu-ying CHANG, Tong-sheng LEE, Yi-ru LIN, Wei Li CHEN, Kwan-rong LIU*

**Purpose:** The aim of this study was to report the successful treatment of choroidal neovascularization (CNV) in pathologic myopia (PM) with a posterior subtenon bevacizumab (PSTB; Avastin) injection.

**Methods:** This study was a prospective case series including 9 eyes of 8 patients with PM and CNV.

**Results:** As corneal stromal penetration of subconjunctival bevacizumab has been demonstrated in animal studies, sclera penetration of PSTB could be expected. All 9 eyes were injected with PSTB (12.5 mg/0.5 mL). Treatment effectiveness was evaluated with optical coherence tomography (OCT). If intraretinal edema or subretinal fluid were detected, injections were repeated after 2 weeks. The main outcome measures were logMAR best corrected visual acuity (BCVA) and central foveal thickness (CFT). The mean follow-up time was 77.56 weeks. BCVA improved by a mean of –0.38 logMAR (>3 lines). The average reduction in absolute CFT was 25.67 µm. OCT revealed marked CNV volume reduction and fluid–free status in 7 eyes. The fluid–free status remained for ≥1 year in these eyes. Fluorescein angiography revealed CNV resolution in 3 eyes.

**Conclusions:** According to these results, PSTB may be an alternative for the treatment of myopic CNV.

Poster No.: EX2–332
Panel No.: 332, Session 2

**Increased Risk of Coronary Heart Disease in Male Patients With Central Serous Chorioretinopathy: Results of a Population-Based Cohort Study**

*First Author: Sheng Ta LEE*
*Co-Author(s): San-ni CHEN*

**Purpose:** To investigate whether patients with central serous chorioretinopathy (CSCR) have an increased risk of coronary heart disease (CHD).

**Methods:** A population–based retrospective cohort and case–control study. Longitudinal data from the Taiwan National Health Insurance Research Database (2000–2009) were analyzed. The study cohort comprised 835 patients with a diagnosis of CSCR and 4175 age– and sex–matched patients without CSCR. Kaplan–Meier plots and log–rank tests were used to compare differences in the hazard rates (HR) of CHD between the CSCR and non–CSCR cohorts. Stratified Cox proportional hazard models were applied to examine the association between CSCR and CHD, adjusting for potential confounding factors.

**Results:** The 5–year CHD cumulative incidence for patients with CSCR was nearly 2–fold that of the non–CSCR cohort (6.12% vs 3.29%, \( P = 0.004 \)) from the log–rank test. The adjusted CHD HR of CSCR versus non–CSCR was 1.61 [95% confidence interval (CI), 1.12 to 2.30; \( P = 0.009 \)] from the Cox model. Specifically, the HR for male patients was 1.72 (95% CI, 1.14 to 2.59; \( P = 0.010 \)) and for female patients it was 1.34 (95% CI, 0.64 to 2.84; \( P = 0.438 \)).

**Conclusions:** Male patients with CSCR had a significantly higher CHD rate than those without CSCR, indicating that CSCR may be a potential risk factor for the development of CHD in men.

Poster No.: EX2–282
Panel No.: 282, Session 2

**Incidence and Risk Factors of Cystoid Macular Edema After Scleral Buckling**

*First Author: Po-ting YEH*
*Co-Author(s): Tso-ting LAI, Jen-shang HUANG*

**Purpose:** To investigate the incidence of cystoid macular edema (CME) after scleral buckling (SB) surgery with OCT and verify the risk factors of CME after SB procedure.

**Methods:** A retrospective, noncomparative, interventional case series was conducted at NTUH. The medical records of 130 eyes from 130 consecutive patients who underwent SB for primary retinal detachment (RD) from 2009 to 2013 were retrospectively reviewed. Data pertaining to patient demographics, pre– and postoperative visual acuity, surgical procedures, and postoperative OCT findings and complications were recorded. Factors associated with CME were also examined.

**Results:** Mean patient age was 45.7 ± 14.6 years. The preoperative and postoperative mean logMAR visual acuity was 0.70 ± 0.68 and 0.41 ± 0.40 (\( P < 0.001 \)), respectively. All cases received cryopexy, and 54 (41.5%) eyes had external drainage. The mean extent of RD involved was 4.6 ± 1.6 clock–hours. One hundred twenty–eight (98.5%) eyes received segmental SB, and 2 eyes (1.5%) had encircling SB. Gas injection was done in 48 (36.9%) eyes. There were 9 (6.9%) eyes that developed CME after SB. The risk factors associated with CME were old age, extent of RD, macula off, and external drainage (\( P < 0.05 \)). No cases of postoperative endophthalmitis or choroidal hemorrhage were observed.

**Conclusions:** CME occurred in 6.9% of patients. The risk factors associated with CME included older age,
more extended RD, macular detachment, and external drainage. OCT is a useful tool for following patients after SB in regards to CME.

**Poster No.:** EX2–283  
**Panel No.:** 283, Session 2

### 27-Gauge Vitrectomy Under Topical Anesthesia

**First Author:** Hussain KHAQAN  
**Co-Author(s):** Jorn-hon LIU

**Purpose:** To evaluate the safety and efficacy of 27G vitrectomy under topical anesthesia.

**Methods:** Forty-nine eyes of 49 patients underwent 27-gauge vitrectomy under topical anesthesia with a pledget soaked in 0.5% proparacaine hydrochloride anesthetic placed in the superior and inferior fornix for 3 minutes before the start of surgery for vitreous hemorrhage, tractional retinal detachment, epiretinal membrane, and macular hole. Subjective pain and discomfort were graded using a visual analog chart from 0 (no pain or discomfort) to 4 (severe pain and discomfort). Patients underwent an immediate postoperative assessment, followed by next day and 1 week postoperative evaluation.

**Results:** Thirty-eight (77.5%) patients had grade 0 pain during the surgery, 10 (20.4%) patients had grade 1 pain, and 1 (2%) patient had grade 2 pain during the placement and withdrawal of the microcannulas. The surgical outcomes were favorable.

**Conclusions:** The 27-gauge vitrectomy procedure under topical anesthesia is safe and effective in selected cases.

**Poster No.:** EX2–285  
**Panel No.:** 285, Session 2

### Polypoidal Choroidal Vasculopathy: Treatment in the “Real World”

**First Author:** Hsiao Ming CHAO  
**Co-Author(s):** Jorn-hon LIU

**Purpose:** To evaluate the efficacy of combined therapy with verteporfin photodynamic therapy and ranibizumab 1.0 mg, monotherapy with anti-VEGF, or transpupillary thermotherapy (TTT) in patients with visually symptomatic macular polypoidal choroidal vasculopathy.

**Methods:** In this study, 16 eyes of 14 Chinese patients (mean age, 68.50 ± 2.87 years; 12 males, 2 females; 5 right eyes, 11 left eyes; bilaterality in 2 patients) were treated by combined therapy (n = 9), anti-VEGF monotherapy (n = 6), or TTT (n = 1). Patients were followed up monthly with 3D OCT and retreated if visual symptoms recurred or persisted. Patients were evaluated with indocyanine green angiography to observe the regression of polyps. Change in best corrected visual acuity (BCVA) was also included.

**Results:** In the mean follow-up period of 32.19 ± 9.56 months, combined therapy and anti-VEGF monotherapy resulted in reduced central retinal thickness (150.63 ± 40.77 µm vs 217.40 ± 99.13); BCVA change (0.01 vs -0.15); and a total cost (US$) per treatment (3088.00 ± 669.23 vs 4034.29 ± 754.62). The mean injection numbers were 1# PDT (1.27 ± 0.20) + 2# anti-VEGF agents (2.00 ± 0.45) for combined therapy; 6# anti-VEGF agents (6.14 ± 1.60); and 1# TTT. Four eyes with PCV (26.67%) had recurrence, and the recurrent period was 15.88 ± 7.05 months. There were no new safety findings with combined therapy, anti-VEGF monotherapy,
Preoperative Optical Coherence Tomography Pattern

First Author: Yusuke ICHIYAMA
Co-Author(s): Osamu SAWADA, Takamasa MORI, Masato FUJIKAWA, Hajime KAWAMURA, Masahito OHJI

Purpose: To investigate the effectiveness of vitrectomy for diffuse diabetic macular edema (DDME) and its dependence on optical coherence tomography (OCT) findings.

Methods: The records of 65 patients with 81 eyes that received vitrectomy for DDME syndrome and were followed up for at least 6 months were retrospectively reviewed. All eyes were classified according to their OCT morphology including sponge-like diffuse retinal thickening (SDRT; n = 13), cystoid macular edema (CME; n = 42), serous retinal detachment (SRD; n = 13), and the combination of all morphologies (FULL; n = 13).

Best corrected visual acuity (BCVA) and spectral-domain OCT were investigated preoperatively and at 1, 3, and 6 months postoperatively.

Results: At 6 months after surgery, BCVA in logMAR units was significantly improved in all groups [−0.16 ± 0.24 in the CME group (P < 0.01), −0.32 ± 0.32 in the SRD group (P < 0.01), and −0.26 ± 0.19 in the FULL group (P < 0.01)] except the SDRT group [−0.04 ± 0.20 (P = 0.504)]. Improvement of BCVA was significantly better in eyes with subretinal fluid (SRF; the SDRT and FULL groups) than in eyes without SRF (the SDRT and CME groups; P = 0.003).

Conclusions: Vitrectomy could be a useful treatment option for DDME, particularly for eyes with SRF.

The Effectiveness of Vitrectomy for Diffuse Diabetic Macular Edema May Depend on its Preoperative Optical Coherence Tomography Pattern

First Author: Kashif IQBAL

Purpose: To describe the appearance of inner retinal defects using en face spectral-domain optical coherence tomography (SD-OCT) after idiopathic full-thickness macular hole (FTMH) surgery, referred to as concentric macular dark spots (CMDs).

Methods: In a retrospective cohort study, the authors evaluated 36 eyes of 36 patients with large idiopathic MH (400 m) who underwent standard 3-port pars plana vitrectomy with internal limiting membrane (ILM) peeling. All patients were analyzed using B-scan and C-scan en face SD-OCT before and after surgery to determine the OCT pattern of the retinal surface.

Results: Mean follow-up was 10 months (8.45 SD;
range, 3–30 months). Three months after surgery, 36 of 36 eyes (100%) showed a CMDS appearance on en face SD-OCT images. Anatomic success rate was 100% (36/36 eyes) after a single surgical procedure. Once they were evident, these dark spots observed on the retinal surface were not progressive and remained stable over time.

**Conclusions:** Inner retinal defects frequently occurred after idiopathic MH surgery when ILM was peeled. All patients in the study showed this typical OCT pattern 3 months after surgery. Thus, the authors suggest that this is a helpful, noninvasive technique to assess complete ILM removal in FTMH surgery if CMDS appearance on the retinal surface is reported.

**Poster No.:** EX2–289  
**Panel No.:** 289, Session 2  
**Intraoperative Optical Coherence Tomographic Factors Associated With Macular Hole Closure at Early Postoperative Stage in the PIONEER Study**  
**First Author:** Yuji ITO  
**Co-Author(s):** Peter KAISER, Rishi SINGH, Sunil SRIVASTAVA, Justis EHLLERS  
**Purpose:** To evaluate the optical coherence tomography (OCT) features that may predict rapid macular hole (MH) closure (eg, 24 hours) compared with delayed hole closure (eg, >24 hours).

**Methods:** Fifty–one eyes of 51 patients from the PIONEER study with intraoperative OCT (iOCT), preoperative SD–OCT, and transgas SD–OCT on postoperative day 1 were included. Quantitative OCT assessment, including volumetric MH assessment, was performed.

**Results:** MH closure was confirmed on postoperative day 1 in 43 eyes (84%). Eight eyes were not closed. In the MH cases with early closure, MH maximum and minimum diameter ($P < 0.001$, $P = 0.0021$, respectively) before surgery were significantly larger than eyes that did not exhibit MH closure on postoperative day 1. The distance between the ellipsoid zone and the retinal pigment epithelium (RPE) (EZ–RPE height) after internal limiting membrane (ILM) peeling ($P = 0.031$), the linear extent of EZ–RPE expansion after ILM peeling ($P = 0.005$), and MH volume before and after ILM peeling ($P = 0.0048$, 0.0058, respectively) were also significantly larger.

**Conclusions:** Intraoperative MH architectural alterations that occur during ILM peeling may play a critical role in the rate of MH closure. Additional research is needed to determine whether this information can be utilized to individualize postoperative positioning to maximize surgical success while minimizing duration of positioning.
Results: A 65-year-old woman had a diagnosis of macular hole. The macular hole was not closed after ICG–assisted internal limiting membrane (ILM) peeling and SF6 tamponade. Two months later, the patient underwent another ILM peeling surgery, during which free ILM was plugged into the macular hole and then covered by viscoelastic agent (Viscoat, Alcon). However, on the first postoperative day, the plugged ILM was not observed any more, and the macular hole remained open. On postoperative day 2, acute endophthalmitis with anterior chamber hypopyon was noted, and emergent vitrectomy with intravitreal injection of antibiotics was performed. A thin fibrin layer coating on the macula was noted during the surgery. A few days later, the endophthalmitis seemed resolved. After the corneal edema resolved and the fundus became visible, we found that the macular hole had closed.

Conclusions: Because previous literature shows that tissue supplements to the macular hole such as autologous blood clots, ILM plugs, or anterior capsule plugs play a bridging role and help close the macular hole, premacular fibrin generated in a case of acute endophthalmitis can act similarly. In this case, we fortunately found that a loss may turn out to be a gain.

Poster No.: EX2–292  
Panel No.: 292, Session 2  
Macular Hole Surgery Outcomes in Central and Sub-Saharan Africa  
First Author: Nishant RADKE  
Co-Author(s): Snehal RADKE  
Purpose: To determine the outcomes of macular hole surgery in central and sub-Saharan Africa.

Methods: A retrospective hospital–based case series at 2 different hospitals between April 2013 and June 2015. The main outcome measures were hole closure rates, visual outcome, and complications.

Results: Fifty–seven eyes of 54 patients were studied. The median age of the patients was 62 years (range, 13–82 years). Most of the holes were idiopathic (87.7%), and the rest were traumatic. Mean duration of symptoms of 13.7 months. The average delay between diagnosis and surgery was 2.4 months. Mean hole size was 578 μm. Forty–six eyes (80.7%) underwent standard internal limiting membrane (ILM) peeling, whereas 11 eyes (19.3%) underwent inverted flap ILM peel. All the eyes were followed up for at least 1 month postoperatively, with a 93% follow–up rate at 3 months, 63% at 6 months, and 36% at 1 year. In total, 94.7% of eyes had anatomical closure; 68.42% had visual improvement of ≥2 Snellen lines, and 15.8% preserved preoperative vision. Nonclosure occurred in holes with size > 400 μm and duration > 6 months. The inverted flap technique had better visual outcome for holes ≥ 400 μm (P = 0.007) and ≥ 6 months duration (P = 0.0045) compared with standard ILM peel alone.

Conclusions: Macular hole surgery was associated with very successful outcomes in the majority of patients regardless of etiology. The anatomic outcome was better than the visual outcome. Inverted ILM peeling is associated with better outcomes in older and larger holes compared with conventional peeling.

Poster No.: EX2–293  
Panel No.: 293, Session 2  
Outcome of Cytomegalovirus-Associated Retinal Detachment Surgeries in Human Immunodeficiency Virus—Infected Patients in the Era of Highly Active Antiretroviral Therapy  
First Author: An-fei LI  
Co-Author(s): Shih-jen CHEN  
Purpose: To describe the surgical outcome of retinal detachment related to cytomegalovirus (CMV) retinitis in human immunodeficiency virus (HIV)–infected patients in 1 tertiary center.

Methods: A retrospective interventional case series.

Results: From July 2003 to July 2015, 6 eyes from 5 patients were reviewed. Four patients had a minimum follow–up time of 1 year. All 5 eyes received silicone oil implantation. Two patients had CD4–positive T cell counts > 300/μL, and the other 2 patients, < 50/μL. Anatomical reattachment after oil removal was achieved in 3 eyes, yet only 2 eyes had vision of 6/60.

Conclusions: Although the rate of retinal detachment in such patients in the era of highly active antiretroviral therapy is estimated at 0.06 person–year, the surgical outcome is poor. Only collaborated teamwork between internists and ophthalmologists can make prompt diagnosis and treatment possible to minimize the chance of devastating retinal detachment in HIV–infected patients with CMV retinitis.

Poster No.: EX2–294  
Panel No.: 294, Session 2  
Can 23-Gauge Vitrectomy Sclerotomies Be Made More Self-Sealing?  
First Author: Errol CHAN  
Co-Author(s): John CHEN  
Purpose: Although 23–gauge transconjunctival vitrectomies are intended to be self–sealing, consistent achievement of this outcome is sometimes difficult. The aim of this study was to describe surgical strategies in the promotion of self–sealing 23–gauge sclerotomies.

Methods: A prospective observational study was conducted on the self–sealing nature of sclerotomies of
Consecutive 23-gauge vitrectomies at our eye center in 2015. All cases underwent fluid-air or fluid-gas exchange. Sclerotomies were deemed self-sealing if there was absence of bubbling from the wound. Intraocular pressure measurement at the first postoperative visit was done, and a pressure of 6 mm Hg or less was also deemed to be from leaking sclerotomies. Wound architecture, duration of surgery, type of tamponade, and location of sclerotomy site were documented. Intraoperative maneuvers employed to stop leakage such as wound massage, trimming of herniated vitreous, refashioning of sclerotomy site with 20-gauge microvitrectomy blade, and suturing of the leaking sclerotomy, were also documented.

**Results:** Fifty cases comprising 150 sclerotomies were included in this study cohort. With a combined approach of sclerotomy construction and management of leaking sclerotomies, less than 5% of all sclerotomies required suturing. Specific surgical strategies, including enlargement and counter-cutting of sclerotomies with the MVR blade, will be discussed in detail.

**Conclusions:** Meticulous attention to sclerotomy construction combined with a stepwise approach to managing initially leaky sclerotomies is effective in achieving more self-sealing 23-gauge vitrectomy sclerotomies.

**Poster No.:** EX2–295  
**Panel No.:** 295, Session 2

**Mechanisms of Cefuroxime Toxicity in Human Retinal Pigment Epithelial Cells: Implications for Preventing or Treating Endophthalmitis in Vitreoretinal Surgeries**

**First Author:** Yi-sheng CHANG  
**Co-Author(s):** Sung-huei TSENG

**Purpose:** Cefuroxime is used to prevent postoperative endophthalmitis, commonly in the intracameral dose of 1 mg/mL at the end of cataract surgery. For its application in vitreoretinal surgery, this study investigated the mechanisms of cefuroxime toxicity in human retinal pigment epithelial (RPE) cells.

**Methods:** Cultured human ARPE–19 cells were exposed to culture medium alone (control) or with cefuroxime (0.25, 0.75, 2.5, 7.5, 25, 75, or 250 mg/mL) for 1, 2, 6, or 24 hours. Cytotoxicity was assessed by trypan blue staining, viability, TUNEL staining, propidium iodide/annexin V–FITC staining, caspase inhibition assay, and TEM.

**Results:** On trypan blue staining, exposure to 0.75 mg/mL cefuroxime for 24 hours resulted in dead and shrunken RPE cells; the numbers increased in a dose- and time-dependent manner. On the viability assay, exposure to 0.25 mg/mL cefuroxime for 24 hours or 25 mg/mL for 1 hour impaired mitochondrial function.

On TUNEL staining, exposure to 7.5 or 25 mg/mL cefuroxime caused DNA fragmentation, characteristic of late apoptosis. On propidium iodide/annexin V–FITC staining and flow cytometry, cefuroxime led to dose- and time-dependent cell death by both apoptosis (more) and necrosis (less). On the caspase inhibition assay, pretreatment with inhibitors of caspase–1, 2, 3, or 9 reduced the percentages of apoptotic cells and reduced cyclosporine A, a mitochondrial stabilizer. Ultrastructural study showed that exposure to 2.5 mg/mL cefuroxime for 24 hours led to swollen organelles, and higher concentrations induced remarkable swelling, disorganization of organelles, disruption of cell membranes, and cell lysis.

**Conclusions:** Cefuroxime causes time- and dose-dependent damage to RPE cells by apoptosis and necrosis. One of the apoptotic pathways is via caspase–2, mitochondria, and caspase–3. Ultrastructure and mitochondria function are impaired within 24 hours. Exposure to 2.5 mg/mL cefuroxime, the commonly used intracameral concentration, is detrimental to RPE cells. We recommend safety precautions to decrease the risk of RPE toxicity.

**Poster No.:** EX2–296  
**Panel No.:** 296, Session 2

**Comparison of Surgical Outcomes of Primary Rhegmatogenous Retinal Detachment in Phakic Eyes Between High Myopia and Non-High Myopia**

**First Author:** Ya-hsin KUNG  
**Co-Author(s):** Tsung-tien WU

**Purpose:** We sought to evaluate the surgical outcomes of primary rhegmatogenous retinal detachment (RRD) in phakic eyes and compare the results between high myopia (HM) and non–HM.

**Methods:** In this retrospective, comparative study, 758 consecutive phakic eyes received primary RRD surgery with a follow–up of at least 6 months. Two groups were created: 349 eyes with HM (~6.00 diopters of refractive error or greater and axial length longer than 26.5 mm) and 409 eyes without HM. We recorded the clinical data to assess and compare anatomical and functional success between the groups.

**Results:** The baseline characteristics of highly myopic eyes did not differ significantly from those of control in terms of sex distribution, preoperative mean logMAR visual acuity (VA), duration of symptoms, number of retinal breaks, and macular involvement. Highly myopic eyes had significant differences from controls in younger mean age (35.37 ± 13.58 vs 52.83 ± 14.61, P < 0.001), a lower number of preoperative vitreous hemorrhages (5.7% vs 13.4%, P < 0.001), less frequent use of combined scleral buckling and vitrectomy (26.1% vs 37.7%,
Panel No.:

Panel No.: 297, Session 2

Safety of Reusing Single-Use Vitrector in Pars Plana Vitrectomy: A Microbiological Study of Reprocessing Procedure With and Without 5% Povidone-Iodine Flushing

First Author: Sita Paramita AYUNITINGTYAS Co-Author(s): Anggun YUDANTHA, Rita S SITORUS, Andriansjah ANDRIANSJAH, Retno WERDHANI

Purpose: The reuse of a single-use vitrector is a complex issue regarding patient safety. One of prerequisites for reusing single-use devices is contamination-free status. Microorganisms may still exist even after routine reprocessing procedure. This study aimed to evaluate the safety of reusing a single-use vitrector with regard to the proportion, number of colonies, and species of microorganism growth in the vitrector after a reprocessing procedure with and without 5% povidone-iodine flushing.

Methods: A randomized, single-blind, controlled trial. After being used once, single-use vitrectors were randomly allocated into 2 groups: group 1 underwent direct reprocessing (cleaning, disinfection, repackaging, and ethylene oxide sterilization), whereas group 2 were flushed with 5% povidone-iodine before reprocessing. Microorganism culture was obtained from the vitrector tip and flushed water of the tip and lumen cultures. There were no significant differences in the proportion of microorganism growth between the groups (P = 1.000).

Conclusions: The proportion of microorganism growth in the reprocessing group was 2.3%, whereas in the 5% povidone-iodine plus reprocessing group it was 0%. Although no significant difference was found, microorganism growth in the reprocessing group may have a clinical impact. Zero microorganism growth in the 5% povidone-iodine group showed that the addition of 5% povidone-iodine might increase the effectiveness of microorganism elimination in reprocessing.

Poster No.: EX2-298
Panel No.: 298, Session 2

Ultra-Widefield Fundus Imaging in Gas-Filled Eyes After Vitrectomy

First Author: Makoto INOUE Co-Author(s): Takashi KOTO, Akito HIRAKATA

Purpose: To evaluate the quality of images obtained by an ultra-widefield system in gas-filled eyes after vitrectomy for retinal detachment.

Methods: The images obtained by an ultra-widefield scanning laser ophthalmoscope (Optos 200Tx imaging system, Optos PLC) of 33 eyes filled with gas in 40 to 90% of the vitreous cavity after vitrectomy for rhegmatogenous retinal detachment were reviewed. The incidences of detecting retinal tears and reattachments were evaluated. In 20 eyes filled with 50 to 90% gas, the widefield images recorded with 532 nm (green) or 633 nm (red) wavelength laser lights were compared to determine which wavelength had a clearer image.

Results: Ultra-widefield images were taken in the primary position on postoperative days 1 to 40 (mean, 9.9 ± 7.5 days). A retinal reattachment was observed in all eyes, even in 8 eyes filled with gas of 80 to 90%. The images of superior retinal breaks were not seen in 9 of 20 eyes due to a reflection from intravitreal gas bubbles. However, the superior retinal breaks were visible when the patients were asked to gaze downward to reduce the reflection of the gas bubbles. The laser burns and retinal vessels were better seen with green laser light, and the choroidal vasculature was better seen with red laser.

Conclusions: Ultra-widefield fundus images can be used to evaluate retinal breaks and retinal reattachments in gas-filled eyes. The green and red laser lights can image different depths of the retina and choroid in gas-filled eyes.
Pars Plana Vitrectomy Versus Combined Scleral Buckling—Pars Plana Vitrectomy for Phakic Rhegmatogenous Retinal Detachment With Inferior Breaks

First Author: Bhuvan CHANANA
Co-Author(s): Rajvardhan AZAD

Purpose: To compare the results of pars plana vitrectomy (PPV) and combined scleral buckling—PPV (SB/PPV) in phakic rhegmatogenous retinal detachments with inferior breaks.

Methods: In this randomized, prospective, clinical controlled trial, 40 consecutive phakic eyes with primary rhegmatogenous retinal detachment associated with inferior breaks and not complicated by proliferative vitreoretinopathy ≥ grade C received either PPV (group 1) or combined SB/PPV (group 2).

Results: At 6 months follow-up, the primary reattachment rate was 100% (20/20 cases) in group 2 and 70% (14/20 cases) in group 1, the difference being statistically significant (P = 0.027). Best corrected visual acuity improved significantly from a preoperative mean of 1.65 ± 1.13 (range, 0.6 to 3) to a mean of 0.45 ± 0.11 (range, 0.3 to 0.6) in group 2, and in group 1 improved from a preoperative mean of 2.34 ± 0.92 (range, 0.48 to 3) to a mean of 0.668 ± 0.20 (range, 0.48 to 1). The difference between the 2 groups was statistically significant (P = 0.001).

Conclusions: Anatomical and functional success rates are significantly better with the use of a scleral explant during PPV for uncomplicated forms of phakic rhegmatogenous retinal detachment with inferior breaks.

Poster No.: EX2–300
Panel No.: 300, Session 2

Inverted Internal Limiting Membrane Insertion for Macular Hole—Associated Retinal Detachment in High Myopia

First Author: Chung-may YANG
Co-Author(s): San-ni CHEN

Purpose: Macular hole (MH) with retinal detachment (RD) in high myopia (HM) has been a challenging disease for retinal surgeons. Many surgical approaches have been proposed. Although anatomical reattachment may be achieved in a high percentage of cases, MH closure rate is low. We reviewed our high myopic cases of MH and RD treated with inverted internal limiting membrane (ILM) flap insertion into the hole.

Methods: This was a retrospective case control study. From January 2014 to June 2015, consecutive cases of HM complicated by MH with RD treated with vitrectomy, inverted ILM flap insertion into the MH, and gas tamponade were enrolled as the study group. From January 2013 to December 2014, consecutive cases with similar conditions treated by vitrectomy with epiretinal membrane (ERM) and ILM peeling plus gas tamponade served as a control. Clinical data including optical coherence tomography findings and surgical outcome were compared between the study and the control groups.

Results: There were 40 eyes in 40 patients overall (M:F = 10:30), with 20 in the study group and 20 in the control group. The baseline characteristics of the 2 groups were similar. MH was closed in all eyes in the study group and in 7/20 eyes in the control group; the difference was statistically significant. There was no significant difference noted between the study group and control group regarding improvement of visual acuity.

Conclusions: Inverted ILM flap insertion into the hole is effective in hole closure for MH with RD in HM.

Poster No.: EX2–301
Panel No.: 301, Session 2

Epiretinal Membrane-Induced Macular Hole—Clinical Features and Surgical Outcomes

First Author: Chung-may YANG
Co-Author(s): Chia-ying TSAI, Yi-ting HSIEH

Purpose: To compare the clinical features and surgical outcomes in patients with epiretinal membrane (ERM)—induced full-thickness macular holes (FTMH) with typical stage 2 and stage 4 full-thickness macular holes.

Methods: Consecutive cases of ERM—induced FTMH (study group, 24 cases) and stage 2 (control A, 20 cases) and stage 4 (control B, 22 cases) FTMH followed by a single surgeon were retrospectively reviewed. The criteria of ERM—induced FTMH selection were as follows: 1) LMH before FTMH formation noticed on OCT, 2) lamellar hole—associated epiretinal proliferation (LHEP) at the hole edge of FTMH, and 3) FTMH with a narrower base and a wider opening. All patients were followed-up for at least 12 months after treatment.

Results: The study group had a younger average age and a higher rate of high myopia (spherical equivalence <−6.0 D) than controls A and B. In the study group, the average hole size (203.6 ± 104.9 μm) was similar to control A but significantly smaller than control B; the postoperative visual improvement (logMAR −0.26 ± 0.38) was lower than that of the control groups. Similar results were noticed when excluding cases with high myopia from the study group.

Conclusions: Distinct features from the typical stage 2 or 4 FTMH were found in ERM—induced FTMH. Despite the small size, ERM—induced FTMH had less visual improvement than did stage 2 FTMH.

Poster No.: EX2–302
Panel No.: 302, Session 2
Choroidal Hyperpermeability Correlates With Delayed Absorption of Subretinal Fluid After Retinal Reattachment Surgery

First Author: Se Woong KANG
Co-Author(s): Si Yeol KIM, Hum CHUNG

Purpose: To investigate the factors associated with delayed absorption of subretinal fluid (SRF) after surgery for acute rhegmatogenous retinal detachment (RRD).

Methods: This prospective study involved 36 eyes of 36 consecutive patients who underwent successful surgery for RRD. Optical coherence tomography and indocyanine green angiography (ICGA) were conducted before and after the surgery. Delayed absorption was defined as the presence of SRF bleb or residual concave SRF at postoperative 6 months. Clinical factors and choroidal changes on ICGA were compared according to the presence and absence of delayed absorption.

Results: There were 18 eyes (50.0%) which manifested delayed absorption after surgery. Choroidal vascular hyperpermeability (CVH) on ICGA was noted preoperatively in 70.0% of eyes with delayed absorption postoperatively and in 14.3% of eyes without it ($P = 0.010$). Postoperative CVH was detected in 46.1% of eyes with delayed absorption and in 6.7% of eyes without it ($P = 0.029$). Worse preoperative visual acuity and macular involvement were also significantly associated with delayed absorption ($P = 0.034$ and 0.001, respectively).

Conclusions: Delayed absorption of SRF after retinal reattachment surgery was noted in about half of the cases. CVH and resultant exudative properties of the choroid are possibly strongly related to its incidence.

Poster No.: EX2–303
Panel No.: 303, Session 2

Preliminary Outcomes of Inverted Internal Limiting Membrane Flap Modifying for Large Macular Hole Repair

First Author: Wang Zhi JUN

Purpose: To report the outcomes of large macular hole repair by lotus leaf–like internal limiting membrane (ILM) flap technique.

Methods: Seventeen eyes of 17 patients with idiopathic macular holes larger than 400 μm were included. Myopic eyes greater than 6.0 D were excluded. A remnant attached to the margins of the macular hole was left in place like a lotus leaf after 10 rounds of diluted ICG staining. Fluid–air exchange with 0.5–0.8 mL C2F6 was then performed. Spectral optical coherence tomography and clinical examination were performed before surgery and postoperatively at 1 week and 1, 3, 6, and 10 months.

Results: Preoperative mean visual acuity was 0.15. During the 2– to 10–month follow–up period, anatomical macular hole closure was observed in all 17 eyes. Mean postoperative visual acuity was 0.25. Bridge–like closure in early and finally anatomical closure pattern was observed on OCT in 11 eyes.

Conclusions: These preliminary outcomes of lotus leaf–like ILM flap technique for large macular hole repair provided both satisfactory functional and anatomic outcomes.

Poster No.: EX2–304
Panel No.: 304, Session 2

Efficacy of Optical Coherence Tomography–Based Face-Down Positioning for Macular Hole Surgery

First Author: Masahiko SANO
Co-Author(s): Makoto INOUE, Yuji ITO, Kazunori HIROTA, Takashi KOTO, Akito HIRAKATA

Purpose: To evaluate optical coherence tomography–based face–down positioning (OBP) for idiopathic macular hole (MH) surgery and to discontinue face–down positioning when MH closure was detected through intravitreal gas with swept source optical coherence tomography (SS–OCT).

Methods: We retrospectively reviewed 66 eyes who had MH surgery. Thirty–three eyes were treated with the OBP protocol and 33 eyes were treated with the conventional protocol of face–down positioning for 5 or 7 days as control. Eyes were treated with pars plana vitrectomy, internal limiting membrane (ILM) peeling including inverted ILM technique, and air or perfluoro propane gas tamponade. The primary outcome measure was MH closure verified by SS–OCT. The secondary outcome was the period of face–down positioning postoperatively.

Results: MH closure was detected at postoperative day 1 through intravitreal gas in 93% (30 eyes) of the OBP protocol and 86% (24 eyes) of the conventional protocol ($P = 0.42$). All MHs were closed at postoperative day 3 and up to the last visit. The period of face–down positioning was 1.4 days in eyes with the OBP protocol, which was significantly shorter than that with the conventional protocol of 5.1 days ($P < 0.001$).

Conclusions: OBP can shorten the period of face–down positioning in early postoperative days after MH surgery with equal anatomical success to conventional positioning.

Poster No.: EX2–305
Panel No.: 305, Session 2

A Comparative Analysis of the Efficacy of Additional Internal Limiting Membrane Removal in Epiretinal Membrane Peeling
Panel No.: EX2–306
Poster No.: EX2–307
Panel No.: 307, Session 2

**Wound Healing and Functional Changes After Blood-Assisted Internal Limiting Membrane Peeling for Repair of Macular Hole**

**First Author:** Laura LIU  
**Co-Author(s):** Nan-kai WANG, Ijilmurun ENKH-GALAN, Yih-shiou HWANG, Wei-chi WU, Chi-chun LAI

**Purpose:** To evaluate the wound healing process and functional changes after macular hole (MH) repair using blood-assisted internal limiting membrane (ILM) peeling techniques during vitrectomy.

**Methods:** A total of 148 patients who received blood-assisted ILM peeling during vitrectomy due to MH were enrolled. The patients were divided into 3 groups according to the size of the macular hole (<250 μm, between 250 and 400 μm, and >400 μm). Each of the 3 groups was further divided into 2 subgroups according to the presence of vitreous traction over the macular hole. The patients were followed up for up to 12 months. The healing process of MH was followed using spectral-domain optical coherence tomography with notes on the continuity of the external limiting membrane, ellipsoid zone, cone outer segment tips, and presence of dissociated optic nerve fiber and gliosis. The rates of MH closure and changes in best corrected visual acuity were also analyzed.

**Results:** The overall closure rate of MH was 92%. The visual acuity for patients with smaller MH (<250 μm) was significantly better than those with larger MH (>400 μm) (P < 0.05). Patients with smaller MH (<250 μm) showed significantly better healing of outer retinal structures than those with larger MH (>400 μm) (P < 0.05). Presence of preoperative vitreous traction was significantly correlated with a better restoration of outer retinal structure (ELM, EZ, COST) but not visual acuity. Patients with a persistent disruption of outer retinal structures (ELM, EZ, COST) showed significantly worse visual acuity than those with restoration of any of these structures (P < 0.05).

**Conclusions:** Patients with smaller MH had superior final visual acuity and better restoration of outer retinal structures after blood-assisted ILM peeling during vitrectomy.
Efficiency of Retinal Laser Coagulation in Retinopathy of Prematurity With Head Ophthalmoscope and Diode Laser

First Author: Maksim PSHENICHNOV  
Co-Author(s): Oleg KOLENKO, Evgeniy SOROKIN

Purpose: To analyze clinical results of retinal laser coagulation in threshold stages of retinopathy of prematurity (ROP) carried out by diode laser (810 nm) with head ophthalmoscope.

Methods: There were 8 children (13 eyes) with gestational age of 24–29 weeks (average, 27 ± 1.6) and mass at birth of 487–901 g (average, 749 ± 149.8 g). At the time of treatment, patients were aged from 32–36 weeks (average, 34 ± 1.3) with body weight ranging from 1078–2450 g (average, 1883.8 ± 478.1 g). Eight eyes had aggressive posterior ROP (AP-ROP) and 5 eyes had ROP stage 3+ disease. Retinal laser coagulation was carried out in available avascular retina. The diode Oculight Six laser (Iridex) was used, with a wavelength of 810 nm adapted for head ophthalmoscope. Laser beam diameter was 1 mm. Radiation power was from 200–350 mW, duration was from 0.1–0.2 seconds, and number of impulses ranged from 857–2345. Results were assessed with RetCam III (Clarity) at the seventh, 14th, 21st, and 30th days.

Results: At the seventh day, in all 13 eyes there were positive effects. On the 14th day, there were signs of regression of the disease in 7 eyes, of which in 4 eyes (2 children) neovascularization remained and additional laser coagulation was carried out. In 6 eyes, there were negative dynamics (a retina cord, new zones of proliferation). At the 21st day, regression of the disease was noted in 6 eyes and tractional retinal detachment in 7 eyes. At 30 days, in 6 eyes (46%) there was regression of the disease and in 7 eyes, retinal detachment. In those with ROP stage 3+ disease, 4 eyes (80%) had regression of the disease. In those with AP-ROP, only 1 (12.5%) case did not develop retinal detachment.

Conclusions: The efficiency of laser coagulation of the retina using a head ophthalmoscope and diode laser (810 nm) in the threshold stages of ROP in nontransportable very premature children was 46%. The efficiency of treating ROP stage 3+ disease was 80% but of AP-ROP was only 12.5%.

Subconjunctival Adenovirus Gene Delivery in Rats: A Study of Immune Response and Safety

First Author: Youn-shen BEE  
Co-Author(s): Shwu-jiuan SHEU, Guei-sheung LIU

Purpose: Gene therapy shows great promise in the treatment of eye disease, and subconjunctival injection appears to be a useful route for gene delivery to ocular tissues. The feasibility and safety of subconjunctival injection of adenovirus vector remains unclear. We investigated the immune response and safety of adenovirus gene delivery by subconjunctival injection in rats.

Methods: Adenovirus was administrated to rats via either the subconjunctival or intravenous route. The effect of subconjunctival injection of adenovirus vector on retinal function was examined by electroretinography (ERG), and hepatic damage was assessed by biochemical analysis and histological analysis by TUNEL stain. Serum level of cytokines was evaluated by ELISA after gene delivery for indication of systemic host immune response.

Results: The ERG parameters in rats receiving subconjunctival adenovirus gene delivery showed no difference from control groups. Unlike the intravenous route, subconjunctival adenovirus gene delivery did not elicit hepatic injury or hepatic cell apoptosis or immune response.

Conclusions: Subconjunctival injection of adenovirus vectors rapidly induced the transgene expression in eyes without causing liver injuries and immune activation. Therefore, subconjunctival adenovirus gene delivery may be a promising approach for gene therapy to treat ocular diseases.

Therapeutic Window of Intravitreous Injections of Triamcinolone in a Rodent Model of Anterior Ischemic Optic Neuropathy

First Author: Tzu Lun HUANG  
Co-Author(s): Rong Kung TSAI

Purpose: To investigate if the early administration of triamcinolone acetonide (TA) in a rodent model of anterior ischemic optic neuropathy (rAION) has better neuroprotective effects.

Methods: We applied laser–induced photoactivation on the optic nerve head after intravenously administered rose bengal. Rats received either an intravitreal injection of TA (0.32 mg/2 µL) after 1 day, 1 week, and 2 weeks or phosphate-buffered saline (PBS) post-rAION. The density of retinal ganglion cells (RGCs) was calculated using retrograde Fluoro–Gold labeling. Visual function was assessed by flash visual–evoked potentials (FVEP). TUNEL assays of the retinal sections
and immunohistochemical (IHC) staining of ED1 in the optic nerve were investigated.

**Results:** At the fourth week postinfarct, TA treatment significantly rescued the RGCs (mm²) in the central (2160 ± 250, P = 0.004; 2050 ± 660, P = 0.004) and midperipheral retinas (1240 ± 130, P = 0.004; 1250 ± 220, P = 0.004) in the 1 day–TA and 1 week–TA groups, respectively (P value compared with PBS group). Functional assessment with photopic FVEP demonstrated that shortened P1 latency (ms) and improvement of P1 amplitude (µV) were significant in the 1 day–TA group (all \( P < 0.05 \)). TUNEL assays showed a decrease in the number of apoptotic cells in the RGC layers of 1 day–TA and 1 week–TA group retinas compared with the PBS group (all \( P = 0.004 \)). ED1-positive cells (/HPF) were significantly decreased in the optic nerves of the 1 day–TA and 1 week–TA groups compared with the PBS group (\( P = 0.004 \) and \( P = 0.02 \), respectively).

**Conclusions:** Local intravitreal injections of TA within 1 week had better neuroprotective effects on RGC survival and anti-inflammation change. Treatment earlier than 1 week seems to rescue visual function in rAION.

**Poster No.:** EX2–312
**Panel No.:** 311, Session 2

**“The Freckle Sign,” A Possible New Clinical Marker for the Diagnosis of Hermansky–Pudlak Syndrome in Indian Patients With Oculocutaneous Albinism**

**First Author:** Karthikeyan ARCOT SADAGOPAN
**Co-Author(s):** Renuka KATHIRVEL, Rosanne KEEP, Kannan PARTHIBAN, P VIJAYALAKSHMI

**Purpose:** Hermansky–Pudlak syndrome (HPS; MIM #203300) is a rare autosomal recessive disorder characterized by oculocutaneous albinism (OCA) and a bleeding diathesis. Some subtypes can develop fatal complications. Current recommendations suggest that all patients with OCA have molecular genetic testing to exclude HPS. We describe a new clinical sign as a possible clinical marker for the early diagnosis of HPS.

**Methods:** Sixteen patients with OCA seen during a 1-year period were clinically evaluated at the ocular genetics service. Five of these children were suspected to have HPS based on history and/or clinical findings suggestive of a bleeding diathesis.

**Results:** We observed a peculiar pattern of cutaneous freckling in 5 patients. These 5 patients also had a history and/or showed signs of bleeding tendency, and 3 of these were confirmed to have HPS with molecular genetic testing.

**Conclusions:** OCA is very common in the South Indian population due to the high rate of consanguinity. We describe a peculiar pattern of cutaneous freckling (previously unreported) and suggest that this could be a reliable clinical marker for diagnosing HPS. We further suggest that the discrepancy between the iris, hair, and skin color and the degree of fundus hypopigmentation should raise the clinical suspicion of HPS.

**Poster No.:** EX2–312
**Panel No.:** 312, Session 2

**Inflammatory Reaction is a Risk Factor of Myopia**

**First Author:** Hui Ju LIN
**Co-Author(s):** Lei WAN

**Purpose:** Myopia is a highly prevalent eye disease in Taiwan, as it can induce many other associated eye diseases and even lead to blindness. However, the detailed pathological mechanisms are not fully elucidated. In recent years, many studies had been conducted to verify whether inflammation played an important role in myopia in our research group.

**Methods:** In this study, we used the Taiwan Longitudinal Health Insurance Database to compare allergic conjunctivitis patients, a kind of long-term inflammatory ocular disease, with control groups. The association of allergic conjunctivitis with myopia was studied by population-based case-control analysis using data from 2004 to 2008, and a significantly higher myopia rate was observed in the allergic conjunctivitis group. To further prove the relationship between these 2 diseases, we established an allergic conjunctivitis rat model by ovalbumin injection and continuously dropping into eyes.

**Results:** Lower refractive error and longer axial length were observed after induction of allergic conjunctivitis. The decrease in refractive error of allergic conjunctivitis eyes was accompanied by an upregulation of MMP2 and TGF-β and downregulation of collagen I, which were the major tissue remodeling proteins related to myopia formation. The expression levels of inflammatory-related transcription factors and inflammatory cytokines were also upregulated in allergic conjunctivitis eyes.

**Conclusions:** We proved that allergic conjunctivitis as an inflammatory ocular disease is correlated with myopia in a nationwide case-control study and in an animal model. The prevalence of myopia might be lessened if allergic conjunctivitis is controlled effectively.

**Poster No.:** EX2–313
**Panel No.:** 313, Session 2

**Efficacy of Warming Periocular Area With Menthol Fragrance on Accommodation, Pupil Change, and Brain Activity**

**First Author:** Yuko SHIMADA
Co-Author(s): Natsuki IIMORI, Igaki MICHITO, Ken ASAKAWA, Hitoshi ISHIKAWA

Purpose: We evaluated the efficacy of warming the periorcular area by applying a steam eye mask with a menthol fragrance on accommodation, pupil change, and brain activity.

Methods: There were 9 healthy volunteers (mean age, 22.9 years) enrolled in this study. The range of accommodation, pupillary changes, and brain hemoglobin oxygenation state were evaluated before and after wearing a steam eye mask with a menthol fragrance. The accommodation (D) and pupil diameter (mm) during fixation from far to near targets were measured with a dioptic accommodometer and infrared pupillography. The hemoglobin oxygenation state of brain activity was measured with visible spectroscopy. A visual analog scale (VAS) was also used to obtain a subjective feelings score.

Results: After applying the eye mask, accommodation was significantly higher ($P < 0.05$) and pupil diameter was smaller. Subject fatigue and exhilaration were improved on the VAS. Brain activity tended to be more inhibited during the application, whereas some subjects had their hemoglobin oxygenation state activated by the menthol feeling after applying this eye mask.

Conclusions: Warming the periorcular area improved visual function and subject relaxation. The steam eye mask with a menthol fragrance may have contributed to the autonomic nervous system activation.

Poster No.: EX2–315
Panel No.: 315, Session 2

Ginkgo biloba Leaf Extract Prevents UVB-Induced Vision Loss and Anterior Segment Inflammation of the Eye

First Author: Bo-yie CHEN
Co-Author(s): Chien-yun WU, Yun-shan TSAI, Ping-hsun WANG, Yun-ping HUANG

Purpose: UV radiation (UVR) exposure is a risk factor for ocular inflammatory problems. The aim of this study was to investigate the effect of UVR on various histophysiological parameters related to inflammation and oxidative stress in the anterior segment of eyes obtained from female mice and the influence of the administration of Ginkgo biloba leaf extract (GK; EGb761) on these animals.

Methods: Mice were divided into 5 groups: 1, a blank control group (no exposure to UV radiation); 2, a UVB group; 3, a UVB/GK low dose treatment group; 4, a UVB/GK medium dose treatment group; and 5, a UVB/GK high dose treatment group. We investigated the UVB-induced changes in visual acuity (VA) and visual contrast sensitivity (CS). Tissue sections were prepared and histologically stained to evaluate the structural integrity of the cornea and inflammatory damage. The change of inflammatory factors in the cornea were also determined by bead-based ELISA assays.

Results: UVB-exposed mice resulted in substantial inflammatory cell infiltration in the anterior segment of the eyes, including corneal stroma, corneal limbus, and anterior chamber. Dosing with GK protected anterior eyes against inflammatory damage and protects visual function against declining VA and CS. The levels of inflammatory factors in the cornea were more decreased after treatment with GK than in untreated mice.

Conclusions: GK is beneficial and protective against UVR-induced corneal inflammation and the related
decline of VA and CS. It is worthy of consideration for a human clinical trial against inflammation of the anterior segment of eyes.

**Poster No.:** EX2–316  
**Panel No.:** 316, Session 2

**Investigation of Human Spatial Attention in Perifoveal Visual Field: A Transcranial Magnetic Stimulation Study**

**First Author:** Indra MAHAYANA

**Purpose:** The use of a low spatial probability visual conjunction search may recruit attentional resources under high load, which is assumed to better elicit more neural activity, especially in the right posterior parietal cortex (rPPC). We aimed to examine the visual search performance after rPPC transcranial magnetic stimulation (TMS) using a perifoveal target conjunction visual search task.

**Methods:** Twenty neurologically intact, normal or corrected-to-normal vision, right-handed participants (9 males; mean age, 22.5 ± 1.8) were recruited and divided into 2 groups: the PPC and the vertex (control) groups. Three different configurations of peripheral search array were displayed with the eccentricities ranging from 3.3 to 13.3 degrees of horizontal visual angle. The low spatial probability search array to increase the attention load of visual search was designed by randomizing the target locations into 36 different possible locations divided into 3 arrays. The distractors were forward (/) red and backward (\) green diagonals, and the target was always a backward (\) red diagonal.

**Results:** There was significant target location main effect with significant effects in paired t tests of target present versus target absent trials in rPPC. The loss of performance in a gradient-like manner was found across all conditions shown by decreased accuracy and increased reaction time.

**Conclusions:** Visual search requires the brain to direct spatial attention when the target is in the perifoveal visual field. TMS disrupted the shift of spatial attention, increasing the time taken to shift attention between different locations and increasing the time to select the spatial scale of attention.

**Poster No.:** EX2–317  
**Panel No.:** 317, Session 2

**Identification of TYR Gene Mutation in Rhesus Monkey With Oculocutaneous Albinism**

**First Author:** Kun-chao WU  
**Co-Author(s):** Zi-bing JIN

**Purpose:** Autosomal recessive oculocutaneous albinism (AROA), a group of genetic disorders with reduced pigmentation of skin, hair, and eyes, is associated with decreased visual acuity, nystagmus, strabismus, and photophobia. Although some pathogenesis of AROA has been shown previously, the treatments were relatively poor, to some extent because of a lack of suitable animal model. The purpose of this study was to identify a potential mutation of the TYR gene and characterize the phenotype of an albino rhesus monkey, the highest homological mammal to humans, with oculocutaneous albinism.

**Methods:** Genomic DNA was extracted from the blood of an albino monkey, and the coding regions of the TYR gene were amplified by PCR and then sequenced to find the mutation of the TYR gene. Direct photograph and fundus images were used to observe the outside eye appearance and fundus phenotype of the albino rhesus monkey.

**Results:** The sequencing result demonstrated that a missense mutation c.934C>A of the TYR gene, a completely similar mutation in humans with albinism, accounts for albinism in the rhesus monkey. Compared with normal monkeys, the hair and skin around the eyes tended to be more yellow and white. The fundus image showed obvious reduced pigmentation on the retina with clearly visible choroidal vessels.

**Conclusions:** From this study, we demonstrated a missense mutation of the TYR gene in an albino rhesus monkey with similar appearance and fundus phenotype to humans with albinism, which may provide a perfect animal model to explore the pathogenesis and treatment of oculocutaneous albinism. Furthermore, the abnormal reduced pigmentation in the retina of the albino rhesus monkey could also be used to conduct research related to treatment of retinal degenerative diseases, such as transplantation therapy, in the future.

**Poster No.:** EX2–318  
**Panel No.:** 318, Session 2

**Human Retinal Progenitor Cells Combined With Mesenchymal Stem Cell Transplantation for Retinitis Pigmentosa: Translational Medicine**

**First Author:** Yong LIU  
**Co-Author(s):** Ling Hui QU, Shiyi LI, Ping DUAN, Zheng Qin YIN

**Purpose:** Transplantation of retinal progenitor cells (RPC) has already been tested in an animal model of retinitis pigmentosa (RP) for their ability to restore visual function. However, maintaining visual recovery after transplantation has been problematic. Here, we investigate whether bone marrow mesenchymal stem cells (BM–MSC) can improve the therapeutic effect of RPC transplantation in RP.

**Methods:** RPC combined with BM–MSC were injected
into the degenerated retina of Royal College of Surgery (RCS) rats and RP patients. Retinal function and morphology were examined.

**Results:** In the combined transplantation group, BM–MSC significantly impaired microglia activation in degenerated retina; accordingly, visual function was restored for a longer time. In a phase I clinical trial, we also transplanted the RPCs combined with BM–MSC into 3 RP patients. After cell transplantation, we have not observed any immunological rejection. Visual function was maintained at 6 months.

**Conclusions:** BM–MSC can modulate microglial cell phenotype and optimize the microenvironment for stem cell survival in degenerated retina. Our studies indicate the potential efficacy of RPC with BM–MSC transplantation and provide the basis for future transplantation studies in RP and other retinal degenerative diseases.

**Poster No.:** EX2–319  
**Panel No.:** 319, Session 2

**The Effects of Different Anti-VEGF on Cell Viability, Phagocytosis, and Mitochondrial Bioenergetics of Retinal Pigment Epithelial Cells**

**First Author:** Shwu-jiuan SHEU

**Purpose:** To evaluate the effects of anti-VEGF agents on cell viability, phagocytosis, mitochondrial bioenergetics, and the oxidant acrolein–induced oxidative stress of human adult retinal pigment epithelial (ARPE) cells.

**Methods:** Cell viability was tested in cultured ARPE–19 cells treated with aflibercept, ranibizumab, or bevacizumab for 48 hours or 24 hours followed by acrolein (25 μM) for an additional 24 hours. Fluorescent latex beads were used to assess the phagocytic function of the cells treated by the agents alone or in combination with oxidative stress by acrolein. Mitochondrial biogenesis was evaluated by Seahorse XF24 Extracellular Flux Analyzer.

**Results:** Long-term exposure to all 3 agents had no effect on cell viability, but rescued the ARPE–19 cells from acrolein–induced decrease in cell viability. Bevacizumab, but not ranibizumab or aflibercept, suppressed the phagocytic activity of ARPE–19 cells and exerted significantly less protection against acrolein–induced inhibition of phagocytosis. Both ranibizumab and aflibercept increased basal respiratory rates and maximal mitochondrial respiratory capacity after 1 hour of exposure but returned to baseline after 24– or 72-hour exposure. In contrast, both responses were reduced on short–term exposure to bevacizumab, but were augmented after long–term exposure. Long–term pretreatment with all 3 agents reversed acrolein–induced impairment of mitochondrial bioenergetics and overproduction of ROS in ARPE–19 cells.

**Conclusions:** Bevacizumab might affect mitochondrial bioenergetics differently than ranibizumab and aflibercept. Ranibizumab and aflibercept at their therapeutic ranges protect against acrolein–induced oxidative cytotoxicity in human ARPE–19 cells via an increase in mitochondrial bioenergetics.

**Poster No.:** EX2–320  
**Panel No.:** 320, Session 2

**Methylglyoxal, a Reactive Glucose Metabolite, Enhances Autophagy Flux and Suppresses Proliferation of Human Retinal Pigment Epithelial ARPE-19 Cells**

**First Author:** Yo-chen CHANG  
**Co-Author(s):** Wen-chuan WU

**Purpose:** Methylglyoxal (MGO), a glycolytic metabolite, induces oxidative injury and apoptotic cell death that play a pathogenetic role in age–related macular degeneration (AMD). This study examined the impact of MGO on cell proliferation and autophagy flux in retinal pigment epithelium (RPE) ARPE–19 cells and elucidated the underlying mechanism.

**Methods:** Short–term MGO exposure suppressed cell proliferation without induction of apoptotic cell death, increased production of reactive oxygen species, and potentiated H2O2–exhibited cytotoxicity in ARPE–19 cells. Conversely, pretreatment with N–acetylcysteine, a ROS scavenger, and aminoguanidine, an MGO blocker, prevented MGO–induced growth retardation. MGO significantly enhanced autophagy flux and increased intracellular accumulation of autophagosomes, which was functionally confirmed by the addition of autophagy enhancers or inhibitors.

**Results:** Signaling kinetic observation indicated that MGO remarkably triggered phosphorylation of Akt, ERK1/2, p38 MAPK, and JNK1/2. Blockade of kinase activity demonstrated that the hyperphosphorylation of Akt, ERK1/2, JNK, and p38 MAPK were all involved in the MGO–enhanced autophagy and growth–arresting effect in ARPE–19 cells. Moreover, pretreatment with autophagic flux inhibitors including 3–methyladenine, bafilomycin A, and chloroquine effectively ameliorated MGO– but not H2O2–mediated ARPE–19 cytotoxicity.

**Conclusions:** In conclusion, modulation of autophagy flux activity by using autophagic or kinase inhibitors may be an applicable modality to treat AMD.

**Poster No.:** EX2–321  
**Panel No.:** 321, Session 2

**Interocular Suppression in Striate and Extrastriate Cortex in Human Intermittent**
Exotropia
First Author: Tzu-hsun TSAI
Co-Author(s): Yu-hsiang TSENG, Chien-chung CHEN, Fung-rong HU

Purpose: To investigate interocular suppression in human X(T) and compare the results with patients with amblyopia without strabismus and normal controls with functional magnetic resonance imaging (fMRI).

Methods: A prospective interventional case–control study. To measure the retinotopic organization of each participant, rotating–wedge (RW) and expanding–ring (ER) checkerboards were used to determine the organization of polar angle and eccentricity. The 4 experiments performed were as follows: (1) binocular, viewing the stimulus with both eyes; (2) dominant eye only; (3) nondominant eye only; and (4) dichoptic, viewing with both eyes wearing red/green glasses. Temporal spectral correlation algorithm was used to analyze the data.

Results: Totally 11 X(T) patients and 11 age–matched control participants and 10 nonstrabismic amblyopic patients and 10 age–matched control participants were recruited. For RW stimulus, the X(T) group showed strongest responses at V1 when viewing with the dominant eye compared with binocularly (P = 0.0234, respectively, compared with control). This phenomenon was consistent in V2 and V3 (P = 0.0285, 0.0043 compared with control in V2 and V3). The results were consistent as with ER stimulus. Contrary to the weaker monocular activation compared with binocular in amblyopia, even viewing with the nondominant eye, the X(T) group showed stronger response than that in binocular condition. In dichoptic condition, X(T) showed less binocular integration compared with control.

Conclusions: Significant interocular suppression or less binocular summation in human intermittent X(T) is revealed by fMRI, even when the eyes are orthotropically similar but dissumatarily dissimilar images projected to the corresponding retinas, and is more profound than in nonstrabismic amblyopes. This phenomenon extends from early visual areas to higher visual areas. We suggest that there is an intrinsic neural difference between X(T), amblyopes without strabismus, and the normal population in binocular interaction.

Effects of Sulforaphane, a Nrf-2 Activator, on the Blue Light Emitting Diode—Induced Cell Damage in Retinal Pigment Epithelial Cells

First Author: Chang-hao YANG
Co-Author(s): Chao Wen LIN, Chung-may YANG

Purpose: Sulforaphane is known as an activator of transcription factor Nrf2, which activates gene encoding for antioxidative enzymes. In this study, we evaluate the effect of sulforaphane to protect retinal pigment epithelial (RPE) cells against blue light emitting diode (LED)–induced cell damage.

Methods: Cultured ARPE 19 cells were exposed to blue LED light (450 nm) after treatment with sulforaphane. Cell viability was evaluated by MTT assay. ROS production and mitochondrial dysfunction were measured by ROS assay and JC–1 mitochondrial membrane potential assay, respectively. Antioxidative enzymes (HO–1, GR, GPx1, NQO1) and proinflammatory mediators (ICAM–1, MCP–1) were quantified by PCR and Western analysis. Electrophoretic mobility shift assay (EMSA) was used to check the activation of Nrf2 and NF–kB in retinal cells.

Results: Treatment with sulforaphane dramatically increased cell survival after exposure to blue LED, significantly decreased cell production of reactive oxygen species, and attenuated mitochondrial dysfunction. Sulforaphane successfully induced antioxidant proteins HO–1, GR, GPx1, and NQO1 in a dose–dependent manner by activated Nrf2. Sulforaphane reduced the elevation of proinflammatory mediators ICAM–1 and MCP–1. EMSA study showed NF–kB was deactivated and Nrf2 was activated by sulforaphane in APRE cells.

Conclusions: Treatment of ARPE 19 cells with sulforaphane effectively protected cells against blue LED–induced oxidative stress by activating the Nrf2–dependent proteins. These results show that sulforaphane had a cytoprotective effect against oxidative stress and may be useful in the prevention of blue light–induced retinal damage.

Poster No.: EX2–322
Panel No.: 323, Session 2

Exploring Sections of Retinal Pigment Epithelium Cells With Focused Ion Beam

First Author: Po-kang LIN

Purpose: Previously, the attempts to apply focused ion beam (FIB) to mill and view biological cell or tissue sections usually resulted in poor outcomes, though FIB has been widely employed in semiconductor research. To accomplish this and improve the image, we developed some novel approaches, using retina.

Methods: We designed and fabricated a unique holding substrate through microprocessing such as e-beam lithography and plasma–enhanced chemical vapor deposition (PECVD). We used cultured human retinal pigment epithelium cell line (ARPE–19) and rat retina as the milling targets. The samples were prefixed with glutaraldehyde and stained with OsO4 (O–T–O–T–O method). Then, the specimens were vacuum–dried separately. Neither plastic embedding nor cryopreparation was performed. ARPE–19 cells and rat retina...
were subsequently milled by gallium ion with a FEI nova-600i FIB/SEM dual system in different milling parameters. Furthermore, ARPE–19 cells were treated with hydrogen peroxide or UV and were investigated with the FIB/SEM system.

**Results:** The ultrafine structure of ARPE–19 cells and rat retina was disclosed in detail with the method we developed. The acquired SEM image resolution approximated TEM images of usual biological samples. The subcellular damage of ARPE from hydrogen peroxide or UV could be observed, in terms of mitochondria damage and nuclear segmentation. Tissue sections of rat retina showed subcellular structures.

**Conclusions:** The FIB/SEM dual system could mill and observe cells and tissue section, and the image resolution approximated TEM. As the sample preparation is relatively simple and the milling procedure is performed under direct visualization, this novel method may have a promising impact in biomedical studies including ophthalmology.

**Poster No.:** EX2–329
**Panel No.:** 329, Session 2

**Niche-Dependent Regulations of Metabolic Balance in High-Fat Diet–Induced Diabetic Mice by Orbital Fat–Derived Stem Cells**

**First Author:** Jennifer HO  
**Co-Author(s):** Oscar LEE, Andrea JI, Yun-chuang CHANG, Yun-ju FU

**Purpose:** To investigate the therapeutic effect and in vivo mechanism of orbital fat stem cells (OFSCs) on blood sugar homeostasis.

**Methods:** B6 mice were continuously fed a high-fat diet (HFD) and developed noninsulin–dependent diabetes. OFSCs (4.2 x 107 cells/kg), mesenchymal stem cells (MSCs) isolated from human orbital fat tissue, were delivered twice via tail vein injection. Fasting sugar, body weight, glucose tolerance test, and serum cytokines were monitored. Biodistribution of stem cells was evaluated, and histopathological staining and Western blot analysis of the pancreas and insulin–sensitive tissues for in vivo mechanism were performed.

**Results:** Two episodes of systemic MSC transplantations effectively improved glucose tolerance and blood sugar homeostasis and reduced body weight by targeting the pancreas and insulin–sensitive tissues and organs via site–specific mechanisms. MSCs support pancreatic islet growth by direct differentiation into insulin–producing cells and by mitigating the cytotoxicity of interleukin (IL)–1 and tumor necrosis factor alpha (TNF–α) in the pancreas. Localization of MSCs in the liver and skeletal muscles in diabetic animals is also enhanced and therefore improves glucose tolerance, although long–term engraftment is not observed. MSCs prevent HFD–induced fatty liver development and restore glycogen storage in hepatocytes. Increased expression of IL–1 receptor antagonist and Glut4 in skeletal muscles after MSC transplantation result in better blood sugar homeostasis. Intriguingly, systemic MSC transplantation does not alter adipocyte number, but it decreases HFD–induced cell infiltration in adipose tissues and reduces serum levels of adipokines, including leptin and TNF–α.

**Conclusions:** Systemic MSC transplantation ameliorates HFD–induced obesity and restores metabolic balance through multisystemic regulations, which are niche–dependent. Such findings have supported systemic transplantation of MSCs to correct metabolic imbalance.
A Clinical Study of Congenital Cataract

First Author: Achyut PANDEY

Purpose: To study the causes, management, and visual outcomes of congenital cataract.

Methods: This was a retrospective study conducted at a government medical college from January 2014 to July 2015. Twenty children ranging in age from 1 month to 11 years were included in the study after fulfilling the inclusion and exclusion criteria. All the children underwent thorough clinical examination before surgery. Children underwent small incision cataract surgery with intraocular lens, phacoemulsification with intraocular lens, or scleral fixated intraocular lens.

Results: Twenty children had congenital cataract in both eyes. Among them 9 were male and 11 were female. Consanguinity was present in 16 children, and the parents of 4 children were not related. Surgery was performed in all children. The preoperative visual acuity ranged from perception of light to 6/24. After surgery, 60% (23 eyes) had 6/60 to 6/18 vision. The rest of the eyes had perception of light to 5/60 vision.

Conclusions: This study revealed that consanguinity of various grades was the etiological factor, and that visual acuity before surgical intervention was very poor. After surgery, visual acuity improved in the range of 6/60 to 6/18 in 60% of the children. This study was performed to highlight the importance of early surgical intervention in children with congenital cataract to give them a better future. Timely recognition and intervention can eliminate blind years due to childhood cataract, as the condition is treatable.

Apparent Accommodation in Pseudophakic Eyes With Against-the-Rule, With-the-Rule, and Minimum Astigmatism

First Author: Takahiro HIRAOKA
Co-Author(s): Toshiya YAMAMOTO, Tetsuro OSHIKA

Purpose: To examine and compare the magnitude of apparent accommodation in pseudophakic eyes with against-the-rule (ATR), with-the-rule (WTR), and minimum astigmatism. Factors associated with apparent accommodation were also examined in each group.

Methods: Ninety-eight pseudophakic eyes (80 patients) with monofocal intraocular lens (IOL) implantation after uneventful cataract surgery were included. There were 41, 31, and 26 eyes with refractive ATR, WTR, and minimum (<0.5 diopters) astigmatism, respectively. Age, time after surgery, pupil size, corneal and refractive astigmatism, axial length, IOL power, corrected distance visual acuity, corneal multifocality, ocular wavefront aberrations, and apparent accommodation without cylindrical correction were evaluated and compared among the 3 groups.

Results: No significant difference was observed in the amount of apparent accommodation among the groups. In the ATR group, the amount of apparent accommodation was significantly correlated with pupil size (r = −0.492, P < 0.001) and refractive astigmatism (r = 0.509, P < 0.001). In the WTR group, no clinical factors examined were significantly correlated with the amount of apparent accommodation. In the minimum astigmatism group, corneal multifocality was significantly associated with apparent accommodation (r = 0.409, P = 0.037).

Conclusions: There was no significant difference in the average amount of apparent accommodation in pseudophakic eyes with ATR, WTR, and minimum astigmatism. However, factors relevant to apparent accommodation were different depending on the status of postoperative refractive astigmatism.

Case Series—Scleral Fixation and Haptic Externalization of Foldable Posterior Chamber AcrySof Multipiece Intraocular Lenses in Aphakics With Absent or Inadequate Capsular Support

First Author: Zia MAZHRY

Purpose: To evaluate scleral fixation and haptic externalization of foldable posterior chamber (PC) AcrySof multipiece intraocular lenses (SF–PCIOLs) in aphakics with absent or inadequate capsular support.

Methods: Ten eyes of 9 patients underwent primary (2 eyes) or secondary (8 eyes) implantation of SF–PCIOLs. Ab externo scleral fixation/haptic externalization of PCIOLs was performed. Visual acuity, IOL position, and postoperative complications were the main outcome measures.

Results: The mean age was 29 years. The mean follow-up was 14 months. The IOls used included AcrySof multipiece (9 eyes; Alcon) and preloaded multipiece (Hoya; 1 eye). Average best corrected visual acuity postoperatively was 6/12 with spherical equivalent of −0.5.

Conclusions: Scleral fixation/haptic externalization acrylic PCIOLs can be visually rewarding in selected cases.

Clinical Outcomes of Phacoemulsification
With Implantation of Intraocular Lens in Functionally One-Eyed Cataract Cases

First Author: Mingxing WU
Co-Author(s): Bo ZHANG, Min HOU, Yizhi LIU

Purpose: To investigate the timing and indications of cataract surgery, postoperative outcomes, and perioperative complications in functionally 1-eyed cataract patients. The cause of the fellow blind eye was also analyzed.

Methods: A retrospective study of cases with functionally 1-eyed cataract from July 2013 to July 2015 in the cataract department at Zhongshan Ophthalmic Center was conducted. Detailed records of visual acuity and slit lamp microscope examination were taken. The specific causes of fellow blind eyes were recorded and their association with cataract surgery was analyzed. Phacoemulsification and intraocular lens implantation through standard procedures were performed in patients with surgical indications; postoperative visual acuity and complications were recorded.

Results: There were 146 functionally 1-eyed patients enrolled in this study (72 males, 74 females). The mean age of the patients was 63.73 ± 16.7 years (range, 6 to 90). The causes of the fellow blind eye included glaucoma (n = 37), retinal detachment (n = 33), ocular trauma (n = 12), corneal diseases (n = 15), high myopia (n = 10), and others (n = 39). The cataract types in operated eyes consisted of age-related cataract (n = 82), complicated cataract (n = 61), congenital cataract (n = 2), and traumatic cataract (n = 1). The causes of complicated cataract included high myopia (n = 31), glaucoma (n = 23), and retinal detachment (n = 7). The preoperative uncorrected distance visual acuity (UDVA) was from light perception to 0.6, of which 70 cases (47%) with UDVA less than 20/400 were included. Almost all the patients underwent successful phacoemulsification with intraocular lens implantation, except for 1 case with the implantation of capsular tension rings and 1 case with extracapsular cataract extraction (ECCE) because of lens dislocation. Twenty-three cases (15.4%) had postoperative VA less than 0.05. Early postoperative complications were corneal edema (n = 40) and intraocular pressure (IOP) increase (n = 4). Corneal edema disappeared 1 week postoperatively, and IOP was controlled normally with eye drops. Best corrected VA better than 20/63 accounted for 46.7%, and the rate of VA over 20/400 was 67.1%.

Conclusions: Phacoemulsification with intraocular lens implantation is a safe and effective method of rehabilitating vision in functionally 1-eyed cataract patients. Strict indications, elaborate preoperative preparation, and appropriate timing for surgery are key to recovering visual function in those patients.

Clinical Results of Phacoemulsification for Low ECD Cataract Cases

First Author: Shaowei LI

Purpose: To report our modified surgical methods for cataract surgery in cases with lower endothelial cell density (ECD).

Methods: Twenty-eight eyes of 26 cataract patients with lower ECD were enrolled in this clinical study. The reasons for lower ECD were as follows: antiglaucoma surgery, 6 eyes; penetrating keratoplasty, 4 eyes; chronic uveitis, 3 eyes; trauma, 3 eyes; Fuch dystrophy, 4 eyes in 2 patients. The modified technique was performed as follows. We used forceps and chopper to do the pre-chop. Viscoat and BSS plus were used, and the phaco power and flow rate were set to very low. Manual chop was used repeatedly, and Viscoat coating was applied as needed during surgery. After surgery, complications and ECD were followed up.

Results: No intraoperative complications occurred, except 1 dislocation of the capsula. All corneas were clear at 1 day postoperation, but 2 eyes had slight edema. One Fuch dystrophy patient experienced endothelial decompensation after 1 year and was treated successfully with Descemet stripping automated endothelial keratoplasty (DSEA). The average ECD before surgery was 736 ± 128 cells/mm² and 678 ± 96 cells/mm² at 1 month postoperation.

Conclusions: Multiple applications of pre-chop and Viscoat coating with lower phaco power and irrigation rate are useful methods for cataract surgery in patients with very low ECD.

E-Poster No.: EP-0016

Comparative Evaluation of Outcomes of AcrySof IQ Versus Acryol EC Lens in a Randomized Controlled Trial

First Author: Shikha YADAV
Co-Author(s): Namrata SHARMA, Tushar AGARWAL, Rasik VAJPAYEE

Purpose: To compare the outcome of 2 monofocal intraocular lenses (IOLs) after phacoemulsification at a tertiary eye care center.

Methods: In a prospective randomized trial, 200 eyes of patients with age-related cataract underwent phacoemulsification and implantation of either the AcrySof IQ SN60WF or Acryol EC lens and were followed up for a period of 1 year. The main outcome measures were uncorrected and best corrected visual acuity for distance (UCVA, BCVA) and near (UNVA, BNVA), contrast sensitivity, glare acuity, ocular aberrations, incidence of posterior capsule opacification (PCO), and Visual Function Index (VF-14) questionnaire results.
Results: There was no statistical difference ($P > 0.05$) between the 2 IOLs in UCVA, BCVA, contrast sensitivity, glare acuity, and rate of PCO formation after cataract surgery. Ocular aberrations including root mean square aberrations, higher order aberrations, and spherical aberrations were significantly higher in the AcrySol group as compared with the AcrySof group ($P < 0.05$). However, both IOL types improved the aspects of patient vision-related quality of life.

Conclusions: Both the IOLs are comparable in visual outcome, complications, posterior capsular opacification rates, and vision-related quality of life.

E-Poster No.: EP-0013

Comparison of Corneal Endothelial Cell Count and Intraocular Pressure in Pure-Dispersive Viscoelastic Protection and Cohesive-Dispersive Viscoelastic Protection in Phacoemulsification Surgery

First Author: Agung NUGROHO

Purpose: The purpose of the study was to determine comparisons between pure–dispersive viscoelastic versus cohesive–dispersive viscoelastic in phacoemulsification surgery regarding corneal endothelial cell count and intraocular pressure (IOP) change.

Methods: This was a cross-sectional study of 41 eligible patients who underwent phacoemulsification surgery by a single operator. Data including patient characteristics of cataract, corneal endothelial cell count, and intraocular pressure were taken before and after surgery. Demographic data were reported descriptively; comparisons were calculated using t test and ANOVA analysis.

Results: The mean change in corneal endothelial cell count in the pure–dispersive viscoelastic group was $71.99 \pm 71.2$ cells/mm$^2$, whereas the mean change in corneal endothelial cell count was $117.62 \pm 78.29$ cells/mm$^2$ in the cohesive–dispersive viscoelastic group. There was no statistically significant difference between the 2 groups ($P = 0.056$). The mean change in intraocular pressure in the pure–dispersive viscoelastic group was $0.75 \pm 1.626$ mm Hg and the mean change in intraocular pressure in the cohesive–dispersive viscoelastic group was $1.90 \pm 0.995$ mm Hg. There was a statistically significant difference between the 2 groups ($P = 0.000$).

Conclusions: This study revealed that in the cohesive–dispersive viscoelastic group, IOP increase was higher than in the pure–dispersive viscoelastic group, but there were similar results between the 2 groups in mean change in corneal endothelial cell count.

E-Poster No.: EP-0023

Depth of Focus Measurement Methods and Comparisons of Ophthalmic Surgical Microscope Illuminations Systems

First Author: Ramon DIMALANTA
Co-Author(s): Jim SCHWIEGERLING

Purpose: The purpose of this study was to develop objective and reliable means for measuring the perceived depth of focus for surgical microscopes.

Methods: Depth of focus for ophthalmic surgical microscopes was assessed. For depth of field testing, the target, which had a calibrated spatial frequency bar pattern on its surface, was angled at 45 degrees to the surgical microscope objective. The microscope was set to focus at the midpoint of the target. Images of the target were captured through the microscope’s primary ocular or through direct access to its outfitted beam splitter and further processed to extract depth of field information. A profile through the bar pattern in captured images was extracted and digitally analyzed to quantify the depth of field. Image analysis techniques will be described. Measured depth of field was compared to an empirical perceived depth of field defined by Berek.

Results: The depth of field of the microscope was measurable and varies depending on from where the image was extracted (ie, through the primary ocular or from the beam splitter device). This value may exceed the depth of field expected based on the Berek formula.

Conclusions: We have developed standardized methods of capturing images from a depth of field target through a microscope at various image access locations and using automatic image processing. The resultant calculations provided an objective measure of the depth of field of a surgical microscope. Improvements in modern lens design may account for these differences.

E-Poster No.: EP-0002

Effect of 3 Different Lens Fragmentation Patterns on Surgical Parameters in Eyes Undergoing Femtosecond Cataract Surgery

First Author: Harvey UY

Purpose: To compare the effect of different lens fragmentation patterns (LFPs) on the surgical parameters in eyes undergoing refractive laser–assisted cataract surgery (RELACS).

Methods: A randomized trial of 100 eyes undergoing RELACS using the Lensar laser but different LFPs: 3–plane chop, 3–plane chop plus pie–cut pattern, and controls. Three–plane prechop was then performed by the same surgeon and PE machine. The main outcome measure was mean cumulative dissipated energy (CDE).
Results: The 3 groups were comparable in terms of nuclear density, PE power, BSS fluid volume, and operative time. The 3-plane plus pie–cut pattern used significantly less PE time ($P = 0.017$) and CDE ($P = 0.002$). No adverse events were observed in all groups.

Conclusions: The femtosecond laser was safe and effective for cataract surgery. Compared with conventional PE, RELACS with 3-plane chop plus pie–cut pattern used less PE time and CDE. The 3-plane chop plus pie–cut pattern was more efficient compared with 3-plane chop alone.

E–Poster No.: EP–0028
Effect of Akt Signaling Pathway in EMT of HLECs
First Author: Yuguang ZHU
Purpose: To study the effect of the Akt signaling pathway in EMT of HLECs.
Methods: The expressions of E-cadherin, α-SMA, p-Akt, and p-GSK-3β were analyzed with Western blot and cell fluorescence immunoassay.
Results: QLT0267 partly reversed the expressions of E-cadherin, α-SMA, p-Akt, and p-GSK-3β.
Conclusions: The Akt signaling pathway may be involved in the EMT of HLECs.

E–Poster No.: EP–0008
Evaluations of Central Corneal Thickness and Corneal Endothelium Count Change in Cataract Surgery Using the LENSAR Femtolaser
First Author: Chih-yu CHEN
Co–Author(s): Chien-liang WU
Purpose: To compare the central corneal thickness and corneal endothelium count change between patients who received LENSAR femtolaser cataract surgery and those who received traditional phacoemulsification cataract surgery.
Methods: We retrospectively collected 100 cases from the past year. Forty–eight eyes had cataract surgery using LENSAR femtocataract laser, and 52 had eyes cataract surgery using traditional phacoemulsification. The surgeries were performed mainly by 1 operator. Pre– and postoperative central corneal thickness and endothelium count were measured. Student t analysis was used, and a $P$ value less than 0.05 was considered significant.
Results: In our study, there was no significant difference between pre– and postoperative central corneal thickness and endothelium count. Additionally, we found that about 33% of patients who received LENSAR femtocataract laser had miosis (2 mm) after femtolaser application.
Conclusions: LENSAR femtolaser cataract surgery does not cause excessive damage to central corneal thickness or endothelium count compared with traditional phacoemulsification cataract surgery.

E–Poster No.: EP–0017
Failure of YAG Laser Capsulotomy in Diabetic Woman With Posterior Capsule Opacification and Neovascularization
First Author: Alice WU
Co–Author(s): Mei–ling PENG, Jyh–cheng LIOU
Purpose: To present a case of posterior capsule opacification and neovascularization in a diabetic woman.
Methods: A case report.
Results: We report an 82–year–old diabetic woman who developed posterior capsule opacification and neovascularization 2 years after extracapsular cataract extraction and posterior chamber intraocular lens implantation. The patient was treated with neodymium: YAG capsulotomy. The treatment induced posterior capsule hemorrhage and visual acuity deteriorated for a period of time.
Conclusions: Posterior capsule opacification and neovascularization in diabetic patients is uncommon. Nd:YAG capsulotomy may not be performed alone in these patients due to the risk of bleeding. Careful evaluation and planning should be done before laser capsulotomy.

E–Poster No.: EP–0021
High–Definition Spectral–Domain Optical Coherence Tomography in Posterior Polar Cataract
First Author: Pranav RANJAN
Co–Author(s): Pranita SAHY, Devesh KUMAWAT
Purpose: To devise an innovative investigation protocol using high–definition (HD) spectral–domain optical coherence tomography (SD–OCT) to check posterior capsular integrity in cases of posterior polar cataract to minimize the intraoperative complications and improve the surgical predictability.
Methods: Twenty–one eyes with posterior polar cataract were evaluated preoperatively with SD–OCT and slit lamp clinical photography. Surgical videos of the concerned cases were also documented.
Results: None of the eyes had a preexisting posterior capsular defect as seen on SD–OCT preoperatively. Intraoperative behavior was as predicted, and surgeries were uneventful in all cases.
**Conclusions**: SD-OCT can prove beneficial in the preoperative evaluation of posterior polar cataract for posterior capsular integrity. It can predict the intraoperative course, which can be difficult for an unprepared surgeon.

**E-Poster No.**: EP-0009

**Hybrid Monovision Applied in Retinitis Pigmentosa**

*First Author: Shao-yu LEI*  
*Co-Author(s): Chien-liang WU*

**Purpose**: To report the visual outcome and VEP change when hybrid monovision was applied in a patient with retinitis pigmentosa.

**Methods**: The multifocal intraocular lens (IOL) in the dominant eye was exchanged with a monofocal IOL. Visual acuity, visual function (by NEI VFQ-25), and VEP were examined before and after hybrid monovision.

**Results**: The patient with retinitis pigmentosa after hybrid monovision showed increased amplitude and shortened latency in VEP. Visual function also improved and photic phenomenon decreased.

**Conclusions**: In our case, hybrid monovision therapy was very effective in improving the visual functions of a patient with retinitis pigmentosa.

**E-Poster No.**: EP-0027

**Long-Term Results and Vision Quality After Trifocal IOL Implantation**

*First Author: Matteo PIOVELLA*  
*Co-Author(s): Barbara KUSA*

**Purpose**: To evaluate results in cataract eyes after phacoemulsification and trifocal IOL implantation.

**Methods**: Eighty-seven eyes of 53 patients (mean age, 67.23 ± 11.10 years) underwent phaco and trifocal IOL (AT LISA tri 839 MP, Carl Zeiss Meditec) implantation. Postoperatively, distance (5 m), near (30 cm), and intermediate (70 cm) visual acuity and contrast sensitivity were measured.

**Results**: Preoperative distance uncorrected visual acuity (UCVA) was 20/126 ± 72.87. At 3 years, distance UCVA was 20/42 ± 30.40; monocular and binocular vision were 20/23. Monocular intermediate vision was 20/32, and binocular intermediate vision was 20/26.

**Conclusions**: Trifocal IOLs provided good distance, near, and intermediate vision, while maintaining contrast sensitivity.

**E-Poster No.**: EP-0024

**Manual Phaco With Microvitreoretinal Blade—A Critical Evaluation**

*First Author: Ravi CHAUHAN*  
*Co-Author(s): Sandesh SONARKHAN, Satishkumar SOLANKE*

**Purpose**: This was a critical evaluation with respect to intraoperative and postoperative complications, endothelial cell loss postoperatively, visual outcome, and cost effectiveness of 4-mm small incision cataract surgery by phacoemulsification with microvitreoretinal (MVR) blade.

**Methods**: One thousand patients with grade I–IV nuclear sclerosis were operated on under peribulbar anesthesia. A 4-mm scleral tunnel was made 2 mm behind the limbus. Capsulorhexis and hydrodissection were done. Nucleus prolapsed in the anterior chamber. Viscoelastic was injected behind and in front of the nucleus. A wire vectis was passed through the main incision below the nucleus to stabilize it. A 20G MVR blade was introduced from 11 o’clock and pierced through the nucleus substance. The MVR blade was pressed against the wire vectis, and the nucleus was bisected into 2 halves. The fragmented nucleus halves were removed through the main incision. Cortical wash was given, and a foldable intraocular lens (IOL) was implanted.

**Results**: Out of 1000 patients, 1.03% had grade I cataract, 20.05% had grade II, 55.01% had grade III, and 24.04% had grade IV. The commonest intraoperative complication was iridodialysis at 7.66%, whereas postoperative striate keratopathy was noted in 14.43% of patients. The endothelial cell count in preoperative cases was 2672 (SD = 184) cells/mm² and at 3 months postoperatively was 2294 (SD = 214) cells/mm² with an endothelial cell loss of 14.14%. Astigmatism less than −0.75 diopters was seen in 33.33%, whereas postoperative best corrected visual acuity was 6/6 in 48.67% and 6/9 in 30.53% of patients.

**Conclusions**: Micro manual small incision cataract surgery is more cost effective, with no major complications and significantly less postoperative astigmatism. It provides early rehabilitation and good visual recovery with a short learning curve.

**E-Poster No.**: EP-0025

**Measuring Posterior Astigmatism in Patients After Cataract Surgery**

*First Author: Hungyuan HSU*

**Purpose**: To evaluate posterior astigmatism in pseudophakic patients with monofocal and multifocal intraocular lenses (IOLs).

**Methods**: Ninety-six eyes of 48 consecutive patients all received cataract surgery from January to December in 2012. Refractive and corneal astigmatism was mea-
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Sure using automatic keratorefractometer before and 2 months after cataract surgery. Posterior astigmatism was calculated by comparing the refractive outcome and corneal power measurements using vector analysis.

**Results:** The mean posterior corneal astigmatism was approximately 0.64 diopters (D). The steep posterior corneal meridian was aligned vertically (60 to 120 degrees) in 81.3% of eyes, horizontally (0 to 30 and 150 to 180 degrees) in 13.6% of eyes, and obliquely (30 to 60 and 120 to 150 degrees) in 5.1% of eyes. The vector difference between both eyes of posterior astigmatism was 0.48 D. Vector difference less than 0.25 D between both eyes was found in 52.1% of patients, and that more than 0.75 D was in 22.9% of patients.

**Conclusions:** Posterior astigmatism can be measured after cataract surgery even without a rotating Scheimpflug analyzer (Pentacam). Almost half of the patients had the same correlation of posterior astigmatism between both eyes. Total corneal astigmatism should be detected by Pentacam when using toric IOLs.

**E-Poster No.:** EP-0003

**Phacoemulsification Using Rotating Needle—A Newer, Cheaper Technique**

**First Author:** Mohammad TALUKDER

**Purpose:** To use the concept of a rotating needle to perform cataract surgery. This rotating needle was known to the inventors of the phaco machine, but they were not successful. I have tried to solve the issues faced by predecessors in developing the concept.

**Methods:** The machine has 2 parts, the body and the tube. The body is again divided into 2 parts. It houses the power source and a motor. The motor has a shaft equipped with a rotating sectional study was done between both eyes. Total corneal astigmatism should be detected by Pentacam when using toric IOLs.

**E-Poster No.:** EP-0005

**Posterior Capsule Dehiscence During Phacoemulsification With Advanced Peristaltic Pump System in 2000 Cases**

**First Author:** Chia-lu CHEN

**Purpose:** To appraise the intraoperative complications occurring during the 2082 cases treated with advanced peristaltic pump phacoemulsification (Phaco) performed by a single experienced extracapsular cataract surgeon.

**Methods:** A retrospective case–note review was done of 2082 consecutive cases having Phaco with advanced peristaltic pump system (Alcon Infiniti) by a single surgeon from June 2010 to August 2015. Patient age, nuclear density, ocular comorbidity, and intraoperative

**Results:** The device showed moderate penetrating capacity in wood resembling the texture of human eye material. Then it also fitted in goat eye samples in vitro. Finally, the human lens in vitro was successfully emulsified with the device. No complication was observed in the sample operations.

**Conclusions:** The machine hereby developed through this research should be given a chance for further trial and development.
complications were documented.

**Results:** The average cataract nucleus density was $3.0 \pm 0.5$. The overall incidence of vitreous prolapse was 0.6% in 2082 Phaco cases. The incidence of vitreous prolapse was 0.2% in the last 500 Phaco cases.

**Conclusions:** The results indicate that Phaco surgeons can obtain an acceptably low complication rate with proper case choice and experience. The ophthalmic viscosurgical device shell, secondary hydrodissection, and 5-piece cracking method could reduce the complication rate.

**E-Poster No.: EP-0014**

**Posterior Capsule Opacification: Alternation in the Aqueous Humor Proteome in Diabetic Patients**

**First Author:** Shang-yi CHIANG  
**Co-Author(s):** Ming-ling TSAI, Da-wen LU

**Purpose:** Posterior capsular opacification (PCO) is the most common complication of cataract surgery occurring in up to 50% of patients after operation. According to previous studies, PCO occurred more frequently, faster, and more severely in the patients with diabetes mellitus (DM) than those without DM, especially those with proliferative diabetic retinopathy (PDR). However, a common cellular basis and the role of aqueous humor (AH) in this induction have not been previously recognized. Our study aimed to detect candidate PCO-associated AH proteins by comparative proteomics to provide clues regarding PCO development.

**Methods:** To better understand the pathophysiology of PCO and to identify risk factors, a gel-based proteomics analysis was performed to compare serum protein profiles of non–PDR (NPDR) and PDR patients and healthy cases (controls). MALDI–TOF MS was then performed to identify protein spots that were differentially expressed between these 3 groups and Western blot analysis was used to validate the experssional change of protein demonstrated by proteomics.

**Results:** Generally, the total protein amounts of NPDR and PDR samples were higher than those of controls. When comparing 2D gels from DM patients with controls, there were in general more spots and more intensely SYPRO Ruby- and silver-stained spots on the 2D gels from patients. Eighty spots were successfully analyzed, and we also found 32 protein spots that showed significant differences between the patients and control groups. In these expressed proteins, 5 spots may be related to PCO formation. Then, we used the bioinformatics tool STRING (http://string-db.org/) to depict protein networks associated with the indentified proteins.

**Conclusions:** The results of our study revealed that 5 AH proteins may be related to PCO formation. By bioinformatics analysis, the biological networks regulated by these AH proteins were demonstrated. These proteins are involved in cell–cell and cell–matrix interaction, proteases and protease inhibitors, antioxidant protection, and signal transduction, thus being essential for maintenance of normal structure and function of the lens. Through comparative analyses of proteomes, it is possible to achieve a better understanding of molecular events involved in PCO development and generate essential data needed to identify new markers and/or treatment. In our study, the proteins identified could function as STOP signal candidates and serve as potential markers for preventing PCO development.

**E-Poster No.: EP-0011**

**Postoperative Outcomes of HOYA 355 Toric Intraocular Lens Implantation**

**First Author:** Shinichiro NAKANO  
**Co-Author(s):** Takahiro HIRAOKA, Tetsuro OSHIKA

**Purpose:** To evaluate early postoperative outcomes of HOYA 355 toric intraocular lens (T–IOL) implantation and to compare postoperative outcomes with Alcon AcrySof IQ and AMO technis T–IOLs.

**Methods:** Sixteen eyes of 13 subjects who underwent cataract surgery with HOYA 355 T–IOL implantation were included. All surgeries were performed by a single surgeon using a unified method. Visual acuity and refraction were measured preoperatively and at 1 day, 1 week, and 3 months postoperatively. IOL misalignments were measured at 3 months postoperatively. These results were compared with patients who received Alcon AcrySof IQ T–IOL (26 eyes of 34 subjects) and AMO technis T–IOL (7 eyes of 13 subjects).

**Results:** At 3 months postoperatively, the mean logMAR uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) of the HOYA 355, AcrySof IQ, and AMO technis T–IOL groups were $-0.00 \pm 0.11$, $0.05 \pm 0.14$, and $0.17 \pm 0.26$ and $-0.06 \pm 0.03$, $-0.04 \pm 0.07$, and $-0.01 \pm 0.08$, respectively. The mean subjective astigmatism and mean objective astigmatism were $0.21 \pm 0.36$, $0.34 \pm 0.39$, and $0.57 \pm 0.37$ and $0.75 \pm 0.56$, $0.77 \pm 0.34$, and $0.84 \pm 0.47$, respectively. The mean IOL misalignments were $2.7 \pm 2.3$, $3.1 \pm 3.0$, and $4.7 \pm 3.6$ degrees, respectively. There were no significant differences in postoperative outcomes between the 3 groups.

**Conclusions:** Early postoperative outcomes of HOYA 355 T–IOLs were nearly identical to those of AcrySof IQ and AMO technis T–IOLs.

**E-Poster No.: EP-0001**

**Prospective Audit of Outcomes of Cataract Surgery in the Auckland Public Health**
System and Correlation With Preoperative Risk Scores

First Author: Bia KIM
Co-Author(s): Dipika PATEL, Charles MCGHEE

Purpose: To assess visual outcomes and complications of phacoemulsification cataract surgery in a public teaching hospital and the validity of 2 preoperative risk stratification systems.

Methods: A prospective audit of 400 consecutive cases of phacoemulsification cataract surgery performed at Greenlane Clinical Centre, Auckland, New Zealand. The primary investigator scored each case using 2 established risk stratification systems based on data from preoperative health questionnaires and ophthalmology clinical notes. Postoperatively, all surgical and clinical notes were reviewed at 4–6 weeks to determine intraoperative and postoperative complications and visual outcomes.

Results: Mean preoperative best corrected visual acuity (BCVA) of the operated eye was 6/30 (N = 400). A higher preoperative risk score using either stratification system correlated with a higher rate of intraoperative complications (P < 0.01). Preliminary analyses of the first 200 consecutive cases revealed a mean postoperative BCVA of 6/9. The postoperative complication rate was 11.0%, again increasing with higher preoperative risk scores (P < 0.01). Complete follow-up of all 400 cases will be presented.

Conclusions: Outcomes of cataract surgery in the Auckland public health system are comparable with reported international standards. However, this comprehensive assessment of complications revealed a higher rate than commonly perceived. Results suggest that preoperative risk scoring can provide a useful indication of the complexity of cataract surgery and likely risk of complications. This may allow individualized counseling for patients and appropriate allocation of cases for ophthalmologists in training.

E–Poster No.: EP–0012

Scleral Fixation of enVista Through 2.2-mm Clear Corneal Wound for Aphakic Patient

First Author: Evelyn Jou Chen HUANG
Co-Author(s): Chien-neng KUO, Li-ju LAI, Ching-lung CHEN

Purpose: To report a case who was aphakic due to eyeball rupture treated with scleral fixation of an enVista (Bausch & Lomb) by 2.2-mm wound.

Methods: A case report.

Results: An 84-year-old female with dementia suffered from a right eye cornea–scleral wound rupture with protrusion of intraocular lens due to a fall. After primary repair of the rupture wound, vitreous hemorrhage and aphakia status were monitored. No retinal detachment was found after close observation, with best corrected visual acuity of 20/100 under hyperopia +10.5 D. Scleral fixation was the favored surgery method for not residual lens capsule could be used to support the lens. However, a cornea–scleral wound with tissue defect was found during previous repair surgery. Thus, we sutured the enVista (a soft foldable lens) through a 2.2-mm wound after folding the enVista and then performed injection combined with microincision wound vitrectomy for vitreous hemorrhage. Good stability and visual acuity were noted after scleral fixation and vitrectomy.

Conclusions: Using enVista for scleral fixation through a 2.2-mm wound can achieve good stability and visual acuity.

E–Poster No.: EP–0010

Surgical Management in Bilateral Persistent Pupillary Membranes With Traumatic Cataract

First Author: Reny SETYOWATI
Co-Author(s): Suhardjo PRAWIRORANU
Purpose: Persistent pupillary membrane (PPM) is a consequence of incomplete involution and atrophy of the pupillary membrane. PPM is able to attach anteriorly to the cornea or even posteriorly to the anterior lens capsule. Successful laser pupillary membranectomy has been reported but requires adequate cooperation of the patient. The aim of this study was to report the surgical management of bilateral persistent pupillary membranes that were attached posteriorly to the anterior lens capsule with unilateral traumatic cataract.

Methods: We report the case of a 51-year-old man diagnosed with bilateral persistent pupillary membranes attached posteriorly to the anterior lens capsule and unilateral traumatic cataract. The management consisted of surgical intervention using vitreous scissors and vannas scissors to excise PPM surgically combined with phacoemulsification for traumatic cataract.

Results: Visual acuity in PPM with unilateral traumatic cataract significantly improved from 1/300 (hand movements) to 6/7.5 on day 7 postoperatively. The pupillary aperture was round and cosmetically good. No complications were found.

Conclusions: Surgical management of persistent pupillary membranes attached posteriorly to the anterior lens capsule and unilateral traumatic cataract was successful. Using vitreous scissors and vannas scissors combined with phacoemulsification, prompt therapeutic intervention provided a good result postoperatively without any complications.

E-Poster No.: EP-0022
Surgical Stress Influences Surgeon Blood Pressure and Heart Rate in Cataract Surgery
First Author: Jyun-ci WANG
Co-Author(s): Hung Yuan LIN, Woun-fu LI, Pi-jung LIN

Purpose: To study if a skillful surgeon’s blood pressure and heart rate will be affected before and after a series of cataract surgeries.

Methods: Six skillful cataract surgeons without any hypertensive or cardiovascular medical history were recruited in this study. Baseline and perioperative blood pressure and heart rate of these surgeons were measured, and comparative analysis was done.

Results: No significant statistical difference in surgeon blood pressure and heart rate change was noted during a series of cataract surgeries. There was a statistical significance between baseline and perioperative mean surgeon blood pressure ($P < 0.05$).

Conclusions: Surgeon blood pressure and heart rate rose significantly at the beginning of cataract surgery. Blood pressure and heart rate fluctuations were not noted during a series of cataract surgeries.

E-Poster No.: EP-0486
Transient Blindness After Intracameral Anesthesia During Phacoemulsification Cataract Surgery
First Author: Ren-yu HUANG
Co-Author(s): San-ni CHEN

Purpose: Transient blindness is a potentially underdiagnosed cause of immediate visual loss after phacoemulsification cataract surgery under intracameral anesthesia.

Methods: A case report.

Results: A 57-year-old woman was scheduled for right eye phacoemulsification and intraocular lens replacement. She had received vitrectomy 1 year before due to right eye retinal detachment. Intracameral anesthesia with 0.5 mL of lidocaine 2% without epinephrine was used after paracentesis of the corneoscleral wound. The surgical procedure proceeded without complications. At the end of surgery, the patient complained of blindness in her right eye. Reverse relative afferent pupillary defect was noted. The fundoscopy that was immediately performed appeared normal. The results of fluorescein angiography and indocyanine green chorioangiography were normal. The patient recovered.
light perception after 1 hour. The day after surgery and 1 week later, visual acuity was 0.8. The patient recovered without sequelae.

Conclusions: Mechanisms involved in this episode of transient blindness are unclear. The lidocaine may have spread along the vitrectomized space to the optic nerve and temporarily interrupted light transmission toward the brain. This theory seems the most credible because the duration of action of that local anesthetic is short lasting.

E–Poster No.: EP–0029

Visual Function Analyzer–Assisted Refractive Correction in Pseudophakic Eyes

First Author: Manqiang PENG

Purpose: To investigate the clinical effect of visual function analyzer–assisted refractive correction in pseudophakic eyes.

Methods: Four special cases from April 2014 to June 2015 are presented. One case was diagnosed as de-focus abnormal by visual function analyzer (iTrace) 1 month after piggyback intraocular lens (IOL) implantation. Then we changed 1 of them. One case was IOL decentration of about 1.5 mm 1 month after multifocal IOL (AcrySof Restore +3D) implantation and was diagnosed with intraocular astigmatism by iTrace. The astigmatism axis lay on IOL decentered direction. Then we reset the IOL. The other 2 cases were posterior capsule shrinkage with obvious vision impairment 6 months to 9 months after single IOL implantation, diagnosed as intraocular astigmatism by iTrace. Then we performed Nd:YAG laser capsulotomy.

Results: After changing the piggyback IOL, visual acuity increased from 0.5J5 to 0.8J2, and there was no change during the subsequent 13 months. After resetting the multifocal intraocular lens, visual acuity increased from 0.2J6 to 0.6J3, and there was no change during the following 8 months. After Nd:YAG laser capsulotomy, visual acuity increased to 0.8, which was same as early postoperative visual acuity, and there was no change during the following 6 to 14 months.

Conclusions: There were various types of refractive error in pseudophakic eyes due to measurement error, intraoperative treatment, posterior capsular opacification, and other reasons. Visual function analyzer–assisted refractive correction can be a good method to solve this problem, but more samples are needed to confirm this result.

E–Poster No.: EP–0030

Changes in Tear Film and Ocular Surface Stability After Manual Phacoemulsification vs Femtosecond Laser–Assisted Cataract Surgery

First Author: Bhupesh SINGH
Co-Author(s): Sudhank BHARTI

Purpose: To evaluate changes in corneal sensitivity, tear film function, and ocular surface stability in patients after manual phacoemulsification (incision size, 2.2 mm) and femtosecond laser–assisted cataract surgery.

Methods: This was a prospective study comprising 2 groups, with 50 eyes in the manual phacoemulsification group and 50 eyes in the femtosecond laser–assisted cataract surgery group. Slit–lamp examination, Schirmer test 1 (ST1), and measurement of corneal sensitivity and tear film breakup time (BUT) were performed for all patients 1 day before and 1 day, 1 month, and 3 months after surgery. Ocular Surface Disease Index (OSDI) scores were also recorded at each visit.

Results: Corneal sensitivity at the center and at incision sites had decreased significantly at 1 day postoperatively ($P < 0.001$). However, the sensitivity had returned to almost the preoperative level 1 month postoperatively in manual phacoemulsification, whereas in femtosecond laser–assisted cataract surgery, the decrease in corneal sensitivity was nonsignificant ($P > 0.05$) and returned to normal at 1 week. The mean postoperative ST1 results were no different from preoperative values. On the other hand, BUT results were decreased significantly at 1 day postoperatively ($P = 0.01$) but returned to normal postoperatively at 1 month, whereas in the femtosecond group the eyes returned to preoperative levels at 1 week.

Conclusions: There was a significant decrease in tear film stability in the early postoperative period. Microscopic ocular surface damage during cataract surgery seems to be one of the pathogenic factors that cause ocular discomfort and dry eye syndrome after cataract surgery. Early ocular surface stability occurred in the femtosecond group. Femtosecond laser–assisted surgery is less harmful to the ocular surface and causes less symptoms related to dry eye.

E–Poster No.: EP–0031

Health Informatics in Ophthalmology—The Doctor’s Perspective

First Author: Abison LOGESWARAN
Co-Author(s): Yu Jeat CHONG

Purpose: To assess the specific requirements, current use, and potential areas of expansion within ophthalmology health informatics systems.

Methods: An automated literature search was per-
formed using Medline with the help of a librarian. This search identified papers classified as about 1) ophthalmology, 2) electronic patient/health records, 3) open standards, 4) HLA–7, 5) DICOM, 6) health informatics, and 7) decision support systems. The search returned 16 articles.

**Results:** The uptake of ophthalmology electronic health records (EPR/EHR) is relatively low within ophthalmology compared with nonophthalmic disciplines. This is because the specific needs of ophthalmology are not addressed. The 4 domains are addressed by Chiang et al: 1) dual medical/surgical nature of the speciality, 2) documentation of visual data, 3) unique parameters, and 4) varying laboratory and imaging techniques. There are no uniform EHR providers in the United Kingdom. OpenEyes is a web-based open source electronic patient record system that was developed by a multidisciplinary team at Moorfields Eye Hospital. There are many strengths and potential areas of expansion that we discuss in this presentation.

**Conclusions:** There is evidence that health informatics and EPRs are increasingly being used in ophthalmology and have the potential to assist in screening programs via decision support systems. However, at this present time, widespread use of such systems does not exist. There needs to be greater analysis of end-user needs and increased use of open standards to enable data sharing and increased uptake of such systems.

**E-Poster No.: EP–0042**

A Clinical Survey on Subcutaneous Triamcinolone Acetonide Eyelid Injection for Vernal Keratoconjunctivitis

First Author: Tomoko TSUKAHARA  
Co-Author(s): Yusuke SAeki, Jane Huang, Eiichi Uchio

**Purpose:** To report the results of our clinical survey on subcutaneous triamcinolone acetonide eyelid (STAE) injection for vernal keratoconjunctivitis (VKC).

**Methods:** Fifteen VKC patients were recruited for the clinical survey on STAE injections at Fukuoka University Hospital. All had past histories of single or multiple STAE injections. It was a closed–question survey with yes or no answers. The survey was completed by either the patients themselves or by the guardian when the patient had not reached a reading age. The survey included questions about how the patient felt during the STAE injection, how symptoms have changed after the injection, any symptoms of side effects, and if the patient would want another STAE injection.

**Results:** Average age of initial STAE injection was 11.4 years old (5~24 years old). Fourteen males and 1 female were included. Ten out of 15 were frightened during the injection, 14 out of 15 felt immediate relief in eye symptoms, 9 out of 15 had no signs of any side effects, and 11 out of 15 would have repeat STAE injections when symptoms recurred. Those who refused to have another injection were younger in age (average, 7.3 years old).

**Conclusions:** Our clinical survey provided insight into
the adjunctive treatment of VKC with STAE injection. The survey revealed an immediate relief of symptoms after the injection and despite being frightened during the procedure, most of the patients were willing to have the procedure again when symptoms recurred.

E-Poster No.: EP-0037

A New Technique of Therapeutic Penetrating Keratoplasty When Large Donor Cornea is Unavailable

First Author: Pornlada SUNLAKAVISET

Purpose: To report a new technique of therapeutic penetrating keratoplasty (PKP) in large infectious keratitis by using the leftover pieces of preserved cornea when a large donor cornea is unavailable.

Methods: A case report.

Results: A 50-year-old Thai male presented with severe infectious keratitis involving the total cornea with generalized corneal thinning. We scheduled him for therapeutic PKP, and the patient was on the donor cornea waiting list. Culture results showed Fusarium organism. After a few days of medical treatment, the lesion worsened, resulting in corneal perforation and autoextrusion of the crystalline lens. The patient was first scheduled for evisceration, as donor cornea was not available. However, we decided to perform large therapeutic PKP by combining 2 leftover pieces of glycercol–preserved cornea, which were a circular-shaped tissue of pathologic cornea and a corneoscleral rim sutured into 1 large graft with 10-0 nylon. The potential benefit of the circular-shaped graft is that it resembles the shape of the cornea, which could make the wound more secure against outward circular tension. No recurrent infection was observed, and the patient was discharged later without any complications. In countries with a shortage of donor corneas, the common practices are to use a scleral graft, which can obscure the new or remnant infection underneath, or perform evisceration, resulting in the loss of the eye. Our new procedure produced a favorable result in terms of preserving globe integrity, eliminating infection, cosmetic acceptance, and blindness prevention. Optical PKP can be performed later to restore vision.

Conclusions: Therapeutic PKP with a new technique of combining remnant glycerol–preserved cornea is an effective and economical method to get rid of infection, stabilize the globe, and save vision in large infectious keratitis when large fresh or preserved donor cornea is unavailable.

E-Poster No.: EP-0066

Amniotic Membrane Transplantation in a Patient With Perforated Corneal Ulcer Caused by Streptococcus mitis

First Author: Yu-chun CHENG
Co-Author(s): Ching-hsi HSIAO, Hsin-chuang LIN, Chi-chin SUN, David Hui-kang MA, Hung-chi CHEN

Purpose: We describe a rare case of perforated corneal ulcer caused by Streptococcus mitis, the course of treatment, and the role of amniotic membrane transplantation in such cases.

Methods: We retrospectively reviewed a case of perforated corneal ulcer caused by S. mitis, which received superficial manual keratectomy with amniotic membrane transplantation after a course of intensive topical
antibiotics failed to halt corneal ulcer progression.  

**Results:** *S. mitis* is most commonly found in infectious crystalline keratopathy, an indolent infection characterized by a branching crystalline pattern of infiltrate within the corneal stroma with insignificant inflammation. This is the first documented case of *S. mitis*-induced perforated corneal ulcer treated by amniotic membrane transplantation. The patient’s amniotic membrane graft remained clear and functional at 6-month follow-up.  

**Conclusions:** This case demonstrated that perforated corneal ulcer may be caused by *S. mitis* and can be adequately treated with amniotic membrane transplantation.  

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**E-Poster No.: EP–0036**  
**An Atypical Presentation of Microbial Keratitis After the Use of Orthokeratology Contact Lenses**  
**First Author:** Chih-chien HSU  
**Co-Author(s):** Chiao-yu WANG, Pei-yu LIN  
**Purpose:** To describe a young man who developed infectious keratitis with atypical presentation after the use of overnight orthokeratology contact lenses.  
**Methods:** A 22-year-old young man complained of photophobia and redness in his left eye after removal of orthokeratology contact lenses in the morning. He came to our clinic for help. Under slit lamp, a discontinuous whitish elevated ring-like epithelial plaque was noted without significant stromal infiltration in his left eye. The anterior chamber was clear in both eyes. His best corrected visual acuity was 6/6 in both eyes. After scrapings of the whitish tissue were sent for bacterial culture, topical levofloxacin 2 hours per day and lubricant were prescribed. The use of orthokeratology contact lenses was also stopped from that day.  
**Results:** Three days later, the patient had no more photophobia and redness. His best corrected visual acuity was 6/6 in both eyes. Under slit lamp, the discontinuous whitish elevated ring-like epithelial plaque had disappeared, but diffuse increased stromal infiltration over the whole cornea was noted. The culture result of corneal swab showed *Pseudomonas aeruginosa* sensitive to levofloxacin. He was followed in our clinic under the use of Cravit 4 times per day and lubricant at night.  
**Conclusions:** The use of orthokeratology contact lenses can reshape the cornea. Infectious process should always be kept in mind when atypical presentation of a corneal lesion is noted.  

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**E-Poster No.: EP–0052**  
**Anterior Opacification of Posterior Chamber Intraocular Lens After Non-Descemet Stripping Automated Endothelial Keratoplasty—A Case Report**  
**First Author:** Shangte MA  
**Co-Author(s):** Yu-chih HOU  
**Purpose:** To present a rare case of anterior opacification of the posterior chamber intraocular lens after non-Descemet stripping automated endothelial keratoplasty (n-DSAEK), which may impair vision.  
**Methods:** Interventional case report.  
**Results:** A 68-year-old woman underwent phacoemulsification and posterior chamber intraocular lens (PCIOL) implantation in the right eye at a local clinic. Corneal edema persisted postoperatively. One month later, she visited NTUH and pseudophakic bullous keratopathy was found in her right eye with a vision of 0.01. Then, n–DSAEK was smoothly performed in her right eye 4 months later. Postoperatively, vision in the right eye improved to 0.5. About 12 months later, a central opacification in the anterior surface of the PCIOL developed in her right eye. The opacification was characterized by fine, granular deposits and located in the pupillary region. Anterior–segment OCT revealed a hyperreflective material in the anterior surface of the PCIOL. Best corrected visual acuity of the right eye remained stable at 0.4. The phenomenon remained the same as the initial presentation during 3 years of follow-up.  
**Conclusions:** Anterior opacification of IOLs may occur after n–DSAEK. After review of the literature, the calcium deposits in IOLs may relate to hydrophilic acrylic lens or lens exposure to air during the surgical procedure. However, most cases had mild vision impairment. Because the calcium deposits inside IOLs are difficult to remove by irrigation or polishing, severe cases may need IOL exchange.  

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**E-Poster No.: EP–0083**  
**Biodegradable Collagen Matrix (OlogenTM) Implant and Conjunctival Autograft for Scleral Necrosis After Pterygium Excision**  
**First Author:** Sang-bumm LEE  
**Co-Author(s):** Chan-ho CHO  
**Purpose:** Scleromalacia, in the form of scleral thinning, melting, and necrosis, is a potentially serious complication of pterygium excision. This study introduces a new biodegradable material, OlogenTM collagen matrix (OCM), to repair scleral thinning as an alternative to preserved scleral tissue and evaluates the long-term outcomes of OCM for ocular surface reconstruction surgery.  
**Methods:** Two cases of possibly mitomycin C (MMC)–associated marked scleral thinning after pterygium excision with 0.02% topical MMC for 2 weeks were
included in this study. An OCM graft at the scleral thinning area and conjunctival autograft (CAU) were performed on both patients. The OCM was sutured with a recipient scleral wall using 10-0 nylon interrupted sutures. Free CAU was harvested from the superonasal bulbar conjunctiva with a punch biopsy 1 mm larger in diameter than that of the OCM. The previously sutured OCM bed was covered with CAU, and the graft was secured with 10-0 nylon interrupted sutures.

**Results:** Both patients were examined periodically for over 2 years by assessing graft thickness and surface vascularization. Reepithelialization of the ocular surface was observed within the first week after surgery. The entire graft site remained intact and provided a good healthy ocular surface over the 2 year follow-up period.

**Conclusions:** For treatment of scleral necrosis after the surgical excision of pterygium, an OCM graft with CAU is highly recommended for good clinical outcomes and low recurrence rates. With the clinical results of this study, OlogenTM collagen matrix qualifies as an alternative treatment to scleral tissue for ocular surface reconstruction.

**E-Poster No.:** EP–0082

**Change in Tear Film Lipid Layer Thickness, Corneal Thickness, and Corneal Volume After Superficial Cauterization for Conjunctivochalasis**

**First Author:** Tommy CHAN  
**Co-Author(s):** Vishal JHANJI

**Purpose:** To evaluate the change in tear film lipid layer thickness, corneal thickness, and corneal volume after superficial cauterization of symptomatic conjunctivochalasis.

**Methods:** This was a prospective interventional study. Bilateral superficial conjunctival cauterization was performed in 36 eyes of 18 patients with symptomatic conjunctivochalasis. The main outcome measures were conjunctivochalasis grading, Ocular Surface Disease Index (OSDI) score, Schirmer test, lipid layer thickness, corneal thickness, and corneal volume before and 1 month after the surgery.

**Results:** The mean age of patients (12 males, 6 females) was 68.6 ± 10.9 years (range, 44–83 years). Preoperatively, 28 eyes (77.8%) had grade 1 disease, and 8 eyes (22.2%) had grade 2 disease. At 1 month postoperatively, 29 eyes (80.6%) had grade 0 conjunctivochalasis (absence of persistent folds) and 7 eyes (19.4%) had grade 1 disease. The severity of conjunctivochalasis decreased significantly after surgery ($P < 0.001$). The mean OSDI score decreased from 31.5 ± 15.2 preoperatively to 21.5 ± 14.2 at the end of 1 month postoperatively ($P = 0.001$). There was a statistically significant increase in the lipid layer thickness 1 month after surgery ($P < 0.001$) from a mean of 49.6 ± 16.1 nm preoperatively to 62.6 ± 21.6 nm postoperatively. The central corneal thickness and corneal volume decreased significantly postoperatively ($P < 0.001$). There was no significant change in Schirmer test and keratometry values before and after surgery.

**Conclusions:** Superficial conjunctival cauterization is an effective technique for the management of conjunctivochalasis. An increase in tear film lipid layer thickness along with a decrease in corneal thickness and volume were observed after surgical correction of conjunctivochalasis.

**E-Poster No.:** EP–0070

**Clinical Characteristics and Treatment Outcomes of Pythium insidiosum Keratitis**

**First Author:** Thitiporn THONGBORISUTH  
**Co-Author(s):** Kaevalin LEKHANONT, Passara JONGKHAIJORNPONG, Manachai NONPASSOPON, Pitak SANTANIRAND

**Purpose:** To report clinical characteristics and treatment outcomes of *Pythium insidiosum* keratitis in the setting of a tertiary care center.

**Methods:** A retrospective descriptive chart review of all patients with culture-proven *P. insidiosum* keratitis from January 2004 to December 2013 was conducted. Patient profiles, clinical manifestations, and treatment modalities were analyzed.

**Results:** Fifteen eyes of 15 patients (11 males, 4 females) were enrolled in the study. The mean age was 54.5 years (range, 18–87 years). The presenting visual acuity (VA) was less than or equal to hand motion for 67% of patients (n = 10). Clinical features consisted of satellite lesion (46.7%), reticular pattern (20%), featheredge (13.3%), endothelial plaque (13.3%), and ring infiltration (6.7%). Treatment options included topical echinocandins (33.34%), topical allylamines (46.67%), systemic allylamines (86.67%), systemic echinocandins (26.67%), and *Pythium* vaccine (60%). All patients required surgical interventions: penetrating keratoplasty in 86.7%, anterior lamellar keratoplasty in 6.7%, evisceration in 20%, and enucleation in 20%. Overall globe salvage was 26.7% (n = 4). Globe salvage among patients who were treated with and without *Pythium* vaccine was 33.3% (n = 3) and 16.7% (n = 1), respectively.

**Conclusions:** *P. insidiosum* keratitis resulted in high visual morbidity. The mainstay of treatment is early surgical intervention. *Pythium* vaccine is a promising adjuvant therapy for globe salvage.

**E-Poster No.:** EP–0084
Clinical Efficacy of Combined Anti-Inflammatory and Tear Stimulation Treatments for Sjogren Syndrome–Related Dry Eye

First Author: Kyung Chul YOON
Co-Author(s): Jee Myung YANG, Yung Hui KIM, Lian CUI, Ying LI, Hyoseok LEE

Purpose: To evaluate the effects of combined anti-inflammatory and tear stimulation treatments on the clinical signs and quality of life in patients with Sjogren syndrome–related dry eye.

Methods: A retrospective chart review was conducted in 151 patients with dry eye associated with Sjogren syndrome who were treated with either topical cyclosporine A 0.05% (80 patients, group A) or cyclosporine A 0.05% combined with diquafofosil 3% (71 patients, group B). Tear film breakup time (BUT), Schirmer test, corneal and conjunctival staining, and quality of life using the Ocular Surface Disease Index (OSDI) questionnaire were evaluated at baseline and 1, 3, and 6 months after treatment.

Results: Tear film BUT and corneal staining score significantly improved at 6 months in group A and at 1, 3, and 6 months in group B. Tear film BUT was higher and corneal staining score was lower in group B than in group A at all follow-up visits (P < 0.05). Group B showed an earlier and better improvement in total OSDI score, especially in symptom and function–related scores compared with group A (P < 0.05). Among group B patients, a significant improvement in tear film BUT, Schirmer test value, and conjunctival staining score was noted in the autoantibody–negative group compared with the autoantibody–positive group.

Conclusions: In Sjogren syndrome–related dry eye, combined use of anti-inflammatory and tear stimulatory agents could achieve an earlier and better improvement in objective signs and subjective quality of life compared with anti-inflammatory treatment only. The treatment response was better in patients with autoantibody–negative Sjogren syndrome.

E-Poster No.: EP–0090

Comparative Study of Pterygium Excision With Conjunctival Autograft, Wet Amniotic Membrane Graft, and Topical Mitomycin C

First Author: Pavitra PATEL

Purpose: To compare the recurrence rate, astigmatism, and surgical outcome with wet amniotic membrane graft (AMG), conjunctival autograft (CAG), and topical mitomycin C.

Methods: A randomized, prospective, interventional study including individuals aged from 21–60 years. We recorded best corrected visual acuity (BCVA) both pre– and postoperatively to detect any defect in vision or change in astigmatism by autorefractometer in 75 patients with primary pterygium. Strict inclusion and exclusion criteria were used. Ocular examination of anterior and posterior segment was done. All the patients were seen on the first postoperative day and examined after 1 week, 4 weeks, and 6 months for any recurrence, possible complications, and change in astigmatism.

Results: Mean patient age was 47.92 ± 10.83. There were more males (61.33%) as compared with females (38.67%). Unilateral pterygium (65.33%) was more common than bilateral pterygium (34.67%). According to slit lamp grading, T3 (48%) was more common than T2 (29.33%) and T1 (26.7%). Mean preoperative astigmatism was 2.36 ± 1.24, which reduced to 1.42 ± 1.43 postoperatively (P < 0.001). Complication rates of around 4% in CAG and 20% in mitomycin C were seen.
The recurrence rate was 4% with both wet AMG and CAG and 12% in cases with mitomycin C.

Conclusions: Simple excision of pterygium followed by CAG or wet AMG has a lower recurrence rate and minimal incidence of complications as compared with the intraoperative use of mitomycin C.

E-Poster No.: EP-0044

Comparison of Anterior Segment Biometric Measurements Between Pentacam and IOLMaster in Normal and High Myopic Eyes

First Author: Xiaogang WANG
Co-Author(s): Jing DONG

Purpose: To compare the anterior chamber depth (ACD), keratometry (K), and astigmatism measurements taken by IOLMaster and Pentacam in normal and high myopic (HM) eyes.

Methods: Sixty-six normal eyes and 59 HM eyes underwent ACD, keratometry, and astigmatism measurements with both devices. Interdevice agreement was evaluated using Bland–Altman analysis and paired t test. The correlations between age and AL and ACD were analyzed.

Results: The difference in ACD between IOLMaster and Pentacam was statistically significant in the normal group (P = 0.003) but not in the HM group (P = 0.280). IOLMaster indicated significantly higher steep K and mean K values than Pentacam but not flat K in the normal group (P < 0.001; P < 0.001; P = 0.119, respectively). Pentacam demonstrated statistically lower flat K, steep K, and mean K values than IOLMaster in the HM group (P < 0.001). Vector analyses indicated no significant differences for astigmatism measurements between IOLMaster and Pentacam in the HM group but not the normal group. In the normal group, age was negatively correlated with both AL and ACD (r = −0.395, P = 0.001; r = −0.715, P < 0.001). In the HM group, age was positively correlated with AL but negatively correlated with ACD (r = 0.377, P = 0.003; r = −0.392, P = 0.002).

Conclusions: The IOLMaster and Pentacam have statistically significant differences in corneal power measurements for both normal and HM groups. The 2 instruments agree on astigmatism measurement for the HM group but differ in the normal group. Therefore, a single instrument is recommended for studying longitudinal changes in corneal power and corneal astigmatism. Age should be considered an influencing factor for both AL and ACD values in the normal and HM groups.

E-Poster No.: EP-0049

Comparison of Endothelial Cell Loss Rate in Penetrating Keratoplasty, Descemet Stripping Automated Endothelial Keratoplasty, and Deep Anterior Lamellar Keratoplasty

First Author: Bo-i KUO
Co-Author(s): Yu-chih HOU, Fung-rong HU, I-jong WANG, Wei Li CHEN

Purpose: To compare the cell loss rate of endothelial cell density (ECD) in penetrating keratoplasty (PKP), Descemet stripping automated endothelial keratoplasty (DSAEK), and deep anterior lamellar keratoplasty (DALK) in noncomplicated cases.

Methods: Patients with clear grafts and initial ECD larger than 1000 cells/mm² were included from 2009 to 2014. Complicated cases were excluded. The follow-up time period was sequentially divided into 5 subgroups (0–1.5 months, 1.5–6 months, 6–12 months, 12–24 months, and longer than 24 months). For statistical analysis, t test was used. Steroid use was also compared.

Results: One hundred seventeen patients undergoing PKP, DSAEK, or DALK (68, 38, and 11 subjects, respectively) were enrolled for analysis. The average cell loss rate (cells/mm²/month) declined with time in the 3 groups (–562, –113, –37, –31, and –54 in the PKP group; –689, –68, –22, –14, and –5 in the DSAEK group; and –577, –68, –24, +6, and +18 in the DALK group). The ECD loss was initially faster in the DSAEK group but became slower than the PKP group after 6 months, and it reached significance at 2 years postoperatively. The cell loss in the DALK group was significantly less than the PKP group after 1 year, with almost no cell loss. Steroid use was less in the DALK group than in the PKP or DSAEK groups.

Conclusions: DSAEK has a better long-term cell survival rate than PKP. Steroid use and cell loss were less in DALK than in PKP or DSAEK.

E-Poster No.: EP-0072

Corneal Graft Shape After DSAEK

First Author: Yi-hao HO
Co-Author(s): Yi-yu TSAI, Elsa CHIANG, Yi-ching HSIEH

Purpose: To investigate the postoperative corneal thickness and shape after Descemet stripping endothelial keratoplasty (DSAEK) using the Visante anterior segment optical coherence tomography (AS-OCT) system.

Methods: All eyes that underwent DSAEK surgery, including simple DSAEK and triple DSAEK, between August 2009 and May 2014 were enrolled in this retrospective study. To determine postoperative thickness and shape of the DSAEK graft, images obtained from AS-OCT were taken at the central (C), paracentral at 4 mm optical zone (P1), and peripheral at 6 mm optical zone (P2) of the graft at 1, 2, and 3 years after surgery.
Results: The C:P1 ratio was 0.96 and the C:P2 ratio was 0.85 at 1 year after surgery (n = 55). The C:P1 ratio was 0.96 and the C:P2 ratio was 0.84 at 2 years after surgery (n = 36). The C:P1 ratio was 0.95 and the C:P2 ratio was 0.83 at 3 years after surgery (n = 28). The shape of the graft was variable, including concave meniscus shape, convex meniscus shape, nearly uniform meniscus shape, and asymmetrical shape, thinning from one side to the other side gradually. The most common shapes were asymmetrical shape at 1 year after operation and concave shape at 2 and 3 years after operation.

Conclusions: Compared with other similar studies, the difference in thickness between the center and periphery of the DSAEK graft was smaller in our study, which may produce less hyperopic shift in refraction. This observation should be taken into consideration when choosing appropriate intraocular lens (IOL) power in the triple DSAEK procedure.

E-Poster No.: EP-0091

Corneal Graft Shape After Triple DSAEK and Its Relationship to Postoperative Spherical Equivalant

First Author: Yi-ching HSIEH
Co-Authors: Yi-yu TSAI, Elsa CHIANG

Purpose: To investigate the postoperative corneal thickness and shape after Descemet stripping endothelial keratoplasty (DSAEK) combined with phacoemulsification and intraocular lens (IOL) implantation (triple DSAEK procedure) using the Visante anterior segment optical coherence tomography (AS-OCT) system and its correlation with refractive change.

Methods: All eyes that underwent the triple DSAEK procedure between August 2009 and May 2014 were enrolled in this retrospective study. To render all eyes close to emmetropia, the IOL calculated target was between -1.0 and -2.0 diopters (D) due to hyperopic shift after DSAEK demonstrated in previous studies. To determine postoperative thickness and shape of the DSAEK graft, images obtained from AS-OCT were taken at the central (C), paracentral at 4 mm optical zone (P1), and peripheral at 6 mm optical zone (P2) of the graft. We measured spherical equivalent (SE) postoperatively and evaluated the correlation of refractive error with graft thickness and shape.

Results: Nineteen eyes and 11 eyes were evaluated 1 year and 3 years after surgery. The C:P1 ratio was 0.97 and the C:P2 ratio was 0.89 at 1 year after surgery. The C:P1 ratio was 0.95 and the C:P2 ratio was 0.84 at 3 years after surgery. The shape of the graft was variable, including concave meniscus shape, nearly uniform meniscus shape, and asymmetrical shape thinning from one side to the other side gradually. The mean change in refraction was -0.92 D (range, -3.00 to +1.75) 1 year after surgery and -1.70 D (range, -3.00 to 0) 3 years after surgery.

Conclusions: In most previous studies, the postoperative graft was well-shaped and concave, which resulted in a marked hyperopic shift. In our experience, however, the difference in thickness between the central and peripheral DSAEK graft was minimal, resulting in little hyperopic shift. The shape of DSAEK grafts among different surgeons may be highly variable. Every surgeon should establish their own nomogram.

E-Poster No.: EP-0034

Corneal Sensitivity and Tear Functions in Patients With Recurrent Corneal Erosion Syndrome

First Author: Hung-chi CHEN
Co-Authors: Hsin-yuan TSAI, Chi-chin SUN, Ching-hsi TSAI, David Hui-kang MA, Chi-chun LAI

Purpose: To determine the role of corneal sensitivity and tear functions on the prognosis of eyes with post-traumatic recurrent corneal erosion syndrome (RCES).

Methods: Between 2006 and 2011, 39 eyes of 39 patients with unilateral RCES and a history of ocular surface trauma were followed. Routine examinations [best corrected visual acuity (BCVA), intraocular pressure (IOP), slit–lamp biomicroscopy], corneal sensitivity measurements (Cochet–Bonnest esthesiometry), and tear function tests [tear film break up time (TFBUT) and Schirmer test with anesthesia (STA)] were performed at time points of months 1, 3, and 6. The inclusion criteria were patients with at least 2 episodes of ocular surface trauma before recruitment, a minimum follow-up of 2 years, and final visual acuity better than 20/40. The exclusion criteria were patients with prior interventions before visits, presumed neuropathy, dry eye syndrome, and meibomian gland dysfunction. Depending on the number of recurrences during follow-up, patients were divided into the study (n > 2) or control (n = 2) groups. For respective groups, comparison of corneal sensitivity and tear functions between the diseased and fellow eyes within each patient was demonstrated as a time course analysis.

Results: After the exclusion of 8 patients, 31 patients were enrolled and divided into the study group (n = 14) and control group (n = 17). Mean patient age was 40.3 ± 12.2 years, and mean follow-up was 28.0 ± 3.6 months. At time points 1 (month 1 to month 3) and 2 (month 3 to month 6), both corneal sensitivity and tear functions were significantly reduced in diseased eyes of both groups. However, at point 3 (month 6 to month 12), tear functions were still significantly reduced in diseased eyes of both groups, whereas corneal sensitivity was only significantly reduced in diseased eyes in the study group but appeared statistically similar be-
Correlations Among Tear Film Lipid Layer Thickness Measurement, Ocular Surface Temperature Difference, and Other Measurements in Patients With Dry Eye

First Author: Tzu Yun TSAI
Co-Author(s): Shu-wen CHANG

Purpose: To report the use of LipiView interferometer for measuring tear film lipid layer thickness (LLT) and to investigate the correlation among the LLT and other parameters for meibomian gland dysfunction (MGD).

Methods: Eighty–two eyes of 82 participants from Far Eastern Memorial Hospital were recruited for this study. LLT was measured by an interferometer (LipiView ocular surface interferometer, TearScience Inc, Morrisville, NC). Ocular surface temperature was measured for 4 seconds after blinking by a thermographer (TDV1 to TDV4). A questionnaire about dry eye including the Ocular Surface Disease Index (OSDI) and Standard Patient Evaluation of Eye Dryness (SPEED) was given. Age, fluorescein tear break up time (FTBUT), tear meniscus height on AS-OCT, and meibum quality score were also prospectively evaluated.

Results: LLT measurements exhibited negative correlation with TDV1 (r = -0.404, P < 0.001), TDV2 (r = -0.289, P < 0.05), and TDV3 (r = -0.278, P < 0.05). There was a significant positive correlation between LLT and FTBUT (r = 0.761, P < 0.001). Additionally, a negative correlation between LLT and meibum quality score (r = -0.718, P < 0.001) was observed. Analysis of other parameters revealed no correlation among LLT, age, TMH, OSDI, and SPEED score.

Conclusions: LLT exhibited significant negative correlation with TDV1 to TDV3, which suggests a higher temperature decrease within 3 seconds in patients with low LLT. The positive correlation between the FTBUT and LLT and the negative correlation between the meibum quality score and LLT found in this study both suggest a higher probability of MGD in patients with a low LLT. LLT measurements by interferometer may provide a simple and noninvasive screening test for detecting MGD.

Correlations Between Blink Patterns and Clinical Parameters in Patients With Dry Eye

First Author: Tzu Yun TSAI
Co-Author(s): Shu-wen CHANG

Purpose: To investigate the correlations among the partial blink rate, total blink number, and other parameters for dry eye.

Methods: Eighty–two eyes of 82 participants from Far Eastern Memorial Hospital were recruited for this study. Partial blink rate, total blink number, and lipid layer thickness (LLT) were measured with a LipiView interferometer in a period of 20 seconds. A questionnaire about dry eye including the Ocular Surface Disease Index (OSDI) and Standard Patient Evaluation of Eye Dryness (SPEED) was given. Fluorescein tear break up time (FTBUT), tear meniscus height (TMH) on AS-OCT, and meibum quality score were also prospectively evaluated. Ocular Protection Index (OPI) was calculated by dividing FTBUT by interblink interval (IBI).

Results: There was a negative correlation between the total blink number and TMH (r = -0.32, P < 0.05), whereas the correlations between the total blink number and FTBUT, dry eye questionnaires, or meibum quality score were not significant. Analysis of the study results showed no correlation between the partial blink rate and all other parameters. OPI showed negative correlation with meibum score but positive correlation with LLT.

Conclusions: The TMH exhibited significant negative correlation with the total blink number, which suggests that patients with aqueous deficient dry eye may present with higher blinking numbers. The OPI, a useful tool in assessing the factors exacerbating dry eye, is associated with the secretions of the meibomian gland, including meibum quality and lipid layer thickness. In this study, the influence of incomplete blinking did not show any correlation with clinical parameters of dry eye. However, further studies are needed to confirm the influence of blink patterns in dry eye.

Deep Anterior Lamellar Keratoplasty for HSV Stromal Keratitis With Lipid Keratopathy

First Author: Jiunn-liang CHEN

Purpose: To evaluate the prognosis and results of deep anterior lamellar keratoplasty (DALK) for dense corneal opacity after herpes simplex (HSV) keratitis.

Methods: We retrospectively reviewed 8 eyes of 8 patients who underwent DALK for HSV–related stromal keratitis with neovascularization and lipid keratopathy. The Anwar DALK big bubble surgical technique or air–assisted manual DALK followed by manual dissection to a near–Descemetic level were performed in all cases. Minimum follow-up was 12 months.

Results: DALK was successfully completed in all 8 eyes. Focal Descemetic opacity was observed in 2 cases. No cases of rejection were observed. However, 1 case of early recurrent epithelial and stromal keratitis was observed during the first month postoperatively. This case was treated with oral valacyclovir (1000 mg daily) immediately and continued for 1 month, then tapered.
to 500 mg daily for a further 2 months. At 6 months, the best spectacle corrected visual acuity in all cases was better than 6/30. In the patient with cataract, cataract extraction was successfully completed at about the eighth month postoperatively without complications. Mean postoperative refractive astigmatism was 2.36 ± 1.15 dioptries (D) (range, 0.75–4.5 D). Mean postoperative endothelial count at final visit was 1673 ± 264 cells/mm² (range, 1148–2145 cells/mm²).

Conclusions: DALK for postherpetic corneal leukemia with stromal neovascularization had a safe surgical profile and resulted in a significant visual recovery. In our series, no graft rejection was observed at least 1 year postoperatively. Acute herpes keratitis recurrence was still a challenge, but early recognition and immediate systemic antiviral treatment resulted in minimal visual impairment. In cases of HSV with severe stromal inflammation cannot be ruled out, oral antiviral therapy may be started preoperatively and immediately after DALK surgery.

E-Poster No.: EP-0086

Descemet Stripping Automated Endothelial Keratoplasty for Pseudophakic Bullous Keratopathy: Results and Complications

First Author: Pham NGOC DONG
Co-Author(s): Do TUVENT NHUNG

Purpose: To evaluate results and complications after Descemet stripping automated endothelial keratoplasty (DSAEK) for pseudophakic bullous keratopathy.

Methods: This was a prospective noncontrolled clinical trial on 36 eyes of 35 patients who underwent DSAEK. The main outcome measures included surgical results [graft success rate, best spectacle corrected visual acuity (BSCVA), refractive status] and intraoperative and postoperative complications.

Results: At 6 months postoperatively, surgical success rate was 27/36 eyes (75.0%), of which there were 11 eyes (40.7%) with BSCVA more than 20/70. The mean spherical equivalent at 6 months postoperatively was +1.48 D ± 2.73 D (range, −4.5 D to +6.38 D). After suture removal, mean astigmatism was only 1.89 D ± 1.73 D. Surgical complications included difficulty in inserting and opening the graft in 3 eyes, intraocular hypertension in 5 eyes, graft detachment in 2 eyes, infection in 2 eyes, but no graft rejection.

Conclusions: DSAEK is an effective surgery in the management of pseudophakic bullous keratopathy. DSAEK does not significantly affect astigmatism but has a trend of ocular hyperopization. Complications found in our series were difficulty in inserting and opening the graft, intraocular hypertension, graft detachment, and infection. Graft rejection is not common in DSAEK.

E-Poster No.: EP-0061

Dynamic Ocular Biomechanical Properties After Keratoplasty for Keratoconus

First Author: Hans VELLARA
Co-Author(s): Noor ALI, Akilesh GOKUL, Charles MC-GHEE, Dipika PATEL

Purpose: To analyze and compare the influence of different keratoplasty techniques [penetrating keratoplasty (PKP) vs deep anterior lamellar keratoplasty (DALK)] on the biomechanical properties of keratoconic corneas.

Methods: A prospective cross-sectional study of 41 eyes with PKP and 23 eyes with DALK was performed. Keratoconus was the indication for corneal transplantation in all eyes. Data collected included demographic details, the date and type of surgery, donor age, and donor–recipient size disparity. All eyes were examined with slit lamp biomicroscopy, Pentacam tomography, and the CorVis ST (CST). Exclusion criteria were eyes less than 3 months after surgery, corneal edema, current rejection, or raised intraocular pressure (IOP). CST parameters after PKP and DALK were compared. Specialized software was designed to remove the globe displacement response to the air pulse and isolate the pure corneal displacement. This facilitated comparison of dynamic biomechanical properties. Multiple regression analysis was used to investigate the correlation between the type of surgery and CST parameters, controlling for various cofactors.

Results: The mean ages of patients with PKP and DALK were 35.8 ± 13.6 and 36.0 ± 12.5 years, respectively. CCT was significantly lower in PKP eyes (530 ± 56 µm) compared with DALK eyes (599 ± 50 µm, P < 0.001). However, there was no difference in any of the CST or additional derived parameters between the 2 groups (P > 0.05). Multiple regression analysis revealed that deformation amplitude was significantly associated with IOP.

Conclusions: The dynamic corneal biomechanical properties of the cornea after PKP are similar to that of DALK and are not associated with donor size or corneal thickness.

E-Poster No.: EP-0080

Effect of Collagen Cross-Linking on Keratocyte Viability and Proliferation in Human Cornea

First Author: Somasheila MURTHY
Co-Author(s): Arif KHADAKHADI, Vivek SINGH

Purpose: To assess the viability, growth rate, and characteristics of keratocytes in culture after collagen cross-linking (CXL).
Methods: Ten donor corneas procured from the eye bank were divided into 2 groups by a table of random numbers. The study group consisted of donor corneas that underwent UV irradiation. A microkeratome was used to make 300 µm flap in all 10 corneas. Donor corneas in the study group were cross-linked according to standard Dresden protocol after mounting on artificial anterior chambers using riboflavin and UV irradiation (370 nm, 3 mW/cm²) at a 1–cm distance for 30 minutes. The 300 µm anterior stromal cap was subjected to keratocyte culture in vitro.

Results: Ten donor corneas were divided into the study group comprising 5 donor corneas that underwent CXL and the control group of 5 donor corneas that did not. All the control corneas showed keratocyte growth in 10–14 days as isolated spindle-shaped cells coming out from the edges of the corneal button, which later grew in confluence, whereas the study corneas did not show growth. Culture plates were observed for 3 weeks before declaring no growth.

Conclusions: This study showed that, after CXL, the corneal stroma appears to lack viable keratocytes. A second part of this study is planned to observe the proliferative capacity of deeper keratocytes.

E-Poster No.: EP–0081

Effects of Collagen Cross-Linking on the Biomechanical Properties of Excised Cattle Conjunctiva

First Author: Bonnie Nga Kwan CHOY
Co-Author(s): Harrison Man Hin CHAN, Jimmy LAI

Purpose: This experiment evaluated the biomechanical effects of collagen cross-linking in terms of covalent bonding, permeability, and indentation rupture force on excised cattle conjunctiva.

Methods: Cattle conjunctiva was extracted and divided into 2 groups: the treatment group was soaked in riboflavin, followed by ultraviolet light illumination, and the control group received no intervention. Samples were subsequently analyzed with Fourier transform infrared spectrum test to identify the presence of amide bonds, permeability test to assess the diffusion of methylene blue across conjunctiva, and indentation rupture force test.

Results: Fourier transform infrared spectrum test (n = 5) showed a significantly higher peak value of amide I band after cross-linking (P = 0.043), as well as amide II, amide A, and amide B bands, although the results were not statistically significant. Permeability test showed a lower concentration of methylene blue in the lower wells in the treatment group (n = 25) compared with the control (n = 24) (4.945 ± 1.700 vs 7.737 ± 4.950 100g/L, P = 0.03), indicating the cross-linked samples were less permeable. Indentation rupture test showed a higher maximal rupture force in cross-linked samples (n = 10) versus controls (n = 29) (2.181 ± 1.000 N vs 1.546 ± 0.407 N, P = 0.07).

Conclusions: The results suggest that collagen cross-linking strengthened cattle conjunctiva by increasing the amount of covalent bonds, reducing its permeability, and possibly improving its resistance to rupture. At the time of writing, this is the first study in the literature on the effect of collagen cross-linking on the biomechanical properties of conjunctival tissue. More studies will be required to evaluate its clinical applications.

E-Poster No.: EP–0071

Efficacy and Safety of Postoperative Topical Corticosteroids for Prevention of Pterygium Recurrence: A Comparison Between One-Month and Three-Month Treatment

First Author: Thanachaporn KITTIPIBUL
Co-Author(s): Vilavun PUANGSRICHARERN
**Purpose:** To evaluate the efficacy and safety of 2 different durations of topical corticosteroid use after pterygium excision in preventing recurrence.

**Methods:** This prospective, randomized, single-masked study included 56 eyes with primary pterygium receiving pterygium excision and amniotic membrane graft at King Chulalongkorn Memorial Hospital from June 2014 to March 2015. Patients were randomized into 2 groups: the control group received postoperative topical steroids for 1 month and the study group received the same drug and regimen for 3 months. The main outcome was corneal recurrence of pterygium at 6 months after surgery. Safety was evaluated by intraocular pressure (IOP) measurement in both groups to determine the occurrence of steroid-induced ocular hypertension.

**Results:** Six-month follow-up was completed in 56 eyes (28 eyes in each group). We found recurrence in 5 out of 28 (17.9%) and 7 out of 28 (25.0%) eyes in the study and control groups, respectively. The difference was not statistically significant ($P = 0.428$). The control group who received a shorter duration of topical steroids (1 month) showed trends for earlier recurrence (7.1%, 22%, and 25.7% at 2, 3, and 6 months) compared with the study group (3 months) (0%, 7.1%, and 17.9% at 2, 3, and 6 months, respectively). Steroid-induced ocular hypertension was detected in 3 eyes (10.7%) of the study group and 2 eyes (7.14%) of the control group, which was not statistically significant ($P = 1.000$).

**Conclusions:** In pterygium surgery with amniotic membrane graft, a longer duration of topical steroids for 3 months does not statistically reduce pterygium recurrence compared with 1-month use. This regimen may be useful for preventing early recurrence of pterygium without increasing the risk of steroid-induced ocular hypertension.

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**E-Poster No.: EP-0075**

**Evaluation of Microbial Contamination of Donor Corneoscleral Rim Immediately After Harvesting and Before Corneal Transplantation: 1.5-Year Report From a Taiwanese Eye Bank**

First Author: Fung-fong HU  
Co-Authors: Yu-chih HOU, Hsaio-sang CHU, Po-ting YEH

**Purpose:** To analyze the microbial contamination of donor corneoscleral rim immediately after harvesting and before corneal transplantation and to identify the contributive factors.

**Methods:** Microbial culture results of 288 donor corneoscleral rims immediately after harvesting and before corneal transplantation were analyzed. The association of microbial contamination rate with age and death-to-excision time was analyzed using multiple logistic regression.

**Results:** The microbial culture rate of donor cornea immediately after harvesting was 15.3% (44/288) with *Staphylococcus epidermidis* (45.5%; 20/44) and *Corynebacterium* species (20.5%; 9/44) being predominant. Bacterial mixed contamination was found in 3 cases. One donor cornea cultured before corneal transplantation grew *Clostridium perfringens*, for a rate of 0.4% (1/278). The average age of donors with negative and positive culture was 50.3 ± 14.7 and 55.1 ± 17.6, respectively ($P = 0.015$). The average death-to-excision time for negative and positive culture was 219 ± 110.2 minutes and 290.7 ± 289.7 minutes, respectively ($P = 0.004$). There was no endophthalmitis reported after surgery.

**Conclusions:** Species in donor cornea contamination during harvesting were mostly physiological skin flora. Older age and longer death-to-excision time showed a higher risk of microbial contamination. However, almost all the donor corneas showed negative culture after storage in Optisol, and there was no endophthalmitis reported after surgery.

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**E-Poster No.: EP-0057**

**Evaluation of the AlgerBrush II Rotating Burr as a Tool for Inducing Limbal Stem Cell Deficiency in the New Zealand White Rabbit**

First Author: Fiona Jinchun LI  
Co-Authors: Elham NIU, Jennifer WALSHE, Neil RICHARDSON, Damien HARKIN

**Purpose:** To examine the effectiveness of the Alger Brush II rotating burr as a surgical tool for inducing limbal stem cell deficiency in a rabbit model.

**Methods:** An initial comparison of 5 different techniques was conducted in situ using 20 freshly acquired cadaveric eyes in New Zealand white rabbits. Techniques for comparison included (n = 4) the following: 1) surgical limbiectomy followed by epithelial debridement by n-heptanol; 2) n-heptanol alone; 3) 20% ethanol only; 4) limbal superficial keratectomy using 1-mm diameter burr, followed by epithelial debridement using 2.5-mm diameter; and 5) 2.5-mm diameter burr applied to both the limbus and cornea. Validation of treatment (5) was subsequently conducted in 6 live rabbits then followed up for 6 weeks by weekly clinical assessments (photography and slit lamp examination) and histological analysis.

**Results:** The 2.5-mm burr consistently removed the entire corneal and limbal epithelium. Islands of limbal epithelial cells were occasionally retained after limbiectomy/heptanol treatment or use of the 1-mm burr. Limbal epithelial cells were consistently retained after...
Purpose: To evaluate therapeutic effect of corneal collagen cross-linking (CXL) in 10 cases of resistant corneal ulcer.

Methods: A retrospective study was conducted from May 2015 to September 2015. Information of 10 corneal ulcer patients who underwent corneal CXL was obtained from medical records. Data on clinical characteristics and comparison of visual acuity, defect, and visual analog scale before and after treatment were recorded.

Results: We found 10 eyes of 10 patients [9 male (90%)]. Three of 10 eyes showed improvement in visual acuity, whereas the remainder were stable. The size of defect was measured before corneal CXL, at first and second control, and divided into 3 categories (mild, <3 mm; moderate, 4–6 mm; and severe, >6 mm). There were 4 eyes (40%) who showed improvement or re-epithelialization up to complete healing of the ulcer; 2 eyes (20%) worsened due to impending perforation and received amniotic membrane transplantation and cryotherapy. Four eyes (40%) were stable. There was marked improvement in severity of pain and discomfort in all patients (100%). Most of these result were obtained within 14 days to 1 month after CXL.

Conclusions: Corneal CXL should be considered as a new adjuvant therapy in patients with resistant corneal ulcer.

E–Poster No.: EP–0051

Eyelid Cutting Injury by Band Keratopathy After Thermal Injury

First Author: Chiwu CHANG
Co-Author(s): Kuo Chiao TSENG, Chi-huang CHANG

Purpose: To report a case of eyelid margin cutting injury induced by band keratopathy after thermal injury.

Methods: A case report.

Results: A 46-year-old male foreign worker suffered from high temperature liquid iron injury to his right eye. His cornea and conjunctiva were severely damaged and healed poorly due to ischemia changes. During the follow-up period, corneal band keratopathy rapidly formed and enlarged within 2 weeks. Six weeks later, he returned with fresh blood in his right eye. Examination revealed a 7.0–mm cutting wound along the right upper eyelid margin caused by the continuous sharp, elevated edge of band keratopathy. Bleeding was eliminated after excising the calcified plaque on the cornea using a surgical knife. The resulting cornea became very thin.

Conclusions: Eyelid cutting injury is a rare complication of band keratopathy. The pathogenesis of band keratopathy after thermal injury is not well known and not exactly the same as chemical injury. In addition to topical steroid and antibiotics, amniotic membrane transplantation might prevent acceleration of corneal thinning and rupture.

E–Poster No.: EP–0033

Failed Graft After Penetrating Keratoplasty Treated With Non–Descemet Stripping Automated Endothelial Keratoplasty

First Author: Yu-chih HOU

Purpose: To report the results of non–Descemet stripping automated endothelial keratoplasty (n–DSAEK) in 3 cases with failed grafts after penetrating keratoplasty (PKP).

Methods: A retrospective study in 3 eyes of 3 consecutive patients undergoing n–DSAEK for graft failure after PKP from 2012 to 2015. Visual acuity, lenticule size, lenticule dislocation, intraocular pressure (IOP), postoperative complications, and endothelial cell density (ECD) were assessed.

Results: Three women were enrolled, including 2 failed grafts after PKP for pseudophakic bullous keratopathy and 1 failed graft after 2 instances of PKP, removal of silicone oil, and sutured intraocular lens who had a history of eyeball rupture, total retinal detachment, aphakia, and aniridia. The lenticule size of the 3 eyes was the same as their PKP graft size. All lenticules almost matched the PKP grafts with slight displacement. There was 1 complication involving 1 graft dislocation in the first case, which attached after rebubbling. Preoperative vision of 0.04, 0.01, and hand movements improved to postoperative 0.5, 0.3, and 0.1, respectively. Postoperative ECD was 1457, 1718, and 1767 cells/mm², respectively. All 3 grafts remained clear with sta-
ble vision in the follow-up period, which ranged from 6 to 40 months. All 3 cases had normal IOP.

**Conclusions:** N–DSAEK is a safe and effective procedure for failed PKP grafts. Vision recovery in n–DSAEK was faster than in PKP regraft. The results of n–DSAEK in the failed PKP grafts are comparable with conventional DSAEK in bullous keratopathy. DSAEK and n–DSAEK are alternatives to repeat PKP.

**E-Poster No.: EP-0076**

**Five-Year Results of Thick Graft Endothelial Keratoplasty in a Patient With Brittle Cornea Syndrome. A New Approach for Keratoglobus**

*First Author: Jamil HASANOV*

**Purpose:** To evaluate the efficacy of the first use of thick graft endothelial keratoplasty (TGEK) in a patient with advanced keratoglobus.

**Methods:** A 5-year-old girl with secondary traumatic Descemet membrane detachment underwent Descemet stripping endothelial keratoplasty and was followed up for 60 months. A large (9.5 mm), thick (400 μm) donor endothelial lenticule was used for the procedure.

**Results:** Mean central recipient/donor:recipient/donor corneal thickness (from 3 to 60 months) was 175.3 ± 5.9 : 260.3 ± 9.7 : 437.9 ± 14.2, respectively. Visual acuity was stable (Vis = 0.1), cornea clear, and no episode of graft rejection was observed.

**Conclusions:** TGEK may be an acceptable technique for providing tectonic tissue support, visual recovery, and stabilizing eyes with advanced keratoglobus, reducing myopia power and the graft failure rate.

**E-Poster No.: EP-0032**

**Graft Rejection in Patients With Iridocorneal Endothelial Syndrome After Descemet Stripping Automated Endothelial Keratoplasty**

*First Author: Yu-chih HOU*

**Purpose:** To report the presentations of graft rejection in iridocorneal endothelial (ICE) syndrome after Descemet stripping automated endothelial keratoplasty (DSAEK).

**Methods:** A retrospective study in 2 eyes with graft rejection among 4 ICE cases undergoing DSAEK, phacoemulsification, implantation of posterior chamber intraocular lens, and peripheral synechiolysis from 2012 to 2015.

**Results:** A 63-year-old man had ICE syndrome and corneal edema in the left eye with 20/2000 vision. After an uneventful surgery, vision improved to 20/60. Graft rejection with diffuse graft edema occurred and vision decreased to 20/2000 4 months later. After systemic and topical prednisolone treatment, rejection resolved and vision returned. The second rejection recurred with inferior edema and resolved with steroid treatment 1 year later. After 2 rejections, endothelial cell density (ECD) decreased from initial 2362 to 1327 cells/mm². A 71-year-old woman had ICE syndrome in the left eye with 20/2000 vision. After surgery, vision improved to 20/100. One year later, local graft edema and several keratic precipitates (KP) were observed with a vision of 20/2000 and resolved after oral and topical prednisolone treatment. ECD decreased from initial 1610 to 1095 cells/mm².

**Conclusions:** Graft rejection in DSAEK may present diffuse graft edema or local KP. Intensive systemic and topical steroid treatment can save vision. The rate of graft rejection after DSAEK in ICE seems higher than other bullous keratopathy and may be associated with its peripheral synechia and abnormal anterior chamber change.

**E-Poster No.: EP-0041**

**Graft Survival After Penetrating Keratoplasty Procedure**

*First Author: Kukuh PRASETYO*

**Purpose:** Penetrating keratoplasty remains the most successful transplantation technique. Survival of the graft depends on either quality of the donor and recipient’s bed tissue. This study aimed to describe survival of grafts after penetrating keratoplasty at Cicendo National Eye Hospital.

**Methods:** This was a descriptional retrospective study that took data from medical records of patients undergoing penetrating keratoplasty from January 2012 to May 2014. There were 33 patients who received the procedure during that period, but 3 of them were excluded. Data collected were demographical data, clinical data, and outcome data.

**Results:** The median age was 45 years old, with a range of 11–72 years old. A total of 33.3% had optical penetrating keratoplasty and 63.4% underwent tectonic penetrating keratoplasty. Corneal neovascularization was found on 40% of samples before the procedure, but deep neovascularization was found only in 1 patient. Seventy percent of the samples were diagnosed as Brightbill Classification 3 preoperatively, with 10% graft rejection and 23.33% graft failure after penetrating keratoplasty. Secondary glaucoma was found in 36.7% of patients after penetrating keratoplasty.

**Conclusions:** Graft survival was only found in 50% after penetrating keratoplasty. Further study needs to be done with an improvement in study design.
Less Tension, Better Vision—Outcomes of Penetrating Keratoplasty With and Without Prior Trabeculectomy in Leucoma Adherens

First Author: Abhishek ONKAR

Purpose: This was a comparative study of trabeculectomy followed by penetrating keratoplasty (PK) versus PK alone in cases of adherent leucoma.

Methods: Trabeculectomy followed by PK (group A) was performed on 32 eyes of 32 patients with adherent leucoma from June 2010 to January 2012. Data was compared with PK done without trabeculectomy in 28 cases from July 2006 to March 2008 (group B).

Results: After 6 months of follow-up, 78.12% of grafts survived in group A as compared with 61% in group B.

Conclusions: Graft survival rate was better in cases of adherent leucoma undergoing trabeculectomy before PK.

Limbal Stem Cell Viability on Lotrafilcon B and Enfilcon A Soft Contact Lens Scaffold

First Author: Vinca DESYANDRI
Co-Authors: Evelyn KOMARATIH

Purpose: To evaluate the viability of limbal stem cells on the scaffolds of the newer generation contact lenses Lotrafilcon B and Enfilcon A.

Methods: The cultured stem cells were seeded in both contact lens groups and the control group, which underwent modification of the contact lens surface using human plasma priorly. Examination of the adhesion and proliferation of limbal stem cells in the contact lenses was performed on the third and fourth days. On the fourth day, immunostaining and p63 expression were evaluated.

Results: Statistically, there were significant differences in stem cell proliferation between the Lotrafilcon B and Enfilcon A groups and also between the Enfilcon A and control groups on the third day (P = 0.000) and on the fourth day (P = 0.000); however, there was no difference between the Lotrafilcon B and control groups. Statistical tests on limbal stem cell differentiation with p63 expression showed no difference between the Lotrafilcon B group and the control group (P = 0.288).

Conclusions: Lotrafilcon B is a good stem cell scaffold.

Microsporidia: A New Pathogen of Keratitis in Vietnam

First Author: Pham NGOC DONG

Co-Authors: Do TUYET NHUNG

Purpose: To report the epidemiologic factors, clinical features, and treatment outcomes of the first 11 microsporidial keratitis patients in Vietnam.

Methods: A prospective, descriptive study. Epidemiologic factors were observed. Slit lamp examination throughout the course of keratitis was recorded. Treatment included topical fluoroquinolones as monotherapy or in combination with topical antifungal and/or systemic albendazole and itraconazole. Keratectomy or PK was indicated when necessary.

Results: Eleven patients with 12 cases of microsporidial keratitis were included, aged from 38 to 77 years with 1 male and 10 females. All patients were from the countryside, and 7 of 11 were farmers. Only 2 patients had a history of ocular trauma. None of them used contact lenses. Four of 11 patients were diagnosed and treated as herpetic keratitis. The mean time between onset and diagnosis of microsporidial keratitis was 4 months (ranging from 10 days to 1 year). One patient had bilateral microsporidial keratitis. Visual acuity (VA) on presentation ranged from hand movements to counting fingers (CF) at 1 m. Common features were corneal ulcer (10/12), stromal abscess (2/12), precipitates (5/12), and ocular hypertension (3/12). Resolution occurred in 1 case with topical levofloxacin, amphotericin B, fluconazole, systemic intraconazole, and keratectomy. PK was done in 9 of 12 eyes. One patient with bilateral keratitis was lost to follow-up due to financial difficulties. Visual outcome was disappointing, with 9 eyes having VA less than CF at 1.5 m. Two eyes had VA of 20/200.

Conclusions: In the first cases of microsporidial keratitis in Vietnam, medical treatment was limited and most patients needed corneal transplantation.
revealed peripheral ulcerative keratopathy at the area of temporal clear corneal incision. An extensive investigation excluded autoimmune disorders and infectious diseases. Topical corticosteroids, prophylactic antibiotics, and artificial tears were prescribed. The ulcer was initially under control. However, the disease recurred after alternative treatment with loteprednol etabonate suspension 0.2% because of steroid-induced glaucoma. The subsequent management included systemic corticosteroids, topical and oral immunosuppressants, antiglaucoma agents, conjunctival resection, amniotic membrane transplantation, and anterior lamellar graft.

Results: None of the metals of interest were detected in any location on any lens by both cryo- XPS beam (1–10 nm detection depth) and conven- tional XPS analyses of the top 1–10 nm of the lens surfaces. These data suggest the absence of pigment exposed on the surface or in the top surface layer of nelfilcon A or lotrafilcon B cosmetic contact lenses. For 100% of nelfilcon A unworn lenses and lotrafilcon B unworn and worn lenses, no ink marks were detected on the blot cloths.

Conclusions: The fabrication methodologies used to produce nelfilcon A and lotrafilcon B color contact lenses can fully encapsulate the pigment particles within the lens polymers. For both lenses, direct contact of pigment particles with the cornea during wear is unlikely.

E-Poster No.: EP-0062

Ocular Manifestations and Complications of Stevens-Johnson Syndrome and Toxic Epidermal Necrolysis in Asian Eyes: Does the Extent of Body Surface Area Involved Matter?

First Author: Kendrick SHIH
Co-Author(s): Loraine CHOW, Alex Lap Ki NG, Jimmy LAI

Purpose: To describe and compare the acute ocular manifestations in an Asian cohort with Stevens-Johnson Syndrome (SJS) and toxic epidermal necrolysis (TENS).

Methods: A retrospective audit of SJS and TEN cases during a 15-year period. Records were reviewed for demographics, spectrum of ocular involvement, and visual outcome.

Results: Twenty SJS and 12 TENS patients were studied. The rates of symblepharon formation, conjunctival, and corneal involvement in SJS were 20%, 40%, and 20%, respectively, and those in TENS were 33%, 75%, and 33%. Comparing both groups, there were no significant differences in all 3 parameters (P = 0.433, 0.076, and 0.433; Fisher exact test).

Conclusions: Ocular involvement was common in both groups. However, a diagnosis of TEN was not associated with more extensive ocular involvement or worse visual outcome.

E-Poster No.: EP-0063

Perforated Herpes Keratitis Successfully Treated With Oral Acyclovir

First Author: Yu-ling LIU

Purpose: To report a case of perforated herpes keratitis successfully treated with oral acyclovir.

Methods: A case report.

Results: A 75-year-old male patient suffered from pain and loss of vision in the right eye for 1 month. He had corneal perforation with collapsed anterior chamber, which had occurred twice in the past 6 months. He was referred to our hospital and presented with flat anterior chamber, corneal stromal neovascularization, and edema covered with a piece of surface exudate. After removing corneal surface exudate for culture, a 8 x 6 mm necrotizing corneal stroma and geographic pattern fluorescein stain with a 0.3 x 0.3 mm perforation were noted. Oral acyclovir 800 mg per day, preservative-free artificial tears, and therapeutic bandage contact lenses were prescribed. Anterior chamber formed well, and the geographic ulcer with corneal perforation healed in 1 week. Corneal edema subsided with stromal haze and corneal stromal neovascularization remaining.

Conclusions: Severe necrotizing herpes keratitis com-
Supplemented with corneal perforation can be successfully treated with oral acyclovir and therapeutic bandage contact lens. The ocular surface toxicity of topical acyclovir eye ointment should be avoided in such compromised corneas. Oral acyclovir is as effective as topical acyclovir eye ointment in herpes epithelial keratitis and may be the better choice in this case.

E-Poster No.: EP-0060

Persistent Circular Epithelial Defect as a Presentation of Nocardia Keratitis

First Author: Yueh-chang LEE
Co-Authors: Yuan-chieh LEE, Fung-rong HU

Purpose: To describe a case of Nocardia keratitis in a long-term steroid user.

Methods: A case report.

Results: A 68-year-old man complained of painful decreased vision in the left eye for several days. He had been taking oral prednisolone for idiopathic thrombocytopenic purpura over 18 months. On examination, visual acuity measured 20/40 in the right eye and 20/200 in the left eye. Slit lamp examination revealed circular corneal epithelial defect with mild dendrite-like picture. There was no cell in the anterior chamber. Assuming herpetic keratitis, oral valaciclovir 500 mg TID and topical acyclovir ointment Q4H were prescribed. However, the pain persisted, and the circular dendritic epithelial defect persisted, but was no better or worse. There was still no definite infiltrate in the stroma and no cell in the anterior chamber. Corneal scraping was then performed, and smear showed several Gram-positive branching filamentous hyphae. Under the suspicion of fungal keratitis, the patient was admitted, and medication was shifted to oral fluconazole with negative branching filamentous hyphae. Under the suspicion of fungal keratitis, the patient was admitted, and medication was shifted to oral fluconazole with topical amphotericin B and natamycin. However, the pain persisted, and the infiltrates started to manifest in a wreath pattern. Culture revealed Nocardia species 1 week after admission. Antifungal agents were then changed into topical 5% ceftriaxone and 2% amikacin. Subsequently, the corneal ulcer and infiltration gradually improved.

Conclusions: Nocardia keratitis may present with persistent circular dendritic epithelial defect in patients taking steroids, leading to a misdiagnosis of herpetic keratitis. Smear showing Gram-positive branching filamentous hyphae might lead to another incorrect assumption of fungal keratitis. Early and correct diagnosis and treatment is the way to achieve a favorable outcome.

E-Poster No.: EP-0079

Postcataract Surgery Entry Wound Infection

First Author: Reena SINGH

Co-Authors: Namrata SHARMA, J.S. TITIYAL, Tushar AGARWAL, Rajesh SINHA

Purpose: To evaluate predisposing factors, clinical presentation, and outcomes of wound infections after cataract surgery.

Methods: Eleven patients with postcataract surgery wound infections were evaluated. The mean age of the patients was 67 ± 6.94 years. There were 6 scleral cases after manual small incision cataract surgery and 5 clear-corneal cases after phacoemulsification surgery [main port (3), side port (2)]. The time of presentation between cataract surgery and onset of infection ranged from 4 days to 3 years. Microbiological sampling, posterior segment ultrasonography, and confocal microscopy was carried out. Medical intervention included standard antibacterial and antifungal treatment. In 3 eyes vitrectomy was done for endophthalmitis and in 1 eye therapeutic penetrating keratoplasty was done.

Results: The most important predisposing factors for infection identified were poor tear film with meibomian gland disorder (9), old healed keratitis (1), and postsurgery recurrent inflammation (1). Out of 11 cases, the most common organisms identified were coagulase-negative Staphylococci (7) and Pseudomonas aeruginosa (1). Endophthalmitis was present in 6 scleral and 2 clear-corneal cases. Visual acuity at presentation in the cases varied from light perception with inaccurate projection (PL + PR inacc.) to 6/60, which improved to more than 6/18 in 4 cases but 7 remained unimproved (PL + PR inacc.). All scleral cases presented with PL + PR inacc. and did not improve.

Conclusions: Postcataract surgery entry wound infection has a dismal prognosis. As compared with clear-corneal, scleral cases may have severe clinical presentation and poor outcomes.

E-Poster No.: EP-0035

Pressure-Induced Stromal Keratitis: A Rare but Potentially Devastating LASIK Complication

First Author: Johan HUTAURUK

Purpose: To describe 4 cases of pressure-induced interlamellar stromal keratitis (PISK) with symptoms similar to those of diffuse lamellar keratitis (DLK).

Methods: A total of 2547 eyes were treated with LASIK at our center in 1 year, of which 7 eyes (4 patients) experienced discomfort and blurred vision within 3–4 weeks after LASIK. All of them had elevated intraocular pressure (IOP) and diffuse hazy corneas similar to DLK.

Results: Three patients were falsely treated with steroid eye drops in the first few days, which were immediately stopped and replaced with pressure-lowering medications. All of the cases dramatically improved...
and regained their normal visual acuity except for 1 eye. For this particular patient, IOP in the left eye was difficult to control despite the use of glaucoma medications, so trabeculectomy was done. At the final visit, IOP was under control without medication, but the patient was left with permanent visual damage and corneal scarring.

Conclusions: PISK is a rare complication of LASIK that resembles DLK. The majority of cases will improve with cessation of steroids and glaucoma medications, but delay in diagnosing this condition could result in permanent visual damage.

E-Poster No.: EP-0058

Quantitative Analysis of the Relationship Between the Location of Orthokeratology Lens and Wavefront Change

First Author: Jy Been LIANG

Purpose: To investigate the relationship between the location of orthokeratology (OK) lens and wavefront change; we collected data on corneal curvature and thickness to compare with wavefront change, especially spherical aberration and coma.

Methods: Orbscan II was used to measured the corneal thickness and corneal curvature before and after wearing the OK lens. The I trace was used to measure wavefront data before and after wearing the OK lens. All data were measured for each eye of each participant and were repeatedly measured at baseline, during, and after the overnight trial of OK lens. Changes in corneal thickness, corneal curvature, coma, and spherical aberration were calculated as differences between pre-OK and mid-OK lens.

Results: A total of 36 participants (47.2% males) were recruited for the study, and all provided data of each eye and each visit. The mean age was 19.22 years old, ranging from 9 to 49 years. Relative temporal corneal thickness was positively and significantly associated with coma (β = 3.76, SE = 1.60, P = 0.024). Results of a separate analysis showed that the association was prominent in participants with vertical coma (β = 10.49, SE = 2.39, P = 0.003). Similar significant results were also found in the association between relative superior corneal curvature and coma (β = 0.10, SE = 0.02, P < 0.001).

Conclusions: Wavefront change is highly associated with change in corneal curvature and thickness. We can predict and effect the desired wavefront change via the OK lens design.

E-Poster No.: EP-0089

Role of Dyslipedemia or Hypercholesterolemia in Meibomian Gland Dysfunction

First Author: Arij ADENWALA
Co-Author(s): Mahesh DALVI, Aamir ANWER

Purpose: The main purpose of this paper was to find the relation of lipid dysfunction or increase in cholesterol in cases of meibomian gland dysfunction. It was an observational case-control study.

Methods: Around 160 symptomatic patients with meibomitis with no past history of hypercholesterolemia were included in the case group, and around 166 normal individuals were in the control group. All the patients were subjected to lipid profiles measuring total cholesterol, high density cholesterol, low density cholesterol, and triglycerides. All cases of meibomitis were also graded on slit lamp depending on their signs and symptoms.

Results: Hypercholesterolemia was seen in around 65% of cases compared with 8% in the normal control group. The levels were high in severe grade meibomitis. Mean total cholesterol was around 230 compared with 150 in the control group, and low density cholesterol was 134 compared with 90 in the control group. There was also a rise in triglycerides in the case group. All the differences were statistically significant. Once statins were started, there was a reduction in recurrence rate and symptoms of these patients.

Conclusions: The results showed that there were increases in cholesterol in cases of meibomian gland dysfunction. Thus, diagnosing this in asymptomatic patients is useful in finding an important risk factor for cardiac diseases.

E-Poster No.: EP-0073

Spherical Equivalent Change After Triple DSAEK

First Author: Yi-hao HO
Co-Author(s): Elsa CHIANG, Yi-yu TSAI, Yi-ching HSIEH

Purpose: To investigate the postoperative spherical equivalent (SE) change after Descemet stripping endothelial keratoplasty (DSAEK) combined with phacoemulsification and intraocular lens (IOL) implantation (triple DSAEK procedure).

Methods: All patients who underwent triple DSAEK between August 2009 and May 2014 were enrolled in this retrospective study. To render all eyes close to emmetropia, the IOL calculated target was −1.0 to −2.0 diopters (D) due to hyperopic shift after DSAEK demonstrated in previous studies. We measured the SE 1 and 3 years after surgery.

Results: Nineteen cases were evaluated and analyzed 1 year after surgery. The mean change in refraction was −0.92 D (range, −3.00 to +1.75). Eleven cases were evaluated and analyzed 3 years after surgery. The mean
change in refraction was -1.70 D (range, -3.00 to 0). There were 10 cases analyzed both at 1 and 3 years postoperatively. The mean SE changed from -1.05 D (range, -2.25 to +0.75) 1 year after surgery to -1.65 D (-3.00 to 0) 3 years after surgery.  

Conclusions: In most of the previous studies, the refractive change after triple DSAEK had a trend of hyperopic shift. In our experience, however, the hyperopic shift induced by the triple DSAEK procedure was little. The effect of graft shape should be taken into consideration.

E-Poster No.: EP-0056
Study of Ocular Manifestations in Adult Patients With Autoimmune Connective Tissue Diseases
First Author: Poonam RAI
Co-Author(s): Chhaya Ashok SHINDE, Nayana POTDAR
Purpose: To study the prevalence of ophthalmic manifestations, to analyze the sex-wise distribution of ocular manifestations, and to analyze the involvement of the anterior and posterior segments.
Methods: This was a prospective observational study of 50 patients with connective tissue diseases in a tertiary care center. Ophthalmological exam including visual acuity on Snellen chart, biomicroscopy of anterior segment, Schirmer test, tear film break-up time (BUT), tonometry, and indirect ophthalmoscopy was done. Fundus photographs and, in indicated cases, fluorescein angiography were performed.
Results: Of the 50 patients, 43 patients (39 females and 4 males) had ocular involvement. Thirty-two of 50 patients had anterior segment involvement and 15 had posterior segment involvement.
Conclusions: Ocular symptoms and signs were present in about 80% cases, and females were more commonly involved. The most common manifestation was dry eye. Visual acuity was not commonly affected. The anterior segment was more commonly affected than the posterior segment.

E-Poster No.: EP-0055
The Effect of Transglutaminase in the Physicochemical Properties of Type I Collagen Gel
First Author: Hsinyuan TAN
Co-Author(s): Chia-yi WANG
Purpose: To evaluate the effect of supplementation of transglutaminase, a cross-linker, in the physicochemical properties of recombinant collagen gel, a prototype of recombinant cornea substitute.
Methods: Recombinant collagen gels were prepared by mixing collagen (type I/type V = 91:9) and the designated ratio (w/w) transglutaminase (collagen: enzyme = 5000:1; 500:1), an effective cross-linker for collagen gels, in 50 mM Tris-HCl buffer (CaCl2 2.5 mM, DTT 1 mM, pH 8.0) at 4°C in a 15-mL centrifuge tube. The influence on the physicochemical properties of recombinant collagen gel, a prototype of corneal substitute, with and without fibroblast seeding was tested using turbidity test and scanning electron microscopy.
Results: The microstructure of collagen gels was altered with the supplementation of transglutaminase as shown in electron microscopy. The interfibrillar space decreased as the supplemented transglutaminase increased. And the transparency of collagen gel without fibroblast seeding was also improved after supplementation of TG during gelation process of collagen gel. However, the turbidity increased in all groups of collagen gels with fibroblast seeding due to the lay down of collagen shown by electron microscopy.
Conclusions: The supplementation of a cross-linker for improving the strength of corneal substitute could potentially be beneficial. However, the supplementation of a cross-linker may affect certain physicochemical properties of collagen gels. Fine titration of the supplementation of cross-linkers is needed to establish nature-mimicking corneal stromal substitute.

E-Poster No.: EP-0054
The Withdrawal Rate of Corticosteroids in Vernal Keratoconjunctivitis
First Author: Mika SHINODA
Co-Author(s): Eichi UCHIO
Purpose: Administration of corticosteroids has been reduced with the use of cyclosporine and tacrolimus solutions in vernal keratoconjunctivitis (VKC). Our purpose is to report the withdrawal rate of corticosteroids in VKC at Fukuoka University Hospital.
Methods: This study involved 48 eyes of 24 VKC patients (18 males and 6 females). Their age ranged from 4 to 26 years old (average, 10.6 years old). The diagnosis and clinical scores of keratoconjunctivitis were evaluated at first visit, 1 month, 3 months, 6 months, and 12 months after stopping the administration of corticosteroids.
Results: The clinical scores of keratoconjunctivitis were 9.5 ± 0.5 at the first visit, 5.4 ± 0.4 at 1 month, 3.8 ± 0.4 at 3 months, 3.3 ± 0.8 at 6 months, and 3.3 ± 0.8 at 12 months. The withdrawal rate of corticosteroid was 50.0% at the first month, 58.3% at the third month, 66.6% at the sixth month, and 70.8% at the 12th month. Eleven eyes of 8 patients had supratarsal injection of triamcinolone acetonide (TA).
Conclusions: Administration of corticosteroids was reduced in VKC in our study. The use of cyclosporine,
E-Poster No.: EP-0039

Topical Anesthetic Abuse With Persistent Corneal Epithelial Defect Treated With Autologous Serum Eye Drops Combined With a Silicone Hydrogel Contact Lens

First Author: Yan-ming CHEN
Co-Author(s): Shih-hao TSAI, Yen-chun LIN, Yu-kuei LEE

Purpose: To report a case of anesthetic abuse with persistent corneal epithelial defect treated successfully by topical 20% autologous serum eye drops combined with a silicone hydrogel contact lens (CL).

Methods: A case report.

Results: A 42-year-old male was referred to our clinic with decreased vision and pain in the left eye. He had been using 0.05% oxybuprocaine HCl eye drops to alleviate pain after corneal foreign body removal for the past 3 weeks and had increased the dosage to 2 bottles per week for the past 1 week. On biomicroscopic examination, the left cornea had a 4x3-mm oval corneal epithelial defect with some stromal whitening. The cornea was scraped for cultures and smears, but there were no findings. Topical anesthetic was discontinued, and a combination of topical 20% autologous serum eye drops bi-hourly with a silicone hydrogel CL along with prophylactic 0.5% levofloxacin eye drops 4 times daily was used. The defect healed gradually by day 5. The silicone hydrogel CL was removed immediately after total re-epithelization. The patient did not report any discomfort associated with the combined treatment. Improved ocular comfort and decreased conjunctival injection was correlated with healing.

Conclusions: The silicone hydrogel CLs help to relieve pain, whereas autologous serum eye drops accelerate epithelial healing in patients of anesthetic abuse with persistent corneal epithelial defects. The combined usage of 20% autologous serum eye drops and silicone hydrogel CLs is potentially efficacious and may be considered as an alternative treatment for these patients.

E-Poster No.: EP-0046

Toxic Keratopathy Associated With the Use of Alcohol-Containing Antiseptics in Nonocular Surgery

First Author: Hsin-yu LIU
Co-Author(s): Yu-chih HOU

Purpose: To report 3 cases of severe toxic keratopathy after the use of alcohol-containing antiseptics in orofacial surgery.

Methods: Interventional case reports.

Results: Three patients had toxic keratopathy in their right eyes after orofacial surgery on the left side between December 2010 and September 2012. All 3 cases were in a right lateral position and used alcohol-containing antiseptic solutions, including 10% povidone–iodine alcohol solution and 2% chlorhexidine in 70% isopropyl alcohol. Ophthalmic examination revealed decreased vision ranging from 20/100 to 20/400, corneal edema/opacity, and anterior chamber reaction in the right eyes treated with topical steroids. Confocal microscopy revealed moderate to severe endothelial cells loss. A severe case had limbal insufficiency, band keratopathy, stromal neovascularization, and corneal edema. Two patients required kerato-
plasty to restore corneal clarity, including Descemet stripping automated endothelial keratoplasty in 1 case and penetrating keratoplasty combined with cataract surgery in the other. Asymmetric cataract in the right eye developed in all cases, and 1 patient underwent cataract surgery without keratoplasty. Postoperative vision improved to 20/30 or 20/40 in all 3 cases. Since switching to alcohol-free antiseptic solutions, no new cases have been reported.

**Conclusions:** Alcohol-containing antiseptics may cause severe toxic keratopathy and should not be used in orofacial surgery. Using alcohol-free antiseptics and measures to protect the dependent eye when patients are in a lateral position may reduce the risk of corneal injury.

**E-Poster No.:** EP–0077

**Treatment of Refractory Vernal Keratoconjunctivitis and Associated Steroid-Induced Glaucoma**

*First Author: Ni-wen KUO*  
*Co-Author(s): Wei-yu LAI, Jiunn-liang CHEN*

**Purpose:** To report 3 cases of refractory vernal keratoconjunctivitis treated with supratarsal injection of triamcinolone.

**Methods:** A case report and literature review.

**Results:** Case 1: A 12-year-old male who suffers from seasonal allergic rhinitis presented with a 6-month history of decreased visual acuity and recurrent corneal erosion in the right eye (OD). Giant papillary keratoconjunctivitis in both eyes (OU) with shield ulcer OD persisted despite topical lubricant and steroid use. Transient steroid–induced glaucoma OU was noted during follow-up. Supratarsal injection of triamcinolone showed resolution without recurrence of glaucoma. Case 2: A 10-year-old boy with severe giant papillary keratoconjunctivitis OU was treated with giant papillary resection and subconjunctival injection of triamcinolone. Temporary recovery of Horner–Trantas dots was found, but recurrent attack and steroid–induced glaucoma were noted. Another supratarsal injection of triamcinolone was administered and showed no rebound of intraocular pressure and improvement. Case 3: A 14-year-old male with atopic dermatitis and refractory giant papillary keratoconjunctivitis with steroid–induced glaucoma OU was also treated with supratarsal injection of triamcinolone. In these cases, a great response to the supratarsal injection of triamcinolone led to tapering of topical steroid eye drops, thereby gaining control of intraocular pressure.

**Conclusions:** Steroid–induced glaucoma is one of the complications of long-standing recalcitrant vernal keratoconjunctivitis. We report 3 cases of good recovery of focal limbal stem cell deficiency, and none of them showed associated elevated intraocular pressure in giant papillary keratoconjunctivitis treated with supratarsal injection of triamcinolone. In conclusion, supratarsal injection of triamcinolone acetonide is effective and safe in patients with refractory giant papillary keratoconjunctivitis to relieve severe inflammation associated with this disease.

**E-Poster No.:** EP–0069

**Treatment Outcome of Keratoconus in Thailand**

*First Author: Siriporn LEUNGROONGROJ*  
*Co-Author(s): Varintorn CHUCKPAIWONG*

**Purpose:** To review demographics and treatment outcome of keratoconus (KC) patients in the tertiary care Ramathibodi Hospital, Thailand.

**Methods:** We retrospectively reviewed medical records of KC patients who received treatments between January 2004 and December 2013. All patients were categorized into 3 groups according to treatment modalities: contact lenses (CLs), deep anterior lamellar keratoplasty (DALK), and penetrating keratoplasty (PKP). Disease severity was graded by the Amsler–Krumbeich system.

**Results:** A total of 89 eyes (62 patients) were recruited. Mean age was 24 ± 10.8 years. Forty–five patients (73%) were males. Allergy was the most common associated condition. CL, DALK, and PKP were prescribed and performed in 57 eyes (64%), 18 eyes (20%), and 14 eyes (16%), respectively. The majority of patients in the CL group were stage 1 KC (30%), whereas the majority of patients in the DALK and PKP groups were stage 4 (78% and 93%). Mean baseline best corrected visual acuity (BCVA) was 0.5, 1, and 1.4 logMAR in the CL, DALK, and PKP groups, respectively. Median gain in BCVA after treatment was 3, 6, and 7 lines in the CL, DALK, and PKP groups, respectively. Decrease in postoperative keratometry was comparable between the DALK and PKP groups (4 and 3.7 diopters). Increased intraocular pressure (IOP) was reported in 1 of 18 eyes (5.6%) in the DALK group compared with 3 of 14 eyes (21.4%) in the PKP group.

**Conclusions:** KC mostly occurred in young males with allergies. Treatment outcomes were favorable in all stages. DALK was more preferable compared with PKP in terms of fewer postoperative complications.

**E-Poster No.:** EP–0088

**Twenty Blinks Keep the Tears Pink—Role of Blinking Exercises in Computer Vision Syndrome**

*First Author: Abhishek ONKAR*  
*Co-Author(s): Suwarna SUMAN*

**Purpose:** This was a comparative study of the efficacy of Blinking Exercises in Computer Vision Syndrome.
of blinking exercises versus lubricant eye drops in computer vision syndrome.

Methods: A dry eye questionnaire was circulated among 80 individuals who had used computers for more than 6 hours per day for the past year or more. Subjects were randomly allocated into 2 groups, A and B. Group A was assigned blinking exercises at 20-minute intervals. Group B was started on lubricant eye drops (carboxymethylcellulose 0.5%) 4-6 times daily. Tear function tests were repeated at months 1, 3, and 6. Statistical analysis was done using student t test and P value calculated.

Results: Fifty males and 10 females ranging in age from 22–35 years were evaluated during the study. Baseline Schirmer test reading and tear film breakup time (TBUT) were 12 ± 3 mm and 10 ± 2 s, respectively. Follow-up Schirmer test reading and TBUT in group A and group B were 12 ± 4 mm and 11 ± 2 s and 12 ± 3 mm and 10 ± 2 s, respectively, after 1 month. After 3 months, Schirmer test reading and TBUT in group A and group B were 13 ± 3 mm and 12 ± 3 s and 12 ± 3 mm and 11 ± 2 s, respectively. At the end of 6 months, Schirmer test reading and TBUT in group A and group B were 14 ± 2 mm and 15 ± 2 s and 13 ± 3 mm and 14 ± 3 s, respectively.

Conclusions: Blinking exercises supplemented with ergonomic modifications and yoga provide relief of dry eye symptoms in subjects with chronic computer usage.

E-Poster No.: EP-0067

Unilateral Conjunctival Mucosa-Associated Lymphoid Tissue Lymphoma Masquerading as Giant Papillary Conjunctivitis

First Author: Kuo-hua JUAN

Purpose: To describe a young woman with unilateral conjunctival mucosa-associated lymphoid tissue (MALT) lymphoma who presented with elevated tumors hidden in the peripheral fornix. She was initially misdiagnosed with chronic giant papillary conjunctivitis (GPC), and the lymphoma was neglected.

Methods: A case report and retrospective study.

Results: A 22-year-old woman was referred from a private clinic with the initial diagnosis of intractable allergic conjunctivitis to conventional medical treatments. She had previously been diagnosed with allergic conjunctivitis due to irritation, redness, and contact lens intolerance. She had been treated with topical antibiotics and steroids for more than 6 months but in vain. She was referred to our hospital for further management. Multinodular salmon-pink tumor in the conjunctival fornix of the right eye resembling GPC was noted on slit-lamp exam. Excisional biopsy of the conjunctival mass was performed, and the pathologic report was extranodal low-grade B-cell lymphoma of MALT subtype immunoreactive to B-cell markers (CD20, CD79-α). Then she was referred to the hematologic oncologist. The staging of systemic work-up found no abnormalities. After excisional biopsy without additional local therapies, there was no evidence of local recurrences or progressions of systemic involvement during the consequent follow-up period of 3 months.

Conclusions: Detection of conjunctival lymphoma can be challenging. Conjunctival MALT lymphoma is a rare, low-grade, non-Hodgkin B-cell lymphoma. The differential diagnoses of MALT lymphoma of the conjunctiva include granulomatous disease (such as sarcoidosis or tuberculosis), GPC, allergic eye disease, ocular cicatricial pemphigoid, amyloidosis, adult inclusion conjunctivitis (chlamydial conjunctivitis), keratoconjunctivitis sicca, and masquerade syndromes, possibly a sebaceous carcinoma. Although malignant conjunctival tumors are relatively rare compared with other ocular cancer, we should nevertheless consider that some patients who initially present with inflamed GPC might have conjunctival MALT lymphoma.

E-Poster No.: EP-0068

Unilateral Keratoglobus and Terrien Marginal Degeneration in a Young Patient

First Author: Brian ARDITYA MAHENDRA
Co-Author(s): Suhardjo PRAWIRORANU, Syam SUHARYONO

Purpose: To report a case of unilateral keratoglobus and Terrien marginal degeneration in the same eye of a young male patient.

Methods: A case report.

Results: The patient was a 15-year-old male with blurred vision in the right eye since childhood. Visual acuity was 0.15 with a correction of S+2.50 C–6.00 axis 80, which became 0.25. There was no history of trauma or systemic abnormalities. The conjunctiva was mildly hyperemic with pseudopterygium. The cornea was in the globe-form with 360-degree marginal degeneration with pannus, stromal thinning, and lipid deposits. Munson sign and Rizzutti sign were positive, but Vogt line and Fleischer ring were negative. The keratometry readings were K1, 39.90 D (8.46 mm); K2, 47.75 D (7.07 mm). Central corneal thickness was 563 µm, and the endothelial count was 2051 cells/mm². The posterior segment was within normal limits. The patient underwent collagen cross-linking (CXL) with riboflavin and UV–A for the right eye. One month after CXL, K1 and K2 became 40.35 D and 47.95 D, respectively. Best corrected visual acuity became 0.3 2 months after CXL. We continue to follow the patient now, and he is still considering the contact lens and keratoplasty for the next therapy.
Conclusions: Unilateral keratoglobus with Terrien marginal degeneration is rare. Collagen cross-linking is one stabilization therapy for corneal ectasia or degeneration and may provide some improvement in keratometry and visual acuity.

E-Poster No.: EP-0488

Unusual Ocular Manifestation of a Patient Suffering From Acute Conjunctivitis Associated With Corneal Pseudomembrane

First Author: Tzu-yu LIN
Co-Author(s): Wen-ming HSU

Purpose: To describe an unusual ocular manifestation of a patient suffering from acute conjunctivitis associated with corneal and conjunctival pseudomembrane covering the right eye.

Methods: A case report.

Results: A 64-year-old female presented with bilateral acute conjunctivitis for 1 week. She suffered from bilateral eye discomfort, itchiness, and foreign body sensation. The right upper and lower conjunctiva showed thickened pseudomembrane covering the entire surface, along with an unusual thin clear pseudomembrane covering the peripheral cornea of the right eye under slit lamp examination. The left eye showed only slight pseudomembrane over the conjunctiva and no corneal involvement. The pseudomembrane was peeled off of the conjunctiva and cornea during the visit. The patient was given tobradex ointment, cravit, and pred-mild 0.12% eye drops. Follow-up 3 weeks later showed that the corneal and conjunctival pseudomembrane had not shown any recurrence. We examined an unusual case of corneal and conjunctival pseudomembrane that developed after acute keratoconjunctivitis infection. The membrane was successfully removed after 5 follow-up visits and has not shown any recurrence.

Conclusions: Corneal pseudomembrane is an uncommon finding after an acute keratoconjunctivitis infection.

E-Poster No.: EP–0045

“Copy and Fix:” A Novel Technique of Harvesting Freehand and Horseshoe Tectonic Grafts

First Author: Chameen SAMARAWICKRAMA
Co-Author(s): Rasik VAJPAYEE

Purpose: To describe a new technique for harvesting freehand and horseshoe tectonic corneal grafts.

Methods: A retrospective, noncomparative interventional case series of 3 eyes from 2 patients was included. The area to be excised from the host was marked with a marking pen. Using the principle of the light table from architecture, the donor corneoscleral rim was placed over the marked area with an ophthalmic viscoelastic device in the interface to provide a coupling medium. The donor was then marked, tracing the exact shape of the tectonic graft with a 0.25-mm overlap (“copy”). This was harvested after being mounted on an artificial anterior chamber and sutured in place with 10/0 nylon (“fix”) to provide an exact copy of the eccentric or horseshoe shape of the tectonic graft. One eye had a full thickness freehand horseshoe tectonic corneal graft for perforated microbial keratitis too large to glue. Two eyes from the same patient had anterior lamellar horseshoe tectonic grafts for Terrien marginal degeneration.

Results: None of the grafts required any modification in their dimensions after harvesting. All grafts were easy to perform and tectonically stable postoperatively. Significant visual improvement was observed in all cases.

Conclusions: The “copy and fix” technique is a simple and effective new technique that consistently and accurately maps and harvests freehand and horseshoe tectonic corneal grafts.

E–Poster No.: EP–0104

A Case of Miliary TB With Third Nerve Paresis and Multiple Choroidal Tubercles

First Author: Nedhina TB
Co-Author(s): Mathew JAMES, Itterah TP, Prakash VS

Purpose: To report a case of miliary tuberculosis (TB) with third nerve paresis and multiple choroidal tuberculosis.

Methods: A 33-year-old male who was a renal allograft recipient on immunosuppressants, with a history of diabetes mellitus and hypertension, presented with fever, malaise, headache, and double vision for 1 week. The patient underwent routine ophthalmological examination and physical examination. He also underwent blood investigations, CSF examination, chest x-ray, and CT of the thorax.

Results: On general physical examination, the patient was febrile with generalized lymphadenopathy. On ophthalmological examination, his vision in the right eye (OD) was 6/9 improving to 6/6 and in the left eye (OS) was 6/6. He had OS moderate ptosis, with limitation of adduction and elevation. Pupil was reacting in both eyes (OU). Fundus examination revealed multiple choroidal tubercles (OD > OS). Chest x-ray showed miliary shadows in lungs. CT of the thorax showed miliary TB lungs, hilar and mediastinal lymphadenopathy, and...
Methods: This retrospective study comprised 14 patients (14 eyes) who had received BDI extraction because of severe complications from 1999 to 2011 in our hospital. Several factors of these patients were analyzed, including traumatic severity, BDI implantation method, intraocular position of BDI, and the cause of BDI extraction.

Results: Fourteen patients were implanted with 67G BDI because of traumatic aniridia, aphakia, or cataract. Severe bullous keratopathy and secondary glaucoma occurred from 2–126 months after operation. All cases received intraocular lens (IOL) removal, penetrating keratoplasty, and antiglaucoma surgery. We found that the BDI loops were in an abnormal position, in front of the more normal position or directly in contact with the cornea.

Conclusions: Bullous keratopathy and secondary glaucoma are the 2 most common reasons for BDI extraction, and a shift in position of the lens loops may be the main cause of these serious complications. The patients who receive BDI implantation should be adequately selected and must be followed up properly.

E-Poster No.: EP-0099
Cases of Ocular Injury Among Earthquake Survivors in Nepal
First Author: Purnima RAJKARNIKAR STHAPIT
Co-Author(s): Pooja SHRESTHA, Tina SHRESTHA

Purpose: The large earthquake in Nepal killed 9000 people and injured more than 22,000. We report the various types of ocular injury among earthquake survivors who presented to a tertiary care hospital, which is close to 5 major earthquake-hit districts in Nepal.

Methods: All the cases with ocular injury who presented to our hospital in the first 3 weeks after the earthquake, both in the emergency department and the ophthalmology outpatient department, were collected. Details of ophthalmic examination findings and treatments received were noted and tabulated.

Results: In our hospital alone, there were 1860 patients who presented in the first 3 weeks after the earthquake. Among them, there were 92 patients with ocular and orbital injuries. Many of these were polytrauma patients, whereas some had isolated ocular injuries. There were 45 patients with eyelid injuries, 36 patients with red eye and infections, and 6 patients had corneal infections. Two patients had proptosis due to orbital inflammation, 1 had diplopia due to sixth nerve palsy, and 2 patients had traumatic optic neuropathy with severe visual impairment.

Conclusions: Ocular injury cases were common in polytrauma cases among earthquake survivors. Although most of them had lacerated injuries of the eyelids and foreheads, vision-threatening conditions were also seen that needed expert opinions and meticulous treatment.

E-Poster No.: EP-0092
Clinical Histopathology of Intrachoroidal Splitting in Open-Globe Injury—A Retrospective Case Series of 4 Patients
First Author: Liang HAN
Co-Author(s): Yen-ling CHO, Zhi Zhong MA

Purpose: To observe the characteristics of intrachoroidal splitting (ICS) associated with choroidal detachment due to open-globe injury.

Methods: This was a retrospective observational case series of 165 patients enrolled in the Eye Injury Vitrectomy Study (EIVS) who were diagnosed with choroidal detachment, 4 of whom exhibited ICS. The in vivo pathologic changes of ICS were recorded during surgery. Four specimens were obtained from the inner part of the ICS region. One specimen was stained with hematoxylin and eosin, 1 specimen was examined under electron microscopy, and the other 2 specimens were examined under transmission electron microscopy.

Results: All 4 patients presented with vortex vein rupture associated with large-scale midperipheral ICS. The histopathologic observations indicated that ICS occurred between the medium-sized and large-sized choroidal vessel layers. Large vascular indentations and medium-sized choroidal vessels were observed on the inner part of the split interface. Postoperative outcomes of the 4 patients were poor. Vision in all 4 patients was no light perception before or after surgery. Three eyes became atrophic with band keratopathy, and 1 eye was eventually enucleated for cosmetic reasons.
Conclusions: ICS can occur during open-globe injury. The outcome of ICS with choroidal detachment was poor.

E–Poster No.: EP–0100

Combination Therapy for Aspergillus Endophthalmitis After Penetrating Keratoplasty for Fungal Keratitis

First Author: Wen-hsiang LEE
Co-Author(s): Kendall DONALDSON, Darlene MILLER, Sarah WELLIK

Purpose: To report clinical findings and management of exogenous Aspergillus endophthalmitis in an immunocompetent patient after penetrating keratoplasty for contact lens–related fungal keratitis.

Methods: Culture–proven Aspergillus flavus keratitis required penetrating keratoplasty (PK). Recurrent fungal keratitis in the graft and B–scan ultrasonography of the posterior segment provided the clinical diagnosis of endophthalmitis. Vitreous tap and intravitreal injections of amphotericin B, voriconazole, vancomycin, and ceftazidime were performed. Corneal graft dehiscence necessitated a second PK plus intravitreal voriconazole, vancomycin, and ceftazidime. Concurrent treatments included topical voriconazole, amphotericin B, Vigamox, and oral ketoconazole. The development of circumferential serous choroidal detachment, shallow anterior chamber (AC), iridocorneal adhesions, and hyphema prompted vitrectomy, lensectomy, choroidal drainage, AC washout, pupillary membranectomy, and intravitreal amphotericin B and voriconazole to prevent graft decompensation. A third PK was needed for graft failure, followed by Ahmed drainage implant for angle-closure glaucoma.

Results: After vitreous tap and injection, pain and AC fibrins improved, but corneal infiltrate, vitreous opacities, and vision of hand motions remained stable. Vitreous aspirate was negative for organisms. The dehisced graft showed PAS–positive and GMS–positive fungal elements and grew Aspergillus species, and intravitreal, topical, and systemic antifungal therapies were continued. During vitrectomy, the retina appeared normal, suggesting that endophthalmitis was resolving. At 11–month follow–up, vision improved to 20/60 after third PK. At 13 months, vision pinholed to 20/80 after glaucoma surgery.

Conclusions: Although Aspergillus endophthalmitis, especially with corneal involvement and multiple PKs, is associated with poor visual prognosis and timely combination therapies can achieve good clinical outcomes.

E–Poster No.: EP–0103

Evaluation of the Management of Open Globe Injury Through an Analysis of Suitability Between Final and Predictive Visual Acuity Based on Ocular Trauma Score at Dr. Wahidin Sudirohusodo Hospital in Makassar, 2014

First Author: Amna RAHMI
Co-Author(s): Habibah MUHIDDIN, Halimah PAGARRA

Purpose: This study aimed to evaluate the management of open globe injury through an analysis of suitability between final and predictive visual acuity based on ocular trauma score (OTS) at Dr. Wahidin Sudirohusodo Hospital in Makassar in 2014.

Methods: This prospective cohort study used samples of 69 eyes with open globe injury at Dr. Wahidin Sudirohusodo Hospital in Makassar. The OTS variables (initial visual acuity, rupture, endophthalmitis, perforation, retinal detachment, and afferent pupillary defect) and the OTS scores were calculated in the initial examination at the emergency unit. After treatment, visual acuity and eye condition were examined at the first, second, third, and fourth weeks. The determination of suitability between final and predictive visual acuity was based on the OTS. After that, risk factors in the management of open globe injury that influenced final visual acuity were determined.

Results: The results showed that 4 eyes (5.8%) did not show suitability, 12 eyes (17.4%) showed suitability, and 53 eyes (76.8%) were better compared with predictive visual acuity based on the OTS.

Conclusions: The management of open globe injury patients at Dr. Wahidin Sudirohusodo Hospital was good enough until the fourth week, but management after the fourth week was not optimal. This was due to several factors including the regularity of treatment, post-surgery condition of the eyes, availability of surgical tools and experts, and reference system.

E–Poster No.: EP–0098

Foreign Body in the Medial Orbital Wall: A Case Report

First Author: Shao-chun CHEN
Co-Author(s): Chun-chen CHEN, Lin-chung WOUNG

Purpose: To explore the feasibility and methods of transnasal endoscope for removing foreign bodies in the medial orbital wall.

Methods: A case report.

Results: A 55–year–old male reported to the department with the complaint of redness and pus discharge from his left upper eyelid. History revealed that the patient had a sudden pain during a fireworks display and injured his left eye 1 month earlier. The skin lesion was mild with pus discharge and mild swelling. No
deficits were noted in visual acuity, visual fields, and ocular movements. After oral antibiotics, the amount of pus decreased but the wound did not heal even with suture. CT scan reported 2.4 x 2 cm radiolucent foreign bodies in the medial wall of the orbit and extending to the nasal pharynx. Based on accurate positioning by imaging examination, transnasal endoscopic removal of 2 broken chopsticks was successfully accomplished. The patient recovered well without any complications after surgery.

**Conclusions:** We report a special case of a chronic skin wound without spontaneous healing. In such cases, we suggest arranging image screening to evaluate if there is any foreign body in the orbit.

**E-Poster No.: EP-0096**

**Intraorbital Metallic Foreign Body: A Case Report**

**First Author:** Karina PRATIWI  
**Co-Author(s):** Purjanto UOTOMO, Agus SUPARTOTO

**Purpose:** The aim of this study was to present a case of ocular damage after an air gun injury with an intraorbital foreign body and its management.

**Methods:** This was a descriptive study. A 17-year-old boy was referred due to dark vision after an air gun injury with a retained bullet in the left eye.

**Results:** Left eye examination revealed no light perception visual acuity, edematous palpebra with hematome, along with a 5 x 3-mm sclopetarum wound on the temporal side of the upper palpebra, conjunctival hyperemia, chemosis, and diffuse hyphema. Sclera and intraocular pressure were difficult to assess due to palpebral engorgement. Posterior segment was difficult to assess as well. Ultrasound findings were distortion of normal ocular shape and intravitreal hemorrhage. Head x-ray detected a foreign body inside the orbital cavity. Head CT scan was scheduled to confirm the exact location of the foreign body, which eventually revealed its location in the orbital apex. Ocular trauma score (OTS) was 1. Lateral orbitotomy with fluoroscopy guidance was performed to remove the intraorbital foreign body, which proved to be a bullet. Patient visual acuity remained no light perception.

**Conclusions:** Ocular trauma after an air gun injury with an intraorbital metallic foreign body can be managed with foreign body evacuation with fluoroscopy guidance.

**E-Poster No.: EP-0095**

**Patching for Corneal Abrasions**

**First Author:** Blanche LIM  
**Co-Author(s):** Chris LIM

**Purpose:** Corneal abrasions are a common eye complaint presenting to the emergency department and ophthalmology clinic in audits. Eye patches are often recommended as part of the treatment regimen for corneal abrasions despite insufficient supporting evidence. A systemic review was therefore performed to assess effectiveness and effects of the eye patch when used to treat corneal abrasions.

**Methods:** All randomized and quasirandomized controlled trials that compared patching with no patching of the affected eye to treat simple corneal abrasions were included. We defined primary outcomes to be healing of the corneal epithelium with comfort levels, or pain, as secondary outcomes. A literature search without language or date restrictions was performed via the Cochrane Central Register of Controlled Trials (CENTRAL) (which contains the Cochrane Eyes and Vision Group Trials Register) in The Cochrane Library (2007, Issue 4), MEDLINE (1966 to December 2007), EMBASE (1980 to December 2007), LILACS (December 3, 2007), NRR (2007, Issue 4), and SIGLE (December 2004). We also searched the reference lists of included studies, unpublished “grey” literature, and conference proceedings and contacted pharmaceutical companies for details of unpublished trials. Two authors then independently assessed trial quality and extracted data. We contacted investigators for further information regarding the quality of trials.

**Results:** We included 11 trials in the review with a randomization of a total of 1014 participants. Meta-analyses of 7 studies with dichotomous healing outcomes favored no patching on the first day of healing [risk ratio (RR), 0.89; 95% confidence interval (CI), 0.79 to 0.99]. For days 2 and 3, there was no significant difference between the 2 groups. Of the 9 trials that measured pain scores, 2 favored no patching and none favored patching. Complication rates were low, and no differences were noted in these between the 2 groups. No-patch groups generally received more adjuvant treatment with antibiotics and/or cycloplegics than the patch groups, which is an important confounding factor.

**Conclusions:** Treating simple corneal abrasions with a patch does not improve healing rates on the first day after injury, neither does it reduce pain. In addition, use of a patch may result in further discomfort with loss of binocular vision. Therefore, we do not recommend patching of simple corneal abrasions. Further research should focus on large (greater than 10 mm²) abrasions.
Purpose: To identify the risk factors and visual outcome of the patients who had *Klebsiella pneumoniae*-related endogenous endophthalmitis secondary to pyogenic liver abscess.

Methods: A retrospective chart review of 793 patients with pyogenic liver abscess from 1985 to 2015 was performed. Of these, data of patients with endogenous endophthalmitis were also collected.

Results: Diabetes mellitus was the most common associated systemic disease of pyogenic liver abscess patients, which accounted for 56% of the patients. Extrahepatic metastasis to the eye, ie, endogenous endophthalmitis, occurred in 9 cases (12 eyes). The causative pathogen of all endogenous endophthalmitis patients was *K. pneumoniae* by blood and/or vitreous cultures. Poorly controlled diabetes had a significant association with the development of endogenous endophthalmitis. The visual outcome of these endophthalmitis patients was generally poor. However, early intravitreous antibiotics and/or vitrectomy could salvage the vision of some patients.

Conclusions: Poorly controlled diabetes had a significantly relationship to *K. pneumoniae* endogenous endophthalmitis. Physicians should be alert to the development of endogenous endophthalmitis when a patient with liver abscess or bacteremia complains of ocular symptoms. Prompt diagnosis and vigorous treatment can save the patient’s eyes and vision.

E-Poster No.: EP-0093

**Therapeutic Effect of Amniotic Membrane Transplantation in Paraquat-Induced Ocular Surface Injury: 2 Case Reports**

First Author: Po Yen LEE
Co-Author(s): Shiuhsiang HSU

Purpose: Paraquat is a dipyridylium quaternary ammonium salt that is used as a herbicide. It is very toxic to humans and can produce organ failure and pulmonary fibrosis. In contrast to systemic toxicity, treatment and prognosis of ocular surface toxicity are not well-decided. We report 2 patients with ocular surface injury caused by paraquat, after a splashing incident.

Methods: Both patients were farmers splashed by diluted, 20% solution of paraquat into 1 eye. The lesion eyes were irrigated for less than 5 minutes at the time of the injury. The clinical pictures showed that the conjunctiva of the exposed fornix area was hyperemic and chemicotic with epithelial erosion. Besides, mucous discharge was produced with multiple yellowish pseudomembranes adherent to the conjunctival surface, similar to the membranous conjunctivitis that can be found in Stevens–Johnson syndrome (SJS). The limbal vasculature appeared congested but without ischemic change. There was a crescent epithelial defect located beneath the limbal cornea. The remaining corneal epithelium was opaque, loose, and edematous. Decreases in intraocular pressure were noted in the lesion eye under the effect of ciliary shock.

Results: The 2 patients were admitted for the administration of our chemical burn protocol, which comprised topical autoserum eyedrops and preservative-free lubricant drops (Optive Sensitive eye drops) every 2 hours for alternate use, Cravit 0.5% eye drops and erythromycin ointment 4 times daily for prophylactic use, cycloplegics of atropine 1% drops 3 times a day, Econopred (prednisolone 1%) drops every 4 hours to decrease inflammation, and oral ascorbate 500 mg and minocycline 100 mg 2 times daily to reduce collage-
nase activity. After a short course (5~7 days) of medical treatment, the epithelium healed poorly, and hyperemic, membranous conjunctivitis persisted. Therefore, amniotic membrane (AM) grafting was done, covering the ocular surface of the lesion eye and sutured to the conjunctiva with 10-0 nylon. During this procedure, partial limbal conjunctival tissue was excised for pathological report and showed severe lymphocytic infiltration and discernible fibrosis. After that, conjunctival erosion started healing and pseudomembrane formation decreased. Corneal epithelial defect healed completely after removing AM graft, without the development of conjunctivalization of the cornea. However, the conjunctiva started fibrosing but without symblepharon formation.

Conclusions: Paraquat–induced ocular surface injury has a relatively good prognosis. Amniotic membrane has antiangiogenic, antiscarring, and anti-inflammatory properties. In our cases, it could be used as a graft for corneal and conjunctival reconstruction, facilitating epithelialization and suppressing inflammation in an acute stage of chemical injury.

E-Poster No.: EP-0151
A Case of Acute Angle Closure With Low Corneal Endothelium Count Receiving Femtosecond Laser—Assisted Phacoemulsification
First Author: Tzu-yang TAI
Co-Author(s): Yu-fan CHANG, Catherine LIU
Purpose: To report a case with an acute attack of angle closure and low corneal endothelium count receiving femtosecond laser—assisted phacoemulsification (FLAPS).
Methods: An interventional case report at a tertiary care center. A 68-year-old man presented with pain and blurred vision in the right eye with intraocular pressure (IOP) 60/58 mm Hg. He visited our hospital due to uncontrolled IOP after initial treatment. Examinations showed a best corrected visual acuity (BCVA) of counting fingers (CF) at 30 cm in the right eye (OD) and 6/6.7 in the left eye (OS). Goldmann applanation IOP was 30/27 mm Hg on multiple glaucoma medications. Moderate corneal edema with bullae and a brunet cataract was observed in the right eye. Gonioscopy revealed circumferential close angle OD and grade 0–2 with peripheral anterior synchiae OS. Presuming acute angle closure attack, laser peripheral iridotomy was executed in the left eye but not in the right due to corneal edema. Endothelium cell count (ECC) was 566 per mm². FLAPS was performed in the right eye. Main outcome measures were postoperative changes in BCVA, IOP, visual field, and ECC.
Results: Two weeks after FLAPS, BCVA was 6/8.6 and IOP was 13 mm Hg in the right eye with Cosopt Q12H use. Corneal edema resolved around 2 weeks after surgery, and the corneal endothelium count was 686 per mm².
Conclusions: After an acute angle closure attack, FLAPS may outperform traditional phacoemulsification in a cataractous eye with low ECC in terms of speedy recovery of visual acuity and preservation of remaining corneal endothelium cells.

E-Poster No.: EP-0150
A Novel Two-Step Surgery in Management of Acute Angle Closure Glaucoma With Persistent Ocular Hypertension
First Author: Min WU
Purpose: To study the effectiveness and safety of a novel 2-step surgery in acute primary angle closure glaucoma (APACG) with persistent high intraocular pressure (IOP) in patients in whom conventional therapy has failed. The aim of surgery is to decrease IOP and reverse epithelial downgrowth to improve visual acuity.
Methods: A case report of two patients with APACG who presented with persistent IOP >45 mm Hg after conventional therapy. Early surgery was performed in each case to remove any residual lens material, limit epithelial downgrowth, and remove the synechial band. Subsequently, a second surgery in both cases involved an approach that included performing a deep sclerectomy, onlay pericardial patch, and posterior sclerotomy.
Results: The mean pre-operative IOP was 50 mm Hg, which reduced to 15 mm Hg post-operatively. Full recovery of vision occurred, with a final visual acuity of 20/20 in both cases. No complications were observed.
Conclusions: This two-step surgical approach effectively reduces IOP and reverses epithelial downgrowth, improving visual acuity in patients with persistent IOP >45 mm Hg following conventional therapy. Further studies are needed to evaluate the long-term outcomes of this two-step approach.
pressure (IOP).

**Methods:** A total of 54 eyes in 54 patients with APACG with persistent high IOP treated at the ophthalmology department of our hospital were followed up prospectively. All the patients were assessed regarding visual acuity, best corrected visual acuity (BCVA), slit lamp, IOP, AS–OCT, and ultrasound AB scan. The 2–step surgery was performed by the same surgeon under local anesthesia. The first step (S1) was intracameral air injection + pars plana vitreous cavity tapping (combined with iridectomy in some cases). Three days later, the second step (S2) consisting of phacotrabeculectomy + IOL + goniosynechialysis + anterior segment vitrectomy was performed. The postoperative follow-up included visual acuity, BCVA, IOP, AS–OCT, slit lamp, opthalmoscopy, and complications during 12 months.

**Results:** The complete success rate was 92.6%, and the partial success rate was 7.4%. IOP was reduced significantly after S1 and was stable after S2. The best corrected visual acuity was significantly improved ($P < 0.05$). Postoperative complications included flat anterior chamber, fibrin exudates in anterior chamber, and pupillary area and choroidal detachment.

**Conclusions:** Two–step surgery is an effective and safe procedure for APACG with persistent high IOP. Further study is recommended to evaluate its long–term outcomes.

**E–Poster No.: EP–0126**

**Amniotic Membrane Transplantation Combined With Conjunctival Rotational Grafting for Persistent Glaucoma Filtering Leak**

*First Author: Fu-ching HUANG*

*Co–Author(s): Min–hsiu SHIH*

**Purpose:** To report amniotic membrane transplantation combined with conjunctival rotational grafting to repair the persistent filtering bleb leak after trabeculectomy with mitomycin C.

**Methods:** A case report.

**Results:** A 53-year–old male had glaucoma associated with cytomegalovirus (CMV) complicated by bleb leak from a microhole after trabeculectomy with mitomycin C. Hypotony with an ischemic bleb, severe choroidal detachment, and a shallow anterior chamber were persistent after 1 month. We tried several medical and surgical treatments, including the administration of an oral carbonic anhydrase inhibitor, injection of autologous blood into the bleb, glue on the surface of the bleb using a tissue adhesive, and amniotic membrane–only grafting, but they provided only temporal relief. Finally, we decided to denude the surface of the bleb and perform amniotic membrane transplantation to cover the denuded area followed by partial–cover conjunctival rotational grafting after dissecting around the edges of the bleb. The bleb leak was closed successfully, and bleb function was maintained during the follow–up period of 2 years.

**Conclusions:** Amniotic membrane transplantation combined with conjunctival rotational grafting may be considered an alternative method for treating filtering bleb leaks with not enough conjunctival grafting to cover the wound.

**E–Poster No.: EP–0153**

**Anatomical Preconditions of Optic Nerve Tunnel Syndrome in Human Ontogenesis**

*First Author: Yuliya HUSEVA*

**Purpose:** The aim was to reveal optic canal (OC) development regularities to identify the anatomical preconditions of tunnel syndrome.

**Methods:** Of 105 human embryos from 4 to 70 mm in parietococcyegeal length, 261 OCs on 140 dissections of skull were studied. Two hundred eight OCs of 104 people aged from 2 weeks to 74 years were investigated using orbital computer tomography (CT). The diameters of optic nerve (ON) and OC, the form of the OC and its apertures, the thickness of the OC walls, and the ratio of ON and OC size in the orbital aperture, cranial aperture, and middle part were defined.

**Results:** The morphogenesis of the OC walls is an asynchronous process. The development of the OC upper wall is retarded. OC growth started after a certain ratio of the ON and OC diameter was achieved. The periods of OC development were identified. Human OC constitutional features appear in diverse shapes of OC and its cranial and orbital apertures and “waist,” OC and its wall lengths, ON and OC vertical and cross–sectional size in its cranial and orbital apertures and “waist” area, interlocation of OC compartments along its axis, and characteristic edges of OC cranial and orbital apertures in humans with dolichocephalic, mesocephalic, and brachicefalic skull type. The correlation between ON and OC diameter in the OC compartments was revealed. The smallest interspace between ON and OC was registered in the OC “waist” area, especially in the OC superior and inferior parts, which may contribute to probable ON compression here. The ON/OC size ratio exceeding 0.7 in OC cranial aperture, 0.8 in the “waist” area, and 0.6 in OC orbital aperture might result in “tunnel syndrome” and other OC defects.

**Conclusions:** OC formation is closely related to its structural component development in the course of which there are some stages reflecting interrelation of all OC parts. OC has certain constitutional and individual features, the revealing of which plays a role in ON pathology. Exceeding the determined ON/OC size ratio...
should be taken into account in cases of ON compression to predict “tunnel syndrome” in OC.

**E-Poster No.: EP-0135**

**Anterior Segment Findings of Pseudoexfoliation Syndrome in Thai Patients**

*First Author: Rattanaporn ROJANATAPPHA*
*Co-Author(s): Wasu SUPAKONTANASAN, Yanin SU-WAN, Chaiwat TEEKHASAENEE*

**Purpose:** To describe the anterior segment findings of different stages of pseudoexfoliation in Thais.

**Methods:** Consecutive pseudoexfoliation patients who had never undergone intraocular laser or surgeries were categorized into 3 stages as pseudoexfoliation syndrome suspect (XFS suspect), pseudoexfoliation syndrome (XFS), and pseudoexfoliation glaucoma (XFG). The anterior segment characteristics and ocular biometry were investigated and analyzed.

**Results:** One hundred seventy-four eyes of 100 patients were included. The mean age was 72.25 ± 16.48 years, and 71% were female. Seventy-eight patients were bilaterally enrolled, and 78% of these had the same stage in both eyes. Eighty-one eyes (47%) were XFS suspect, and 58 eyes (33%) were XFS. All eyes revealed at least 1 abnormal pigmentation sign, for instance, pigment deposit on corneal endothelium, pigment dispersion during pupillary dilatation, trabecular meshwork hyperpigmentation, and white collarette (color of iris collarette changing from brown to white). The most common finding in XFS suspects was a spoke-wheel pattern of pigment on the anterior lens capsule (97.53%). The presence of exfoliative materials on the lens was the most common finding in both XFS and XFG (89.7% and 97.1%, respectively). There were no significant differences in the angle opening \( (P = 0.47) \), and anterior chamber depth \( (P = 0.60) \) among the 3 groups.

**Conclusions:** Pseudoexfoliation is a mainly symmetrical disease among Thais. All subjects had pigment-related signs. The spoke-wheel pattern deposit was mostly seen in the XFS suspect group, whereas deposition of PXM on the anterior lens capsule was commonly found in both XFS and XFG.

**E-Poster No.: EP-0113**

**Anxiety and the Reliability of Visual Field Assessment in Glaucoma Patients**

*First Author: Lai Chan FHUN*
*Co-Author(s): Kok Leong TAN, Mei Fong CHONG, Mai-zen YAAKUB, Liza Sharmini AHMAD TAJUDIN*

**Purpose:** To evaluate the influence of anxiety on the reliability of visual field assessment in glaucoma patients.

**Methods:** An observational cross-sectional study was conducted involving 161 glaucoma patients (110 POAG patients, 19 PACG patients, and 32 patients with other types of glaucoma) during follow-up in the eye clinics of 3 tertiary centers in Malaysia: Hospital Raja Permaisuri Bainun, Hospital Sultanah Nur Zahirah, and Hospital Universiti Sains Malaysia. Face-to-face interviews using a modified Beck Anxiety Inventory (BAI) questionnaire were conducted by a masked investigator before conducting the automated Humphrey Visual Field (HVF) test. Based on the score of modified BAI, the anxiety level was classified as mild, moderate, or severe. The reliability of HVF was based on index fixation loss, false negative, and false positive.

**Results:** All patients were confirmed cases of glaucoma. For a mean majority of the patients, there was a low anxiety level (154, 95.7%). Only 7 patients (4.3%) expressed moderate anxiety. Surprisingly, none thought they had a high anxiety level. Nearly a third (31.8%) of patients with mild anxiety produced unreliable HVF, whereas more than half (57.1%) of patients with moderate anxiety produced unreliable HVF. There was no association of anxiety levels with reliability of HVF in both eyes \( (P = 0.674 \text{ in the right eye}, P = 0.247 \text{ in the left eye}) \), based on a simple Pearson \( X^2 \) test of Fisher exact test.

**Conclusions:** Reliability of HVF is not affected by the anxiety level of glaucoma patients. Perhaps anxiety level is not the only determinant of reliable HVF. However, in this study, newly diagnosed glaucoma patients with unreliable visual fields were not included.

**E-Poster No.: EP-0106**

**Beta Blocker Eye Drops for Low Tension Glaucoma and Migraine: A Case Report and Literature Review**

*First Author: Yuan-chieh LEE*
*Co-Author(s): Wei-shan TSAO*

**Purpose:** To report a case of migraine and low tension glaucoma that benefited from beta blockers.

**Methods:** A case report.

**Results:** A 43-year-old woman came with the complaint of intermittent bright light in the right eye for months. The bright light appeared in the right upper visual field with blurring of surrounding images, lasted for 30 minutes, and was followed by temporal headache. Migraine with aura was assumed. The intraocular pressure (IOP) was 15 and 12 mm Hg in the right eye and left eye, respectively. However, fundus examination revealed superior notching of the optic disc in the left eye. OCT confirmed decreased nerve fiber layer. Automated perimetry revealed compatible inferior nasal step. Low tension glaucoma was surmised, and topical 0.5% timolol was prescribed. There was no further
Blindness Caused by Late-Onset Angle Recession Glaucoma—A Case Report

First Author: Chia-ming HSU
Co-Authors: Ying-ying CHEN, Shwu-jiuan SHEU

Purpose: To report a case of blindness caused by late–onset angle recession glaucoma.

Methods: A case report.

Results: A 51-year-old male presented to our clinic with no light perception and elevated intraocular pressure (IOP) in the left eye. He had suffered a closed-globe injury in the left eye 13 years previously. He visited a medical center but was lost to follow-up later. Central scotoma in the left eye developed afterwards and progressive blurred vision was noted 2 years previously. Macular hole in the left eye was diagnosed at another clinic but he was lost to follow-up again. This time, he visited our clinic with high IOP (54 mm Hg by Tonopen) in the left eye. Slit lamp examination revealed a very deep anterior chamber in the left eye with elliptic pupil and relative afferent pupillary defect. Gonioscopy examination revealed angle recession in 4 quadrants. Fudoscopic examination revealed subtotal cupping and macular hole in the left eye. The patient denied any history of elevated IOP in the past. Although we took measures to reduce IOP, visual acuity remained no light perception even with adequate IOP control.

Conclusions: Angle recession glaucoma may develop more than 10 years after trauma. Detailed history taking with careful slit lamp and gonioscopy examination may prevent misdiagnosis and preserve vision.

Case Report: Hair Formation at the Malar Area After Using Lantanoprost 0.005%

First Author: Chan SHAO EN
Co-Authors: Lai ING CHOU

Purpose: To report a case of hair formation at the malar area after using lantanoprost 0.005% (Xalatan, Pfizer).

Methods: A case report.

Results: We present a case of a 76-year-old female who was diagnosed with open angle glaucoma with an intraocular pressure (IOP) of 13.6 mm Hg in her right eye and 14.3 mm Hg in her left eye. Cupping was 0.9 x 0.9 with thinning of the neuroretinal rims superiorly and inferiorly. Topical medication was given initially with brimonidine 0.15% (Alphagan–P, Allergan). However, allergic reaction in the form of conjunctival hyperemia with follicle formation at tarsal conjunctiva was noted after half-year follow-up, and topical medication was changed to lantanoprost 0.005%. At 4-month review,
periocular pigmentation with increased hair growth at the malar area was noted. Due to cosmetic concerns, the patient even had to shave the hair every day. We suggested that she wipe the area after using lantanoprost and apply tetracycline (tetracycline hcl 5 g/tube) ointment, and the condition mildly improved.

Conclusions: Lantanoprost is a topical PGF2α analog for lowering IOP. Side effects such as hypertrichosis and increasing pigmentation at the iris, periocular skin, or eyelash were reported in early reviews. The reported incidence of hypertrichosis and hair formation was higher with bimatoprost and travoprost than latanoprost. In a review of the literature, we noted a rare case report of a 54-year-old Asian female with the same problem of increased growth of vellus hair in the malar area after using lantanoprost for 4 months. Another 64-year-old female complained about excessive hair growth in both malar areas after using lantanoprost for 4 years. Additionally, a dermatologist noted hypertrichosis and poliosis of the eyelash. In our clinical practice, vellous hair increase around the malar area after using lantanoprost is seldom noted, but we should take note of this side effect.

E-Poster No.: EP-0116

Changes in Glaucoma Medication Expenditures in Taiwan

First Author: Shin-lin CHIU

Purpose: Medical care in Taiwan is well known for its low cost, high efficiency, high quality, excellent accessibility, and high equity. We investigated the trends in medication expenditures for glaucoma from 1997 to 2010.

Methods: This was a nationwide population-based retrospective longitudinal study based on records from the Longitudinal Health Insurance Database 2000 (LHID2000). Patients who had taken antiglaucomat ic agents were enrolled and categorized by sex, age, income, and occupation in this study. After adjusting for survey design and inflation using the 2011 inflation index, we analyzed the data of patients using glaucoma medication.

Results: The results show that higher medical expenditures were incurred by patients who were aged ≥40 years, male, and in the highest salary population, whereas lower medical expenditures were incurred by blue-collar workers. The medications with the most significant increases in expenditure were prostaglandin analogs (PGAs), α-agonists, and fixed combinations, whereas the medications with the most significant decreases in expenditure were β-blockers and cholinergic agonists. The number of trabeculectomies shows 2 downward break points in 1999 and 2000 when PGAs were listed and reimbursed.

Conclusions: These results suggest socioeconomic disparities in glaucoma care, along with an understanding of the changes in the expenditure of glaucoma medications under such a universal health insurance system.

E-Poster No.: EP-0143

Chronic Open-Angle Glaucoma and its Association With Cup Shape in Those Referred to the Ophthalmology Clinic of Vali-Asr Hospital in 2011–2012

First Author: Behrouz HEYDARI
Co-Authors: Gholamhossein YAGHOOBI

Purpose: To determine the prevalence of chronic open-angle glaucoma and its association with cup shape among the patients referred to our ophthalmology clinic.

Methods: Among those aged over 40 without inflammatory and congenital ocular diseases who were referred to the ophthalmology clinic on 2 days of week, subjects were selected for the study during a period of 6 months in 2011–2012.

Results: The mean age of 312 subjects was 58.5 ± 11.4 with a minimum and maximum of 40 and 110, respectively. Cup shape in the studied population was mostly flat with a frequency of 62.4% (78 cases) in the left eye and 62.1% (77 cases) in the right eye. Funnel-shaped cup was observed in 26 cases (20.8%) in the left eye and 26 cases (21%) in the right eye. Mean IOP in the left and right eyes was equal to 14.85 ± 2.95 mm Hg and 14.9 ± 2.86 mm Hg, respectively. The lowest and the highest IOP in both left and right eyes were 9 mm Hg and 25 mm Hg, respectively. The lowest and highest cup-disc ratio in both left and right eyes, respectively, were 0 and 1, with a mean of 0.32. In the studied population, cup shape in most subjects with open-angle glaucoma (OAG) was flat (7.7% in the left eye and 9.1% in the right eye). Then, funnel was the most prevalent cup shape (3.8% in each eyes). In both eyes, no significant relationship was found between cup shape and normal tension glaucoma (NTG) and OAG.

Conclusions: Prevalence of OAG in the study population was 7.1%, which is higher than the rate obtained in other studies. In addition, the prevalence of NTG (14.1%) was much higher than the prevalence in other studies. No significant relationship was found between the cup shape and prevalence of glaucoma.

E-Poster No.: EP-0139

Clinical Risk Factors Related to the Outcome of Trabeculectomy in Neovascular Glaucoma

First Author: Shirley CHANG
Co-Authors: Shiu-chen WU, Wei-chi WU

Purpose: To investigate the impact of clinical risk fac-
tors on the failure rate of trabeculectomy in patients with neovascular glaucoma (NVG).

**Methods:** A retrospective study was conducted to review the medical records of patients with neovascular glaucoma who received trabeculectomy at Chang Gung Memorial Hospital (CGMH) from January 2009 to June 2013. Clinical information was collected to investigate the potential risk factors of failure. Baseline factors including diabetes, hypertension, renal function, cholesterol, HbA1C, and underlying ocular diseases were reviewed. The impact of the management before and after trabeculectomy was also evaluated, including preoperative management such as intravitreal injection of bevacizumab (IVIB), panretinal photocoagulation (PRP), complications during trabeculectomy, and postoperative management such as needling revision with subconjunctival injection of 5-fluorouracil, postoperative IVIB, postoperative PRP, or cataract operation.

**Results:** A total of 42 patients (45 eyes) with neovascular glaucoma who had undergone trabeculectomy were included in our study. Postoperative needling, postoperative IVIB, and postoperative cataract surgery were significant risk factors of trabeculectomy failure in patients with NVG. Postoperative procedures to rescue impending bleb failure, including needling revision with 5-fluorouracil and postoperative IVIB, could not change the failing outcome.

**Conclusions:** Cataract surgery performed after trabeculectomy can induce the failure of trabeculectomy in NVG patients. Needling revision of bleb and IVIB do not help to rescue the failing outcomes of trabeculectomy in NVG patients.

**E-Poster No.: EP–0149**

**CO2 Laser—Assisted Deep Sclerectomy in Chinese Glaucoma Patients: A Pilot Study**

_First Author:_ Gangwei CHENG

**Purpose:** To evaluate the safety and preliminary efficacy of CO2 laser–assisted deep sclerectomy (CLASS) in Chinese open angle glaucoma (OAG) patients.

**Methods:** Sixteen eyes of 15 consecutive patients with OAG, including 5 primary OAG (POAG), 4 Vogt–Koyanagi–Harada (VKH) steroid–induced glaucomas, 2 exfoliative glaucomas, 2 Fuch uveitic glaucomas, 2 cortical steroid–induced glaucomas, and 1 traumatic glaucoma, were recruited. Laser–assisted deep sclerectomy using a CO2 laser system was performed in all patients. A one-third thickness scleral flap was created. The use of 0.04% mitomycin C for 2 minutes was left to the surgeon’s discretion, and a CO2 laser with a beam–manipulating system was used to achieve deep scleral ablation and unroofing of the Schlemm canal zone. Visual acuity, complete ophthalmologic examination, and intraocular pressure (IOP) were measured and documented at baseline, 1 day, 1, 2, 3, 4, 8 weeks, and 3 months at most. Safety was defined as less than 2 lines’ drop in visual acuity, quiet anterior chamber with stable depth, no leakage in conjunctival wound, and no worsening in visual field at the final visit. Complete success was defined as IOP reduction of 5–21 mm Hg with no medication at the final visit. Qualified success was defined as a similar IOP range with either Nd: YAG laser or trabeculotomy.

**Results:** The preoperative IOP of 38.5 ± 11.7 mm Hg dropped to 8.9 ± 3.7 at 1 day and 15.6 ± 4.3 mm Hg at final postoperative visit. Four (4/16) eyes received trabeculectomy due to penetration of the anterior chamber intraoperatively or postoperatively. Safety rate of CLASS was 75%. The complete success rate at the study endpoint was 50%, whereas qualified success was 68.8%.

**Conclusions:** We found CLASS is currently an effective and safe treatment for Chinese OAG. Further improvement is needed to increase the safety and success rates.

**E-Poster No.: EP–0131**

**Combined Trabeculectomy With Mitomycin C, Pars Plana Vitrectomy With Panretinal Photocoagulation, and Intravitreal and Intracameral Bevacizumab for Neovascular Glaucoma**

_First Author:_ Hong-zin LIN

_Co-Author(s):_ Yuan-chieh LEE

**Purpose:** To report the effectiveness of combined surgery for neovascular glaucoma.

**Methods:** Six eyes of 6 consecutive patients with neovascular glaucoma underwent combined surgery: trabeculectomy with mitomycin C, pars plana vitrectomy, endolaser panretinal photocoagulation, and intravitreal and intracameral injection of bevacizumab.

**Results:** Intraocular pressure returned to normal range soon after operation. Iris neovascularization regressed in days. Mild hyphema developed in 3 patients. All 6 patients had improved or stable visual acuity and achieved normal intraocular pressure without antiglaucoma medications 3 months after the operation.

**Conclusions:** This combined surgery may break the vicious cycle of neovascular glaucoma and preserve useful vision in these patients.

**E-Poster No.: EP–0148**

**Combining Canaloplasty and Canalectomy in Primary Angle Closure Glaucoma: A Case Report**

_First Author:_ Yuanbo LIANG
**Purpose:** To report surgical results of combined surgery for primary angle closure glaucoma (PACG) with canaloplasty and canalectomy.

**Methods:** A case report. The following surgical technique was used. A deep scleral flap was created and the Schlemm canal (SC) was unroofed. A flexible 250-μm diameter optical microcatheter was used to probe the opening of SC and advanced 360 degrees. After complete catheterization, the microcatheter was retracted and replaced by a 10–0 prolene suture along with injection of Healon GV. The suture loop was tightened to dilate the SC and then locked by knots. A bloc excision of 2 mm x 1 mm of tissue containing the inner wall of SC followed by a peripheral broad iridectomy were completed. The scleral flap was closed with 10–0 nylon sutures, watertight to avoid bleb formation. This study was approved by the ethics committee of the Eye Hospital of Wenzhou Medical University.

**Results:** The right eye of a 65–year–old man with PACG underwent the surgery described above on June 11, 2015. The preoperative intraocular pressure (IOP) fluctuated between 27.8 mm Hg and 38.1 mm Hg with 3 antiglaucoma drugs (0.5% pilocarpines sol tid, 0.5% timolol sol bid, and 0.2% alphagan sol bid). Gonioscopy demonstrated narrow angles of Shaffer grade IV in the right eye in which peripheral anterior synechia could be identified in at 6:00–12:00–9:00; there were narrow angles of Shaffer grade IV in the left eye in which the trabecular meshwork was identified 360 degrees. HFA visual field (24–2) showed tubular visual field with −29.1 dB mean deviation in the right eye and −0.8 dB mean deviation in the left eye. On the first postoperative day, the patient’s uncorrected visual acuity was 0.6 and IOP (recorded by Goldmann applanation tonometry) was 13.0 mm Hg in the operated eye. Meanwhile, the filtering bleb was uplifted and dispersed in the right eye. Bleb disappeared and IOP remained 14.0 mm Hg 1 month after surgery.

**Conclusions:** Canaloplasty combined with canalectomy is a feasible and bleb–independent approach in the treatment of PACG. More cases and longer follow up are warranted.

**E–Poster No.:** EP–0155

**Compliance With Glaucoma Treatments in Barcelona, Spain**

**First Author:** Jaime Pablo KELLY-RIGOLLET
**Co-Author(s):** Martin Ignacio KELLY-MUÑOZ, Juan Antonio ONDATEGUI GARCIA

**Purpose:** To understand the knowledge patients have about their pathology, their treatment compliance, dosage, and the accessibility of the medicine prescribed.

**Methods:** We carried out a survey in 230 patients. We selected patients from a random sample obtained from the list of patients under glaucoma treatment (150 patients) and a second group of patients who participated voluntarily (80 patients), invited to an informative meeting anounced by posters in our medical center. The mean age was 71 years old (minimum, 43 and maximum, 93). Subjects completed an anonymous test, carried out together at the same time, question by question. All the questions and answers were explained by an ophthalmologist who gave an informative speech after the test. All the incomplete tests or those with mistakes were rejected. We received 123 useful tests for this study.

**Results:** Half of the patients (49.6%) thought that their ophthalmologists had given a good explanation of their pathology. About the same amount of patients did not know about the inherited aspect of glaucoma. Some of them (7.3%) did not even know their diagnosis. From these patients, 49.6% did a visual field once per year and were controlled 1 or 2 times per year. Most patients said that they did not have any problems with remembering to administer eye drops and mostly did
this by themselves. Our patients did not have problems getting the medicines from social security. Half of them used only 1 eye drop. About one third of the patients thought that it was more difficult to use more than 1 type of eye drop. A total of 69.9% of our patients said that they did not forget to administer the drops, and 74% of them had no adverse reactions to their medicines.

**Conclusions:** It is very necessary to insist on educating patients about their pathology. This will result in improvements in compliance. It is necessary to give general ophthalmologists guidelines for the follow-up of glaucoma. The use of 1 or 2 eye drops made no difference to our patients.

**E-Poster No.: EP–0125**

**Computer Analyzing Infrared Video Image for Pupillary Response**

**First Author:** Fu-ching **HUANG**  
**Co-Author(s):** Min-hsiu **SHIH**

**Purpose:** To evaluate the efficacy of computer analysis of the digital image of pupillary size in response to swinging light.

**Methods:** Sony Nightshot video camera (HDR–PJ790V) was used to record a series of binocular pupillary images. LED was used binocularly and rhythmically as a swinging light. After computing extraction of the pupil with k-means algorithm, pupillary size (diameter) was measured and recorded. Neutral density filters (ND 2, 4, 8, and 16) were used in 1 eye to mimic relative afferent pupillary defect.

**Results:** Binocular symmetric pupillary responses were recorded in response to light. With filter application, pupillary constriction was less. There were dose-dependent decreases of pupillary constriction in response to 4 filters.

**Conclusions:** Infrared-assisted Nightshot video can record pupillary responses easily, no matter the color of the iris. The devices are effective at calculating binocular pupillary size reactive to swinging flashlight test. This will be helpful when quantifying relative afferent pupillary defect such as glaucomatous optic neuropathy.

**E–Poster No.: EP–0122**

**Effects of Ranibizumab and Aflibercept on Human Subtenon Fibroblast: A Cell Signal Transduction Perspective**

**First Author:** Caroline **BINSON**  
**Co-Author(s):** Visvaraja **SUBRAYAN**, Sushil **VASUDEVAN**, Siti Hamimah **SHEIKH ABDUL KADIR**

**Purpose:** To study the apoptosis cell signal markers of the primary human subtenon fibroblast grown in vitro treated with antivascular endothelial growth factor agents ranibizumab and aflibercept.

**Methods:** The influence of ranibizumab and aflibercept on human subtenon fibroblast was studied and cultured in the laboratory. The cultures were treated with 0.5 mg/mL ranibizumab and 2 mg/mL aflibercept, respectively, per well of 300,000 fibroblast cells and were examined for the expression of pro-apoptosis (p53, JNK) and pro-survival (PI3K, AKT) cell signals with Western blot analysis.

**Results:** In this study, we observed that treatment with both ranibizumab and aflibercept increased the expression of both pro-apoptosis (p53 and JNK) and pro-survival (PI3K and AKT) cell signals. Ranibizumab caused stronger expression (p53 and JNK, 4 folds and 7 folds; PI3K and AKT, 2 folds and 12 folds) in general as compared with aflibercept (p53 and JNK, 2 folds and 4 folds; PI3K and AKT, 2 folds and 8 folds) on the same fibroblast cell groups tested.

**Conclusions:** Both ranibizumab and aflibercept induce activation of pro-apoptotic and pro-survival pathways at different intensities. The results indicate probable interaction between both pathways that warrants further research into the potential of wound-healing properties.
Furthermore, IVB can be a beneficial adjunct to surgery for treatment of secondary neovascular glaucoma.

E-Poster No.: EP-0132

Elevated Levels of Interleukin-6 in the Aqueous Humor in Primary Open-Angle Glaucoma Patients Who Required Repeat Trabececutomy

First Author: Sachi KOJIMA
Co-Author(s): Toshihiro INOUE, Saori OHIRA, Kelichiro IWAO, Hidenobu TANIHARA

Purpose: To evaluate the aqueous humor proinflammatory cytokines and growth factor levels in primary open-angle glaucoma (POAG) who required repeat trabecucctomy.

Methods: Twenty-seven POAG patients (27 eyes) underwent initial trabecucctomy without history of ocular surgery (group A), and 5 POAG patients (5 eyes) who required repeat trabecucctomy (group B) were enrolled in this cross-sectional study. Aqueous humor samples were collected from the anterior chamber at the beginning of trabecucctomy, and the concentrations of interleukin (IL)-6, IL-8, monocyte chemoattractant protein-1, tumor necrosis factor-α, vascular endothelial growth factor, platelet-derived growth factor (PDGF)-AA, and PDGF-AB/BB were measured using multiplex immunoassay. These cytokines and growth factor levels, patient age, and preoperative intraocular pressure (IOP) were compared between the groups using t test.

Results: There were no significant differences in age or preoperative IOP between the groups. In group A and B, the mean concentrations of IL-6 were 4.75 ± 9.03 pg/mL and 149.41 ± 308.84 pg/mL, respectively. Among the measured cytokines and growth factors, only IL-6 level was significantly different between the groups (P = 0.013).

Conclusions: IL-6 levels in the aqueous humor of POAG patients who required repeat trabecucctomy were higher compared with those who only required initial trabecucctomy.

E-Poster No.: EP-0144

Evaluation of Two Needling Revision Methods With 5-Fluorouracil for Two Kinds of Dysfunctional Filtering Bleb

First Author: Hong JU

Purpose: To evaluate the efficacy of transconjunctival needling revision with 5-fluorouracil in glaucomatous eyes with uncontrolled intraocular pressure (IOP) due to encapsulated bleb (Kronfeld IV bleb) and failed bleb (Kronfield III bleb) after trabecucctomy.

Methods: This was a retrospective study of 32 eyes of 32 patients that underwent repeated bleb needling performed for dysfunctional blebs on slit lamp with 5-fluorouracil (5-FU) injections. Eight cases occurred in 1 month after primary trabecucctomy, 17 cases were in more than 1 month but less than 3 months after primary trabecucctomy, and 7 cases were more than 1 year after primary trabecucctomy. This was performed after gonioscopic examination to define levels of filtration block. For encapsulated bleb (Kronfeld IV bleb), under slit lamp a 27-gauge needle was passed into the subconjunctival space to rupture the scar tissue underneath the conjunctiva. For failed bleb (Kronfield III bleb), a 27-gauge needle was passed into the sub scleral flap space to rupture the scar tissue underneath the scleral flap. Five milligrams (0.2 mL of 25 mg/mL solution) of 5-FU was subconjunctivally injected superior to the bleb.

Results: There was significant reduction of mean IOP from 35.87 mm Hg to 15.76 mm Hg at the final follow-up (P <0.05). The overall success rate was 87.4%. Complications after the needling procedure were observed in 8 eyes (25%) that had flat anterior chamber. All were resolved with conservative treatment.

Conclusions: The 2 needling revision methods with 5-fluorouracil for 2 kinds of dysfunctional filtering bleb proved effective and safe.

E-Poster No.: EP-0114

Express Implant for Secondary Glaucoma in Superior Vena Cava Syndrome—A Case Report

First Author: Yi-ju HO
Co-Author(s): Lan-hsin CHUANG, Ling YEUNG, Chi-chun LAI

Purpose: To demonstrate the effective and safe surgical management for secondary glaucoma in superior vena cava (SVC) syndrome.

Methods: A 66-year-old female with end-stage renal disease complained of bilateral puffy eyelids for 3 months and had been treated as primary open angle glaucoma. Over 3 years, there was progressive marked face and neck swelling, accompanied by dyspnea and nocturnal coughing. The patient had been under hemodialysis for 5 years. There were several times of vascular access reestablishment for susceptibility to vascular thrombosis, and she was diagnosed as SVC syndrome. Best corrected visual acuity (BCVA) was 20/60 in the right eye and 20/400 in the left eye. Pneumatic tonometry revealed gradually rising intraocular pressure (IOP) even with use of tolerable antiglaucoma agents. C/D ratio was 0.7 and bilaterally symmetric. Optical coherence tomography indicated superior and inferior retinal nerve fiber layer (RNFL) thinning in both eyes,
and standard automated perimetry showed partial to generalized depression.

**Results:** Filtering surgery for the left eye was done evenly, but the IOP climbed gradually over 3 months postoperatively. Subsequent placement of 1 ExPRESS miniature glaucoma advice p200 effectively lowered the IOP. Postoperatively, IOP of the left eye was maintained under 20 mm Hg without further decrease in visual acuity, whereas the right eye, which was controlled with only medications, still has IOP over 30 mm Hg.

**Conclusions:** High central venous pressure is a primary pathology disturbing fluid production–drainage balance in intractable secondary glaucoma. Prompt alleviation of SVC stenosis and intervention with ExPRESS shunt is mandatory.

**E–Poster No.: EP–0109**

**Focal Laminar Defects of Optic Disc in Glaucoma: Evaluation Using Enhanced Depth Imaging Optical Coherence Tomography**

**First Author: Ying-ying CHEN**  
**Co-Author(s): Henry CHEN**

**Purpose:** To investigate the structural and clinical characteristics of the focal laminar cribrosa (LC) defects of glaucomatous optic discs via enhanced depth imaging (EDI) spectral-domain optical coherence tomography (OCT).

**Methods:** Serial EDI–OCT images of the optic nerve head were obtained from patients with glaucoma and reviewed for focal LC defects (laminar holes or disinsertions). Anterior laminar insertion points and edges of laminar holes or disinsertions were marked in EDI–OCT images, reconstructed 3-dimensionally, and superimposed on optic disc photographs. The clinical features, optic disc images, and perimetric defects were analyzed.

**Results:** We reviewed 11 cases (12 eyes) diagnosed as open angle glaucoma with focal laminar defects between 2009 and 2014. Six patients were men, and 5 were women. The mean age at diagnosis was 48.3 years. Focal laminar defects of 10 patients were unilateral, and 1 patient was bilateral. All these defects were located inferiorly, except 1 eye was located superiorly. Automated perimetry revealed a dense superior or inferior arcuate scotoma closed to fixation. Spectral-domain OCT images showed the focal laminar excavated structure and the corresponding area in the optic disc photographs.

**Conclusions:** Focal laminar defect changes of the optic nerve head are characteristic of glaucomatous damage and may be a sign of a localized susceptibility of lamina cribrosa of the optic nerve.

**E–Poster No.: EP–0117**

**Glaucoma in Highly Myopic Eyes**

**First Author: Chi-hsin HSU**  
**Co-Author(s): Shan LIN**

**Purpose:** To summarize the evidence implicating the association between myopia and glaucoma, the possible underlying mechanisms for this relationship, and the controversies surrounding detection of glaucomatous changes in coexisting myopia.

**Methods:** A review article. Numerous studies show that increasing categories of myopia were associated with higher risk for optic neuropathy and glaucoma–like visual field defects. Recently, some high–resolution imaging modalities that aid further detection of the microanatomical changes of the optic nerve head may provide new insight to explain the association between myopia and glaucoma.

**Results:** Although the highly myopic eye usually shows many structural and functional defects that are difficult to distinguish from those caused by glaucoma, some new methods have been introduced to better differentiate between these changes. Whether to treat for glaucoma relies on the suspicion level of the clinician, who must consider other risk factors for vision loss.

**Conclusions:** The interaction of myopia with glaucoma risk remains complex, largely due to the retinal and nerve fiber layer damage that occurs in myopia alone. Ultimately, it is the progression of glaucoma–like findings that determines whether a myopic patient has glaucoma.

**E–Poster No.: EP–0145**

**Glaucoma Staging System to Compare Visual Field Defects in Primary Open Angle Glaucoma Versus Narrow Angle Glaucoma Patients**

**First Author: Sumit GUPTA**  
**Co-Author(s): Rekha KHANDELWAL**

**Purpose:** To compare the demographic profile and visual fields (VF) of primary open angle glaucoma (POAG) patients with primary angle closure glaucoma (PACG) in a rural hospital.

**Methods:** This was a hospital–based retrospective analysis of primary glaucoma cases attending the eye outpatient department between January 2010 and December 2014. Demographic data relating to age, sex, and type of glaucoma was analyzed. Group A consisted of POAG patients and group B had PACG. Glaucoma staging system (GSS) was used to grade visual field defects.

**Results:** Out of 226 cases of primary glaucoma, group A (POAG) had 104 patients and group B (PACG) had...
122 patients. The mean age was 58.97 ± 12.18 years in group A and 57.78 ± 10.22 years in group B. Sex distribution in the 2 groups was statistically different, with male preponderance in group A (P = 0.004). The difference in the staging pattern of the 2 groups was statistically significant (P = 0.047), and end-stage glaucoma was particularly associated with group B (P = 0.029).

**Conclusions:** Primary angle closure glaucoma is more blinding as compared with POAG. In developing countries like India, visual morbidity may be related to lack of awareness and late diagnosis of the more commonly found chronic PACG.

**E-Poster No.: EP-0112**

**Intractable Hyphema After Nd:YAG Iridotomy in a Uremic Patient Under Hemodialysis**

*First Author: Pei-yao CHANG*  
*Co-Author(s): Jia-kang WANG*

**Purpose:** To report a case of intractable hyphema after Nd:YAG iridotomy in a uremic hemodialysis patient.

**Methods:** An observational case report.

**Results:** Repeated bleeding occurred after Nd:YAG iridotomy. Therefore, the patient was treated with an intracameral injection of tissue plasminogen activator and surgical irrigation. Findings and outcomes are described.

**Conclusions:** Laser peripheral iridotomy may be associated with intractable hyphema in uremic patients. Ophthalmologists should be aware of the potential for this serious complication after the procedure.

**E-Poster No.: EP-0152**

**Intraocular Pressure Elevation in the Contralateral Untreated Eye After Selective Laser Trabeculoplasty in Rabbit Eyes**

*First Author: Bonnie Nga Kwan CHOY*  
*Co-Author(s): Kin CHIU, Jennifer Wei Huen SHUM, Jian JI, Ai Hua LIU, Jimmy LAI*

**Purpose:** To evaluate if a single session of unilateral selective laser trabeculoplasty would affect the intraocular pressure of the fellow untreated eye in rabbits.

**Methods:** Eleven rabbits were involved, and 360-degree selective laser trabeculoplasty with 532 nm frequency-doubled green Nd:YAG laser was performed over the right eyes. The mean intraocular pressure of both eyes at baseline, 3 hours, 24 hours, 3 days, and 7 days after laser were measured.

**Results:** The baseline mean intraocular pressure of the right eye and the left eye were 8.07 ± 1.72 mm Hg and 8.27 ± 1.56 mm Hg, respectively (P = 0.78). The mean intraocular pressure of the treated eye was lower than baseline from 3 hours through 3 days after laser, with a maximum mean decrease of 1.36 mm Hg on day 3. On the contrary, the mean intraocular pressure of the untreated eyes were higher than baseline throughout the study, particularly at a later course (1.91 mm Hg on day 3 and 1.85 mm Hg on day 7).

**Conclusions:** This suggests that the change of intraocular pressure in one eye after selective laser trabeculoplasty leads to a change in the pressure of the fellow eye. The detailed mechanisms require further studies to evaluate.

**E-Poster No.: EP-0123**

**Investigation of the Willingness to Use Mobile Health in Patients With Glaucoma**

*First Author: Jingjing HUANG*  
*Co-Author(s): Miaomiao DAI, Jianan XU, Jialiu LIN, Zhonghao WANG*

**Purpose:** To investigate the willingness of patients to use mobile health (mHealth) and influencing factors in patients with glaucoma.

**Methods:** A total of 1487 patients with glaucoma at the outpatient glaucoma service of Zhongshan Ophthalmic Center were investigated with questionnaires and interviews. The willingness to use mHealth and the general situation of patients were described.

**Results:** A total of 1097 valid questionnaires were obtained. Seven hundred fifty–five patients (68.8%) had the willingness to use mHealth. A total of 65.4% of respondents were younger than 60 years old. There were 40.9% respondents whose travel time from home to hospital was more than 3 hours. The overall usage of WeChat was 61.7%. The sex of patients was not significantly related to the willingness to use mHealth (P = 0.934). Age, travel time on the road, frequency of visits, trouble events, and usage of WeChat in patients with glaucoma were related to the willingness to use mHealth (P < 0.05). Further binary logistic regression analysis showed that age, travel time on the road, frequency of visits, and trouble events in patients with glaucoma were correlated with the willingness to use mHealth (OR = 0.570, 1.148, 0.875, 1.922, P < 0.05).

**Conclusions:** Most of the investigated patients with glaucoma were willing to use mHealth. The patients with younger age, shorter travel time on the road, having trouble events during clinic process, and who were WeChat users were more willing to accept mHealth. It is possible and necessary to develop mHealth based on the current medical situation of patients with glaucoma.

**E-Poster No.: EP-0111**

**Microhook Ab Interno Trabeculotomy, A**
Novel Minimally Invasive Glaucoma Surgery, in Open-Angle Glaucoma Eyes With Scleral Thinning

First Author: Masaki TANITO
Co-Author(s): Ichiya SANO, Yoshifumi IKEDA, Etsuko FUJIHARA

Purpose: To report an open-angle glaucoma (OAG) case treated with a novel glaucoma surgery, namely, microhook ab interno trabeculotomy.

Methods: A case report.

Results: A 63-year-old woman who had been treated with systemic and topical steroids for 2 years for scleritis that was associated with relapsing polychondritis in both eyes (OU) was referred to our hospital. At referral, visual acuity was 0.5 in the right eye and 1.2 in the left eye; the respective intraocular pressure (IOP) values were 36 mm Hg and 32 mm Hg with 2% carteolol. No signs of active scleritis were observed. However, patchy scleral thinning due to previous nodular scleritis and secondary cataract were observed OU; thus, she was diagnosed with steroid-induced glaucoma OU. Because of the scleral thinning and the possibility of recurrent scleritis, glaucoma surgeries that require creation of a scleral flap were unsuitable for this case; therefore, trabeculotomy with an ab interno technique was performed OU. After cataract surgery, trabecular meshwork was incised over 3 clock hours each in both nasal and temporal angles by using the tip of a microhook that was inserted from the corneal side port. No complications other than early postsurgical hyphema developed perioperatively. At the final visit 4 months postoperatively, visual acuity was 1.0 OU, and IOP was 8 mm Hg OU with 2% carteolol.

Conclusions: The microhook ab interno trabeculotomy, a minimally invasive glaucoma surgery that targets the outflow pathway while sparing the conjunctiva without scleral dissection, can be a surgical option in cases of OAG with scleral thinning.

E-Poster No.: EP-0133

Outcome of Moorfields Safer Surgery System Trabeculectomy With Mitomycin-C in Iridocorneal Endothelial Syndrome

First Author: Rekha KHANDELWAL
Co-Author(s): Sumit GUPTA

Purpose: To investigate the efficacy of Moorfields Safer Surgery System trabeculectomy with intraoperative mitomycin-C application in cases of iridocorneal endothelial (ICE) syndrome.

Methods: This was a retrospective case series of 4 unilateral ICE syndrome patients who presented between January 2012 and January 2014 at 1 institution. Intervention consisted of trabeculectomy with a for-}

nix-based conjunctival flap and mitomycin-C (0.2 mg/mL for 2 minutes).

Results: Main outcome measures were adequate control of intraocular pressure (IOP) (≤15 mm Hg without antiglaucoma medications) over the entire length of follow-up (mean, 14.6 months). There was no deterioration of vision in any patient after surgery.

Conclusions: Trabeculectomy with mitomycin-C application offers a good intermediate-term success rate in ICE patients, who are otherwise at high risk for failure of filtering surgery.

E-Poster No.: EP-0108

Phacoemulsification With Illuminated Microcatheter—Assisted 360-Degree Ab Externo Trabeculotomy for Treatment of Narrow Angle Glaucoma in Adult Indian Eyes

First Author: Ankush MAHAJAN
Co-Author(s): Vijay MAHAJAN, Nitish MAHAJAN

Purpose: To evaluate the safety and efficacy of 360-degree ab externo trabeculotomy with phacoemulsification in adult Indian eyes with narrow angle glaucoma.

Methods: Thirty-three eyes of 33 patients with narrow angle glaucoma with synechial angle closure underwent combined phacoemulsification with illuminated microcatheter—assisted 360-degree ab externo trabeculotomy from January 2014 to March 2014. No peripheral iridotomy was done in any of the cases. All patients were followed up for 1 year.

Results: The average preoperative IOP was 26.55 ± 10.07 mm Hg. The average postoperative IOP at 1 month, 3 months, and 1 year was 13.2 ± 3.46, 13.18 ± 1.86, and 13.27 ± 1.79, respectively. A complete success rate based on IOP of 18 or less was 100% at 1 year. Preoperative antiglaucoma medication use was 1.97 ± 1.03, which decreased to 0.09 ± 0.29. Hyphema was noticed in 28/33 (84.84%), which resolved in all in 7 days. No other complications were noticed.

Conclusions: Combined phacoemulsification with illuminated microcatheter—assisted 360-degree ab externo trabeculotomy is a very promising procedure for adult patients with narrow angle glaucoma and gives very consistent IOP results in Indian patients.

E-Poster No.: EP-0138

Phosphoproteomics Characterization of Lens Proteins of Ischemia/Reperfusion Injury Model in Rats

First Author: Mei-Ian KO
Co-Author(s): Hsin-yi CHEN, Yu-ju CHEN

Purpose: Is acute high intraocular pressure induced in lens protein changes? This study was performed to
identify in vivo phosphorylation sites of lens protein in rat eyes after ischemia/reperfusion injury (IR model, similar to acute glaucoma).

**Methods:** The IR model was conducted by inserting a 30-gauge needle connected to a saline reservoir into the anterior chamber of rat left eyes and raising the saline reservoir to 2 meters high. After 1-hour reperfusion, the lens was removed. Then, phosphopeptides were sequentially purified by Fe3+-IMAC (immobilized metal affinity chromatography) and further analyzed by LC–MS/MS liquid chromatography coupled with tandem mass spectrometry.

**Results:** The number of identified proteins increased from 171 to 246, whereas phosphopeptides further increased from 362 to 547. The proportion of upregulated proteins was 60%. Alpha/beta-crystallin and other noncrystallin cellular proteins, such as ribosomal protein, heat shock protein (HSP), and mitogen-activated protein kinase (MAPK), showed upregulation.

**Conclusions:** The lens protein showed significant upregulation after ischemia/reperfusion. Correlation between these novel phosphorylation sites in lens proteins and ageing lens (cataract) will be investigated further in future.

**E-Poster No.: EP-0118**

**Proinflammatory Cytokine Levels in the Aqueous Humor of Secondary Glaucoma Patients With Familial Amyloidotic Polyneuropathy**

*First Author: Toshihiro INOUE*
*Co-Author(s): Saori OHIRA, Takahiro KAWAJI, Hidenobu TANIHARA*

**Purpose:** To evaluate the aqueous humor proinflammatory cytokines and growth factor levels in secondary glaucoma patients with familial amyloidotic polyneuropathy (FAP).

**Methods:** Seven secondary glaucoma patients with FAP (7 eyes) were enrolled in this cross-sectional study. Aqueous humor samples were collected from the anterior chamber, and iris bombe. B-scan ultrasonography excluded gross vitreoretinal pathology. The corneal edema cleared gradually over 1 day and then aggravated during hemodialysis, which was concordant with the changes in intraocular pressure. Patient laser iridotomy failed to prevent intraocular hypertension. The ocular symptoms significantly improved after dialysate sodium and ultrafiltration profiling. Finally, the patient underwent an uneventful cataract surgery for her left eye; however, the intraocular pressure still fluctuated along with her hemodialysis status.

**Conclusions:** Various proinflammatory cytokines and growth factors were present in the aqueous humor of secondary glaucoma patients with FAP.

**E-Poster No.: EP-0120**

**Refractory Bilateral Angle-Closure Attack During Hemodialysis**

*First Author: Jia-horung HUNG*
*Co-Author(s): Fu-ching HUANG*

**Purpose:** We present a patient with end-stage renal disease who suffered from intractable and recurrent bilateral angle-closure attack during hemodialysis, characterized by periodically blurred vision and headache. Symptoms were relieved with the adjustment of sodium and ultrafiltration profiles.

**Methods:** A case report.

**Results:** A 53-year-old woman with end-stage renal disease presented with a 1-week history of bilateral painful blurred vision. She had undergone parathyroidectomy for renal hyperparathyroidism within the past 2 weeks, and she denied any ocular history. Under full antiglaucomatous agents, intraocular pressure in the right and left eyes was 17 and 41 mm Hg, respectively. Biomicroscopic examination showed bilateral microcystic corneal edema, swollen lens, shallow anterior chamber, and iris bombe. B-scan ultrasonography excluded gross vitreoretinal pathology. The corneal edema cleared gradually over 1 day and then aggravated during hemodialysis, which was concordant with the changes in intraocular pressure. Patient laser iridotomy failed to prevent intraocular hypertension. The ocular symptoms significantly improved after dialysate sodium and ultrafiltration profiling. Finally, the patient underwent an uneventful cataract surgery for her left eye; however, the intraocular pressure still fluctuated along with her hemodialysis status.

**Conclusions:** Prexistent outflow abnormality was thought to be an underlying cause of recurrent intralysytic intraocular hypertension, and the possible pathophysiology for angle-closure attack might be similar to dialysis-disequilibrium syndrome. A combination of sodium and ultrafiltration profiling could prevent intralysytic angle-closure attack, meanwhile achieving the goal of high fluid removal.
**E-Poster No.: EP-0140**

**Repeatability of Ganglion Cell Complex Parameters Measured by Avanti RTVue XR Spectral Domain Optical Coherence Tomography**

*First Author:* Suria SUDHAKARAN  
*Co-Author(s):* Dhanaraj RAO

**Purpose:** To determine the repeatability of ganglion cell complex (GCC) parameters measured by Avanti RTVue XR spectral domain optical coherence tomography (SD-OCT).

**Methods:** In this prospective, observational study, patients attending the glaucoma clinic at our hospital were included after a comprehensive eye examination. Subjects included had best corrected visual acuity equal to or better than 20/40, spherical correction within ±5.00 diopters (D), and cylindrical correction within ±3.00 D. There were no significant media opacities or other ocular conditions that could affect OCT image acquisition and reliable visual fields performed within 6 months of undergoing Avanti RTVue imaging. The GCC measurements were performed thrice within a span of a few minutes by the same technician. Repeatability was determined by calculating within-subject standard deviation (Sw) and coefficient of variation (CVw).

**Results:** Thirty-nine eyes of 21 subjects with glaucoma were included. GCC parameters (mean ± SD) were as follows: total GCC (μm), 66 ± 10; superior GCC (μm), 79 ± 15; inferior GCC (μm), 81 ± 17; GLV, 18.0 ± 13.0; FLV, 7.3 ± 7.2. The Sw [95% confidence interval (CI)] for total GCC, superior GCC, inferior GCC, GLV, and FLV were 2.4 μm (2.1, 2.9), 1.7 μm (1.4, 1.9), 3.2 μm (2.8, 3.8), 2.2 (1.9, 2.6), and 9.2 (7.9, 10.8), respectively. The CVw (95% CI) for total GCC, superior GCC, inferior GCC, GLV, and FLV were 3.3% (0.0, 5.0), 2.4% (0.0, 3.7), 4.1% (0.0, 6.2), 19.3% (2.8, 27.2), and 38.2% (5.1, 53.8), respectively.

**Conclusions:** The repeatability of GCC parameters with Avanti RTVue XR SD-OCT was good. GLV and FLV showed inferior repeatability indices when compared with the rest.

**E-Poster No.: EP-0128**

**Retinal Nerve Fiber Bundle Defect in a Case of Ocular Hypertension With Diabetes: Is It Associated With Pressure or Cotton-Wool Spots?**

*First Author:* Shiu-chen WU  
*Co-Author(s):* Shirley CHANG, Wei-chi WU

**Purpose:** To present a case of ocular hypertension with diabetes developing localized retinal nerve fiber layer (RNFL) defect after retinal cotton-wool spots.

**Methods:** A case report.

**Results:** A 24-year-old man was referred for evaluation due to a subjective abnormal visual field in his right eye. The patient was diagnosed with ocular hypertension and followed without treatment. Medical history included treatment for diabetes mellitus type II for 1 year. Visual acuity was 20/20 in both eyes (OU). Intraocular pressure (IOP) ranged from 25 to 28 mm Hg in the right eye (OD) and 23 to 29 mm Hg in the left (OS). Cup/disc ratio was 0.4 OU. Dilated fundoscopic examination revealed scattered cotton-wool spots (CWS) within the superior temporal parapapillary region OD. The visual field was normal. No signs of diabetic retinopathy were observed in the left eye. Topical glaucoma medications were initiated, and IOP was controlled below 18 mm Hg OU after that. Eight months later, the CWS spontaneously resolved, and a localized RNFL defect was identified at the same location.

**Conclusions:** Progressive localized RNFL defects can be an early sign of glaucomatous damage. Nonprogressive RNFL defects may occur after the appearance of CWS with diabetes. Clinicians need to carefully follow the progression and determine the association with glaucoma or systemic diseases.

**E-Poster No.: EP-0154**

**Selective Laser Trabeculoplasty in Lowering Intraocular Pressure in Open Angle Glaucoma**

*First Author:* Faisal THATTARTHODY  
*Co-Author(s):* Sushil OJHA, Srishti RAJ, Sushmita KAU-SHIK, Surinder PANDAV

**Purpose:** To study the efficacy of selective laser trabeculoplasty (SLT) in lowering intraocular pressure (IOP) in open angle glaucoma patients not adequately controlled with maximum medications.

**Methods:** Thirty-seven eyes (27 POAG, 7 SOAG, and 3 JOAG) of 33 patients (age ≥ 18 years) on maximum antiglaucoma medications were included and treated with 3600 SLT in a single sitting. IOP was recorded at 1 day, 1 week, 1 month, and 3 months after SLT.

**Results:** Average patient age was 58.64 ± 18.19 years. The baseline IOP was 23.76 ± 6.39 mm Hg, which was significantly reduced by 40.5, 28.6, 25.2, and 22.7 percent at day 1, 1 week, 1 month, and 3 months, respectively. IOP reduction and efficacy was not dependent upon sex, various glaucoma subgroups, or number of pre-SLT medications. No adverse effect was observed with SLT.

**Conclusions:** SLT is a safe and effective procedure as secondary or adjunctive treatment for lowering IOP in open angle glaucoma not adequately controlled with medical therapy in an Indian population.

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Subtenon Triamcinolone—Induced Ocular Hypertension Treated With Removal of Triamcinolone and Histopathologic Features of Deposits

First Author: Yi-ching SHAO
Co-Author(s): Alice WU, Mei-ling PENG, Jeng-dong HSU

Purpose: To present a case of corticosteroid-induced uncontrolled ocular hypertension treated with surgical removal of subtenon triamcinolone acetonide deposits.

Methods: A case report.

Results: A 7-year-old boy presented with refractory ocular hypertension of 4 months’ duration. His ocular history was remarkable for severe vernal conjunctivitis treated with subtenon injection of triamcinolone acetonide 40 mg in both eyes 5 months previously. The bilateral subtenon triamcinolone acetonide deposits were excised 5 months after the injection. The intraocular pressure returned to normal values 1 month after removal of triamcinolone acetonide deposits. Light microscopy showed the triamcinolone deposits were surrounded by fibrotic tissues. Two years after surgery, intraocular pressure remained normal.

Conclusions: For subtenon triamcinolone–induced ocular hypertension refractory to medical therapy, surgical removal of subtenon triamcinolone acetonide precipitate should be considered before performing glaucoma filtration surgery.

Successful Management of Postoperative Malignant Glaucoma

First Author: Jia-horung HUNG
Co-Author(s): Fu-ching HUANG

Purpose: To report a case with malignant glaucoma after an uneventful cataract surgery.

Methods: Retrospective case report.

Results: A 72-year-old woman presented with pain in the left eye. Two days before the onset of eye pain, she underwent an uneventful phacoemulsification and intraocular lens implantation. The follow-up on the first postoperative day was unremarkable. One day later, she started to have severe eye pain, accompanying by blurred vision, headache, and nausea. Visual acuity was counting fingers, and intraocular pressure was 92 mm Hg in her left eye. Biomicroscopic examination revealed microcystic corneal edema, grade 3 shallow anterior chamber, and an anteriorly dislocated intraocular lens. Intravenous mannitol, maximal topical antiglaucomatous agents, and frequent topical steroids failed to resolve the condition within 2 days, despite the creation of a patent laser iridotomy. A diagnosis of malignant glaucoma was made. Eventually, an emergent pars plana vitrectomy and intraocular lens–capsular complex removal normalized the intraocular pressure, restored the anterior chamber depth, and achieved a fair postoperative visual outcome.

Conclusions: Malignant glaucoma can present after uneventful phacoemulsification, even after several days. Complete pars plana vitrectomy and intraocular lens–capsular complex removal seem to play an important role in the treatment of patients with pseudophakic malignant glaucoma.

Superior-Inferior Asymmetry in Ganglion Cell—Inner Plexiform Layer Thickness Assessed by Spectral-Domain Optical Coherence Tomography in Glaucoma

First Author: Yu-fan CHANG
Co-Author(s): Catherine LIU, Yu-chieh KO, Mei-ju CHEN, Chih-chien HSU, Nai-wen FAN

Purpose: This study aimed to determine whether asymmetry between the superior and inferior macular ganglion cell–inner plexiform layer (GC-IPL) thickness in Cirrus HD-OCT provides a clue to early structural changes of glaucoma.

Methods: Subjects with primary open angle glaucoma (POAG), glaucoma suspect, and normal healthy eyes were recruited from February 2013 to January 2014. The absolute value of the difference between the inferior and superior thickness (I–S difference) was regarded as asymmetry in GC-IPL thickness. We calculated the area under the receiver operating characteristic curve (AUROC) of the absolute I–S difference over the whole macular imaging area, and of the temporal and nasal sectors, to determine their diagnostic ability in glaucoma.

Results: A total of 269 POAG eyes, 122 glaucoma suspect, and 105 normal healthy eyes were included. The AUROC of the cpRNFL parameters showed the best performance in clock–hour 7 (AUROC = 0.89), whereas minimum GC-IPL (AUROC = 0.86) and temporal–inferior sectors (AUROC = 0.86) stood out among all the GC-IPL parameters. The AUROC of total GC-IPL (I–S difference), temporal (I–S difference), and nasal (I–S difference) were 0.76, 0.76, and 0.67, respectively. When only early POAG with a VF mean deviation no worse than −6.0 dB (173 eyes) was considered, the AUROC of the clock–hour 7 cpRNFL parameter became 0.84, of minimum GC-IPL became 0.81, and of temporal–inferior GC-IPL sector became 0.80.

Conclusions: Although diagnostic ability decreased in all cpRNFL and GC-IPL parameters for early glaucoma, the AUROC of total GC-IPL (I–S difference) and temporal GC-IPL (I–S difference) remained similar (0.77).

A-Poster No.: EP-0147

E-Poster No.: EP-0124
E-Poster No.: EP-0137

Surgical Outcomes of Ex-PRESS Mini Glaucoma Shunt Surgery With Extended Indications

First Author: Chawawat KANGWANWONGPAISAN
Co-Author(s): Yanin SUWAN, Pornchai SIMAROJ, Wasu SUPAKONTANASAN

Purpose: To evaluate the surgical outcomes and safety of Ex-PRESS mini glaucoma shunt surgery in conventional and extended indications.

Methods: A retrospective descriptive case series of 33 patients treated with Ex-PRESS mini glaucoma shunt under the scleral flap in various conditions (both conventional and extended indications) was done. Surgical success was evaluated for 12 months after surgery. Complete success was defined as intraocular pressure (IOP) 5–21 mm Hg without medications or further glaucoma surgery. Qualified success was defined as IOP 5–21 mm Hg with additional antiglaucoma medications. Complications were also recorded.

Results: Thirty-three eyes of 33 patients (19 males, 14 females) were operated on and analyzed. The mean age was 64.6 years (range, 15–80 years). Subjects with conventional indications were 6 with open-angle glaucoma (OAG), 3 OAG with failed trabeculectomy, and 15 combined phacoemulsification with trabeculectomy. Extended indications included 4 with angle-closure glaucoma, 4 silicone oil–induced glaucoma, and 3 uveitic glaucoma. Overall success rates were 95.5% (n = 21) and 72.7% (n = 8) in the conventional and extended indication groups, respectively. Most complications were found only in the first few weeks, such as hypotony without choroidal detachment (24.2%; n = 8), wound leakage (21.2%; n = 7), and choroidal detachment (18.2%; n = 6). There were neither device complications nor postoperative endophthalmitis.

Conclusions: The Ex-PRESS mini glaucoma shunt surgery in extended indications shows a satisfactory success rate and minimal complications compared with conventional indications.

E-Poster No.: EP-0134

Treating Proliferative Diabetic Retinopathy—Related Neovascular Glaucoma With Intravitreal Aflibercept

First Author: Shao-wei WENG
Co-Author(s): Jia-kang WANG, Shu-wen CHANG

Purpose: To report a case of rubeosis iridis treated by intravitreal aflibercept.

Methods: A case report.

Results: A 61-year-old man had iris neovascularization and scant vitreous hemorrhage secondary to proliferative diabetic retinopathy in the right eye. Neither neovascularization of the angle nor elevation of intraocular pressure was found. A single intravitreal injection of aflibercept 2 mg was performed. Ruberosis iridis disappeared on the next day. Scattered retinal laser photocoagulation was added 1 week later. There was no recurrence after 3-month follow-up.

Conclusions: Aflibercept may serve as another antivasculogenic endothelial growth factor for treating ruberosis iridis.

E-Poster No.: EP-0119

Ultrasound Biomicroscopic Study of Anterior Chamber Depth and Angle in Adult Phakic Eyes at a Tertiary Care Hospital in the Philippines

First Author: Barbara Joy HIDALGO
Co-Author(s): Manuel AGULTO, Patricia KHU, Ma Magarita LUNA

Purpose: To evaluate anterior chamber depth (ACD) and angle width (ACA) of adult phakic Filipino subjects from a general clinic at a tertiary care hospital in the Philippines and to determine their associations with ocular and general parameters.

Methods: This was a prospective, observational, cross-sectional study of 123 adult phakic Filipino subjects with concomitant advanced PXF glaucoma and cataract.
the Philippines conducted from June to July 2009. The subjects underwent complete ophthalmologic examination including measurement of ACD and ACA by ultrasound biomicroscopy (UBM). χ² tests were used to compare proportions. All P values were 2-sided and considered statistically significant when the values were less than 0.05.

Results: Of the 123 subjects, UBM measurements were available for 105 subjects (85.36%) (aged 19+ years). Mean ACD measured was 2.54 ± 0.42 mm, and mean ACA was 30.18 ± 8.49 degrees. In univariate analysis, a shallow ACD was significantly associated with increasing age (P = 0.002), female sex (P = 0.046), presence of nuclear cataract (P = 0.0043), short body stature (P = 0.042), body weight (P = 0.005), presence of PACG (P = 0.0055), and PACS (P = 0.0002). Narrow ACA was associated with higher age (P = 0.001), presence of nuclear cataract (P = 0.0002), and PACS (P = 0.0002).

Conclusions: In this hospital-based study of adult Filipino eyes, shallow ACD and narrow ACA were significantly associated with increasing age, female sex, short body stature, weight, presence of nuclear cataract, PACG, and PACS. In recent years, several Southeast Asian population-based studies also revealed a similarity and consistency of association between shallow ACD and narrow ACA with the above mentioned parameters.

E-Poster No.: EP-0110

Uveitis-Glaucoma-Hyphema Syndrome and Corneal Decompensation in Association With Complicated Cataract Surgery

First Author: Chui-lien TSEN
Co-Author(s): Chia-ming HSU, Jiunn-liang CHEN

Purpose: To report a rare case of uveitis-glaucoma-hyphema (UGH) syndrome and corneal decompensation after a complicated cataract surgery.

Methods: A case report and literature review.

Results: A 62-year-old woman had undergone cataract surgery about 7 months previously. She presented with redness, severe pain, photophobia, and decrease in visual acuity in her right eye. Ophthalmic examination demonstrated increased intraocular pressure (IOP), diffuse corneal bullous edema, anterior chamber white blood cells, and hyphema. Pupillary capture intraocular lens associated with 360° peripheral anterior synechiae was also observed. The patient was diagnosed with UGH syndrome and corneal decompensation. After anterior chamber irrigation, removal of intraocular lens, and subsequent transscleral cyclophotocoagulation, IOP became stable without antiglaucoma medications.

Conclusions: Complicated cataract surgery may lead to UGH syndrome and permanent angle destruction, which can be challenging to manage even after removal of the intraocular lens.

E-Poster No.: EP-0115

Very Late-Onset Hypotony Maculopathy After Trabeculectomy in a Glaucoma Patient With High Myopia

First Author: Shuting KAO
Co-Author(s): Shwu-huey LEE, Yi-chun CHEN

Purpose: To report a case of very late-onset hypotony maculopathy after trabeculectomy in a high myopia patient with primary open-angle glaucoma.

Methods: A case report.

Results: A 34-year-old male with high myopia of both eyes had received trabeculectomies of both eyes for primary open-angle glaucoma. Trabeculectomy of the right eye was performed 14 years previously, and the intraocular pressure measurements of the right eye were between 6 and 14 mm Hg without medication during the follow-up period. A decrease in best-corrected visual acuity of the right eye from 0.6 to 0.1 was found in March 2015. Optical coherence tomography revealed radial choroidal retinal folds extending from the fovea of the right eye, which confirmed the diagnosis of hypotony maculopathy. Hypotony maculopathy is a sight-threatening complication after trabeculectomy. Male sex, high myopia, young age, and patients who receive primary filtering surgery are associated with an increased risk of hypotony maculopathy. Our patient had all mentioned risk factors, but the hypotony maculopathy developed 14 years after trabeculectomy. The possible mechanisms for the development of very late-onset hypotony maculopathy in high myopia patients are changes in the composition of the sclera extracellular matrix, deepening of the posterior staphyloma, and change in the morphologic features of posterior staphyloma with increasing age. The changes might decrease the mechanical strength of the sclera and then contribute to the collapse of the scleral wall during hypotony.

Conclusions: In a primary open-angle glaucoma patient with high myopia, hypotony maculopathy can happen 14 years after trabeculectomy.

E-Poster No.: EP-0141

Visual Field Defects in Highly Myopic Eyes With Early Primary Open-Angle Glaucoma

First Author: Yi-chun CHEN
Co-Author(s): Chih-heng HUNG, Shwu-huey LEE

Purpose: To investigate the visual field defect characteristics of highly myopic eyes with early primary open-angle glaucoma (POAG).
**Methods:** Twenty-four highly myopic eyes (≤ 6 diopters [D]) of 24 patients and 31 non–highly myopic eyes (> 6 D) of 31 patients with early POAG were enrolled in this study. Mean defect (MD) and loss variance (LV) of tendency-oriented perimetry program in Octopus 101 and the number of abnormal points in the probability plots were compared between the highly and non–highly myopic groups. The probability plots were divided into 8 subfields: central 10–degree and outer arcuate subfields in the superonasal, superotemporal, inferonasal, and inferotemporal quadrants.

**Results:** Spherical equivalent and axial length were significantly different between the highly myopic and non–highly myopic groups. There were no significant differences between the 2 groups in age, visual acuity, central corneal thickness, MD, LV, and abnormal points in subfields. The abnormal points in the superior hemifield were significantly greater than that in the inferior hemifield in both groups. Most of the abnormal points occurred in the superonasal quadrant followed by the inferonasal, superotemporal, and inferotemporal quadrant in both groups. The highly myopic group did not have more central damage compared with the non–highly myopic group.

**Conclusions:** The severity of visual field defects in highly myopic eyes with early POAG was not more than that in non–highly myopic eyes with early POAG. The damaged areas in the visual field were not different between the highly myopic eyes and non–highly myopic eyes. The highly myopic eyes were more susceptible to central visual field damage in the early stages of POAG.

**E–Poster No.:** EP–0130

**Visual Field Improvement After Trabeculectomy—Two Case Reports**

**First Author:** Hong-zin LIN  
**Co–Author(s):** Wei-shan TSAI, Tsing-hong WANG

**Purpose:** We report 2 patients with significant visual field improvement after trabeculectomy.

**Methods:** Two case reports.

**Results:** The first patient was a 52–year–old female patient referred to our clinic due to blurred vision in the right eye for 1 week. Upon examination, best corrected visual acuity (BCVA) was reduced to 6/30 in the right eye. The fundus revealed dilated and tortuous retinal veins and intraretinal hemorrhage over the temporal retina. Optical coherence tomography (OCT) showed significant cystoid macular edema (CME). The patient’s neck manifested diffuse goiter. The thyroid function showed lower TSH level and elevated free T3 and free T4 titers. High factor VIII was observed as well. In addition, significant elevation of antiphospholipid antibody was observed, including anticardiolipin anti–β2–glycoprotein–I antibodies. Presuming BRVO secondary to the association of Graves disease with antiphospholipid antibody syndrome (APS), a periocular injection of bevacizumab was administered. After 3 months, BCVA improved to 6/6.7. The intraretinal hemorrhage, macular edema, and soft exudates from BRVO had subsided.

**Conclusions:** Graves disease associated with APS may carry hypercoagulable risk and lead to retinal venous occlusion. Moreover, BRVO with CME can be relieved by peribulbar injection of bevacizumab.

**E–Poster No.:** EP–0163

**Case Report of Incomplete Vogt–Koyanagi–Harada Syndrome With Neurological Manifestations**

**First Author:** Umesh BHAMMARKAR  
**Co–Author(s):** Neha BIJLANI

**Purpose:** We report a case of incomplete Vogt–Koyanagi–Harada syndrome (VKH) with neurological manifestations with ocular findings, in which bilateral papillitis and serous retinal detachments involving the macula with intraretinal edema and choroidal thickening were
Methods: A 21-year-old female presented with DOV in both eyes for 10 days with pain and redness with headache and vomiting. BCVA was 3/60 in both eyes and not improving. Anterior segment showed CCC, ++ Cells. Fundus showed serous retinal detachment and hyperemic discs. All routine laboratory investigations were normal.

Results: The patient was put on oral prednisolone 1 mg/kg along with topical prednisolone acetate and cycloplegics. Visual acuity dramatically improved from 3/60 to 6/18 within 10 days, and anterior segment became better.

Conclusions: Ocular inflammation in VKH is typically very responsive to corticosteroids, which may require a gradual discontinuation over many months. Both FFA and OCT are helpful in diagnosing and monitoring the response to treatment.

E-Poster No.: EP-0158

Delayed Detection of Cytomegalovirus Infection in a Presumed Posner-Schlossman Syndrome Eye Results in Irreversible Visual Loss

First Author: Chiamin WU
Co-Author(s): Yun-dun SHEN, Ting-yu WU, Allen LIN

Purpose: To report a case of presumed Posner–Schlossman syndrome (PSS) with delayed detection of cytomegalovirus (CMV) infection that resulted in irreversible visual loss.

Methods: A case report and review of the literature.

Results: A 45-year-old man was referred with presumed PSS in the right eye, off and on for more than 10 years. Intractable elevated intraocular pressure (IOP), anterior uveitis with keratic precipitates, and sub-toral cupping of the disc were noted. Relative afferent pupillary defect with maximum IOP up to 40 mm Hg was noted in the right eye. Visual acuity was counting fingers in the right eye and 20/20 in the left eye. Other conditions in the left eye were relatively normal. Aqueous humor analysis by polymerase chain reaction (PCR) revealed CMV positive in the right eye. After institution of topical 2% ganciclovir, the patient’s ocular inflammation resolved and IOP normalized.

Conclusions: Ocular inflammation in VKH is typically very responsive to corticosteroids, which may require a gradual discontinuation over many months. Both FFA and OCT are helpful in diagnosing and monitoring the response to treatment.

E-Poster No.: EP-0159

Infectious Scleritis After Pterygium Excision—A Case Report

First Author: Chao-chien HU
Co-Author(s): Yu-tien CHI

Purpose: To report a case of infectious scleritis after pterygium excision managed with antibiotic therapies and early scleral debridement.

Methods: A 78-year-old man had undergone nasal pterygium excision with conjunctival autograft without the use of adjunctive treatment in the form of β irradiation, mitomycin C, or thiopeta in the left eye at another facility. He presented with painful sensation and blurred vision in the left eye.

Results: Initially, the sclera at the site of prior pterygium excision showed significant thinning with uveal show at our clinic. There was active inflammation adjacent to the site of thinning with nebula cornea and hypopyon. Systemic studies and examination were noncontributory. The patient was suspected of having infectious scleritis and received antibiotic treatment. Additionally, culture showed Pseudomonas aeruginosa infection. The patient underwent surgical debridement of subconjunctival abscesses and removal of calcified plaque. We also performed a scleral patch graft with amniotic membrane graft using Artiss glue (tissue glue).

Conclusions: Infectious scleritis may develop after pterygium surgery with conjunctival autograft. Another report showed Pseudomonas (81.3%) as the major pathogen in patients with infectious scleritis. Early diagnosis, prompt antibiotic (anti-Pseudomonas) use, and scleral patch grafting are important in preventing devastating complications.

E-Poster No.: EP-0160

Oral Nonsteroidal Anti-Inflammatory Drugs for Surgically Induced Necrotizing Scleritis

First Author: Monika LUSIANI

Purpose: To report a patient with surgically induced necrotizing scleritis (SINS) in the left eye.

Methods: A case report of a 64-year-old man with left eye SINS that was treated with oral nonsteroidal anti-inflammatory drugs (NSAIDs). The data were collected from medical records.

Results: A 64-year-old man with left eye SINS was treated with NSAIDs. Twenty-two days after treatment, the scleromalacia persisted, but the necrotic tissue was reduced. A month later, the scleromalacia persisted, but the necrotic tissue was minimal and the choroid was invisible from the sclera. Two months later, the scleromalacia persisted, but there was no necrotic tissue and the choroid was invisible from the sclera.
However, there was significant change in either necrotic tissue or the sclera.

**Conclusions:** NSAIDs had a beneficial effect in SINS.

**E-Poster No.: EP-0487**

**Posterior Scleritis in a 9-Year-Old Girl: A Case Report**

**First Author:** Kuo-chi HUNG  
**Co-Author(s):** Chang-ping LIN, Po-ting YEH

**Purpose:** To report a case of posterior scleritis in a 9-year-old girl.

**Methods:** A case report.

**Results:** Unicocular presentation in a 9-year-old girl.

**Conclusions:** Posterior scleritis is seen commonly in middle-aged women. The average age of patients with posterior scleritis has been reported as 45 to 49 years, associated with mild ocular congestion, globe tenderness, and varying amounts of vision loss. Posterior scleritis in children is even rarer than in the adult population. We report an uncommon presentation of posterior scleritis in a young female child. The patient presented with decreased vision and extraocular and intraocular inflammatory signs in the left eye. Fundus examination showed hyperemic disc, and soft tissue infiltration around globe was noted on CT. The patient showed good response to oral and topical steroids with resolution of inflammation and recovery of vision.

**E-Poster No.: EP-0164**

**Presumed Cytomegalovirus Anterior Uveitis and Endothelitis: Report of Six Cases With Unusual Presentations**

**First Author:** Somasheila MURTHY  
**Co-Author(s):** Sirisha SENTHIL

**Purpose:** To report the diverse clinical presentation and diagnostic and therapeutic challenges in 6 cases of presumed cytomegalovirus (CMV) uveitis with endothelitis.

**Methods:** A retrospective case series of 6 patients.

**Results:** We had 6 patients who presented with similar disease courses with different manifestations. Mean patient age was 34.33 years (range, 28–45 years). There were 4 males and 2 females. The right eye was involved in 5 patients and the left eye in a single patient. Best corrected visual acuity (BCVA) of the involved eye was 20/20 in all patients. Five of the 6 patients had recurrent acute episodes with hallmark appearance of medium-sized keratic precipitates (KPs) in a discrete localized distribution with surrounding corneal edema and 2 to 3+ anterior chamber reaction. One patient had localized inferior limbal ischemia with KPs and raised intraocular pressure (IOP). The mean highest recorded IOP was 34 mm Hg (range, 10–60 mm Hg) even on antiglaucoma medications. All 6 had at least 4 recurrent attacks of unilateral uveitis with raised IOP even with continued treatment of topical and oral steroids and antiglaucoma medications. After treatment of the acute episodes, 3 of the 6 patients were started on oral acyclovir (400 mg BD), of which 1 patient (who had coin-shaped KPs) appeared to respond to this treatment. In the remaining 2 patients, there was no improvement, and acyclovir therapy was discontinued after 3 to 6 months. Anterior chamber tap was performed in 3 patients, and PCR was positive for CMV DNA in 2 patients. A total of 5 of 6 patients were started on valganciclovir (tab valganciclovir 900 mg BD for 2 to 4 weeks then OD for 4 to 8 weeks with or without ganciclovir gel). All of these patients showed rapid clinical response with immediate control of IOP and no further recurrences of anterior uveitis.

**Conclusions:** Based on these 6 cases with clinical features as described, CMV endotheliitis should be considered as the etiological agent. PCR of the aqueous may be negative for CMV virus and should not be relied upon as the only diagnostic criteria. Valganciclovir shows excellent therapeutic response and should be initiated in such case.

**E-Poster No.: EP-0156**

**Sarcoidosis Presenting With Lupus Pernio and Uveitis in a 64-Year-Old Asian Woman**

**First Author:** Shuting KAO  
**Co-Author(s):** Shu-wei HSIEH, Chih-heng HUNG, Shwu-huey LEE

**Purpose:** To report the initial presentation of facial skin lesions and the subsequent symptoms of panuveitis in both eyes (OU) in a biopsy–proven sarcoidosis.

**Methods:** A case report.

**Results:** A 64-year-old female suffered from indolent, red-to-purple nodular or plaque skin lesions on the nose, left cheek, and left forehead for 6 months. Meanwhile, she denied any symptoms of dyspnea or cough. Four months later, progressively blurred vision and fullness (OU) were noted. She was then diagnosed as primary open angle glaucoma with advanced glaucomatous optic neuropathy and treated with Xalacom (0.005% latanoprost, 0.5% timolol) (OU). Unexpected elevated intraocular pressure (IOP) was 30 mm Hg in the right eye and 32 mm Hg in the left eye during the follow-up period. Ocular examination showed the granulomatous keratic precipitate with cells (4+) in the anterior chamber accompanied by snowball-like vitreous opacity and perivascular sheathing in the posterior segment (OU). After 1% prednisolone, 0.15% brimonidine tartrate, 1% brinzolamide, and Xalacom were prescribed, IOP dropped down into the range of 8–10
mm Hg (OU) eventually. Skin biopsy on the nose lesion demonstrated confluent nests of naked granulomas and scattered multinucleated giant cells focally cuffed by lymphocytic infiltrate throughout the dermis without any caseating necrosis, necrobiosis, suppuration, vasculitis, or specific microorganisms. Serum angiotensin-converting enzyme (ACE) levels were 12.25 IU/L (normal range <22.5 IU/L).

Conclusions: Onset of sarcoidosis usually occurs between the ages of 20 and 50 years. We reported a 64-year-old Asian woman who presented with initial lupus pernio, followed by glaucoma and panuveitis in both eyes without intrathoracic manifestations.

E-Poster No.: EP-0161
Severe Unexplained Ocular Pain After Retinal Detachment Surgery is a Warning Sign of Poor Final Visual Acuity
First Author: Evelyn Jou CHEN HUANG
Co-Author(s): Chien-neng KUO, Ching-lung CHEN, Li-ju LAI

Purpose: To report 2 cases that suffered from unexplained severe eye pain for days to weeks after retinal detachment surgery, which finally resulted in very poor visual outcome with good retinal attachment.

Methods: Two case reports.

Results: Two female patients with good health suffered from severe eye pain after retinal detachment surgery comprising scleral buckling, trans plana vitrectomy, endorser, and 18% C3F8. No corneal lesion, no elevated intraocular pressure, and no wound infection were noted but mild to moderate keratic precipitates were revealed. The severe ocular pain was hard to control and persisted for weeks even under anti-pain drugs. The cause of the severe ocular pain was unclear, but uveitis was suspected due to keratic precipitates. One case was unfortunate, with needle penetration during scleral buckle suturing. We used topical prednisolone 1%, but there was no good response. A few weeks after surgery, the pain was relieved with poor visual acuity. After detailed examinations, retina was well attached but visual outcome was very poor (around counting fingers).

Conclusions: Severe unexplained ocular pain after retinal detachment is a poor prognostic factor of final visual outcome.

E-Poster No.: EP-0162
The Epidemiology and Treatment of Behcet Disease in Taiwan—A Population-Based Study
First Author: De-kuang HWANG

Purpose: This study aimed to investigate the incidence and prevalence of Behcet disease in Taiwan. Patient characteristics and treatments were further analyzed and described.

Methods: This prospective population-based study was designed using the Taiwan National Health Insurance Research Database (NHIRD). A million residents were randomly selected from the database and analyzed. Participants with at least 3 consensus diagnostic codes of Behcet syndrome in ambulatory claims or at least 1 diagnostic code in in-patient claims first diagnosed from January 1, 2005, to December 31, 2009, were identified and analyzed in the study.

Results: One hundred eleven cases of Behcet disease newly diagnosed after January 1, 2005, were enrolled in our study. The annual cumulative incidence of Behcet disease in Taiwan ranged from 1.62 to 3.23 cases per 100,000 persons over the study period, and the average incidence density was 2.22 cases per 100,000 person-years. Surprisingly, females seemed to have a higher incidence of Behcet disease (2.91/100,000 years) than males (1.52/100,000 years). Among all cases, 38 (34.2%) cases were male. The mean age of onset was 40.3 ± 16.1 years. Sixty-eight (61.3%) patients were diagnosed by rheumatologists, 11 (9.9%) patients were diagnosed by ophthalmologists, and 6 (5.4%) were diagnosed by dentists.

Conclusions: We provided a representative epidemiologic report about Behcet disease in Taiwan in our study. Clinicians and researchers might obtain some information from our results. More studies regarding clinical medical records in Asian countries should be done to understand the new situation of this disease.

NEURO-OPHTHALMOLOGY

E-Poster No.: EP-0167
A Case of Isolated Noninvasive Aspergillosis Sphenoiditis Causing Unilateral Abducens Nerve Palsy
First Author: Yu Chi LIN

Purpose: Isolated infection of the sphenoid sinus is rare and can result in life-threatening complications. Diagnosing sphenoiditis can be very difficult because patients seldom complain of nasal symptoms. We report an unusual case of isolated aspergillosis sphenoiditis in a 68-year-old female who presented with left-sided abducens nerve palsy (ANP) and headache.

Methods: A case report.

Results: A 68-year-old female patient suffered from sudden onset of diplopia and progressive mild headache in the left frontal, periorbita, and retro-orbital regions for 3 days. There was no associated fever, facial sensation asymmetry, gait deviation, or phonophobia.
She had multiple underlying diseases, such as diabetes mellitus, hypertension, heart disease, hyperlipidemia, and anxiety disorder. Neurologic examination showed limited left eye abduction. Her vision and color contrast were normal. Initial brain CT scan revealed left sphenoid soft tissue density with “metallic sign” with bone thickening, suggesting fungal infection (Fig. A). Coronal T2 brain MRI showed left sphenoid sinusitis, which may result in an inflammatory process in the left cavernous sinus (with close proximity to left CNVI) (Fig. B). The patient was admitted and received functional endoscopic sinus surgery–wide open sphenoidotomy. The histopathological report showed fungal balls suggestive of aspergillosis. She soon recovered after the day of surgery and was in complete remission at 1 month follow-up.

**Conclusions:** Isolated aspergillosis sphenoiditis can be an unusual cause of abducens nerve palsy. However, prompt diagnosis and invasive treatment may be required in these cases.

**E–Poster No.: EP–0170**

**A Case of Leber Hereditary Optic Neuropathy Presenting as Central Serous Chorioretinopathy**

**First Author:** Guohong TIAN

**Purpose:** Leber hereditary optic neuropathy (LHON) patients who have atypical clinical features can be misdiagnosed as other optic neuropathies. We report a young Chinese male, who presented with central serous chorioretinopathy and the final diagnosis was LHON.

**Methods:** A case report. A 43-year-old Chinese male presented with decreased vision and metamorphopsia in the left eye 3 months prior to our neuro-ophthalmology clinic. The visual acuity measured in medical records was 20/25 in the right eye (OD) and 20/200 in the left eye (OS) at onset. There was central serous detachment in the left macula detected by retina OCT. Photocoagulation was given as treatment; however, visual acuity continued deteriorating to 20/250 in the left eye afterward. Three months later, he complained of painless visual loss in the right eye for 4 days and was referred to our clinic for further evaluation. His medical history showed he was a healthy young man without remarkable systemic diseases. He had been drinking liquor for more than 20 years. He denied smoking or taking any illegal drugs. The family history revealed his mother and 1 of his brothers had “poor vision.”

**Results:** The neuro-ophthalmological examination revealed the patient to be alert and oriented. Best corrected visual acuity (BCVA) was 20/200 OD and 20/250 OS. Color vision (Ishihara plates) was 1/8 and 0/8. There was relative afferent papillary defect (RAPD) OS. Slit lamp examination revealed normal anterior segment. The IOP measured was 16 mm Hg OD and 17 mm Hg OS. Funduscopic examination showed normal optic disc with slight peripapillary telangiectasia OD and pallid optic disc with C/D 0.7 OS. The macula in the left eye showed chronic RPE change. Octopus visual field test revealed global depression OS and cecocentral scotoma on the background of diffusion defect OD. The orbit MRI with contrast showed normal right optic nerve without enhancement and atrophy of optic nerve on left side. Blood test for mtDNA revealed a mutation of 3460.

**Conclusions:** LHON could be underdiagnosed in patients without distinctive clinical features of age, onset, fundus characteristics, or comorbidity with other ocular disorders causing visual decrease.

**E–Poster No.: EP–0171**

**A Case of Presumed Cortical Visual Impairment With MRI Finding of Periventricular Cyst Caused by Perinatal Asphyxia**

**First Author:** Yen-chih CHEN

**Co-Author(s):** Jieh-ren JOU

**Purpose:** To report a case of periventricular cyst caused by perinatal asphyxia.

**Methods:** A case report.

**Results:** We report a 5-month–old male patient with presumed cortical visual impairment secondary to birth asphyxia. MRI revealed a periventricular cyst in the right caudothalamic groove that may be a result of hypoxic ischemic damage.

**Conclusions:** This case showed that visual impairment in infants can be caused by perinatal hypoxic-ischemic encephalopathy.
significant history or family history. Her visual acuity was hand motions (nc) in the right eye and 0.1 (nc) in the left eye. No abnormal clinical findings were observed in the anterior segment and ocular fundus. Visual field showed homonymous hemianopia.

**Results:** Magnetic resonance imaging (MRI) demonstrated a normal study in T1 weighted images and T2 weighted images. Further fluid–attenuated inversion recovery (FLAIR) and diffusion-weighted imaging (DWI) showed a high signal intensity in the white matter of the occipital lobes. She was diagnosed with PRES. A scheduled Caesarean section was performed on day 2 of the 38th week to alleviate her stress due to pregnancy. Her visual acuity recovered to 1.2 a week after the delivery, whereas her visual field defect remained.

**Conclusions:** A visual disturbance could be a manifestation of PRES during normal pregnancy. MRI with FLAIR and DWI are substantial for the diagnosis of PRES.

**E-Poster No.: EP-0178**

**A Case of Vertebral Artery Dissection Presenting as Blurring of Vision**

*First Author:* Caroline BINSON  
*Co-Author(s):* Visvaraja SUBRAYAN

**Purpose:** To report a case of vertebral artery dissection which first presented as an insidiously progressive visual field defect.

**Methods:** A case report.

**Results:** Vertebral artery dissection is an important cause of stroke especially in the young. It is often a clinically elusive diagnosis, with varied presentations depending on the presence or absence of precipitating factors and complications along with the level the dissection occurs. Our patient was a 50-year-old man of Malay origin who was known to have hypertension for the past 4 years. He first presented complaining of painless and gradual bilateral blurring of vision. He denied any previous history of neck or head trauma. There was no headache, dizziness, neck pain, or neurological deficit. On examination, his best corrected vision was 6/9 bilaterally. Slit lamp examination was insignificant except for bilateral early nuclear cataract and cup-to-disc ratio of 0.6. Intraocular pressure was normal at 16 and 17 mm Hg. A series of 24–2 Humphrey visual field tests showed a progressively worsening right homonymous hemianopia. A computed tomographic angiography showed a right vertebral artery dissection with multiple brain infarcts. The patient was referred to the neurosurgical team and was treated conservatively with antplatelets.

**Conclusions:** Vertebral artery dissection can be present nonspecifically and may be misdiagnosed with adverse consequences. This case suggests that a high awareness of vascular and neurological pathology are necessary in cases of progressive visual field defects.

**E-Poster No.: EP-0188**

**Brain Electrophysiological Oscillatory Activity and Vision Loss in Occipital Stroke Patients**

*First Author:* Bernhard SABEL  
*Co-Author(s):* Ting LI, Carolin GALL, Ying GAO, Michal BOLA, Hermann HINRICHS

**Purpose:** To investigate the correlation between different functional visual parameters and the brain–wide spectral power of different frequency bands of resting state EEG in hemianopia patients.

**Methods:** Twenty-five patients with occipital lobe lesions were tested for visual acuity, contrast sensitivity, reading speed, dynamic vision, visual alertness, standard static perimetry, and high-resolution perimetry (HRP) considering both visual field halves separately. A 5-minute resting–state EEG with eyes closed was recorded as well. The correlation between the performance in vision tests and EEG spectral power of different frequency bands was calculated with $P < 0.01$.

**Results:** Different visual function parameters correlated with EEG spectral power of specific frequency bands: contrast sensitivity correlated positively with higher alpha and beta in the occipital and parietal lobes; phasic alertness correlated positively with lower alpha and beta in the occipital and parietal lobes; foveal vision correlated positively with delta and theta in the occipital lobe; and dynamic vision correlated negatively with delta in the occipital lobe. Yet, other visual function parameters such as visual acuity, reading speed, and perimetry measures (detection accuracy and reaction time in both visual field halves in HRP, mean threshold, absolute and relative defects and false positive rates in standard static perimetry test) showed no correlation with EEG spectral power.

**Conclusions:** Not all aspects of vision loss are related to occipital/parietal oscillatory activity as measured by spectral power. Further studies are needed to characterize more subtle changes in the brain, such as functional activity network alteration.

**E-Poster No.: EP-0180**

**Case Report of Bilateral Foville Syndrome**

*First Author:* Prashant GHORPADE  
*Co-Author(s):* Chhaya Ashok SHINDE, Nayana POTDAR

**Purpose:** To report a rare case of bilateral Foville syndrome.

**Methods:** We present a case of bilateral Foville syndrome. A 50-year-old male presented with inability to walk, inability to look to the side, and inability to close both eyes for 2 months. These symptoms were fol-
Twenty cases of optic neuritis were included in our study. Baseline clinical features and visual function were analyzed. We prospectively collected 99 adult patients who were found to have acute optic neuritis. A total of 30 cases, ranging in age from 21 to 55 years old, that were followed up for at least 6 months were enrolled in our study. Baseline clinical features and visual function results were analyzed.

Results: The mean follow-up period was 15.6 months. Twenty-three cases were female, and 27 cases were unilaterally involved. One case was simultaneously bilaterally involved, and 2 cases were sequentially bilaterally involved. In all 33 affected eyes, ocular or pericocular pain was noted in 14 eyes. Optic disc swelling was noted in 5 eyes. A total of 6 cases had recurrent episodes, and 2 of them were shown to have multiple sclerosis. At 6-month follow-up, 24 eyes had good visual recovery. Optic disc pallor was detected in 72.7% of eyes during follow-up.

Conclusions: Visual recovery was observed in most eyes with acute optic neuritis, although optic disc pallor was detected. Patients with recurrent optic neuritis had worse visual outcomes, and there was a low association of optic neuritis with multiple sclerosis in our patients.

E-Poster No.: EP-0183
CMV and Toxoplasma Infection in Pediatric Optic Neuritis
First Author: Prihatningtiyas

Purpose: Optic neuritis in children usually occurs after previous infection. Cytomegalovirus (CMV) and toxoplasma are some examples of infections that are associated with pediatric optic neuritis. The aim of this study was to analyze CMV and toxoplasma infection that can cause pediatric optic neuritis and the therapy of the diseases.

Methods: We describe 5 cases of pediatric optic neuritis with CMV and toxoplasma infection. The clinical characteristics, serologic findings, and neuroimaging were explained in this study. All the patients were given intravenous injection of methylprednisolone combined with therapy of CMV and toxoplasma based on serologic finding, in cooperation with the pediatric department.

Results: Serology for Toxoplasma gondii IgG was positive in 3 patients and IgM was positive in 3 patients. Serology for CMV IgG was positive in 4 patients and IgM was positive in 2 patients. After the steroid combined with CMV/toxoplasma therapy, all the patients had improvements in clinical findings, especially in visual acuity.

Conclusions: CMV and toxoplasma are some infections that can cause optic neuritis in children. To get good results from the management, therapy should include steroid injection for optic neuritis combined with CMV and toxoplasma therapy themselves.

E-Poster No.: EP-0187
Efficacy of Automated Computer-Aided Diagnosis of Retinal Nerve Fiber Layer Defects in Healthcare Screening
First Author: Jieh-ren Jou

Purpose: To investigate the clinical features and visual outcomes of acute optic neuritis in adult patients.

Methods: We prospectively collected 99 adult patients who were found to have acute optic neuritis. A total of 30 cases, ranging in age from 21 to 55 years old, that were followed up for at least 6 months were enrolled in our study. Baseline clinical features and visual function results were analyzed.

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were also analyzed using the CAD system to detect RNFL defects on fundus photographs in various cases of glaucomatous and nonglaucomatous optic neuropathy. A free-response receiver operating characteristics curve was generated for the evaluation of efficacy of the CAD system. The results of the automatic detection were compared with those of manual detection, and sensitivity and specificity of the CAD system were calculated.

**Results:** In manual detection, a total of 41 RNFL defects from 36 photographs of 28 patients were detected. The CAD system achieved a sensitivity of 90.2% (37/41 RNFL defects) and a specificity of 72.5% (1620/2234 photographs with no RNFL defects) at 0.36 false positives per image for detecting RNFL defects in the 2270 fundus photographs.

**Conclusions:** The new CAD system successfully detected RNFL defects in a mass screening of fundus photographs in a large population who visited a healthcare center. The proposed algorithm can be useful for clinicians in screening for RNFL defects in healthcare centers.

**E-Poster No.:** EP–0193

**Etiology and Clinical Profile of Oculomotor Nerve Palsy**

*First Author: Praveen JEYASEELAN*

*Co-Author(s): Kowsalya AKKAYASAMY*

**Purpose:** To study the demographics and clinical profile of oculomotor nerve palsy.

**Methods:** A hospital-based prospective case series of oculomotor nerve palsies from January 2014 to January 2015. Documentation included age, sex, presenting complaints, history of diabetes, hypertension, trauma, and mode of onset. Slit lamp biomicroscopy was performed paying attention to lids, pupil reaction, and extraocular movements. Systemic and neurological examination was done. Hess charting and diplopia charting was done. MRI/CT was taken wherever indicated.

**Results:** Mean age of presentation was 49 years with male preponderance. The commonest complaint was drooping of lids (47.3%). Partial palsy was seen more commonly. Pupil involvement was noticed in 49% of cases. Painful third nerve palsy was observed in 113 (54.6%) cases. The commonest causes were traumatic (28.5%), microvascular ischemia (17.3%), neuritis of undetermined etiology (14.9%), orbital inflammatory disorders (11.5%), and vascular aneurysm (3.4%). Three (1.5%) cases of pure ischemic palsy with normal neuroimaging had pupil involvement against the standard rule of pupil sparing. Four cases had aberrant regeneration.

**Conclusions:** In our study, trauma was the common cause of oculomotor palsy affecting predominantly males aged from 20 to 40 years. Microvascular ischemia can also present with pupillary involvement with normal neuroimaging. Neuroimaging yielded significant diagnosis in 60.9% of cases. There were various pathologies affecting the oculomotor nerve along its entire course with different clinical presentations. Hence, careful clinical examination with neuroimaging on selected cases helps in early diagnosis.

**E-Poster No.:** EP–0485

**Isolated Optic Neuritis in a Child With Previous Acute Disseminated Encephalomyelitis: A Case Report**

*First Author: Pei-ning TU*

*Co-Authors: I-hua WANG, Shwu-huey LEE, Szu-yuan LIN*

**Purpose:** Pediatric optic neuritis (ON) may be associated with acute disseminated encephalomyelitis (ADEM); however, isolated ON after ADEM is rarely reported. We herein report a case of isolated ON with 2 previous episodes of ADEM.

**Methods:** A case report.

**Results:** A 7-year-old girl presented with sudden onset of vision loss in the right eye (OD). She had a history of ADEM diagnosed at the age of 5 and multiphasic ADEM at age 6. Her best corrected visual acuity was no light perception (OD) and 20/20 in the left eye (OS) with relative afferent pupillary defect (OD). Her ocular structure was unremarkable except that the right optic disc was swollen. Visual field and color test were failed in the right eye but intact in the left eye. Magnetic resonance imaging revealed no demyelinating brain lesions except right optic nerve enhancement. Her vision improved to 20/20 (OD) with pulse steroid therapy. Retinal nerve fiber layer thinning (OD) was detected by optical coherence tomography 2 months after the event and remained stationary during 1-year follow-up.

**Conclusions:** Isolated ON after ADEM might be a rare clinical phenotype not meeting the criteria of either multiphasic ADEM or multiple sclerosis at present. However, the risk of chronic demyelinating disease cannot be ignored and should be evaluated carefully. Therefore, long-term follow-up is needed.

**E-Poster No.:** EP–0185

**Natural History of Nonarteritic Anterior Ischemic Optic Neuropathy: Longitudinal Analysis by Optical Coherence Tomography**

*First Author: Ko-jo LIN*

*Co-Authors: An-guor WANG*

**Purpose:** To investigate the temporal sequence of optical coherence tomography (OCT) changes and to ana-
lyze their correlation with visual outcome in patients with nonarteritic anterior ischemic optic neuropathy (NAION) in a longitudinal follow-up.

**Methods:** Thirteen patients with NAION underwent sequential OCT measurements of retinal nerve fiber layer (RNFL) and ganglion cell–inner plexiform layer (GCIPL) at different time points.

**Results:** A significant increase of RNFL thickness was detected at the first visit and 2 weeks after onset. It decreased gradually thereafter and became significantly atrophic at 2 months. GCIPL thickness began to decrease from 2 weeks and became significantly thinner at 1 month. Temporal quadrant RNFL thickness and GCIPL normal sector number were correlated with visual acuity.

**Conclusions:** GCIPL begins to decrease earlier than the decreasing change of RNFL. Visual acuity is correlated with GCIPL normal sector number and RNFL temporal quadrant thickness, which may both reflect papillomacular bundle involvement.

**E–Poster No.: EP–0169**

**Ocular Cat-Scratch Disease Presenting As Anterior Uveitis—A Case Report**

**First Author:** Seok Hui NG  
**Co-Author(s):** Wan-hazabbah WAN HITAM

**Purpose:** To report a rare presentation of cat-scratch disease.

**Methods:** A case report.

**Results:** A 39-year-old Malay female presented with redness and blurring of vision in both eyes for 2 weeks. There was no history of fever or contact with cats recently. Visual acuity on presentation was 6/6 in both eyes. Both anterior segments showed moderate cells with multiple fine white keratic precipitates. There was presence of iris pigment on the anterior lens surface. Both fundi were normal with healthy–looking disc and macula. There was no lymphadenopathy. She was diagnosed to have bilateral anterior uveitis and treated with topical steroid. On follow-up at 6 weeks, there was slight reduction of visual acuity to 6/9 in both eyes. Funduscopy showed bilateral hyperemic swollen discs. There was also presence of multiple retinitis lesions with vasculitis in both retinas. *Bartonella* serology was positive for both IgG and IgM. She was started on oral azithromycin for 6 weeks. Both anterior chambers were quiet. Her visual acuity remained 6/9 with resolving optic disc swelling bilaterally.

**Conclusions:** Anterior uveitis is a rare presentation in ocular cat-scratch disease. Sometimes the neuroretinitis may present later. Oral azithromycin for 6 weeks is an effective treatment for ocular cat-scratch disease caused by *Bartonella henselae.*

**E–Poster No.: EP–0181**

**Optic Nerve Sheathotomy Audit**

**First Author:** Sunil MOREKAR  
**Co-Author(s):** Harshavardhan GHORPADE

**Purpose:** To identify the learning gaps in a clinical audit of optic nerve sheathotomy done for visual preservation in cases of severe papillodema with vision threatened or lost in 1 eye.

**Methods:** A clinical audit was done to quantify the clinical results and identify learning gaps with regard to the management of vision–threatening severe papillodema due to benign intracranial hypertension and other causes.

**Results:** Vision was preserved in all cases in the short term, but 1 patient lost his vision after 3 months. Optic disc swelling reduced on ocular coherence tomography, and the visual field improved in all cases except 1.

**Conclusions:** Optic nerve sheathotomy, if performed before vision loss in cases of severe papillodema, can preserve vision. Even if it is done after vision loss, some vision can be salvaged.

**E–Poster No.: EP–0182**

**Persistence of Parinaud Syndrome Symptoms After Tectal Plate Glioma Resection**

**First Author:** Prashant GHORPADE  
**Co-Author(s):** Chhaya Ashok SHINDE, Nayana POTDAR

**Purpose:** To report the persistence of symptoms in Parinaud syndrome even after treatment.

**Methods:** A 13-year-old male was referred for evaluation of binocular diplopia from neurosurgery. The patient complained of binocular, vertical, and torsional diplopia for 3 months. He had had an inability to look up for 3 months. The patient was diagnosed with tectal plate glioma for which he underwent near total resection of tectal plate glioma 6 months previously in neurosurgery. Histopathology of tissue confirmed it to be pilocytic astrocytoma. He also complained of oscillopsia that was more pronounced in upgaze. The family members noticed an anomalous chin–up position subsequent to the tectal plate glioma. There was a history of hydrocephalus of unknown etiology for which ventricular–peritoneal shunt was done 2 years before the diagnosis of tectal plate glioma on the right side. The patient was investigated with MRI.

**Results:** On examination, the patient was conscious, cooperative, and well oriented to time and place. On ocular examination, best corrected visual acuity was 6/6 in the right eye and 6/9 in the left. There was anomalous head posture with chin up and left head tilt. Eyelid retraction was present. Pupils in both eyes were normal size with reaction to light. Light near dis-
Methods: Plasmapheresis Treatment for Neuromyelitis Optica—A Case Report

First Author: Kukuh PRASETYO

Purpose: To present the outcome of plasmapheresis treatment in a neuromyelitis optica (NMO) case.

Methods: A 25-year-old female was referred from the neurology department at Hasan Sadikin Hospital to the neuro-ophthalmology department at Cicendo National Eye Hospital with decrease in visual acuity in both eyes. The patient had been admitted to Cicendo National Eye Hospital a year before with bilateral retrolubular optic neuritis. The patient also complained of lower limb hipoaesthesia and was unable to move her lower extremities. Visual acuity on the first examination was counting fingers at one half meter in both eyes. Pupillary reaction was decreased in both eyes. MRI of the brain showed no demyelinization characterized with McDonald criteria. The patient was then diagnosed with NMO according to Wingerchuck criteria. The patient was given methylprednisolone 1 g/d for 5 days but showed no improvement. Plasmapheresis was done and after 4 sessions, improvement both in visual and neurological aspects emerged.

Results: Visual acuity after plasmapheresis treatment in the right eye was 0.08 ph 0.1 and the left eye was CFFC with better muscle contraction power in her lower extremities.

Conclusions: Plasmapheresis is effective as a rescue therapy for neuromyelitis optica that has received methylprednisolone intravenous therapy.

E-Poster No.: EP–0177

Postoperative Vision Recovery From Right Eye Monocular Hemianopia Caused by Meningothelial Meningioma—A Case Report

First Author: Liyi CHIU
Co-Author(s): Wen-chuan WU

Purpose: Monocular temporal hemianopia could be a functional disorder or a manifestation of chiasmal compression. We report a case of right eye monocular temporal hemianopia defect, which was accidentally found during follow-up at the ophthalmology outpatient department (OPD) and finally proved to be a suprasellar tumor compression. Significant vision recovery was noted after tumor removal, achieving great patient satisfaction.

Methods: A retrospective case report.

Results: A 54-year-old female came to our OPD with progressive blurred vision in the right eye, with best corrected visual acuity (BCVA) that decreased from 0.7 to 0.1 in 1 year. Basic ocular examinations were done, and bilateral optic disc pallor was observed. Auto perimetry test was done, and right eye temporal hemianopia was noted. The field of the fellow eye was normal. Therefore, brain computed tomography (CT) was done, and the results showed a suprasellar tumor extending to the right frontal lobe. The patient was referred to the neurosurgery department, and tumor excision was performed smoothly with bilateral optic nerves, optic chiasm, and pituitary stalk well preserved. The pathology report revealed meningothelial meningioma. Two months after surgery, BCVA in the right eye recovered from 0.1 to 1.0. Auto perimetry was repeated; the visual field index improved from 48% to 89%, and mean defect decreased from −14 db to −5 db.

Conclusions: Monocular temporal hemianopia is mostly caused by the involvement of the ipsilateral optic nerve near the chiasm and selectively impairs conduction in crossing nasal retinal fibers from the ipsilateral eye, but is too anterior to affect crossing nasal retinal fibers from the fellow eye. From clinical observation, we may find RAPD, optic disc pallor, and abnormal confrontation test. With the abnormal visual field re-
results that implied the possibility of intracranial lesion, image studies (CT and even MRI) were necessary and essential for early detection and early intervention to prevent the potential for visual loss. As meningioma is a tumor with high recurrence, close follow-up and repeat auto perimetry may be needed after periods of time.

E-Poster No.: EP-0173
Relapsing Polychondritis: Systemic and Ocular Manifestations
First Author: Ho-min CHEN
Co-Author(s): Allen LIN, Chiamin WU, Wen-ming HSU, Yun-dun SHEN
Purpose: To present a rare ocular manifestation of relapsing polychondritis with ischemic optic neuropathy.
Methods: A case report.
Results: This was a case of misdiagnosed relapsing polychondritis in a 54-year-old male with a complaint of right eye redness and sudden visual loss, accompanied by right auricular pain and erythematous for 1 week. Fundoscopy exam revealed right optic disc swelling and optic neuropathy, and slit lamp exam showed anterior chamber cells and flare in the right eye. Treatment for the patient consisted of a high dose of systemic steroid. Inflammation subsided, vision was slowly regained, and swelling of the right ear reduced with a prominent saddle nose appearing 2 days after treatment.
Conclusions: Due to the varied manifestations of the disease, it is often difficult to diagnose in early stages until the progression is irreversible. Ocular manifestations with scleritis, anterior uveitis, and optic neuritis can be the initial presentation of relapsing polychondritis. Patients that have delayed diagnosis often have poorer prognosis due to subsequent damages to the cartilage that results in respiratory failure.

E-Poster No.: EP-0186
Repeatability and Diagnostic Value of the Ice Test in the Evaluation of Ptosis in Myasthenia Gravis
First Author: Jeong-min HWANG
Co-Author(s): Jun Young PARK, Hee-kyung YANG, Kyung Seok PARK
Purpose: To determine the repeatability and diagnostic value of the ice test in the evaluation of ptosis in myasthenia gravis (MG).
Methods: Thirty-one patients with ptosis related to MG and 38 controls with ptosis other than MG were included. All patients were tested with the ice test 2 times on separate days in the afternoon. The margin reflex distance (MRD) was measured before and immediately after 5-minute application of ice on the eyelids. The ice test was judged positive if there was an improvement of at least 2.0 mm MRD after the ice test. “Equivocal” was defined by improvement of MRD of at least 1.0 to less than 2.0 mm after the ice test.
Results: Repeated ice tests showed an agreement of 67.7% in MG and 97.4% in nonmyasthenic ptosis. Repeated ice tests increased positive predictive value by 2.1%, negative predictive value by 9.2%, and sensitivity by 21.0% compared with a single test. In patients with repeated negative results, 71.4% of those who showed equivocal results at least once turned out to be MG. Of those with repeated nonequivocal negative results, only 2.9% turned out to be MG. There was no statistically significant difference in the results of the ice test between ocular versus generalized MG.
Conclusions: The repeatability of the ice test was 67.7% in MG. Repeated ice tests enhanced the sensitivity. Patients with an equivocal negative result had a 71% chance of having MG.

E-Poster No.: EP-0184
Sagittal Sinus Thrombosis: A Rare Case
First Author: Karen REYES
Co-Author(s): Ivan TECSON
Purpose: To report a rare case of sagittal sinus thrombosis.
Methods: This is a case report.
Results: A 34-year-old female presented with binocular diplopia with headache and tinnitus. On examination, she was seen to have a nonlocalizing left sixth nerve palsy and bilateral disc edema. Initial brain magnetic resonance imaging with contrast revealed normal findings. She underwent a lumbar tap which showed increased opening pressure. The rest of the CSF analysis was normal. Immediately after tap, her diplopia resolved. However, symptoms of diplopia recurred with tolerable headache without tinnitus. She was eventually diagnosed with idiopathic intracranial pressure and managed accordingly with no relief of symptoms. Magnetic resonance venogram (MRV) was finally done 2 weeks later, which revealed a sagittal sinus thrombosis. The treatment plan was tailored accordingly.
Conclusions: A thorough clinical history and physical examination are important in arriving at a proper diagnosis and appropriating diagnostic investigations. Cost-effective ancillary tests, like MRV, are essential in this case where appropriate therapeutic management has been instituted to address the etiology of increased intracranial pressure.

E-Poster No.: EP-0168
Segmental Optic Nerve Hypoplasia: A Case Report and Literature Review

First Author: Wei-shan TSAO
Co-Author(s): Yuan-chieh LEE

Purpose: To report a case of segmental optic nerve hypoplasia and review the literature.

Methods: A case report.

Results: A 27-year-old male patient visited our clinic with the chief complaint of an accidentally discovered lower visual field defect of the left eye. On examination, best corrected visual acuity was 0.9 and 0.8 in the right and left eyes, respectively. The intraocular pressure was 16 in both eyes. Automated perimetry demonstrated lower visual field defect in the left eye. Fundoscopic examination revealed enlarged cupping in the left eye. Bare vessels on the superior part of the retina without reflected light from the nerve fiber layer were noted. Spectral domain optical coherence tomography showed nerve fiber layer had disappeared on the superior part. Segmental optic nerve hypoplasia was diagnosed. The types, presentation, ocular associations, systemic associations, and spectral domain optical coherence tomography of optic nerve hypoplasia are discussed.

Conclusions: Optic nerve hypoplasia should be in the differential diagnosis of patients with visual field defect. The risk of hormonal imbalances and midline brain defects in these patients are present.

E-Poster No.: EP-0176

Septo-Optic Dysplasia With Abducens Nerve Palsy: A Case Report

First Author: Yan-ting CHEN
Co-Author(s): Tung-ming CHANG

Purpose: To present an unusual case with septo–optic dysplasia combined with abducens nerve palsy.

Methods: We report the clinical presentation and findings of ophthalmoscopy, optical coherence tomography, and magnetic resonance imaging (MRI) in a young girl with septo–optic dysplasia. We also reviewed the findings regarding septo–optic dysplasia in previous articles.

Results: An 11-year-old Taiwanese girl had poor vision, hearing impairment, and lost the ability of abduction in her right eye in early childhood. Recently, she suffered from involuntary leg movements with suspected seizure attacks and was brought to hospital for detailed survey. Ophthalmic survey revealed reduced vision [hand motions in the right eye (OD) and 20/40 in the left (OS)], bilateral optic nerve hypoplasia with significantly reduced retinal nerve fiber layer thickness, and relative afferent pupillary defect in OD. Ocular alignment and motility test revealed V–pattern esotropia with limited abduction of the right eye, but there was no change of palpebral fissure in all gazing directions. Right abducens palsy was suspected. MRI revealed hypoplasia of the optic nerves and chiasm and the absence of septum pellucidum.

Conclusions: In this case, septo–optic dysplasia was combined with paralysis of not only the oculomotor nerve but also the abducens nerve. The relationship between these findings is interesting and could be a clue for investigating pathogenesis. To our knowledge, cases of septo–optic dysplasia with abducens nerve palsy are rarely reported.

E-Poster No.: EP-0189

Serum Aquaporin-4 Antibody Positive Optic Neuritis Patients Have Similar Structural Injury Pattern to Neuromyelitis Optica Patients in Afferent Visual Pathway

First Author: Chun Xia PENG

Purpose: Water channel aquaporin–4 antibody (AQP4–Ab) is a highly specific biomarker for neuromyelitis optica (NMO). We evaluated afferent visual pathway structural injury in optic neuritis (ON) patients who were serum AQP4–Ab positive [AQP4–Ab(+)]ON and serum AQP4–Ab negative [AQP4–Ab(−)]ON and neuromyelitis optica patients using optical coherence tomography (OCT) to offer structural markers to predict ON converting to definite NMO.

Methods: We cross-sectionally studied 107 ON patients (157 eyes) and 47 healthy controls (HCs) who were age- and sex-matched. All subjects underwent best corrected visual acuity (BCVA) examination and peripapillary retinal nerve fiber layer (pRNFL) and inner segmented macular layers with OCT.

Results: AQP4–Ab(+)ON patients had the same structural injury patterns as that of NMO with ON (NMO–ON) patients in pRNFL and segmented macular layers that were distinct from those in AQP4–Ab(−)ON patients. NMO–ON and AQP4–Ab(+)ON preferentially damaged axonal layers including pRNFL, macular retinal nerve fiber layer (mRNFL), and inner plexiform layer (IPL) compared with AQP4–Ab(−)ON, especially for the nasal and inferior axonal layers. When controlling for age, sex, and BCVA, the nasal inferior pRNFL (NI) thickness less than 69.5 μm (AUC: 0.740) and the inferior sector of outer circle (C2I) of mRNFL thickness less than 17.5 μm (AUC: 0.846) predict ON converting to definite NMO.

Conclusions: AQP4–Ab(+)ON and NMO–ON damaged axonal layers more severely in contrast to that of AQP4–Ab(−)ON which could be associated with aquaporin–4 expression locations in retina. The NI of pRNFL and C2I of mRNFL thickness could be biomarkers to predict ON converting to definite NMO.
E-Poster No.: EP-0191

The Effect of Ethambutol Treatment Duration on Color Perception Based on Ishihara vs Farnsworth D-15 Test

First Author: Marthasari ROSALINA
Co-Author(s): Gatot SUHARTONO, Tutik KUSMIATI, Musbadiany YOGIANTORO, Gatut SUHENDRO, Lukisiari AGUSTINI

Purpose: To determine the effect of the duration of ethambutol (EMB) treatment on color perception in multidrug-resistant tuberculosis (MDR TB) patients.

Methods: This analytic observational study was conducted in the pulmonary department from December 2014 to February 2015. All subjects underwent both the Ishihara plates and the Farnsworth D-15 (FD15) test. Subjects were divided into 2 groups: group 1 was treated with EMB regimen for 2–5 months and group 2 for >5 months. Patients were also divided by history of previous treatment with EMB: group A with no previous history treatment, group B with ≤12 months, and group C with >12 months. The data were analyzed with Spearman correlation test.

Results: There were 33 subjects. On Ishihara testing, 100% had normal results, but on FD15 testing, 24.24% had abnormal results. FD15 had the specification of 24.24%. There was 50% group 1, and 50% group 2. There was no significant correlation between the duration of EMB treatment and color perception (P = 0.631). There was 0% in group A, 37.5% in group B, and 62.5% in group C. There was no significant correlation between previous EMB treatment and color perception (P = 0.075). There were 0% of subjects ≤30 years old and 100% >30 years old. There was a significant correlation between age and color perception (P = 0.016).

Conclusions: FD15 appears to be more specific than Ishihara as a screening tool. Duration and previous history of EMB treatment did not influence any changes in color perception. Age was shown to influence changes of color perception in MDR TB patients.

E-Poster No.: EP-0166

Two Cases of Optic Neuropathy Associated With Idiopathic Hypertrophic Pachymeningitis

First Author: Chun Hsiu LIU
Co-Author(s): Ling-yuh KAO

Purpose: To report 2 cases of bilateral optic neuropathy related to idiopathic hypertrophic pachymeningitis.

Methods: A case report.

Results: Case 1: A 56-year-old male with a 2-year history of headache presented to our clinic with progressive bilateral vision loss for 20 days. His visual acuity was 0.05 in the right eye and only counting fingers in the left eye. A relative afferent papillary defect (RAPD) was noted in the patient’s left eye. Fundus examination showed mild, bilateral temporal optic disc pallor. On brain MRI, the dura mater was thickened and enhanced by contrast. The erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) level were increased. Cerebrospinal fluid (CSF) protein level was elevated. Other neurological and medical abnormalities were not found. Under the suspicion of bilateral optic neuropathy due to idiopathic hypertrophic pachymeningitis, the patient was treated with oral prednisolone therapy. Two weeks after treatment, the headache was improved, and visual acuity was 0.09 in the right eye and no light perception in the left eye. Case 2: A 52-year-old male with a history of chronic headache presented with acute visual loss for 6 months in the left eye and 2 weeks in the right eye. His visual acuity was counting fingers in the right eye and no light perception in the left eye. Fundus examination showed a normal right optic disc but left optic disc pallor. On brain MRI, the dura mater was thickened and enhanced by contrast. The rheumatoid factor and CSF protein level were elevated, but other neurological and medical abnormalities were not found.

Conclusions: The authors report 2 cases of optic neuropathy associated with idiopathic hypertrophic pachymeningitis. Idiopathic hypertrophic pachymeningitis should be considered as one of the various causes of optic neuropathy.

E-Poster No.: EP-0177

Visual Change as Initial Presentation of Metastatic Esophageal Cancer

First Author: Jian-sheng WU

Purpose: To report a patient with metastatic esophageal cancer who initially presented with homonymous hemianopsia in surveying ethambutol-induced optic neuropathy.

Methods: A case report.

Results: A 55-year-old man presented with visual change after being treated for pulmonary tuberculosis with ethambutol for 2 months. The spectacle-corrected visual acuity was 20/20 in the right eye and 20/25 in the left. Color vision, pupil response, and fundus examination were normal. Confrontation visual field revealed a left homonymous hemianopsia confirmed by automated perimetry. Neuroimaging demonstrated a focal lesion at the right occipital lobe with compression of the posterior horn and right lateral ventricle. He had esophageal cancer after radiotherapy and chemotherapy 2 years previously. Esophageal cancer with brain metastasis was suspected. Unfortunately, he died of respiratory failure due to pneumonia 3 months later.
Conclusions: This case demonstrated normal ocular examination except homonymous hemianopsia in surveying ethambutol–induced optic neuropathy. Careful evaluation and listening to the patient may detect the concealed problem earlier.

E-Poster No.: EP–0192

Visual Field Defect and Ocular Motor Dysfunction in Stroke Patients

First Author: Aisyah MUHLISAH

Purpose: Visual field defect and ocular motor dysfunction after stroke can result in significant disability and reduction in quality of life. The aim of this study was to observe the proportion of visual field defects and ocular motor dysfunctions in stroke patients.

Methods: An observational cross–sectional study of 52 stroke patients. Visual assessment included visual acuity measurement, visual field assessment, ocular alignment, and movement.

Results: Of a total of 52 patients, 5 patients (9.6%) were diagnosed with visual field defects. Of these, 4 patients had homonym hemianopia and 1 patient had quadrantopia homonym inferior. Seventeen patients (32.7%) were diagnosed with ocular motility abnormalities. Of these, 11 patients had saccadic pursuit abnormalities and 6 patients had ocular motor cranial nerve palsies (OMCNP). Unilateral third nerve palsy was present in 2 patients, sixth nerve palsies in 2 patients, and all OMCN in 2 patients. The locations of strokes were reported mainly in the cortex, brain stem, and subcortex.

Conclusions: Ocular motor dysfunction accounted for 32.7% and visual field defects for 9.6% of eye abnormalities in stroke patients. The reported brain areas affected by stroke were typically the cortex and brain stem.

E-Poster No.: EP–0190

Wolfram Syndrome in Twins

First Author: Gholamhossein YAGHOOBI
Co-Author(s): Behrouz HEYDARI, Samaneh NOROOZI-ASL

Purpose: To report Wolfram syndrome, which is characterized by early onset diabetes mellitus and progressive optic atrophy, in twin children and 1 relative.

Methods: A case report to show characteristics and fundus picture.

Results: Two twin 10-year-old male patients with type 1 diabetes mellitus presented with best corrected visual acuity of 1/10 in both eyes with correction of −0.25 + 1.50 x 55 and −0.25 + 1.50 x 131 in the right and left eyes, respectively. Bilateral optic atrophy was evident on fundus examination. The patients also had diabetes insipidus, neurosensory deafness, neurogenic bladder, polyuria, and extraresidual voiding indicating atony of the urinary tract, combined with delayed sexual maturity.

Conclusions: There are many reports of Wolfram syndrome in patients with juvenile onset diabetes mellitus and hearing loss. However, this is among the few rare cases of twins suffering from Wolfram syndrome.

E-Poster No.: EP–0200

Anterior and Posterior Segment Structural Features of Healthy Chinese Subjects

First Author: Wenbin HUANG

Purpose: To measure the anterior and posterior ocular biometric characteristics concurrently and to determine the relationship between the iris and choroid in healthy Chinese subjects.

Methods: A total of 148 subjects (270 eyes) were enrolled in this cross–sectional study. The anterior and posterior ocular biometric characteristics were measured simultaneously by anterior segment optical coherence tomography (AS–OCT) and swept–source optical coherence tomography (SS–OCT).

Results: Compared with male eyes, female eyes had narrower anterior biometric parameters that presented with smaller anterior segment parameters [including anterior chamber depth (ACD), width (ACW), area (ACA), and volume (ACV); all \(P < 0.001\)], narrower anterior chamber angle parameters [including angle opening distance (AOD750), trabecular–iris space area (TISA750), and angle recess area (ARA); all \(P < 0.001\)], higher iris curvature (ICURV) \((P = 0.003)\), and larger lens vaults (LV) \((P = 0.019)\). These anterior ocular biometric parameters were correlated with increasing age \((P < 0.01)\). Iris thickness (IT750) and iris area (IAREA) were associated with age, ACW, and pupil diameter \((all \ P < 0.05)\), whereas choroidal thickness (CT) was associated with age, sex, and axial length \((all \ P < 0.05)\). Univariate regression analysis showed that greater CT was significantly associated with smaller IAREA \((P = 0.026)\).

Conclusions: Compared with male eyes, female eyes had narrower anterior biometric parameters that correlated with increasing age, which would be helpful in explaining the higher prevalence of angle closure rates in females and in aging people. Increased CT might be associated with smaller iris area; however, this possibility needs to be investigated in future studies before this conclusion is made.

E-Poster No.: EP–0196
Application of Smartphone Devices in Ophthalmic Photography
First Author: John AKKARA

Purpose: To review the various uses of smartphone devices in the field of ophthalmic photography including gross photographs, anterior segment photographs, slit lamp photographs, fundus photographs, squint measurement photographs, structure and lesion size/area measurement using ImageJ software, documentation of nystagmus, 3D photographs (both anterior segment and fundus), and various app-based enhancement of photographs for better visualization and documentation of findings.

Methods: The various methods of ophthalmic photography possible with currently available low-to-medium cost mobile devices were evaluated to document the reliability and ease of use of mobile phone cameras in ophthalmic photography. Best practices and best settings for various photographs were determined by a review of literature, and a series of tips and guidelines were proposed. The techniques evaluated included gross photographs, anterior segment photographs, slit lamp photographs, fundus photographs, squint measurement photographs, structure and lesion size/area measurement using ImageJ software, documentation of nystagmus, 3D photographs (both anterior segment and fundus), and various app-based enhancement of photographs for better visualization and documentation of findings. Quality of photographs was compared with those obtained from standard ophthalmic imaging devices wherever possible. Not only the quality, but also the ease of use and cost of equipment were evaluated to approximately determine the cost-benefit ratio. Salient advantages and disadvantages were noted and work-arounds tried.

Results: Several gross photographs, anterior segment photographs, slit lamp photographs, fundus photographs, squint measurement photographs, structure and lesion size/area measurements using ImageJ software, documentation of nystagmus, 3D photographs (both anterior segment and fundus), and various app-based enhancements of photographs for better visualization and documentation of findings were reviewed, and they were compared with photographs taken from standard commercial ophthalmic photographic devices. The guidelines and tips for each specific type of photography were noted. Advantages and disadvantages of each type of device were tabulated.

Conclusions: Smartphones today have cameras good enough to take high quality ophthalmic photographs with little to no extra costs. The software capabilities of smartphones have also advanced to a level capable of reliably enhancing ophthalmic photographs and easily transferring and sharing photographs, and in some cases they appear to be better than their expensive commercial counterparts. We can strive to make affordable alternatives to expensive ophthalmic photography devices that would help to bring near–comprehensive ophthalmic care to places that cannot afford it.

E-Poster No.: EP-0199

Assessment of Lens Center Using Optical Coherence Tomography, Magnetic Resonance Imaging, and Photographs of the Anterior Segment of the Eye
First Author: Choun-ki JOO
Co-Author(s): Woong-joo WHANG, Yongeun LEE, Young-sik YOO

Purpose: To determine the nearest marker for evaluating the center of the crystalline lens using optical coherence tomography (OCT), magnetic resonance imaging (MRI), and photographs.

Methods: Optical coherence tomography scans of human eyes were obtained in vivo during femtosecond laser–assisted cataract surgery. From axial and sagittal images, the distance of the angle center (AC) and pupil center (PC) from the scanned capsule center (SCC) was calculated. From pre- and postoperative photographs, the distance of the PC and limbal center (LC) from the intraocular lens (IOL) center was calculated, and the distance between each center on the lens equatorial plane was compared. After combining pre- and postoperative images, we arranged the centers in order of distance from the IOL center. High-resolution MRI was performed in pig eyes ex vivo to confirm the exact location of the lens center relative to the other centers.

Results: In human OCT scans and photographs (n = 76), the IOL center to AC distance was 0.22 ± 0.13 mm, the IOL center to SCC distance was 0.22 ± 0.12 mm, the IOL center to PC distance was 0.25 ± 0.17 mm, and the IOL center to LC distance was 0.30 ± 0.18 mm. The AC and SCC were significantly closer to the IOL center than the PC or LC. In MRI (n = 54 images), the lens center to AC distance was 0.90 ± 0.58 mm, and the lens center to PC distance was 1.53 ± 0.87 mm (D distance = 0.63 ± 0.69 mm, P = 0.000).

Conclusions: Optical coherence tomography, MRI, and photographs of the anterior segment revealed that the AC is the nearest marker to the center of the lens equator.

E-Poster No.: EP-0195

Comparability of Retinal Thickness Measurements Using Different Scanning Protocols on Spectral-Domain Optical Coherence Tomography
First Author: Milton CHEW
Co-Author(s): Louis LIM, Colin TAN
Purpose: Retinal thickness measurements obtained using optical coherence tomography (OCT) play an essential role both in multicenter clinical trials and in normal clinical practice. Different scanning protocols are available on most OCT devices, and it is important to ascertain whether the retinal thickness measurements obtained from these are comparable. This study aimed to compare retinal thickness measurements between raster and radial scanning protocols using spectral-domain OCT (SD-OCT).

Methods: In a prospective study, 32 healthy subjects were scanned sequentially using raster and radial protocols from a SD-OCT device. For both the raster and radial OCT scans, retinal thicknesses were measured manually subfoveally and at 12 other points at 0.5-mm intervals temporally and nasally on the horizontal OCT B-scan passing through the fovea. The retinal thickness measurements were compared using intraclass correlation (ICC) and Bland–Altman plots.

Results: Subfoveal retinal thickness was 227.0 µm when measured on the raster scan and 229.2 µm on the radial scan, with a mean difference of 2.2 µm (P = 0.141). The ICC for agreement was 0.889 (95% confidence interval, 0.818 to 0.933). Similar results were observed for retinal thickness measurements at all other points, with mean differences ranging from −3.37 µm to 2.59 µm, and ICC values ranging from 0.837 to 0.972.

Conclusions: The retinal thickness measurements obtained by the raster and radial scans of the same SD-OCT device are comparable, with differences of less than 4 µm. This is of relevance when measurements made using different OCT scan protocols are compared.

E-Poster No.: EP-0197

Manual Versus Automated Measurement of Choroidal Thickness in Glaucmatous Eyes Using Enhanced Depth Imaging Spectral-Domain Optical Coherence Tomography

First Author: Suria SUDHAKARAN
Co-Authors: Abhijit SINHA, Neha ANEGONDI, Rajesh KUMAR

Purpose: To compare manual versus automated measurement of choroidal thickness in glaucomatous eyes using enhanced depth imaging (EDI) spectral-domain optical coherence tomography (SD-OCT).

Methods: Methods were tested on a set of 42 enhanced depth SD-OCT (Cirrus 4.5; Carl Zeiss Meditec, US) images of 42 eyes of patients with primary open-angle glaucoma, primary angle-closure suspect, primary angle-closure glaucoma, or primary angle-closure. Before segmentation, B scans were processed to minimize speckle noise. Bruch membrane (BM) was detected by searching for the layer with the largest gradient below the retinal pigment epithelium layer of the retina, and change in intensity of the image at the choroid–sclera interface (CSI) was used as a threshold to detect CSI. Subfoveal choroidal thickness and peripapillary choroidal thickness were estimated using the automated segmentation and manual segmentation techniques were compared.

Results: The mean central subfield CT was 324.9 µm (range, 123–566 µm) and varied significantly with both spherical equivalent (P < 0.001) and axial length (P < 0.001), but not age or sex. On multiple linear regression analysis using spherical equivalent, the coefficients were 20.0 for the central subfield, ranged from 16.9 to 19.9 for the inner subfields, and decreased to 13.9 to 16.2 for the outer subfields. Performing regression analysis using axial length, the coefficients were −36.4 for the central subfield, −30.5 to −34.5 for the inner subfields, and −24.6 to −27.3 for the outer subfields.

E-Poster No.: EP-0198

Macular Choroidal Thicknesses in Healthy Adults—Relationship With Ocular and Demographic Factors

First Author: Colin TAN
Co-Authors: Kai Xiong CHEONG

Purpose: To determine the differences in choroidal thickness (CT) among different groups of refractive errors and axial lengths and to describe the rates of CT change with ocular and demographic factors in various regions of the macula.

Methods: A prospective cohort study of 150 healthy volunteers. Spectral domain optical coherence tomography was performed on both eyes using a standardized imaging protocol. Manual grading of the choroidal boundaries was independently performed by trained graders to determine Early Treatment Diabetic Retinopathy Study (ETDRS) subfield CT. Multiple linear regression analyses were performed to determine the effects of spherical equivalent, axial length, and age on CT in each subfield.

Results: Mean subfoveal choroidal thickness was 209.2 ±17.5 µm with the automated and 207.7 ± 19.9 µm with the manual technique. Mean peripapillary choroidal thickness was 177.1 ± 18.6 µm with the automated and 180.4 ± 20.7 µm with the manual technique. Bland–Altman plot for data illustrates good agreement between the 2 methods for peripapillary choroidal thickness measurement. The mean method difference was −3.3195 ± 14.67 µm, and the limit of agreement
Monotherapy in the Management of Refractory Vitreous Seeds in Retinoblastoma

First Author: Raksha RAO
Co-Author(s): Santosh HONAVAR, Vishal SHARMA, Vijay Anand PALKONDA

Purpose: To evaluate the efficacy of intravitreal topotecan injection as monotherapy for refractory vitreous seeds in retinoblastoma.

Methods: This was a prospective, interventional case series of 22 consecutive patients with retinoblastoma with refractory vitreous seeds managed over 2 years and followed up for at least 6 months after the completion of treatment. Institutional review board approval was obtained. Intravitreal injection of topotecan hydrochloride (30 μg in 0.15 mL) was provided by the safety enhanced technique as monotherapy in patients with persistent or recurrent focal and diffuse vitreous seeds. The main outcome measure was regression of vitreous seeds and eye salvage.

Results: Six eyes belonged to International Classification of Retinoblastoma group C and 16 belonged to group D. All the patients had received primary systemic chemotherapy with a combination of carboplatin + etoposide + vincristine for a mean of 9 (range, 6 to 18) cycles. Of these, 9 had received high-dose chemotherapy. Periocular carboplatin had been administered concurrently with systemic chemotherapy in 10 patients for a mean of 4 (range, 1 to 8) injections. Three patients had received prior intravitreal melphalan and had continued to show the presence of viable vitreous seeds after a mean of 5 (range, 3–9 injections); all 3 of them showed anterior uveitis with posterior synechiae formation and 2 had cataract. Twenty-two eyes of 22 consecutive patients with refractory vitreous seeds received a mean of 3 (range, 2 to 6) intravitreal topotecan injections. Complete regression of vitreous seeds was achieved in all (100%) patients at a mean follow-up of 11 (range, 6 to 20) months. One eye (4.5%) with a recurrent retinal tumor needed enucleation. In the rest of the 22 patients, no ocular or systemic complication was observed, and the visual acuity remained stable.

Conclusions: Intravitreal topotecan hydrochloride injection for refractory vitreous seeds in retinoblastoma appears safe and potent in a carefully selected subset of patients and seems to work even in those who had failed prior intravitreal melphalan.

E–Poster No.: EP–0209

A Rare Case of Lacrimal Gland Solitary Fibrous Tumor

First Author: Ko-fang CHANG
Co-Author(s): Yun-dun SHEN

E–Poster No.: EP–0202

3-Weekly Intravitreal Topotecan as

E–Poster No.: EP–0194

Spontaneous Resolution of Vitreomacular Traction: Case Series

First Author: Wei Cheng CHANG
Co-Author(s): Hsiao Ming CHAO, Chia-chen TSAI, Tsui-kang HSU, Yei-ching CHEN, Jorn-hon LIU

Purpose: To demonstrate the spontaneous resolution of vitreomacular traction (VMT) with spectral-domain optical coherence tomography (SD–OCT) and to evaluate the predicting factors.

Methods: We studied 5 eyes in 4 patients with VMT examined by SD–OCT. The VMT disorders of the 5 eyes underwent the natural course of spontaneous traction release from June 2012 to July 2015. During the whole course, all selected patients did not receive any treatment, namely, vitrectomy or intravitreal injection. We compared with other previous reported factors, and our cases were evaluated to analyze if there were any other predicting factors associated with the spontaneous resolution of VMT.

Results: In the 5 eyes, normal fovea contour after spontaneous release of VMT was found in 4 eyes. One eye with vitreous traction progressed to macular hole when VMT released. Furthermore, the hole was spontaneously closed 6 months later. The mean angle between the posterior hyaloid and the macula representing the strength of the traction was less than a previous report. Three eyes (60%) showed focal VMT, whereas 2 eyes (40%) demonstrated broad VMT. The horizontal adhesion diameter was less than 400 μm in 2 eyes and greater than 400 μm in 3 eyes. All eyes with VMT had isolated inner retinal distortion.

Conclusions: The present results support that isolated inner retinal distortion may be a better predicting factor for the release of VMT than horizontal adhesion diameter or mean vitreomacular angle.
Purpose: To report a case of lacrimal gland solitary fibrous tumor.

Methods: A case report.

Results: A 39-year-old male presented with severe left eye proptosis and orbital deformity for 3 years. Severe left eye proptosis resulted in progressive left eye orbital pain without movement for a period of 3 years. Hertel exophthalmometry showed a 9-mm forward displacement of the left eye compared with the right eye. MRI revealed a lesion 1.59 x 3.42 x 3.44 cm, occupying the left superolateral extraconal orbital cavity, displacing the left eyeball anteriorly and inferiorly, and also displacing the left superior and lateral rectus muscles. The tumor was removed through lateral orbitotomy with no complications. Follow-up at 1 year showed no recurrence of the solitary fibrous tumor. A definitive diagnosis of lacrimal gland solitary fibrous tumor was made on histopathological examination. The clinical and histological features of orbital solitary fibrous tumor are discussed.

Conclusions: Lacrimal gland orbital solitary fibrous tumor is a rare tumor originating from the mesenchyme. We will describe the clinical presentations, radiological and operative findings, and pathological features of a patient with lacrimal solitary fibrous tumor.

E-Poster No.: EP-0210

An Invasive Nasopharyngeal Carcinoma Patient With Eye Exenteration

First Author: Ya-ying WANG
Co-Author(s): Yun-dun SHEN

Purpose: To promote the knowledge of the molecular pathogenesis of nasopharyngeal carcinoma (NPC) invasiveness and metastasis and thus use that knowledge to block its pathway in a successful small scale animal trial. Human use may be tried case by case.

Methods: A 54-year-old male patient had a history of NPC s/p CCRT at Kuang Tien Hospital in Taichung for 5 years, paranasus cancer s/p for 3 years, left nasal cavity, and orbital cavity squamous cell carcinoma s/p lateral rhinotomy w/o facial bone reposition s/p tumor debulking at our hospital. His cancer was still progressing, and he came to our outpatient department. CT showed lacrimal sac tumor, and he was admitted for exenteration. Nasopharyngeal carcinoma is a unique virus–caused, highly invasive carcinoma of the head and neck, which without treatment, can cause skull base periosteal invasion. By studying recent publications, mostly from Southeastern China where NPC is prevalent, we gained a thorough understanding of NPC molecular pathogenesis, how EBV causes tumor growth and evades the human body immune system, how it gains its high invasiveness and metastatic ability, and possible pharmaceutical treatment by blocking this pathway and even immunotherapy using cytotoxic T cell therapy. This presentation will finish with a successful animal study: orthotopic xenograft of both undifferentiated and differentiated NPC cells in nude mice, and this sheds light on the possibility that human patients may use the same medication (sirolimus, tacrolimus, everolimus) to achieve tumor regression and maybe cure, especially if combined with other chemotherapy.

Results: EBV viral oncogene latent membrane protein 1 (LMP1) stimulates the transcription of eukaryotic translation initiation factor (eIF4E) to promote the proliferation, migration, and invasion of NPC. Sirolimus is a rapalag compound that is against TORC1 (mTORcomplex 1). mTORis a key component of PI3K/Akt/mTOR pathway that is strongly implicated in NPC. Phosphatidylinositol 3 kinase elf4E–BP (binding protein) epithelial mesenchymal antigen (EMA), which was stained immunohistochemically in this patient, are products of PI3K/Akt/mTOR signaling pathway. Orthotopic xenograft shows inhibition of NPC metastasis with sirolimus treatment.

Conclusions: The orthotopic xenograft may be used as a platform and sirolimus may be used in human invasive NPC when stained with EMA or eIF4E–BP positivity on a case–by–case basis to reduce its invasiveness and metastasis.

E-Poster No.: EP-0207

Clinical and Histopathologic Characteristics of Ophthalmic Non-Hodgkin Lymphoma Patients

First Author: Riani ASRINDI
Co-Author(s): Shanti BOESOIRIE

Purpose: To describe the clinical and histopathologic characteristics of ophthalmic non–Hodgkin lymphomas (NHLs).

Methods: Patient medical records were reviewed retrospectively. Thirty–seven patients with biopsy–proven ophthalmic NHLs were reviewed. Age, sex, anatomical location, regional lymph node enlargement, laterality, clinical signs and symptoms, therapy, recurrence, and histopathology subtype were recorded.

Results: Data was collected from 37 patients (41 eyes). Ophthalmic NHL was more frequent in men (75.7%) and as unilateral presentation (89.2%). The mean patient age was 54.6 years (range, 16–77 years). The most common complaint was lump (51.4%). Eyelid and conjunctival mass were the major orbital lesion symptoms (56.8%). Only 4 patients (10.8%) presented with regional lymph node enlargement. The eyelid with orbital involvement (24.3%) was the most frequently involved site. There was 1 patient (2.7%) who had intracranial involvement. Of the 37 histopathology specimens, there were 24 (64.9%) small lymphocytic
type low grade malignancy, 6 (16.2%) diffuse inter-
mediate lymphocytic type intermediate grade malignancy,
3 (8.1%) follicular type low grade malignancy, 3 (8.1%)
diffuse mixed type intermediate grade malignancy, and
1 (2.7%) diffuse large cell type high grade malignancy.

Conclusions: Similar to previous study results in Asian
countries, this study revealed a younger age at the
time of diagnosis, with male rather than female pre-
dominance and unilateral presentation. The most
common clinical signs and symptoms were eyelid and
conjunctival mass. The majority of histopathology
results showed small B-cell lymphomas, which had
better prognosis.

E–Poster No.: EP–0217
External Ciliary Tumor Resection Approach
Aiming for Vision Conservation
First Author: Lei GAO

Purpose: The optimal surgical approach that preserves
vision for patients who have ciliary tumor is still con-
troversial. We report 2 cases with successful surgical
treatment to discuss the surgical utility and technique
options.

Methods: Both patients were female, aged 44 and 53
years old, respectively. Ciliary tumor was diagnosed
and confirmed by slit lamp, gonioscopy, ultrasound,
UMB, and MRI. The tumor sizes were 8 x 6 x 4 mm and
8 x 5 x 4 mm, respectively. Both patients underwent
focal resection.

Results: The 2 patients were respectively followed
for 35 and 50 months postoperatively. There was no
evidence of tumor recurrence or severe surgical com-
plications. The corrected visual acuity measured at the
last follow–up visits were 0.8 and 0.5, respectively. The
pathology reports revealed melanocytoma for 1 patient
and squamous cell carcinoma for the other patient.

Conclusions: Focal resection of ciliary tumor can not
only conserve the eye ball, but also some of the vision.
An accurate diagnosis can be made by performing
pathological analysis on the resected tissue.

E–Poster No.: EP–0215
Exudative Retinal Detachment as Presenting
Feature of Undiagnosed Breast Carcinoma
First Author: Chanchal GADODIYA
Co–Author(s): Anamika AGRAWAL, Darshana RATHOD,
Anuja GHARAT

Purpose: To report a rare case of breast carcinoma
presenting as exudative retinal detachment and disc
edema.

Methods: A 35–year–old female presented with sud-
den painless diminution of vision in the left eye for 1
week, abdominal pain for 1 year, and multiple skin nod-
ules for 1 month. Left eye vision was hand movements,
perception of light and projection was accurate. Pupils
showed relative afferent pupillary defect, and anterior
segment was normal. Fundus revealed hyperemic disc
with blurred margins, elevated yellowish lesion supe-
rior to disc, inferior retinal detachment with shifting
fluid, and no peripheral break. Other eye examinations
were normal. Thus, a provisional diagnosis of exudative
retinal detachment was made.

Results: B–scan of the left eye showed thickened
posterior coat near optic nerve head with retinal de-
tachment. MRI revealed thickening and abnormal
enhancement of the posterior wall of the left eye.
CT of the abdothorax showed hypodense lesions in
kidneys, adrenals, pancreas, and liver with peripheral
enhancement; soft tissue lesion in right pubis; enhanc-
ing nodular lesion in breast; and necrotic nodes in the
right internal mammary region. Breast nodule biopsy s/ o
infiltrating breast carcinoma.

Conclusions: The incidence of ocular breast cancer
metastases varies from 5–30%, but it is rare to have
exudative retinal detachment as the initial manifes-
tation of an undiagnosed breast tumor. Better screening,
earlier detection, and better treatment modalities have
positively altered the prognosis and survival time of
patients with breast cancer, leading to an increased va-
riety of ocular manifestations. Because early diagnosis
and prompt management positively alter the progno-
sis, ophthalmologists should be aware of this entity.

E–Poster No.: EP–0213
Histopathological Profile of Orbital and
Periorbital Tumor in Ophthalmology–
Oncology Clinic at a Teaching Hospital: A
Retrospective Study
First Author: Doni WIDYANDANA
Co–Author(s): Indra MAHAYANA, Purjanto UTOMO,
Agus SUPARTOTO

Purpose: To profile the prevalence and incidence of
histopathological findings of orbital and periorbital
tumor in the ophthalmology–oncology clinic at a teach-
ning hospital that needs an adequate variety of cases for
education and research and to analyze and correlate
factors that could be related to the tumor, such as age,
sex, location, and malignancy.

Methods: Orbital and periorbital tumor histopatholog-
ical findings from the ophthalmology–oncology clinic
at a teaching hospital were recorded from 2014–2015.
Descriptive quantitative analysis was performed to
describe basic patient characteristics, such as age, sex,
anatomical location, and type of tumor. Correlations
among those factors were analyzed using Spearman
correlation test.
Results: The age range was from 2–80 years old (mean, 45) with 34 males and 40 females. We found that the tumor locations were intraorbital (10), palpebral (19), lacrimal (4), conjunctival (15), or other (25). There were 30 malignant cases. There was no correlation among all factors above, except a correlation between age and the type of tumor ($P < 0.05$). Older patients had a higher tendency to have a malignant orbital tumor.

Conclusions: There were no correlations among all factors related to the tumor, except a correlation between age and the type of tumor. The prevalence of orbital and periocular tumor occurrence were not shown only in a specific location, which is useful for education and research purposes at this teaching hospital.

E-Poster No.: EP-0214

Invasive Ocular Surface Squamous Neoplasia Masquerading as Necrotizing Scleritis: A Rare but Grave Diagnostic Dilemma

First Author: Somasheila MURTHY
Co-Authors: Swathi KALIKI, R MURALEEDHARA

Purpose: To report 3 cases of invasive ocular surface squamous neoplasia (OSSN) initially diagnosed and treated as necrotizing scleritis.

Methods: A case report of 3 patients.

Results: Case 1 was a 25-year-old male, who presented with a 6-month history of painful red eye. Incisional biopsy performed elsewhere was noncontributory. Based on the clinical picture, he was diagnosed with necrotizing scleritis with peripheral ulcerative keratitis and received high-dose immunotherapy with oral corticosteroids and cyclophosphamide. Systemic workup was negative for collagen vascular disorders. He was lost to follow-up over the next 8 months and presented with large corneal perforation. He underwent evisceration, and histopathological diagnosis revealed invasive squamous cell carcinoma. The second patient was a 56-year-old female treated for 6 months for necrotizing scleritis but progressively deteriorated. Local apperance of calcified plaque led to suspicion of OSSN, which was confirmed by biopsy pathology. Case 3 was a 56-year-old male with a 3-month history of pain. Initial work-up included serological investigations and incisional biopsy, which did not reveal OSSN. Follow-up showed worsening on therapy and appearance of calcific mass. Exenteration and subsequent histopathology showed invasive OSSN.

Conclusions: OSSN can present as necrotizing scleritis, especially in the invasive stage. Findings of calcific plaque and nonresponsiveness to immunosuppressive therapy should prompt the clinician to suspect a diagnosis of OSSN. Invasive carcinoma is more likely in these cases, necessitating exenteration and follow-up chemotherapy.

E-Poster No.: EP-0216

Kindle the Spindle: A Rare Case of Lid Leiomyosarcoma With Intraorbital Metastasis

First Author: Abhishek ONKAR
Co-Authors: Suwarna SUMAN

Purpose: To describe a rare case of spindle-cell leiomyosarcoma of the eyelid.

Methods: A 75-year-old female presented with complaints of severe pain in the right eye and right-sided headache for 2 months. She had a history of cataract surgery with intraocular lens implantation in the right eye 4 months previously. During the same time, a mass lesion was also removed from the underside of the right lower lid, which had been present for about 7–8 years. Her Snellen visual acuity was 6/60 in the right eye and 6/18 in the left eye with intraocular pressure (IOP) of 37.5 mm Hg and 18.6 mm Hg, respectively. Ocular movements were restricted in lateral and superior gazes in the right eye. Stony hard, tender induration could be recognized along the right inferonasal lid margin. Fundus examination revealed choriotretinal folds in the inferior quadrant peripherally. Computed tomography (CT) scan of the brain and orbit was advised, along with routine blood investigations and IOP-controlling medications.

Results: CT scan revealed a heterogenous cystic lesion measuring 17 x 16 x 21 mm in the anteroinferior right orbit, abutting the globe and inferior rectus with thickening of the uveoscleral ring. The right globe was compressed and displaced superolaterally. Earlier histopathological report of the excised lid tumor revealed low grade spindle-cell sarcoma.

Conclusions: Spindle-cell sarcoma of the lid is a rare entity. This case report reveals a spindle-cell sarcoma of the lid with intraorbital metastasis.

E-Poster No.: EP-0204

Malignant Ciliary Body Medulloepithelioma Necessitate Semi-Exenteration of Orbit

First Author: Yeen Fey HO
Co-Authors: Shu-ya WU, Yueh-ju TSAI

Purpose: To report a rare devastating case of malignant medulloepithelioma that necessitated semi-exenteration of the orbit.

Methods: A case report.

Results: A 12-year-old female patient was referred to our institute in January 2014 for uveitis evaluation. She had poor right eye vision since age 3 and was treated for amblyopia in a local clinic. Our initial ocular examination revealed right eye vision was 6/100 with exotropia, band keratopathy, anterior uveitis, iris neovascularization, secluded pupil, and elevated intraocular
pressure (IOP; 30–40 mm Hg). B-scan ultrasonography did not detect specific anomaly. Timolol was given to lower IOP, but she did not attend follow-up. One year later, she presented to our clinic with a rapidly growing, well-vascularized mass protruding from the upper nasal quadrant in her right eye. The eye was displaced inferolaterally, and the anterior chamber was collapsed with exudation and hyphema. Her right eye vision was negative for light perception. Computed tomography suggested a malignant orbital tumor at the medial canthus and periorbital region, extending from the eye globe. We performed incisional tumor biopsy, and the result suggested malignant medulloepithelioma. She subsequently received semi-exenteration of the orbit with lid preservation. Systemic survey revealed right parotid lymph node metastasis. She received radiotherapy for the tumor bed and right parotid area.

**Conclusions:** Medulloepithelioma is a rare intraocular tumor most commonly found in young children. Misdiagnosis is not uncommon. The tumor displays a variety of presentations such as unilateral uveitis and neovascular glaucoma, features that should prompt the clinician to investigate for this tumor.

**E-Poster No.: EP–0212**

**Orbital Cellulitis—A Diagnostic Challenge**

**First Author:** Swapnil RATHOD
**Co-Author(s):** Avinash INGOLE, Anjali Darius NICHOLSON, Sujit MURADE, Anuja GHARAT, Anamika AGRAWAL

**Purpose:** To evaluate a rare case presenting as orbital cellulitis.

**Methods:** An 80-year-old female presented with chief complaints of a gradual onset painful progressive diminution of vision, swelling of lid, and watery discharge in the left eye for 1 month. There were no ocular complaints in the right eye. She had a history of bronchial asthma and hypertension under treatment, along with a history in both eyes of cataract surgery with PCIOL implantation. The patient was afebrile. Vision was 20/40 in the right eye and hand movements in the left. Ocular findings were within normal limits in the right eye. The left eye showed that the lid was edematous, axial proptosis 22 mm, conjunctiva chemosed (fleshy appearance), ocular movements limited in all directions, and choroidal folds on fundus.

**Results:** Investigations including ESR, serum amylase, lipase (raised), blood sugar (normal), blood culture (negative), and conjunctival and nasal swab (no organisms detected) were done. Other routine blood investigations were normal. B–scan and CT of the orbit in the left eye were suggestive of orbital cellulitis. There was evidence of a lesion (4 x 4 mm) at the corneoscleral junction (calcification). USG abdomen showed a heterogenous hypoechoic lesion involving the body and tail of the pancreas suggestive of pancreatitis of neoplastic etiology. CECT abdomen showed pancreatic and liver lesions suggestive of neoplastic etiology. Liver biopsy revealed non–Hodgkin lymphoma (diffuse large B cell type). Immunohistochemistry showed tumor cells positive for CD20 and Bcl 2 and negative for CD10 and CD3. The patient was treated for orbital cellulitis and was managed on systemic and local antibiotics, but did not respond to treatment. The patient died within 1 month of presentation.

**Conclusions:** This is a rare case of non–Hodgkin lymphoma (diffuse large B cell type) masquerading as orbital cellulitis with local calcification (another rare finding). This case highlights the importance of thorough systemic evaluation of cases presenting as orbital cellulitis. There should be a comprehensive, multidisciplinary approach involving the ophthalmologist, hematologic oncologist, and radiologist to manage such cases.

**E-Poster No.: EP–0201**

**Orbital Metastases of Breast Carcinoma**

**First Author:** Sonal CHAUGULE
**Co-Author(s):** Kaustubh MULAY, Vijay Anand PALKONDA, Santosh HONAVAR

**Purpose:** To study the clinical presentation, histopathology, management, and ocular and systemic outcomes in patients with orbital metastases of breast carcinoma.

**Methods:** This was a retrospective, noncomparative, interventional case series. Twelve consecutive patients with orbital mass with previously diagnosed breast carcinoma were studied.

**Results:** Diplopia was the most common presenting complaint. Restriction of ocular movement and enophthalmos were the most common examination findings. Concurrent systemic metastasis was found in 5 (42%) cases on PET–CT scan. All patients had been treated with systemic chemotherapy previously for the primary tumor, whereas local radiotherapy had been provided in 5 (42%). All patients received stereotactic orbital radiotherapy, whereas 8 (67%) patients were given adjuvant chemotherapy. Vision was >20/200 in 9 (75%). Local and systemic control was achieved in 83% at a mean follow-up of 22 months.

**Conclusions:** Treatment for orbital metastases is inevitably palliative. A combination of chemotherapy and stereotactic radiotherapy may help preserve vision and prolong life.

**E-Poster No.: EP–0203**

**Orbital Pyoderma Gangrenosum Mimicking Malignant Tumor**

**First Author:** Hideki TSUJI
**Purpose:** To report a case of orbital pyoderma gangrenosum mimicking malignant tumor.

**Methods:** A case report. The patient was a 36-year-old woman and was referred to Cancer Institute Hospital, Tokyo (CIH) of the Japanese Foundation for Cancer Research (JFCR) with a left orbital tumor. At age 16, a skin biopsy had been done, and she had been diagnosed as pyoderma gangrenosum. Orbital MRI imaging suggested adenoid cystic carcinoma or mucoepidermoid carcinoma, etc.

**Results:** Biopsy specimen of the orbital mass revealed pyoderma gangrenosum. The lesion has been shrunken with oral steroid treatment for 2 years.

**Conclusions:** Although pyoderma gangrenosum is rare, it should be considered in the differential diagnosis of orbital diseases.

**E-Poster No.:** EP-0211

**Plaque Brachytherapy for Invasive Ocular Surface Neoplasia**

*First Author: Vishal SHARMA*

*Co-Author(s): Sonal CHAUGULE, Raksha RAO, Vijayanand P REDDY, Santosh HONAVAR*

**Purpose:** A case series of plaque brachytherapy to salvage eyes with invasive ocular surface neoplasia.

**Methods:** A multicenter retrospective chart review of 10 cases with evidence of corneal stroma, scleral, and/or uveal invasion treated by affixing a radioactive episcleral plaque (Pd103 or Ru106) over the tumor and free-margin. An intraocular dose was delivered to a point 2 mm from the inner sclera, cornea, or tumor apex. Follow-up included comprehensive ophthalmic oncology workup.

**Results:** Local control was achieved (n = 9/10; 90%). One patient underwent orbital exenteration to control mucoepidermoid carcinoma. None developed metastatic disease over a mean follow-up of 15 months (3 to 70 months).

**Conclusions:** In select cases with invasive ocular surface neoplasia, plaque brachytherapy has potential to save the globe and thus vision.

**E-Poster No.:** EP-0482

**Presenting Age and Histopathological Stage of Retinoblastoma in Cambodia**

*First Author: Grace BUTEL-SIMOES*

*Co-Author(s): Heidrun GOLLOGLY*

**Purpose:** To investigate the clinical and histopathological features of eyes diagnosed with retinoblastoma at a surgical subspecialty center in Cambodia. Results were compared with international data from regional countries published in the past 10 years.

**Methods:** A retrospective chart review of 25 children (28 eyes) who presented from January 2005 to February 2015 and underwent enucleation with a histopathological retinoblastoma diagnosis was performed to collect demographics, presenting clinical features, histopathological stage (pathological grades pT1a–pT4d), and clinical course including recurrence. Data was then compared with recent findings from regional countries published in the past 10 years.

**Results:** During the study period, 25 children (40% female; average age 31.2 ± 1.26 months) presented with initial symptoms as follows: leukocoria, 85.7%; pain, 25.0%; eyelid swelling, 17.9%; proptosis, 14.3%; and orbital cellulitis, 3.6%. These results are similar to comparison studies. Five cases had bilateral retinoblastoma (20.0%) and 4 cases recurred, a rate significantly higher than comparison studies (P = 0.046). Pathological stage revealed a skew toward more advanced stages that was not statistically significant; however, aggressive and extraocular tumors were more common in this study than in comparison studies. Proptosis and cellulitis were more common in the pT4 group.

**Conclusions:** Cambodian children with retinoblastoma present with similar symptoms and demographics to those previously reported. However, they do exhibit more advanced stage retinoblastoma and are more likely to have recurrence compared with other regional Asian study findings.

**E-Poster No.:** EP-0206

**Primary Central Nervous System Lymphoma With Vitreoretinal Involvement—A Case Report**

*First Author: Ya-chi HUANG*

*Co-Author(s): San-ni CHEN, Jieh-ren JOU*

**Purpose:** To describe a rare case of primary central nervous system lymphoma with vitreoretinal involvement treated with intravitreal injections of methotrexate (MTX).

**Methods:** A case report.

**Results:** A 76-year-old man had primary central nervous system lymphoma (diffuse large B cell lymphoma) and had undergone craniotomy, chemotherapy, and radiotherapy. Ocular lymphoma was found in his left eye (OS) and 2 months later, in his right eye (OD). Visual acuity was 20/2000 OD and no light perception OS. Ocular examination revealed a vitreous infiltration (OD) and a subretinal infiltration with pale optic nerve (OS). He received a treatment protocol studied by Frenkel et al, which included injection of 400 µg/0.1 mL MTX.
intravitreally twice weekly for 4 weeks, once weekly for 8 weeks, and then once monthly for 9 months, for a total of 25 injections. Currently, he has received 14 injections in the right eye. Visual acuity was 20/200 OD and 20/2000 OS. There were no immediate ocular or systemic side effects.

**Conclusions:** A primary central nervous system lymphoma with ocular involvement is a rare malignancy. Vitreoretinal involvement of lymphoma can be controlled effectively and without serious adverse reactions with intravitreal MTX injections. The clinical results also lead us to propose systemic effects of intravitreal MTX injections. Intravitreal MTX injection can be considered another option for intraocular lymphoma other than chemotherapy or radiotherapy.

**E-Poster No.: EP-0205**

**Small Cell Lung Carcinoma Presenting With Facial Palsy and Iris Tumor**

**First Author:** Hao-jung LI  
**Co-Author(s):** Yung-chuan SUNG, Yi-shin LIU, Chih-heng HUNG, Shwu-huey LEE

**Purpose:** To report a case of small cell lung carcinoma (SCLC) that initially presented with facial palsy and iris tumor.

**Methods:** A case report.

**Results:** A 60-year-old man, who was a former smoker for 30 years and was previously healthy, presented with right side facial droop and red eye for 1 month. His initial best corrected visual acuity was 20/40 in the right eye and 20/30 in the left eye, with intraocular pressure 16 mm Hg in both eyes. Aside from moderate cataract formation in both eyes, a gelatinous nodule measuring 3x2 mm was found at the 9-o’clock pupillary margin of the iris with an otherwise silent anterior chamber in the right eye. On physical examination, several firm nodules were palpated around the bilateral neck and inguinal area. Computer tomography demonstrated multiple nodules on the brain and neck, suspecting a metastatic origin, and positron emission tomography scan also revealed numerous malignant tumors in bilateral lung, mediastinum, liver, spleen, pancreas, and several lymph nodes. Both excision biopsy of iris and neck nodule discovered metastatic small cell carcinoma which were verified by positive staining with CK (AE1/AE3) with dot–like pattern, synaptophysin, chromogranin A, CD56, and TTF-1. He received chemotherapy with cisplatin and etoposide combined with whole brain radiotherapy, and most palpable nodules regressed gradually.

**Conclusions:** We reported a very rare case of SCLC initially presenting with facial palsy and iris tumor. As SCLC is notorious for its rapid growth and early metastasis, early diagnosis and treatment may be beneficial to the patient.

**E-Poster No.: EP-0208**

**Wide Excision Surgery Combined With Cryotherapy and Application of Topical Mitomycin C for Ocular Surface Squamous Neoplasia**

**First Author:** Yurike TIURMA

**Purpose:** To report a patient with right eye ocular surface squamous neoplasia (OSSN).

**Methods:** A case report of a 56-year-old man with right eye OSSN that was treated with wide excision surgery combined with cryotherapy and application of topical mitomycin C (MMC).

**Results:** A 56-year-old man with right eye OSSN was treated with surgical excision with a wide margin about 2-3 mm from the lesion. The surgery was performed with minimal manipulation. Cryotherapy was done as adjuvant treatment to make ischemic infarction of abnormal tissue. Lastly, topical use of MMC was performed to inhibit fibroblast cell migration. He showed good response after the treatment. There was no recurrence after 1 year of treatment.

**Conclusions:** Surgical excision combined with cryotherapy and application of topical MMC can reduce the recurrence of OSSN.

**E-Poster No.: EP-0218**

**Comparison Between Cleaning Eyelids After Taking Off False Eyelashes With Eye Makeup Remover Alone and Eye Makeup Remover With Ocusoft**

**First Author:** Vachira SONTICHAI  
**Co-Author(s):** Manchima MAKORNWATTANA

**Purpose:** Nowadays, false eyelashes are widely used from adolescence to working age by women in Thailand. However, not all clean their eyelids after removing false eyelashes or use special products to remove the adhesive glue. The glue residue may cause dry eyes, eyelid inflammation, or possible infection of the cornea. This study compares the glue residue on eyelashes after using eye cleansing products alone or in combination with Ocusoft.

**Methods:** A randomized clinical trial was conducted to collect information from all interested participants at Thammasat University Hospital from January to February 2015. We randomly selected eyes to be wiped with cleansing products and water. Then, a
photo was taken and the amount of glue residue along the lashes line determined. Statistical analysis was performed using paired t test.

**Results:** All study participants were female, mean age 31.59 years. There was no statistically significant difference between the eyes cleaned with Ocusoft and those cleaned with water ($P = 0.3251$).

**Conclusions:** There is no difference between cleaning eyelashes with Ocusoft and cleaning lashes with water. Thus, both methods are inadequate for removing glue residue left behind by false eyelashes.

**E-Poster No.:** EP-0219

**Scientific Publications of Taiwanese Ophthalmologists**

*First Author: Wen-ming HSU*

**Purpose:** To collect and analyze scientific papers published by Taiwanese ophthalmologists from 1985 to 2014.

**Methods:** The scientific publications (from 1985 to 2014) of Taiwanese ophthalmologists from local and international ophthalmology-related journals were searched and analyzed.

**Results:** There were approximately 4800 scientific papers written by Taiwanese ophthalmologists from 1985 to 2014. Among these papers, approximately 2900 were published in local journals, whereas 1900 were in journals abroad. Most local papers (2783) were published in the *Transactions of the Taiwan Ophthalmological Society*. Approximately 1520 papers (31.7%) were published in Science Citation Index (SCI) journals. Some significant SCI journals included *Journal of Ocular Pharmacology and Therapeutics* (89 papers), *Eye* (87), *Journal of Cataract and Refractive Surgery* (58), *Cornea* (56), *British Journal of Ophthalmology* (62), *American Journal of Ophthalmology* (60), *Investigative Ophthalmology & Visual Science* (58), *Ophthalmology* (48), *Archives of Ophthalmology* (46), and *Retina* (36). There were 9 papers that were cited more than 100 times and 15 papers cited 50 to 99 times according to data from Web of Science.

**Conclusions:** The quantity of scientific publications of Taiwanese ophthalmologists from 1985 to 2014 is relatively good, although the quality of the publications is relatively weak.

**E-Poster No.:** EP-0226

**Evidence-Based Medicine of Diabetic Retinopathy Screening in Type 2 Diabetes: A Population-Based Study in Kinmen, Taiwan**

*First Author: Tao-hsin TUNG*

**Co-Author(s):** Shih-jen CHEN, Fenq-lih LEE, Jorn-hon LIU

**Purpose:** To discuss the epidemiologic and economic evaluation of diabetic retinopathy based on a population-based screening experience in Kinmen, Taiwan.

**Methods:** From 1991 to 1993, 971 type 2 diabetes patients underwent diabetic retinopathy screening performed by a panel of ophthalmologists using on-site indirect ophthalmoscopy and 45-degree color fundus retinal photographs during 1999 to 2002 and then utility and willingness-to-pay values were evaluated in 2003. The basic epidemiology, multistate natural history, and economic evaluation of screening for diabetic retinopathy were estimated.

**Results:** In addition to poor glycemic control, which
was the most significant risk factor for the development of diabetic retinopathy and significant prognostic factor for the progression of nonproliferative diabetic retinopathy to proliferative diabetic retinopathy or blindness, longer duration of diabetes, higher systolic blood pressure, and elevated serum triglyceride levels were also associated with the development of diabetic retinopathy. The average time of development from no diabetic retinopathy to blindness was approximately 26.5 years. The different degrees of diabetic retinopathy were revealed to decrease the utility value and increase the willingness-to-pay values after adjustment for the confounders. Assessing the progression of diabetic retinopathy following the proliferative pathway and through economic evaluation suggests that screening for diabetic retinopathy is worthwhile and that an annual screening interval should be recommended.

Conclusions: In addition to indicating a series of demographic and biochemical markers related to diabetic retinopathy, this study also demonstrated the screening efficacy and optimal screening interval for early detection of diabetic retinopathy.

E-Poster No.: EP–0225

Lack of Awareness, Neglect, and Late Referrals—The Trilogy of Preventable Blindness: A Study of Blindness in Eyes With No Light Perception

First Author: Abhishek ONKAR
Co-Author(s): Gunjan PRAKASH, Nisha CHAUHAN

Purpose: This was an evaluation of patients with no perception of light (No PL) for causes of preventable blindness.

Methods: A cross-sectional study of 68 patients with No PL was done with history-taking, examination, and review of medical records.

Results: Sixty-eight cases (40 males, 28 females) ranging in age from 10–75 years were evaluated. Phthisis after traumatic eye injury, postoperative endophthalmitis, primary glaucoma, and leucomatous corneal opacities were major causes identified. Forty-eight patients belonged to a lower socioeconomic group, and 36 did not seek any medical help initially. Twenty of these were females. Among the 20 cases with relatively better socioeconomic status, 12 didn’t seek medical help, including 7 females. Fifty of the 68 patients visiting the outpatient department had vision less than 6/60 in the other eye.

Conclusions: Trauma, postoperative endophthalmitis, primary glaucoma, and leucomatous corneal opacities were major causes of blindness in this study. Low socioeconomic status, neglect, female sex, and good vision in fellow eye were contributory factors.

E-Poster No.: EP–0220

Ocular Injuries From Dust Explosion at Taiwanese Water Park: Single Medical Center Experience

First Author: Yi-lin LIAO
Co-Author(s): Shin-yi CHEN

Purpose: To report the correlation between ocular involvement and systemic conditions in the event of a dust explosion at a water park in Taiwan.

Methods: A total of 50 cases who were victims of a dust explosion on June 27, 2015, were sent or transferred to Chang Gung Memorial Hospital, Linkou. We reviewed the charts of these cases retrospectively to compare their ocular injuries with systemic conditions. The factors evaluated included total body surface area (TBSA), burn degree, facial burn, inhalation injury, and expiration. Information related to goggle/glasses wearing was also obtained via phone calls and clinical visits.

Results: There were 22 male and 28 female patients. The mean extent of burn was 45.92% TBSA, with 12% of patients having burns of less than 20% TBSA and 6% having burns of 80% TBSA or more. There were 2 deaths within 1 month for a mortality rate of 4%. Twenty-five cases (50%) had facial burns, and 28 cases (56%) had inhalation injury confirmed by bronchoscopy. Ocular involvement was greater in patients with facial burns, 72% vs 8%, and inhalation injury, 64.3% vs 9.1%. All cases of mortality had ocular involvement. Ocular involvement was not correlated with TBSA.

Conclusions: There were correlations between ocular involvement and mortality and facial burn and inhalation injury. There was no correlation between ocular involvement and TBSA.

E-Poster No.: EP–0224

Ophthalmic Epidemiology in Taiwan

First Author: Wen-ming HSU
Co-Author(s): Chi-hsin HSU, Allen LIN

Purpose: To review the development of ophthalmic epidemiology and to summarize some important articles regarding ophthalmic epidemiology from Taiwan.

Methods: Articles concerning ophthalmic epidemiology from open information of the Bureau National Health Insurance (BNHI) of Taiwan, Acta Societatis Ophthalmologicae Sinicae (1985 to 2010), Taiwan Journal of Ophthalmology (2011 to 2014), and PubMed resources (1985 to 2014) were searched and analyzed.

Results: In 2014, there were a total of 1728 ophthalmologists serving a population of 23.4 million people in Taiwan. Among the ophthalmologists, approximately 300 are interested in the field of epidemiology. From 1985 to 2014, Taiwan ophthalmologists have pub-
lished approximately 250 academic papers (some 90 articles in Science Citation Index journals) in the field of ophthalmic epidemiology. In these papers, part of the study materials are from fieldwork investigations, whereas the rest are from the National Health Insurance Research Database (NIHR). Three representative examples of ophthalmic epidemiology from fieldwork are shown. Many epidemiological articles, which have been published in SCI journals using the NHIR database, are demonstrated.

**Conclusions:** Ophthalmic epidemiology has been developing in Taiwan during the past 30 years. There were around 300 ophthalmologists who worked in the field of ophthalmic epidemiology. From 1985 to 2014, Taiwan ophthalmologists published approximately 250 academic papers on ophthalmic epidemiology. The resources provided by BNHI contain invaluable information on epidemiological studies of ophthalmic diseases in Taiwan.

**E-Poster No.: EP-0223**

**Prevalence of Refractive Errors in Population Aged 50+**

*First Author: Anita MUSKALSKA*

*Co-Authors: Krzysztof MUSKALSKI, Mariola DORECKA*

**Purpose:** To determine the prevalence of refractive errors (myopia, hyperopia, and astigmatism) in the population aged 50+ and their influence on quality of life.

**Methods:** Two hundred fifty–five patients with myopia, hyperopia, and astigmatism were included in the population aged 50+ evaluation. Age ranged from 50 to 75 years old. One hundred fifty–seven patients were female, and 98 patients were male. Exclusion criteria were ocular pathologies with major influence on visual acuity, mainly cataract, intraocular lenses (IOLs), glaucoma, keratoconus, and corneal dystrophies. Patients underwent autorefractometry, far distance best corrected visual acuity (BCVA) correction, slit lamp examination, fundus eye examination, and quality of life questionnaire evaluation.

**Results:** The most frequent far distance refractive error in the examined population aged 50+ was hyperopia (≥+0.5 D) in 127 patients. In 78 patients, myopia was present (≥-0.5 D), and in 17 patients astigmatism (≥-0.5 Dcyl). Astigmatism (≥-0.5 Dcyl) accompanying hyperopic and myopic patients was present in 90 cases. Twenty–eight patients were emmetropic. All refractive errors had influence on patient quality of life, especially regarding professional skills, driving a car, watching TV or films, and hobbies. Most hyperopia was diagnosed during this study.

**Conclusions:** Regular far distance visual acuity examination and refractive error correction play a significant role in improving quality of life in the population aged 50+.

**E-Poster No.: EP-0221**

**Risk Factors for Myopia Progression in Second-Grade Primary School Children in Taipei: A Population-Based Study**

*First Author: Chih-chien HSU*

*Co-Authors: Pei-yu LIN, Der-chong TSAI, Ching-yao TSAI, Lin-chung WOUNG, Catherine LIU*

**Purpose:** To evaluate the progression of myopia and associated risk factors in second–grade primary school children in Taipei.

**Methods:** This population–based study is a part of the Myopia Investigation Study in Taipei (MIT), which is a 3–year follow–up cohort study starting from June 2013, with all the second–grade children in Taipei invited to participate. A questionnaire was distributed to the participants’ parents, and their written informed consent was obtained before performing eye examinations annually. Eye examinations that included visual acuity testing and cycloplegic autorefraction were done twice a year. Multiple logistic regression models were applied to assess possible risk factors associated with the progression of myopia. Myopia was defined as spherical equivalent (SE) ≤ -0.5 diopters (D) in either eye. The more myopic eye was included into analysis when both eyes were myopic. We also defined myopia progression as slow (△ SE ≤ -0.5 D), medium (-1.0 D ≤ △ SE < -0.5D), and fast progression (△ SE < -1.0 D), where △ SE meant the change of SE in the past year.

**Results:** A total of 4214 children were myopic in 2013, and only 2677 (63.5%) children completed the eye examinations 1 year later in 2014. Among these children, 56.1%, 19.1%, and 24.8% showed slow, medium, and fast myopia progression, respectively. When compared with slow myopia progression, fast myopia progression was associated with greater baseline spherical equivalent [odds ratio (OR), 1.004], more time spent on near work every day (OR, 1.13), and shorter visual distance when doing near work (OR, 1.48). Unexpectedly, slow myopia progression was not associated with the use of cycloplegics as myopia treatment or spending more time in outdoor activities.

**Conclusions:** In our study, 24.8% of second–grade myopic children in Taipei showed fast myopia progression. Our findings indicate decreasing the time spent on near work and longer visual distance when doing near work may be a feasible way to slow myopic progression. Although the treatment efficacy of cycloplegics is proved in many studies, treatment compliance is still doubted in clinical practice.
E-Poster No.: EP-0230

Endonasal Endoscopic Nasolacrimal Duct Dissection for Primary Nasolacrimal Duct Obstruction

First Author: Yun-dun SHEN  
Co-Author(s): Ko-fang CHANG, Wen-ming HSU

Purpose: To examine the surgical result of endonasal endoscopic nasolacrimal duct dissection (EES-NLDD) for primary nasolacrimal duct obstruction.

Methods: A retrospective chart review from February 2012 to June 2015 was performed for 27 sides of 26 patients with primary nasolacrimal duct obstruction who underwent EES-NLDD. This technique involved minimal dissection of the lacrimal sac mucosa and extended dissection of the nasolacrimal duct mucosa down into the insertion of inferior turbinate. The patients were followed up postoperatively at 1, 2, and 4 weeks and every month for a minimum of 6 months. Anatomical success was defined as patency on lacrimal irrigation at 6 months. Functional success was defined as improvement or complete resolution of epiphora at the last follow-up.

Results: Anatomical success was demonstrated on 27 sides of 26 patients. Epiphora completely resolved in 24 sides of 23 patients and partially resolved in 3 sides of 3 patients. No significant intraoperative or postoperative complications were noted.

Conclusions: EES-NLDD showed a high anatomical success rate and favorable functional success rate for primary nasolacrimal duct obstruction.

E-Poster No.: EP-0259

A Case of Potentially Lethal Red Eye: Cavernous Sinus Thrombosis Caused by Septic Emboli

First Author: Jyh-cheng LIOU  
Co-Author(s): Chofan YANG

Purpose: To present the case of a 27-year-old man with fatal right red eye caused by septic emboli.

Methods: A case report.

Results: A 27-year-old man fell down the stairs, and as a result of the fall, lost consciousness and received a right raccoon eye. Bilateral restricted eye motions and proptosis of the right raccoon eye with lid laceration were noted. An ophthalmic exam revealed visual acuity was 0.08 in the right eye (OD) and 0.5 in the left eye (OS), and intraocular pressure was 22 mm Hg OD and 17 mm Hg OS. Hertel exophthalmometry measured 23 mm OD and 20 mm OS. The right pupil showed a poor light reflex with relative afferent pupillary defect. Limited extraocular movement was noted in all gaze directions in both eyes, especially in abduction. Brain angiography showed right cavernous sinus, right superior ophthalmic vein thrombosis, and partial left cavernous sinus thrombosis. After high-dose intravenous antibiotics and diabetic control, the clinical condition improved. His left ophthalmic findings resolved, with the abduction deficit being the last symptom to resolve.

Conclusions: Septic cavernous sinus thrombosis is rare but is associated with significant morbidity and mortality. Septic cavernous sinus thrombosis is an emergency, as it can have devastating complications. It requires an interdisciplinary approach and immediate aggressive therapy, especially the use of antibiotics. One must always consider that proptosis could be caused by an infectious etiology.

E-Poster No.: EP-0274

A Unique Ophthalmic Manifestation in Job Syndrome

First Author: Aditi AGARWAL  
Co-Author(s): Anjali Darius NICHOLSON, Avinash INGO-LE, Darshana RATHOD

Purpose: To be aware of ophthalmological manifestations of Job syndrome.

Methods: A 4-year-old male, a known case of Job syndrome, had swelling in the right eyelid for 3 weeks. The patient was uncooperative for vision. On examination, the right eye showed upper and lower lid edema, conjunctival congestion, and chemosis; cornea and anterior segment were normal. Extraocular movements appeared to be restricted in the right eye. Disc was pale in the right eye. Anterior segment and fundus of the left eye were within normal limits. There was swelling over the right maxillary area, and skin was eczematosid with multiple abscesses all over the body. CT of the brain, orbit, and PNS showed a right-sided 4 × 3 × 1.5 cm preseptal abscess in the intraorbital extraconal space along the lateral wall up to the optic canal, right zygomatic abscess, parapharyngeal abscess, buccal space abscess, and deep parotid abscess. Patient was started on injectable ceftriaxone and vancomycin, and preseptal abscess incision and drainage was done through the lateral route. USG-guided aspiration of deep parapharyngeal abscess and zygomatic abscess was also done. Culture report of pus drained from the abscess showed staphylococcal growth.

Results: Eleven days later, repeat CT of the orbit showed a reduction in the size of the preseptal abscess to 3.3 × 2.6 × 1 cm. Parapharyngeal abscess and zygomatic abscess were found to be resolving, too. The patient was kept under close follow-up, and 2 months later right lid swelling reduced significantly.

Conclusions: This is a very unique ophthalmic presentation in Job syndrome, and ophthalmic surgeons need to be aware of this manifestation to ensure prompt...
medial and surgical intervention. A survey of the literature failed to reveal such a case.

E-Poster No.: EP-0244
An Infrequent Lacrimal Lesion, Dacryops: A Case Series
First Author: Wei Kuang YU
Co-Author(s): Shu Ching KAO, Chieh Chih TSAI
Purpose: To report the clinical characteristics, histopathology, and outcome of lacrimal dacryops.
Methods: A retrospective chart review was performed on 3 patients with histopathologically confirmed dacryops. Clinical data, image findings, histopathology, and outcome were reviewed.
Results: The average age of the patients was 39 years. All cases were unilateral and presented as an upper lid mass at lateral side. All 3 lesions were bluish–tinged, cystic lesions extending from the palpebral lobe of the lacrimal gland. The average lesion diameter on computed tomography (CT) was 8.83 millimeters. Histopathology revealed classic double-layered epithelial cyst in all cases. No recurrence was noted in an average follow-up of 6.3 years.
Conclusions: Dacryops is an infrequent lacrimal lesion with unique characteristics and clinical findings. It is an important differential diagnosis when considering a mass lesion in the upper fornix and lacrimal gland. CT imaging is very helpful in delineating the extent and size of the lesion. Surgical excision with histopathology can confirm the diagnosis.

E-Poster No.: EP-0241
Association of Differences of Exophthalmetry and Interpalpebral Fissure Measurements in Enophthalmos Caused by Orbital Wall Fracture
First Author: Eungsuk LEE
Purpose: A patient group with enophthalmos after orbital fracture was studied using exophthalmetry to determine the relationship between the degree of enophthalmos and difference of interpalpebral fissure (IPF). Relevance of other potentially related factors including patient sex, age, medical history, the position of fracture, and the number of fractures were also considered.
Methods: The present study was conducted on 45 patients with enophthalmos after orbit fractures. Several factors that might have relevance to enophthalmos were taken into account to perform exophthalmetry. These factors included patient sex, age, medical history, the position of fracture, and the number of fractures. These factors were analyzed for possible correlation with the degree of enophthalmos. We performed a Pearson correlation analysis to identify correlation between the degree of enophthalmos and difference of IPF measurement values. We also examined whether correlation changed after some factors, including medical history, age, and the number of fractures, were adjusted.
Results: In a patient group with enophthalmos after orbital wall fracture, correlations between the degree of enophthalmos and the difference of IPF measurements was weakly positive (R = 0.299) but statistically significant (P = 0.046). When factors were adjusted, correlation coefficient increased to R = 0.316 and was still statistically significant (P = 0.044).
Conclusions: In a patient group with enophthalmos after orbital wall fracture, correlation exists between the degree of enophthalmos and the difference of IPF measurements. This will help predict the degree of enophthalmos and the difference of IPF by exophthalmetry measurement.

E-Poster No.: EP-0268
Buccal Mucous Membrane Grafting for Cicatricial Entropion
First Author: Hee Bae AHN
Co-Author(s): Eun Jung SOHN, Yoon Hyung KWON, Won Yeol RYU, Woo Jin JEONG, Seoung Hyun AN
Purpose: To evaluate the use of anterior lamellar recession or posterior lamellar resection with buccal mucous membrane grafting for the treatment of cicatricial entropion.
Methods: A retrospective chart review was performed on all cases of anterior lamellar recession or posterior lamellar resection with buccal mucous membrane grafting performed by 1 surgeon for cicatricial entropion or trichiasis of the upper or lower eyelids from June 2008 to May 2014. The height of each graft was measured during and after surgery, and the amount of contraction was measured for each graft.
Results: Twelve eyelids underwent anterior lamellar recession, 14 eyelids underwent posterior lamellar resection, and all patients had buccal mucosal graft. Twenty–six eyelids (14 upper lids, 12 lower lids) were identified in 16 patients. Mean patient age was 56.3 years. The mean follow–up period was 7.9 months (range, 2–24 months). One eyelid underwent repeat grafting for recurrent entropion secondary to graft dislocation. The mean graft contraction rate was 18% after 12 months. There was a reduction in the frequency of patients reporting discomfort, foreign body sensation, tearing, and pain after treatment in 23 eyelids. Two eyelids had recurrent entropion that was managed by electrolysis or cilia epilation.
Conclusions: Minimal graft contraction can be antici-
Corrected with the use of mucosal graft. Anterior lamellar recession or posterior lamellar resection with buccal mucous membrane grafting in patients with cicatricial entropion is a simple and cosmetically effective procedure without complications.

**E-Poster No.: EP-0267**

**Clinical Characteristics and Treatment Outcomes of Lacrimal Plug—Related Canaliculitis**

*First Author: Chieh Chih TSAI*
*Co-Author(s): Yu-yun HUANG, Wei-kuang YU, Shu Ching KAO, Hui-chuan KAU, Catherine LIU*

**Purpose:** To investigate the clinical characteristics and treatment outcomes of lacrimal plug–related canaliculitis.

**Methods:** Patients with plug–related canaliculitis between 2007 and 2015 in a medical center were collected.

**Results:** Charts were reviewed for clinical features, microbiological profiles, time lapse between plug insertion and symptom onset, type of plug, and outcomes.

**Conclusions:** Plug–related lacrimal canaliculitis appear to be more prevalent in women and show a distinct microbiological profile. Retrieval of infected plug by canaliculotomy and adequate antibiotics could achieve a good outcome.

**E-Poster No.: EP-0249**

**Clinical Features of Patients With Congenital Nasolacrimal Duct Obstruction who Removed Silicone Tube Early Due to Prolapse**

*First Author: Sang-duck KIM*
*Co-Author(s): Jae-wook YANG*

**Purpose:** To evaluate clinical features such as the silicone tube retention time and improvement of epiphora in patients with silicone tube intubation for congenital nasolacrimal duct obstruction who removed the silicone tube early because of prolapse.

**Methods:** We conducted a retrospective chart review of 19 patients (19 eyes) who underwent silicone tube intubation for treatment of congenital nasolacrimal duct obstruction but removed the silicone tube due to prolapse.

**Results:** Mean silicone tube retention time was 34.9 days and, except for the case in which the tube was removed after 3 months, mean silicone tube retention time was 21.4 days. All 19 patients had no epiphora, despite early removal of the silicone tube.

**Conclusions:** Although the silicone tube was removed early due to prolapse in patients with congenital nasolacrimal duct obstruction, this is thought to have no influence on surgical outcome. Further study to evaluate surgical outcome considering the site of obstruction is needed.

**E-Poster No.: EP-0239**

**Correction of Involutional Entropion With Retractor Redirection**

*First Author: Yen-chang CHU*
*Co-Author(s): Yueh-ju TSAI, Shu-ya WU*

**Purpose:** To report the surgical outcome of a retractor redirection procedure for involutional entropion repair.

**Methods:** This study included all cases diagnosed with involutional entropion and significant ocular irritation who presented from August 2008 to October 2012. Forty–seven eyelids in 38 patients were included in this study. All cases were operated on by 1 surgeon and had a minimum of 12 months follow–up. Success was defined as cases showing no recurrence of entropion with forceful eyelid squeezing postoperatively. A retrospective chart review was performed to assess the success rate, recurrences, and complications of the procedure.

**Results:** During a mean follow–up period of 26.2 months (range, 12–53 months), 5 patients died during the study period. Two eyelids (4.3%) of 1 patient had a recurrence at 34 months postoperatively. No other postoperative complications or dissatisfaction were reported.

**Conclusions:** The retractor redirection procedure aims to prevent orbicularis muscle overriding via repairing the anterior layer of the retractors which insert to the anterior lamellae. It yields a long–term success rate of 95.7% and is an effective technique for correcting involutional entropion.

**E-Poster No.: EP-0258**

**Correction of Lower Eyelid Retraction With Silicone Sheet in Patients With Graves Ophthalmopathy**

*First Author: Wei Kuang YU*
*Co-Author(s): Chieh Chih TSAI*

**Purpose:** To report a new surgical material for the correction of lower eyelid retraction by using a silicone sheet as a posterior lamellar spacer graft.

**Methods:** We retrospectively reviewed 8 patients with dysthyroid lower eyelid retraction undergoing repair using PERTHESE silicone sheet (150 x 200 x 0.5 mm, with polyester reinforcement) as a spacer graft in Taipei Veterans General Hospital between January 2011 and July 2015. Outcome measures included MRD2 (measured from the center of the pupil to the inferior eyelid margin), reduction of exposure keratopathy, cosmetic...
satisfaction, complications, and need for further surgery. All patients were evaluated on follow-up at 1 week, 1 month, and 3 months after the operation.

**Results:** The mean preoperative MRD2 was 8.0 ± 1.19 mm, whereas the mean MRD2 measured 3 months after surgery was 5.75 ± 1.1 mm. The average MRD2 improvement after operation was 2.25 ± 0.38 mm. There was a statistically significant difference between preoperative and postoperative MRD2 (Wilcoxon signed-rank test, \( P = 0.01 \)). All cases achieved reduction of exposure keratopathy and cosmetic satisfaction 3 months after surgery. No evidence of infection or allergic reaction was noted during follow-up. None of the patients needed further surgeries.

**Conclusions:** A silicone sheet can provide a safe and effective spacer graft for the correction of lower lid retraction in patients with Graves ophthalmopathy.

**E-Poster No.:** EP-0247

**Dramatic Visual Recovery From Dysthyroid Optic Neuropathy After Methylprednisolone Pulse Therapy: A Case Report**

*First Author: Chiayeu CHEN*

*Co-Authors: Jieh-ren JOU, San-ni CHEN*

**Purpose:** To report a patient who was treated with intravenous methylprednisolone 125 mg 4 times daily for 6 consecutive days.

**Methods:** A case report of thyroid-associated optic neuropathy.

**Results:** A patient with acute dysthyroid optic neuropathy (DON) was identified with worsening vision and EOM limitation. MRI showed enlarged and inflamed extraocular muscles. Steroids had also been used intravenously to treat DON. Visual acuity, visual field, and optic discs were analyzed during hospitalization and at 1 week after treatment. The patient showed a significant improvement in all clinical and visual parameters of DON within the first week of follow-up. The patient avoided surgical decompression because of a good visual recovery.

**Conclusions:** High-dose intravenous methylprednisolone was effective in restoring visual function in a patient with DON. We therefore recommended intravenous methylprednisolone as an emergency treatment for DON with the purpose of replacing or postponing orbital decompression.

**E-Poster No.:** EP-0236

**Early Single-Stage Repair for Open Orbital Fractures**

*First Author: Wei LU*

**Purpose:** Orbital fractures with periorbital wounds create actuality due to timing of debridement, fracture reconstruction, and soft-tissue repair. This study focuses on the feasibility of enduring an early single-stage surgery for open orbital fractures.

**Methods:** Twenty-three patients reporting with open orbital fractures were enrolled for early single-stage surgery for both orbital reconstruction and peri-orbital soft-tissue repair. Approval from the concerned ethical committee was sought. Inclusion criteria was radiographic evidence of significant orbital bone fracture(s), surgery within 48 hours after trauma, and use of titanium implant. Exclusion criteria was patient age <18 years, grade IV patients as per a classification for periorbital injury, or compromised conditions. Surgical complications and reconstructive outcomes were assessed for 6 months.

**Results:** The mean difference (SD) of reconstructed orbit relative to intact orbit was 1.37 (1.61) mm (paired \( t \) test, \( P = 0.002 \)). Enophthalmos was effectively corrected in 14/19 cases, whereas it was improved in 5/19 cases. One case of local wound infection was noted at 1 week. Neither flap necrosis/rejection incidence (0/11) nor infection of titanium implant was reported. Over 6 months, a logarithmic likelihood on the Stony Brook Scar Evaluation Scale was established (\( R^2 = 0.9896 \)). Other outcomes included residual diplopia in secondary gazes (3) and ectropion (1); these were complex fractures. Hypoesthesia resolved in all but 3 patients under recovery. Observational evaluation of 3D reconstructed CT images and clinical photographs showed proper reconstruction.

**Conclusions:** Complications inherent to the operative proceedings were low and mostly related to the complexity of the trauma. An early single-stage repair yields optimum functional and aesthetic outcomes. Titanium is a valid material for alloplastic hardware.

**E-Poster No.:** EP-0254

**Effect of Botulinum Toxin-A on Corneal Astigmatism in Patients With Hemifacial Spasm**

*First Author: Tammy OSAKI*

*Co-Authors: Teissy OSAKI, Midori OSAKI, Flavio HIRAI, Nambi NALLASAMY, Mauro CAMPOS*

**Purpose:** To evaluate corneal astigmatism changes in hemifacial spasm (HFS) patients during 1 complete botulinum toxin–A (BTX–A) treatment cycle.

**Methods:** This prospective study evaluated corneal astigmatism changes in affected and in normal contralateral eyes of HFS patients before BTX–A (Botox, Allergan) applications in the affected hemiface and at 15 days, 2, 3, and 4 months. Corneal topography was performed using ATLAS (Carl Zeiss). Visual acuity (best corrected and uncorrected) was also evaluated and
measured using the logMAR scale.

**Results:** Twenty-four patients (16 females) were treated with BTX-A. On the normal side, mean astigmatism value was 0.9 ± 0.64 D before treatment, and no significant difference was observed after treatment ($P > 0.05$). On the affected side, mean astigmatism value was 2.63 ± 2.46 D before treatment. A statistically significant decrease in astigmatism was observed at 15 days ($P = 0.017$), 2 ($P = 0.0004$), and 3 months ($P = 0.01$). Subdividing patients into with-the-rule (WTR) and non-WTR astigmatism groups, the reduction in astigmatism magnitude was significant only at 2 months ($P = 0.020$) in the WTR group (17 patients). In the non-WTR group, no significant changes ($P > 0.05$) were observed after treatment. Although a statistically significant reduction in astigmatism values was observed in the affected eye, no statistically significant difference was observed in visual acuity measurements over the study period ($P > 0.05$).

**Conclusions:** The results suggest that treatment with BTX-A in patients with HFS leads to significant temporary changes in corneal astigmatism in the affected eye during BTX-A period of action. However, these changes do not appear to be clinically significant, as significant improvement in visual acuity has not been observed.

**E-Poster No.: EP–0265**

**Enucleation Versus Evisceration in Ocular Trauma: A Retrospective Review and Study of Current Literature**

**First Author:** Albert WU  
**Co-Author(s):** Chengjie ZHENG

**Purpose:** To compare variables and outcomes from ocular trauma leading to either enucleation or evisceration to better inform surgical decision–making.

**Methods:** We reviewed 441 patients presenting with ocular trauma to a level 1 trauma center in Queens, New York between 2001 and 2012. Of these, there were 16 enucleations and 6 eviscerations. Retrospective chart review noted age, sex, mechanism of injury, initial and final visual acuity, time to surgery, length of follow–up, pain, degree of motility, and complications. A review of literature in the context of our study was performed.

**Results:** Twenty patients were male and 2 patients were female; average age was 44 (SD, 20.0; range, 18–91). Nine of 16 patients were enucleated to prevent sympathetic ophthalmia, whereas only 1 of 5 patients was eviscerated for this indication ($P = 0.1619$). No cases of sympathetic ophthalmia were reported over an average follow–up of 316 days. Average length of follow–up varied significantly between the 2 groups, with an average of 370.4 days (SD, 566.9; range, 0–1870) for enucleated eyes and 172.7 days (SD, 146.3; range, 0–422) for eviscerated eyes ($P = 0.42$). Medpor implants were preferred in eviscerations (5/6 eviscerations), whereas hydroxyapatite implants were preferred in enucleations (10/16 enucleations, $P = 0.04$).

**Conclusions:** Surgical decision–making in ocular trauma is largely based on surgeon preference and experience, with minimal evidence in the literature to support either enucleation or evisceration. We recommend evisceration over enucleation in cases of reliable patient follow–up due to the low incidence of sympathetic ophthalmia.

**E-Poster No.: EP–0256**

**Fibro-Osseous Lesions of the Orbit and Face—A Case Series**

**First Author:** Janice LAM  
**Co-Author(s):** Stephanie YOUNG, Raghuraj HEGDE, Shantha AMRITH, Gangadhara SUNDAR

**Purpose:** To describe clinical manifestations, approach in management, and treatment outcomes of fibro-osseous lesions of the orbit and face.

**Methods:** A retrospective review of patients diagnosed with fibro-osseous lesions of the orbit and face in the past 5 years. Clinical manifestations, histopathological findings, radiologic reports, management, and treatment outcomes of these patients were documented.

**Results:** Four cases of fibrous dysplasia, 2 cases of osteoma, and 2 cases of ossifying fibroma were reviewed, with a median follow–up of 9 months. Five patients were male, and age at diagnosis ranged from 4–63 years with a median of 19 years. Presenting complaints included presence of hard lump at orbital rim, eye protrusion, cheek swelling, and progressive globe displacement. Surgeries were performed in 4 patients and involved surgical excision of the tumor with reconstruction of the defects. Management of these patients was multidisciplinary, and surgeries were performed with otolaryngology and plastic surgery services as needed.

**Conclusions:** Benign bony tumors of the face and orbits are rare and include a diverse group of pathologic conditions. Complete surgical excision of the tumor and subsequent reconstruction is challenging. This series highlights the need for a multidisciplinary approach in the accurate diagnosis and management of patients with fibro-osseous lesions.

**E-Poster No.: EP–0231**

**Filariasis of the Eyelid: A Rare Clinical Entity**

**First Author:** Syeed KADIR

**Purpose:** We report a rare case of eyelid subcutaneous filariasis in Bangladesh.

**Methods:** A thorough clinical history, meticulous evalu-
First Author: Sonal CHAUGULE
Co-Author(s): Raksha RAO, Vishal SHARMA, Santosh HONAVAR

**Purpose:** To study the outcome of intralesional picibanil (OK 432) injection in patients with orbital lymphangioma.

**Methods:** Five patients with symptomatic orbital lymphangioma were managed with intralesional picibanil injection (1 KE/5 mL).

**Results:** Indications for treatment included disfiguring proptosis in 3 patients, recurrent hemorrhage in 1, and ocular motility restriction with diplopia in 1. Two patients with predominantly macrocystic lesions underwent percutaneous aspiration and picibanil injection, whereas 1 patient with microcystic lesion underwent direct injection. Two patients with mixed features underwent debulking and injection under direct visualization. Four patients needed 2 injections, whereas 1 patient needed 3 injections. Clinically and radiologically evident tumor regression was noted in all cases with a mean follow-up of 6 months, without any local or systemic side effects.

**Conclusions:** Intralesional injection of picibanil (OK 432) is safe and effective in the management of orbital lymphangioma.

E-Poster No.: EP-0242

**Isolated Lower Eyelid Cysticercosis Masquerading as an Epidermoid Cyst—A Case Report**

First Author: Poonam RAI
Co-Author(s): Akshay NAIR, Chhaya Ashok SHINDE, Nayana POTDAR

**Purpose:** We report a rare and unusual case of isolated eyelid cysticercosis in a middle aged woman masquerading as an asymptomatic slowly growing subcutaneous painless mass in the left eyelid, which was presumed to be a benign cyst of appendegeal origin such as an epidermoid cyst. This case highlights the ubiquitous nature of cysticercosis in tropical countries and the need for a high degree of suspicion while surgically treating subcutaneous masses.

**Methods:** We report a case of a middle aged female presenting with a painless mass in the lower lid. On complete excision and histopathological diagnosis, the mass was found to be an isolated lid cysticercosis with no associated neurocysticercosis.

**Results:** Microscopic examination was consistent with a diagnosis of cysticercosis. The larva could be visualized within a cyst that showed 3 discrete layers: an outer cuticular layer, a middle cellular layer, and inner fibrillary layer, which could be seen in a typical racemose pattern (Fig. 2). Magnetic resonance imaging (MRI) of
Management of Congenital Severe Microphthalmos With Microblepharon

First Author: Raksha RAO
Co-Author(s): Santosh HONAVAR, Raju KUMAR

Purpose: To evaluate the role of cosmetic rehabilitation by staged prosthetic–surgical management in congenital microphthalmos (with no visual potential) with microblepharon.

Methods: In this retrospective, interventional case series of 6 consecutive patients, 5 underwent expansion of the eyelids and fornices with serial conformers, followed by enucleation by the myocutaneous technique with silicone orbital implant. One was managed by serial conformers, followed by lateral canthoplasty. Socket expansion was continued with serial customized conformers until the horizontal palpebral fissure and the vertical eyelid height matched with the contralateral eye. A customized ocular prosthesis was then fitted.

Results: Eyelid and socket expansion with excellent static cosmesis and good prosthetic motility was achieved in all the patients.

Conclusions: Staged prosthetic–surgical management provides excellent static and dynamic cosmesis in patients with congenital severe microphthalmos with microblepharon.

E–Poster No.: EP–0250

Methods to Avoid a Forehead Scar in Frontalis Suspension for Severe Ptosis

First Author: Ruth CHEN
Co-Author(s): Katya TAMBE

Purpose: We describe the efficacy and surgical methods of a single trapezium (modified Fox pentagon) for nylon suture and double triangle (modified Crawford) for autologous facia lata (FL) in frontalis suspension.

Methods: A retrospective case review was performed on children who underwent frontalis suspension over a 5–year period (2010–2014). Thirteen children underwent the modified techniques with either the single trapezium (supramid) or the two–triangle (FL) technique. Data were analyzed for pre– and postoperative margin reflex distance 1 (MRD1), palpebral aperture (PA), eyelid contour, lagophthalmos, and patient/parent satisfaction. Success was based on the following criteria: satisfactory contour, clearance of pupillary axis, postoperative MRD1 of 2 to 4.5 mm or PA > 7 mm, and intereyelid height asymmetry of ≤1.5 mm. Secondary outcomes noted were complications and redo rates.

Results: All the patients had congenital ptosis; 85% (11/13) of patients had simple congenital ptosis, and 15% (2/13) had blepharophimosis, ptosis, and canthus inversus syndrome (BPES). Mean age was 8.6
Methods: In a boy who had congenital ptosis, the modified Fox pentagon technique allows the nylon suture to be buried deep under the brow fat, reducing the likelihood of suture exposure and granulomas, whereas the modified Crawford technique allows for a shorter length of FL to be harvested.

Conclusions: The modified methods have good success rates. They avoid an unsightly forehead scar. The modified Fox pentagon technique allows the nylon suture to be buried deep under the brow fat, reducing the likelihood of suture exposure and granulomas, whereas the modified Crawford technique allows for a shorter length of FL to be harvested.

E-Poster No.: EP-0248

Minimally Invasive Surgery for Deep Orbital Cavernous Hemangioma

First Author: Hongfei LIAO

Purpose: To explore the effect of the surgical removal of deep orbital cavernous hemangioma in a minimally invasive way.

Methods: The clinical data of 63 cases of deep orbital cavernous hemangioma with surgical excision, including the surgical approach, surgical techniques, and surgical results, were retrospectively analyzed.

Results: There were 32 cases of orbital surgery with the conjunctival approach; lateral orbitotomy, 17 cases; 6 cases of orbital surgery with medial skin; 6 cases of lateral orbital combined with medial conjunctiva of lateral orbit; and 2 cases of nasal endoscopic approach. All patients were treated with complete resection of cavernous hemangioma without any visual loss.

Conclusions: Using the concept of minimally invasive surgery, the choice of the appropriate surgical approach can save patients the greatest degree of visual function and even improve the visual function of patients with orbital cavernous hemangioma.

E-Poster No.: EP-0251

Modified Frontalis Suspension Surgery Using Autogenous Fascia Lata in Congenital Ptosis

First Author: Purjanto UTOMO
Co-Author(s): Indra MAHAYANA

Purpose: Congenital ptosis typically has poor levator muscle function. Frontalis suspension is the most satisfactory surgical option for the correction of congenital ptosis by connecting the tarsal plate to the frontalis muscle with a sling. Autogenous fascia lata is commonly utilized due to its long-term effect and low rate of complications. Here, we describe a newly modified frontalis suspension surgery technique, which was used in a boy who had congenital ptosis.

Methods: The procedure was performed with a piece (“sheet-shape”) of autogenous fascia lata. The fascia (2 cm in width and 3.5 cm in length) was harvested with 1 end fascia lata and divided into 3 splits (each with 1 cm length). A full-width skin incision in the eyelid crease was made followed by a 1-cm incision in the upper eyebrow. Then, the preseptal tunnel was created from the eyebrow incision through the eyelid skin crease incision. Those 3 partitions of the fascia lata were then fixated with the tarsus in the central, medial, and lateral sites. The other end was then passed through the preseptal tunnel and fixated to the frontalis muscle to adjust the height of the eye opening. Eyelid crease was made by suturing the skin to skin.

Results: This modified frontalis suspension surgery technique satisfactorily corrected ptosis in the patient, and the eyelid crease was formed nicely. There were no other complications found.

Conclusions: This modified frontalis suspension surgery, using autogenous fascia lata, revealed a promising outcome for the treatment of congenital ptosis.

E-Poster No.: EP-0261

Modified Lateral Orbitotomy With Minimal Skin Incision for the Removal of Benign Orbital Tumors

First Author: I-chan LIN
Co-Author(s): Yun-dun SHEN

Purpose: To describe a modified technique of lateral orbitotomy and review the surgical outcomes.

Methods: A retrospective chart review was performed for 21 sides of 21 patients with benign orbital tumor removal through a modified technique of lateral orbitotomy. This technique was started with a 1.5-cm horizontal lateral canthotomy, involving both the skin side and the conjunctival side. A wide subgaleal dissection along the lateral orbital rim to the frontal and the zygomatic area was then performed. After exposing the lateral orbital rim, a T-shaped incision on the lateral orbital rim was then performed, which was followed by a wide subperiosteal dissection into the internal orbit and along the lateral orbital rim. The lateral canthal tendon and the periosteum along the lateral rectus muscle were divided, so a wide exposure of the lateral orbital area could be obtained. The lateral orbital osteotomy could therefore be executed at the zygomatic frontal suture and at the level of zygomatic arch. These patients were followed up postoperatively at every week in the first month postoperatively. Patients followed up less than 1 month were excluded in this series.

Results: The removal of the benign orbital tumor was successfully performed in 21 patients. No postoperative vision complications were noted in any of these patients. No significant deformity at the lateral canthal...
area was noted.

Conclusions: This modified technique of lateral orbitotomy with minimal skin incision is a safe approach for the removal of benign orbital tumors.

E-Poster No.: EP-0240

Nasolacrimal Duct Probing for Congenital Nasolacrimal Duct Obstruction Combined With Lacrimal Fistula

First Author: Chih-heng HUNG
Co-Authors: Shun-ling LIN, Shuting KAO, Shwu-huey LEE

Purpose: To analyze the treatment of patients with symptomatic congenital nasolacrimal duct obstruction (NLDO) combined with lacrimal fistula by a single ophthalmologist over 10 years.

Methods: In this retrospective chart review from 2004 to 2013, 14 eyes with NLDO combined with lacrimal fistula in 13 patients (8 female, 5 male) were included. Recorded data included age, sex, symptoms (epiphora and/or discharge), and the methods of treatment. Treatment success was defined as anatomic patency by immediate irrigation after probing or silicone tube intubation and absence of epiphora and mucous discharge from the fistula and the eye(s) at the follow-up visit.

Results: Mean age of presentation in 13 patients was 11.1 months old (range, 3.2 to 28.5 months). All presented with epiphora from the fistulous opening and the affected eye(s). Four cases had bilateral NLDO and 1 among them had bilateral fistulae. Ten of 14 eyes (71.43%) had dacryocystitis. There were 14 eyes receiving nasolacrimal duct probing under topical anesthesia. Finally, 10 of 14 eyes (71.43%) were successfully treated with only 1 probing. One of 4 eyes with probing failure was successfully treated after the second probing. Another 1 eye with probing failure was successfully treated with bicanalicular silicone tube intubation under general anesthesia. The remaining 2 unsuccessful eyes (14.29%) with dacryocystitis were lost to follow-up.

Conclusions: Congenital NLDO combined with lacrimal fistula can be successfully treated with probing under topical anesthesia in most eyes. Adjunctive management with silicone tube intubation can be reserved for those probing failure cases.

E-Poster No.: EP-0275

Nasopharyngeal Carcinoma With Lacrimal Sac Metastasis—An Exenteration Case

First Author: Ya-ying WANG
Co-Authors: Yun-dun SHEN

Purpose: To explain the natural course, pathology, molecular development, and treatment of this situation.

Methods: A literature review.

Results: To be added.

Conclusions: To be added.

E-Poster No.: EP-0263

Ocular Manifestations in Cases of Bell Palsy

First Author: Purnima RAJKARNIKAR
Co-Authors: Raju KAITI, Pooja SHRESTHA

Purpose: Bell palsy is the most common diagnosis of isolated, frequently idiopathic unilateral acute facial nerve palsy. It often causes ocular morbidity, which is annoying to the patient. It is usually reported by otorhi-
Bell palsy is commonly seen in young adults aged 16–30 years old. Both eyes were equally involved among our cases. Although 21 (30.4%) patients complained of blurring of vision, 60% had best corrected vision of 6/9 or better. Only 1 patient needed surgery, whereas the rest of the patients healed with medical and physical therapy. Twenty–three patients (33.2%) were completely resolved within 1 month, with 3 of them being resolved in 10 days. Our study also showed that younger male patients recovered faster than older people.

**Conclusions:** Bell palsy is commonly seen in young adult females. They often present within a few days of the onset of symptoms. Complete recovery occurs within 6 months, though the recovery rate is faster in younger individuals. Vision–threatening complications are rare.

**E–Poster No.: EP–0253**

**Orbital Cellulitis With Panophthalmitis After Bacteremia During 20th Week of Gestation: A Case Report**

First Author: Simranjeet AULAKH  
Co–Author(s): Chhaya Ashok SHINDE, Nayana POTDAR

**Purpose:** To present a rare case of orbital cellulitis with panophthalmitis after bacteremia in a patient during the 20th week of gestation.

**Methods:** A 25–year–old female patient in the 20th week of gestation was referred with complaints of sudden onset painful loss of vision in the right eye for 2 days after developing tender swelling over the site of intravenous access. The patient was being treated with intravenous ferrous sucrose for anemia. The patient was transferred to ophthalmology and investigated. Thorough ocular examination, blood culture, and MRI of the orbit were done.

**Results:** Blood culture was positive for methicillin–sensitive *S. aureus*. MRI was suggestive of orbital cellulitis. B–scan ultrasound showed features of panophthalmitis. The patient was started on appropriate systemic and topical therapy and showed improvement after 7 days. There was further improvement after systemic steroids. However, stromal infiltrate led to corneal perforation after 2 days. Right eye was eviscerated and on discharge, the patient was asymptomatic with a healthy fetus.

**Conclusions:** Orbital cellulitis during pregnancy has been reported very rarely. Bacteremia during pregnancy itself is a rare occurrence, the incidence being 0.3% as reported by Surgers et al. In this case, anemia led to an immunocompromised state, which in turn led to the development of bacteremia with endogenous orbital cellulitis with panophthalmitis. As the vision was not salvageable, evisceration was done to remove the septic foci and safeguard the pregnancy.

**E–Poster No.: EP–0266**

**Outcome of LPS Tucking: Case Series of 26 Patients at the National Institute of Ophthalmology, Dhaka**

First Author: Shawkat–ara SHAKOOR

**Purpose:** To assess the outcome of LPS tucking in moderate to severe ptosis with good LPS function.

**Methods:** This prospective study was carried out at the National Institute of Ophthalmology and Hospital from January 2012 to December 2014. Twenty–six patients with moderate to severe ptosis and good LPS function were included in the study. Patients with a history of previous lid surgery and poor LPS function were excluded. All surgeries were done under local anesthesia by the same surgeon. Three stay sutures were placed on the upper lid margin at the level of the pupil and temporal and nasal limbus. Eyelid crease incision was given maintaining symmetry with the contralateral eye. The orbicularis was separated and undermined to expose the orbital septum and the upper half of the tarsal surface. The orbital septum was then cut through its entire extent, exposing the fat pad. Whitnall ligament was identified. Three double–armed sutures with 6/0 vicryl were passed about 2 mm from the upper border of the tarsus at the level of the 3 stay sutures. The sutures were then passed through the Whitnall ligament maintaining the same level. The sutures were tightened. Lid crease was formed; eyelid skin was closed with 6/0 vicryl and a frost suture was applied.

**Results:** During our study, we did LPS tucking surgery on 26 patients, 15 male and 11 female. The mean age of the sample was 21.8 ± 3.2 years. Ptosis was severe in 9 (34.6%) and moderate in 17 (65.4%) cases. Bell was good in 15 patients (57.7%) and fair in 11 patients. No patient had MGJWP. After surgery, 24 patients achieved satisfactory cosmetic outcomes. In 2 patients, the lid crease needed to be reformed. We looked for complications of the surgery and found conjunctival prolapse in 1 patient (1/26, 3.8%), which was resected later. No revision surgery was needed for any of the patients.
Conclusions: LPS tucking is an easier procedure for the management of moderate to severe ptosis and does not have a steep learning curve. The results were satisfactory with very minimal complications. This could be practiced at the community level to correct ptosis.

E–Poster No.: EP–0276

Outcome of Upper Eyelid Blepharoplasty With Concurrent Müller Muscle Conjunctival Resection

First Author: Emmy LI
Co-Author(s): Hunter YUEN

Purpose: To determine the effect of concurrent blepharoplasty and Müller muscle conjunctival resection (MMCR) surgery on eyelid position.

Methods: This was a retrospective case series. Medical records of 22 patients who received concurrent upper eyelid blepharoplasty and MMCR were reviewed. In this study, blepharoplasty consisted of skin removal and debulking of orbicularis and fat, leaving the tarsus intact. Conjunctivomullerectomy was performed after blepharoplasty, and the wound was closed with a single run of prolene suture.

Results: There were 18 cases of bilateral blepharoplasty with bilateral MMCR and 6 cases of bilateral blepharoplasty with unilateral MMCR. Operating time and complications were documented. Preoperative and postoperative palpebral fissure height and margin-reflex distance 1 were compared. Patient satisfaction on functional and cosmetic outcomes was assessed.

Conclusions: Combining MMCR surgery with upper eyelid blepharoplasty provides a reliable and satisfactory option to correct dermatochalasis and ptosis in the same setting in a relatively short operating time.

E–Poster No.: EP–0233

Posttraumatic Enophthalmos Corrected With Medpor Orbital Implants

First Author: Yun-dun SHEN
Co-Author(s): Allen LIN

Purpose: To report a case of posttraumatic enophthalmos corrected with Medpor orbital implants.

Methods: A case report.

Results: A 19–year-old female presented to our emergency department with traumatic facial injury to the right side. Initial CT findings showed a Le Forte level III fracture, right zygomaticomaxillary complex (ZMC), bilateral zygomatic bone and arches, orbital floor plus medial wall blowout fracture, and nasal bone fracture. Her ophthalmic exam showed EOM limitation to the up, down, and left gaze (OD) with a 4 mm enophthalmos in the right side. The patient received surgical repair of a 3 cm wide blowout fracture of the orbital floor with prefabricated titanium plate (OD), orbital rim and maxillary fixation with titanium miniplate screw implants, and reduction of the zygomatic arch. After the first operation, the EOM limitation resolved. However, Hertel exophthalmometry still showed a 4 mm enophthalmos in the right side. Therefore, the patient received a secondary enophthalmos correction surgery 6 months after her accident. Multiple sheets of Medpor plates were implanted over the medial wall and over the titanium mesh of the orbital floor. After her surgery, Hertel exophthalmometry showed a 1 mm residual enophthalmos in the right eye.

Conclusions: The treatment of Le Fort level III fractures combined with enophthalmos poses a difficult challenge, especially if the orbital volume has increased in size resulting in a sunken eyeball. Secondary implants with Medpor sheets over areas that have previous fractures can greatly reduce orbital volume and correct
enophthalmos challenges.

**E-Poster No.: EP-0245**

**Preliminary Results of Balloon Dacryoplasty With Nunchaku-Style Tube Intubation for Lacrimal Passage Obstructions**

*First Author: Shang-yi CHIANG  
Co-Author(s): Ke-hung CHIEN, Da-wen LU*

**Purpose:** To describe the surgical technique of balloon dacryoplasty (DCP) combined with Nunchaku–style tube intubation for the treatment of lacrimal passage obstruction and assess its effectiveness.

**Methods:** Fifteen cases (12 patients) diagnosed with adult–onset lacrimal passage obstruction underwent balloon dacryoplasty combined with Nunchaku tube intubation.

**Results:** At the final examination, irrigating fluid passed readily through the lacrimal passage in 12 (80.0%) of the 15 cases who underwent balloon dacryoplasty with Nunchaku–style tube intubation (anatomical and functional patency).

**Conclusions:** Balloon dacryoplasty with Nunchaku–style tube intubation represents an alternative, minimally invasive and effective technique in the management of lacrimal passage obstruction. We regard this surgical technique as the first choice for the treatment of this condition. However, a larger study group is required to confirm our results.

**E-Poster No.: EP-0271**

**Primary Biphasic Synovial Sarcoma: A Case Report and Literature Review on a Rare Case of Orbital Involvement**

*First Author: Amit RATHORE  
Co-Author(s): Sima DAS*

**Purpose:** Synovial sarcoma is one of the most common soft tissue malignancies in young adults, usually involving extremities. Despite its name, it is now not thought to be derived from the synovium. Tumors of the head and neck are rare, and only very few cases of orbital involvement have been previously reported. In our case report, we describe various immunohistochemical markers found to be positive in various neoplasms.

**Methods:** We describe a case of primary biphasic synovial sarcoma of superomedial aspect of the orbit causing proptosis. A 26-year-old young woman underwent orbitotomy and excision biopsy. Histopathology followed by immunohistochemistry confirmed it.

**Results:** An encapsulated nodular mass measuring 3 × 2.5 × 1.8 cm was excised. Cut surface was grey–white and nodular with cystic areas. In microscopic view, circumscribed spindle cell tumour with a variably hyalinized and myxoid stroma was seen. Analysis showed cytokeratin (CK) immunoreactive score 1+, epithelial membrane antigen (EMA) immunoreactive score 3+, glial fibrillary acidic protein (GFAP) nonimmunoreactive score -0 in neoplastic cells, and S–100 immunoreactive score 1+ in neoplastic cells. A thorough clinical and radiological search for a primary lesion in the head and neck, trunk, and limbs was done. CECT thorax was within normal limits. Adjuvant treatment with radiation was advised.

**Conclusions:** Immunohistochemistry differentiates less malignant tumors from more malignant tumors and also from benign/malignant tumors. Complete metastatic work–up is necessary and adjuvant chemo/radiotherapy should be considered accordingly.

**E-Poster No.: EP-0482**

**Presenting Age and Histopathological Stage of Retinoblastoma in Cambodia**

*First Author: Grace BUTEL-SIMOES  
Co-Author(s): Heidrun GOLLOGLY*

**Purpose:** To investigate the clinical and histopathological features of eyes diagnosed with retinoblastoma at a surgical subspecialty center in Cambodia. Results were compared with international data from regional countries to determine whether the pathology was consistent with other regional countries or indicated a more aggressive grouping of tumours.

**Methods:** A retrospective chart review of 25 children (28 eyes) who presented from January 2005 to February 2015 and underwent enucleation with a histopathological retinoblastoma diagnosis was performed to collect demographics, presenting clinical features, histopathological stage (pathological grades pT1a–pT4d), and clinical course including recurrence. Data was then compared with recent findings from regional countries published in the past 10 years.

**Results:** During the study period, 25 children (40% female; average age 31.2 ± 1.26 months) presented with initial symptoms as follows: leukocoria, 85.7%; pain, 25.0%; eyelid swelling, 17.9%; proptosis, 14.3%; and orbital cellulitis, 3.6%. These results are similar to comparison studies. Five cases had bilateral retinoblastoma (20.0%) and 4 cases recurred, a rate significantly higher than comparison studies (P = 0.046). Pathological stage revealed a skew toward more advanced stages that was not statistically significant; however, aggressive and extraocular tumors were more common in this study than in comparison studies. Proptosis and cellulitis were more common in the pT4 group.

**Conclusions:** Cambodian children with retinoblastoma present with similar symptoms and demographics to those previously reported. However, they do exhibit more advanced stage retinoblastoma and are more
likely to have recurrence compared with other regional Asian study findings.

E-Poster No.: EP-0272

**Primitive Neuroectodermal Tumors of Orbit in Children: Largest Case Series**

*First Author: Tayyab AFGHANI*

**Purpose:** To present the clinical features of peripheral primitive neuroectodermal tumors (pPNETs) of the orbit in children.

**Methods:** This was a retrospective analysis of tumors of the orbit that presented to the tertiary eye care center of Al-Shifa Trust Eye Hospital in Rawalpindi, Pakistan between 2000 and 2014.

**Results:** A total of 625 tumors of the orbit were analyzed to identify pPNETs. Four cases of pPNET were identified. The main symptom was displacement of the globe. However, there were no associated symptoms like loss of vision, diplopia, or pain, etc. Three children had presented for the first time, whereas the fourth was a case of recurrent orbital tumor. The age range was from 3 months to 12 years. There were 3 males and 1 female. All the children underwent orbital surgery to remove the tumors in toto. The follow-up period ranged between 1 and 9 years. No recurrence has been reported after the tumor surgery so far.

**Conclusions:** pPNETs of the orbit are extremely rare in children. This is the largest case series of these tumors in children reported so far.

E-Poster No.: EP-0257

**Rare Case of Primary Localized Lacrimal Gland and Conjunctival Amyloidosis**

*First Author: Allen LIN  
Co-Author(s): Cho-hsing CHUNG, Wen-ming HSU*

**Purpose:** To report a rare case of unilateral lacrimal gland and conjunctival amyloidosis in a 35-year-old female.

**Methods:** A case report.

**Results:** A 35-year-old female presented with a progressively enlarged mass over the left lacrimal gland and conjunctiva for a period of 1 year. On ophthalmic examination, a firm and nontender mass was palpated over the entire upper eyelid; inverting the eyelid revealed a confluent fusiform lesion yellow–pink in color underneath the conjunctiva. Imaging study by CT showed a well-defined, enlarged left lacrimal gland with central hypoattenuated region and mild superficial eyelid thickening. Surgical debulking by fornical approach for the lacrimal gland and conjunctival lesion was performed, with removal of tissue fragments measuring 1.7 x 1.0 x 0.8 cm. Microscopically, a predominantly amorphous and eosinophilic substance deposition was seen in the subepithelial connective tissue. The deposits were positive for Congo red stain. The pathology was positive for amyloidosis.

**Conclusions:** The majority of the lesion was removed and relief of clinical symptoms was achieved. A fornical approach can achieve good results with no complications.

E-Poster No.: EP-0273

**Rare Extraconal Orbital Mass: A Benign Schwannoma**

*First Author: Azida KADIR  
Co-Author(s): Syaridatul KAMARUDIN, Chin ONG*

**Purpose:** To describe a case of a benign tumor occurring at a rare site.

**Methods:** Here we describe the presentation, findings, and outcome of an orbital schwannoma.

**Results:** A 23-year-old female presented with slow, painless proptosis of the right eye without symptoms of diplopia or blurring of vision. Examination showed right eye nonaxial proptosis and hypertropia with intact optic nerve function. There was no restriction of eye movement. CT scan showed a well-defined and enhancing extraconal oval–shaped mass in the orbit, which displaced the globe anteriorly. Excision biopsy done with histopathological examination showed schwannoma with Antoni A pattern. Postoperatively, the proptosis resolved. Optic nerve function and ocular movements were intact.

**Conclusions:** In this case, the proptosis was approached systematically to rule out other causes such as infection, lymphoma, and thyroid eye disease. Excision biopsy was done to confirm the diagnosis and to preserve optic nerve function.

E-Poster No.: EP-0260

**Reconstruction of a Postexenteration Orbital Socket With Anterolateral Thigh Flap**

*First Author: Ko-fang CHANG  
Co-Author(s): Yun-dun SHEN*

**Purpose:** To report a case of a periorbital sebaceous cell carcinoma and postexenteration orbital socket reconstruction with anterolateral thigh flap.

**Methods:** A case report.

**Results:** A 70-year-old female was referred to our ophthalmology department with a right eyelid tumor diagnosed for 3 years and a history of previous eyelid tumor removal, which was resected with upper eyelid reconstruction performed at another institution. Her initial immunohistochemical stain showed CK (+),
HMB–45 (–), and LCA (+) and a diagnosis of poorly differentiated carcinoma. Two years later, carcinoma in situ at the upper and lower eyelid was diagnosed, and she was referred to our institution. MRI showed a small mass lesion about 1.9 x 1 cm at the inferomedial subcutaneous region of the right periorbital area. Her surgical treatment involved exenteration of the right orbital content, and the orbital socket was reconstructed with an anterolateral thigh flap. Her pathology revealed a sebaceous carcinoma with pagetoid spreading along the conjunctiva, margin free. Follow-up at 3 months showed improvement of the right neck lymph nodes, and an ENT specialist performed neck dissection. The patient received radiotherapy after her surgery and at postoperative 1-year follow-up showed no further spreading of the sebaceous cell carcinoma.

Conclusions: Traditional postoperative wound care after exenteration poses a long and challenging problem for ophthalmologists and patients. The treatment of malignant eyelid tumors with exenteration and reconstruction with anterolateral thigh flap can provide earlier wound recovery and allow the patient to receive further treatment.

E-Poster No.: EP–0243

Recurrent Orbital Hemorrhage After Orbital Trauma

First Author: Hsueh Yen CHU
Co-Author(s): Yueh-ju TSAI, Shu-ya WU, Yan-chang CHU, Yi-lin LIAO

Purpose: To report a case of abrupt severe recurrent orbital hemorrhage after the initial orbital hemorrhage had resolved.

Methods: A 17-year-old male without previous medical illness came to our ophthalmology clinic due to recurrent eyelid pain and swelling for 1 day. His left eye was hit by his left knee during exercise. Initial ecchymosis was noted without proptosis. Ice-packing was applied. Proptosis occurred on the second day. Orbital hemorrhage was noted on CT. Eye movement, intraocular pressure, and visual acuity were not affected at that time. However, more proptosis was noted 3 days later with decreased vision and lagophthalmos but without positive RAPD sign. During follow-up, swelling and proptosis improved with ice-packing. Swelling improved greatly during follow-up. Best corrected visual acuity regained to 20/20 in both eyes with symmetric pupil light reflex, though shortened axial length was noted in his left eye (right eye, 24.41; left eye, 23.67 mm). Warm compress was applied from then on. Two days later, severe proptosis recurred with limited eye movement and decreased vision. Orbital CT revealed multiply–located large orbital hemorrhage. Then he was admitted for further management.

Results: After admission, systemic antibiotics were given. Persistent swelling of eyelid was noted. Needle aspiration revealed Streptococcus intermedius infection. Large amount of purulent pus was drained. Condition improved after treatment, but persistent eye movement limitation was found. Hertel exophthalmometry revealed 13 mm–109–18 mm. Retrobulbar hematoma causing choroidal folding over posterior pole with optic disc swelling was noted with shortened axial length and shallow anterior chamber in the left eye. However, pupil light reflex, RAPD, and vision remained normal and unchanged. Oral prednisolone was given to facilitate orbital edema resolution. Orbital ultrasound revealed smaller and central hyperechoic retrobulbar hematoma. Then, he was discharged. During follow-up, anterior chamber depth, axial length, and eye movement improved when the retrobulbar hemorrhage shrank. It took around 3 months for the orbital hemorrhage to completely resolve. The patient ended up with good vision and minimal double vision at very peripheral upgaze.

Conclusions: Recurrent orbital hemorrhage after the initial traumatic orbital hemorrhage has resolved can occur in patients without secondary trauma or coagulopathy, and it can be even more severe than the initial one. Large amounts of blood in the orbit can cause visual disturbance, impair extraocular muscle movement, and shorten the eyeball and anterior chamber depth. Prolonged orbital hemorrhage can lead to infection, which should be treated in time to prevent devastating outcomes. Closely following–up the RAPD and eye movement enables the ophthalmologist to make appropriate treatment decisions. We report a case of severe, abrupt, recurrent orbital hemorrhage with good final visual outcome treated with relatively conservative yet closely monitored care.

E-Poster No.: EP–0238

Recurrent Solitary Fibrous Tumor of the Orbit: Case Report and Review of Literature

First Author: Pei-shin HU
Co-Author(s): Shu-yan YANG, Jieh-ren JOU, San-ni CHEN

Purpose: To report the clinical presentations, radiological and operative findings, and pathological features of a patient with recurrent orbital solitary fibrous tumor along with a brief review of literature.

Methods: A case report.

Results: A 32-year-old Filipino man presented with recurrent painless right lateral orbital masses for several months. He underwent orbital tumor excision at the same location 7 years previously in the Philippines with uncertain pathology results (spindle tumor). Computed tomography scan revealed 2 well–defined nodules (1.5 x 1.2 x 1.1 cm and 1.9 x 1.3 x 1 cm) located in the right lateral orbit with lateral rectus muscle deviation. He underwent complete orbital masses excision. Histological examination confirmed the diagnosis of solitary fibrous tumor. The patient was discharged after a satisfactory recovery. A 3-year follow-up revealed no recurrence or clinical symptoms.

Conclusions: Solitary fibrous tumor of the orbit is a rare entity with limited literature. This report adds to the literature and highlights the significance of multidisciplinary approach in the management of this rare entity.
pathologic examination showed spindle cells arranged in random to focal fascicular patterns. Some branching, stag horn–like vessels were noted. The tumor was immunoreactive for CD34, CD99, and BCL-2 and negative for 5–100 protein and β-catenin. The morphological and immunohistochemical features were consistent with a diagnosis of orbital solitary fibrous tumor. No systemic metastases occurred.

**Conclusions:** Solitary fibrous tumor is a rare etiology of orbital tumor. Recurrences can occur despite complete surgical resection. Metastases have been observed. Recurrent tumors must be surgically removed when possible. A very long–term follow–up is mandatory.

**E–Poster No.:** EP–0252

**Retrospective Study of Upper Eyelid Ptosis Correction With Modified Müller Muscle–Conjunctival Resection Combined With Redundant Skin Excision**

*First Author: Tsui-kang HSU*

*Co-Authors: Jorn-hon LIU, Shu-lang LIAO*

**Purpose:** Müller muscle–conjunctival resection is used to correct mild to moderate ptosis commonly encountered in the senile patient population. The authors examined its efficacy and durability and evaluated variables that potentially affect outcomes.

**Methods:** People who received ptosis correction using modified Müller muscle–conjunctival resection and skin excision with more than 6 months of follow–up were enrolled. Degree of ptosis reduction, eyelid symmetry, and adverse outcomes were evaluated. Patients were grouped into medium– (<24 months after surgery) and long–term follow–up (≥24 months) to determine whether lid height changed over time.

**Results:** Thirty patients with a mean follow–up of 8 months were included, with a total of 50 resection operations. Resection significantly reduced ptosis by a mean of 2.12 ± 0.56 mm (P < 0.001), indicating 0.36 mm of eyelid elevation for every 1.0 mm of Müller muscle with tarsus plate resected. The procedure successfully corrected 72% of eyelids to within 0.5 mm and 90% to within 1.0 mm of normal eyelid position. In patients with asymmetric ptosis, it significantly improved eyelid symmetry to within 1.0 mm, from 85% of patients before surgery to 95% after surgery. Furthermore, the mean ptosis correction was not significantly different between medium– (1.78 ± 0.86 mm) and long–term (1.82 ± 0.91 mm) follow–up patients (P = 0.347).

**Conclusions:** Modified Müller muscle–conjunctival resection combined with skin excision is an effective long–term solution for mild to moderate eyelid ptosis and asymmetry, which minimizes the frequency of changing patient position and is more predictable than conventional levator muscle resection.

**E–Poster No.:** EP–0265

**Role of Ivermectin in Management of Orbital Myiasis Due to Primary New World Screwworm**

*First Author: Vishal SHARMA*

*Co-Authors: Prashant GUPTA, Santosh HONAVAR, Madhu BHADAURIA*

**Purpose:** To report a case of orbital myiasis due to primary screwworm treated with ivermectin.

**Results:** A 30–year–old male initially presented with lower leg skin ulcerations, bilateral chronic sinusitis, hearing impairment, and multiple lung nodules 6 years previously. Diagnosis of WG was confirmed by histopathologic examination of nasal biopsy, which revealed necrotizing granuloma and lymphocytic vasculitis. Serum test of ANCA was positive. The disease was relatively under control with maintenance of prednisolone combined with methotrexate and azathioprine until 2 years previously, when relapsing paranasal sinusitis occurred despite multiple endoscopic sinus surgeries and steroid pulse therapy combined with immunosuppressants. Recurrent sinusitis resulted in bony erosion of sinus wall complicated with bilateral orbital inflammation. Episcleritis with peripheral ulcerative keratitis of both eyes was noted afterward with visual threatening. Due to the refractory nature of the disease, rituximab was given for induction of remission and followed by prednisolone plus methotrexate for maintenance. The inflammation quieted down rapidly in 2 months with nearly complete resolution of orbital granuloma. However, conjunctivalization of the corneal epithelium and cicatrical change of the ocular surface resulted in guarded visual prognosis. The ocular condition remained silent for 18 months until the present.

**Conclusions:** Ophthalmologic involvement is an important cause of morbidity in WG occurring in approximately half of the patients. Rituximab may be an alternative treatment of ocular WG in refractory disease.
**Methods:** Initial mechanical removal was tried by conventional method with partial resolution. Later, oral and topical ivermectin was used judiciously along with topical steroids.

**Results:** The patient showed continuous improvement and complete resolution of the myiasis with oral and topical ivermectin (broad spectrum antiparasitic agent) along with topical steroids. The isolated organism was a primary screwworm (*Cochlomyia hominivorax*).

**Conclusions:** Orbital myiasis can be effectively treated by ivermectin with early resolution, thus precluding the need for exploratory surgery and avoiding prolonged morbidity.

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**E-Poster No.: EP-0229**  
**Spontaneous Orbital Subperiosteal Hematoma**

**First Author:** Yi-hsuan WEI  
**Co-Author(s):** Jieh-ren JOU, Shu-lang LIAO

**Purpose:** We report 2 cases of spontaneous orbital subperiosteal hematoma which resolved after surgical drainage.

**Methods:** A case report.

**Results:** Case 1: A 50-year-old woman who had a history of hypertension suffered from severe headache and painful progressive proptosis in the left eye. Magnetic resonance imaging revealed a fusiform mass located extraconally in the region of the left superior orbit. The lesion was surgically removed due to elevated intraocular pressure (IOP) and visual decline. Orbital hematoma was proved histopathologically. Case 2: A 54-year-old hypertensive man complained of left eye pain followed by progressive proptosis and chemosis in 2 days. Orbital CT revealed a crescent-shaped mass lesion in the superior left orbit. Surgical drainage was performed due to progressive proptosis and severe downward shift of eye globe with motility limitation. The intraoperative finding showed a well-encapsulated dark brown mass in the subperiosteal region.

**Conclusions:** Subperiosteal hematoma can resolve spontaneously, which can be observed when vision is not threatened. However, increased IOP and direct compression of the optic nerve might cause decreased vision. Therefore, surgical evacuation is recommended when loss of visual acuity or visual field occur secondary to compressive optic neuropathy.

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**E-Poster No.: EP-0227**  
**Surgical Outcome of Blepharophimosis Syndrome**

**First Author:** Syeed KADIR  
**Co-Author(s):** Golam HAIDER

**Purpose:** To assess the surgical outcomes of blepharophimosis syndrome (BPS).

**Methods:** This observational case series evaluated 50 patients with BPS pre- and postoperatively at the National Institute of Ophthalmology & Hospital, Bangladesh Eye Hospital, and Sankar Foundation Eye Hospital, India. All patients were divided into 2 groups: group A (35 patients) and group B (15 patients). Telecanthus, epicanthus, and ptosis were corrected 3 months apart in group A. All procedures were done in a single sitting in group B. Telecanthus and epicanthus inversus were corrected by Y-V plasty in group A and C-V plasty in group B. Ptosis was corrected by frontalis brow suspension (FBS) with fascia lata 3 months after Y-V plasty. Lateral canthotomy and canthoplasty were done to maintain normal horizontal palpebral fissure.

**Results:** There were 21 male patients (42%) and 29 female patients (58%). The age range of these patients was 3 to 42 years. In group A, 31 patients showed postoperative acceptable results, and 4 patients presented unsatisfactory correction of telecanthus. Revision was planned in 1 female patient, but she did not follow up. Among 31 patients, 1 patient required lazy T procedure for correction of punctal eversion. Undercorrection after ptosis surgery was observed in 2 patients. In group B, 14 patients showed satisfactory outcomes of C-V plasty, and undercorrection was observed in 4 patients after ptosis surgery.

**Conclusions:** There is no significant difference between Y-V plasty and C-V plasty to correct telecanthus and epicanthus. Ptosis correction resulted in better outcomes when performed in separate sittings.

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**E-Poster No.: EP-0277**  
**Surgical Treatment of Deformities Associated With Blepharochalasis**

**First Author:** Bin Yu XIE

**Purpose:** To describe the effect of surgical treatment of deformities associated with blepharochalasis.

**Methods:** A retrospective chart review was conducted of 51 patients (95 eyes) who had blepharochalasis between 2008 and 2013. Surgical treatment for the correction of deformities included blepharoplasty, re-suspension of the prolapsed lacrimal gland, and ptosis repair. Follow-up ranged from 6 to 60 months.

**Results:** After surgical repair, all patients were satisfied with the bilateral symmetrical creases and contour of the upper eyelids. The appearance of floppy eyelids was improved distinctly. No patients complained of epiphora or dry eye symptoms. Prolapse of the lacrimal gland recurred in 2 patients (3 eyes). They underwent reoperation with no further recurrence. Overcorrection in blepharoptosis surgery of 5 patients was fixed with suture adjustment of the levator aponeurosis.
Conclusions: Because blepharochalasis involves bilateral and unilateral local eye tissues or periorbital tissues, clinical manifestations may vary. Ophthalmic plastic surgery to correct blepharochalasis and its associated deformities in the quiescent stage is usually safe and yields satisfactory cosmetic effects.

E–Poster No.: EP–0228
The Pathogenesis of Periocular Cellulitis
First Author: Youn-shen BEE
Co-Author(s): Shwu-juan SHEU
Purpose: To analyze the antibiotics used, bacterial culture results, and drug sensitivity among periocular cellulitis in children and adults.
Methods: This was a retrospective review to analyze the antibiotics used, bacterial culture results, and drug sensitivity among preseptal and orbital cellulitis in children and adults.
Results: Orbital cellulitis is defined as infection within the orbit posterior to the orbital septum, whereas preseptal cellulitis occurs in front of the orbital septum. Clinically, appropriate antibiotics combined with wound drainage are effective. Initially, when culture results are not available, empiric antibiotic regimen is helpful. Bacterial sensitivity tests showed higher drug resistance in ampicillin, penicillin, cefazolin, and oxacillin. Vancomycin showed less resistance.
Conclusions: We suggest the pathogenesis and guidelines of management of preseptal and orbital cellulitis in children and adults.

E–Poster No.: EP–0264
The Results of Anterior Blepharotomy for Upper Lid Retraction in Graves Ophthalmopathy in Taiwan
First Author: Shu-lang LIAO
Purpose: To investigate the efficacy of anterior blepharotomy for upper lid retraction correction in patients with Graves ophthalmopathy in an Asian population.
Methods: A retrospective review of patients with Graves ophthalmopathy undergoing anterior blepharotomy from August 2009 through February 2012 was performed. Outcome measures included upper eyelid height (measured from the corneal light reflex to the upper eyelid margin, or MRD1), reduction of lagophthalmos, cosmetic appearance, complications, and need for further surgery. Presurgery and post-surgery construction photographs were reviewed for functional and cosmetic outcomes.
Results: A total of 71 eyes with Graves upper lid retraction underwent anterior blepharotomy. There were 18 males and 53 females, with a mean age of 45.5 ± 11.7 years. Preoperative MRD1 was 7.1 ± 0.8 mm. Postoperative MRD1 was 5.2 ± 0.5 mm. Mean improvement in MRD1 was 1.8 ± 0.6 mm. Mean reduction of lagophthalmos was 1.5 ± 0.5 mm. Only 8 eyes revealed postoperative MRD1 more than 6 mm. Two eyes were complicated with mild ptosis. No evidence of infection or corneal erosion was noted, and none of the patients needed further surgeries. The cosmetic result was satisfactory in most cases.
Conclusions: Anterior blepharotomy is effective for the management of upper lid retraction in patients with Graves ophthalmopathy.

E–Poster No.: EP–0235
Treatment Outcomes of Incision-Sparing and Surgical Management of Canaliculitis: A Case Series
First Author: David LAW
Co-Author(s): E-shawn GOH
Purpose: To describe the outcomes of surgical (3–snip punctoplasty, 1–snip canaliculotomy) and conservative (punctual dilation, manual expression, microcurettage, and canalicular irrigation with antibiotics) modalities of canaliculitis management in an Asian population.
Methods: Medical records of 11 consecutive patients presenting with canaliculitis to 1 surgeon from August 2010 to January 2014 were reviewed. The clinical presentation, findings, management, microbiology, and treatment outcomes were studied.
Results: The mean age was 70.6 years (range, 57–91), 8 (72.7%) patients were female, and all 11 (100.0%) were Chinese. The majority had unilateral canaliculitis—6 (54.5%) right eye only, 4 (36.4%) left eye only, and 1 (9.1%) bilaterally—involving the lower canaliculi (72.7%). Ten (90.9%) patients had primary canaliculitis, whereas 1 patient had secondary canaliculitis from punctual plug insertion. Common presenting symptoms included eye discharge (81.8%) and eyelid swelling/redness (45.5%). Common clinical signs included mucopurulent punctal regurgitation (81.8%) and pouting punctum (54.5%). Facultative anaerobes (56.3%) formed the majority of organisms, and the commonest bacteria isolated was Streptococcus (18.8%). Mean duration to definitive treatment was 40 days (range, 0–133). Nine (81.8%) were successfully treated with incision–sparing modalities, whereas 2 (18.2%) were treated surgically. There were no recurrences at 3, 6, and 12 months, and only 1 (11.1%) of 9 conservative–managed patients had a recurrence after 3.8 years.
Conclusions: Surgical modalities remain effective for the treatment of canaliculitis. However, they are not without complications such as scarring and functional damage of the lacrimal pump. In our experience, incision–sparing modalities are effective in the treatment
of canaliculitis with low recurrence rates.

**PEDIATRIC OPHTHALMOLOGY & STRABISMUS**

**E-Poster No.: EP-0305**

**13-Year-Old Girl With Left Eye Total Third Nerve Palsy and Amblyopia**

First Author: Kasihana SOPHA

**Purpose:** To report a patient with left eye total third nerve palsy and amblyopia.

**Methods:** A case report of a 13-year-old girl with left eye total third nerve palsy and amblyopia who received strabismic correction with split lateral rectus muscle surgery. The data were collected from medical records.

**Results:** After treatment, the eye ball was at the orthoforia position. Limitation in abduction due to the insertion of lateral rectus muscle was moved to the medial rectus muscle, so there was no power to move the eye ball laterally.

**Conclusions:** Split lateral rectus muscle surgery may be an alternative option in cases of exotropia due to total third nerve palsy. Cosmetic result was satisfactory in which the eyeball was at the orthoforia position. However, if there has been deep amblyopia, visual acuity is difficult to repair.

**E-Poster No.: EP-0302**

**A Rare Picture of Congenital Cataract—Membrane Cataract in Microphthalmia**

First Author: Min-hsiu SHIH

**Purpose:** To present bilateral cataract in a baby with microphthalmia.

**Methods:** A case report. The surgical findings and the results of A-scan sonography are presented.

**Results:** A 6-month-old boy was brought to the clinic due to involuntary eye movement. Bilateral microphthalmia with small cornea (about 8 mm) and white pupils unresponsive to mydriatics (phenylephrine HCl 0.5% and tropicamide 0.5%) were found by biomicroscopic examination. B-scan sonography showed small-sized and normal appearance of the posterior segment. During surgery on the right eye, miotic pupil was dilated with iris retractor. White cataract was noted about 4 mm in diameter. We used cautelization to perform anterior capsulotomy. However, after removal of the anterior capsule, no lens material was found. After removal of iris retractors and wound closure, A-scan sonography was performed in the fellow eye. Short axial length (about 13 mm) and a membrane lens was revealed without the presence of the peak of the posterior surface of the lens. A similar finding of membrane cataract was noted during operation in the left eye.

**Conclusions:** Microphthalmia involves either anterior or posterior segments or all of the globe. Our case had bilateral microphthalmia involving the anterior and posterior segments without iris coloboma. Poorly developed lens turn into a dense membrane cataract. Amblyopia therapy is mandatory for visual rehabilitation. However, intraocular lens implantation will be challenging in the future.

**E-Poster No.: EP-0307**

**A Study of Late-Onset Nonparalytic Esotropia Within a Southeast Asian Population**

First Author: Yvonne LING

Co-Authors: Karen ZHANG

**Purpose:** To examine the demographics, clinical characteristics, and outcome of late-onset nonparalytic esotropia in the local Southeast Asian context.

**Methods:** This was a retrospective study of 73 patient records from a national eye center, which fulfilled the inclusion criteria of nonparalytic esotropia not associated with onset in early childhood. Cases of infantile esotropia and accommodative esotropia, and obviously paralytic esotropia, were thus excluded. The authors evaluated the sex, age, presenting symptoms, refractive error, management, and outcome of the patients.

**Results:** Seventy-three patients (40 male, 33 female) met the inclusion criteria. The ages ranged from 6 to 86 years; 11% were younger than 20, 17.8% were aged 21–40 years, 34.2% were aged 41–60 years, and 37% were older than 60. The majority (76.7%) were myopic, and only 17.8% had hypermetropia. A great proportion (91.8%) had diplopia for distance (47.9% intermittent, 43.8% constant); 31.5% had diplopia at near. The angles of strabismus ranged from 2 to 53 prism dipters. Base-out prisms with or without stereogram exercises were the most commonly prescribed treatment. Ten patients required surgery.

**Conclusions:** Most of the patients presenting with late onset esotropia in this Southeast Asian population had myopia rather than hypermetropia. The majority had diplopia, especially for distance. Most patients were happy with base-out prisms alone or with distance stereogram exercises. Few required surgery.

**E-Poster No.: EP-0311**

**Avulsion of the Inferior Rectus Muscle Due to Contusion by the Corner of a Table and Reconstruction of its Function**

First Author: Xuhong ZUO

**Purpose:** To find a way to identify the avulsed inferior rectus muscle in a 63-year-old patient who had an
almost complete avulsion of the inferior rectus muscle.

**Methods:** Generated forced duction test was applied to discover the proximal part of the inferior rectus muscle.

**Results:** The proximal part of the inferior rectus muscle was detected by generated forced duction test applied on its ventral surface and then sutured in its original region. After surgical repair, function of binocular movement was restored. There was no complaint of diplopia by the patient in any gaze.

**Conclusions:** Generated forced duction test is useful in discovering the proximal part of the lost muscle in the traumatic avulsion of an extraocular muscle and recovering its function.

**E–Poster No.:** EP–0290

**Bilateral Acute Proptosis as Initial Manifestation of Acute Myeloid Leukemia**

**First Author:** Ya-chen HUANG  
**Co-Author(s):** San-ni CHEN, Jieh-ren JOU

**Purpose:** To report the youngest patient with bilateral proptosis of both eyes as an initial manifestation of acute myeloid leukemia (AML).

**Methods:** A case report.

**Results:** A 19–month–old infant presented with painless, progressive proptosis for 2 weeks. His family denied any history of trauma or systemic disease. Both ocular fundus were normal, and there was no afferent pupillary defect noted. However, there was mild limitation of bilateral eye movement. Brain magnetic resonance imaging (MRI) scan revealed bilateral infiltration involving the orbital soft tissue, extraocular muscles, temporalis muscle, and maxillary sinuses. The peripheral blood smear revealed immature blast cells with a high total leukocyte count and relative neutropenia. Subsequent bone marrow aspiration presented abnormal white blood cells. He also received maxillary sinus biopsy by functional endoscopic sinus surgery, and histopathologic result revealed diffuse infiltration of round to ovoid tumor cells. AML subtype of monocytic with myeloid sarcoma was confirmed, and he received the Taiwan Pediatric Oncology Group (TPOG)–AML–97A protocol for chemotherapy. One year later, the 3 courses of chemotherapy were completed. Remission of AML was achieved and no AML relapse episode was noted. Fourteen months after initial presentation of bilateral proptosis, brain MRI scan showed shrinkage of the orbital volume with complete resolution of infiltration.

**Conclusions:** This case highlights the need for peripheral blood smear and neuroimage work–up for acute proptosis in infancy. AML should be considered in the differential diagnosis of an orbital mass, even in the absence of typical leukemic symptoms.

**E–Poster No.:** EP–0304

**Brown Syndrome Secondary to Accessory Tissue Band: A Case Report**

**First Author:** Srikanth RAMASUBRAMANIAN  
**Co-Author(s):** Meenakshi SWAMINATHAN

**Purpose:** We report a case of a child with Brown syndrome with an accessory tissue band. Identifying the fibrous tissue band and releasing its attachments intraoperatively resulted in good outcomes surgically and visually.

**Methods:** A 9–month–old female child, born of a nonconsanguineous marriage, presented with an inward deviation of the left eye since birth. The child had been born premature at 24 weeks and had developed retinopathy of prematurity. After careful ocular motility examination, a diagnosis of left eye Brown syndrome was made. A preoperative MRI of the orbits was normal. Intraoperatively, a 4–mm long fibrous band was noted extending from the sclera just lateral to the superior rectus and 5 mm posterior to its insertion. The abnormal attachments were released. A 5–0 polyester suture was passed through the tendon. A large loop was created and suture passed through the tendon 2 mm distal to the first suture. The tendon was cut between the 2 sutures, and the sutures allowed to retract into the subconjunctival space.

**Results:** The patient had 4 prism diopters of esotropia in primary gaze when examined at 6 weeks after surgery with improvement in elevation in adduction.

**Conclusions:** Abnormal attachments of fibrous band are of concern in patients with Brown syndrome, as our case illustrates. Failure to identify these accessory muscle and fibrous tissues may lead to undercorrection and unsatisfactory surgical results. Our case underscores the importance of vigilance in cases of strabismus and being prepared for intraoperative surprises.

**E–Poster No.:** EP–0318

**Can My Child See After Cataract Surgery?**

**First Author:** Alampur GOUD

**Purpose:** To assess visual prognosis in pediatric cataract surgery.

**Methods:** Pediatric cataract is the most common cause of curable blindness in children, accounting for 12% to 39% worldwide. Surgical management with or without intraocular lens (IOL) alone is not sufficient for the restoration of vision. More regular follow–up in the management of complications like nystagmus, amblyopia, strabismus, thickening of posterior capsule, posterior synichae, glaucoma, RD, and low vision is needed. In
some cases, lifelong follow-up is required. Follow-up also varies with ocular conditions before the operation, family status, and surgical outcome. Postoperative correction can include glasses, contact lenses, or IOL implantation (if not done earlier). Postoperative capsular thickening is treated with YAG laser. The treatment of amblyopia, nystagmus, and glaucoma is difficult and needs more regular follow-up. Amblyopia, nystagmus, and strabismus that might have developed earlier may continue.

**Results:** We see postoperative capsular thickening, amblyopia, nystagmus, glaucoma, etc. Delay in treatment and inadequate follow-up result in poor visual outcome.

**Conclusions:** Surgical treatment for pediatric cataract surgery should be done at the earliest and regularly followed up to prevent complications. Successful surgery is not the end because many cases may be lost in follow-up, leading to visual disaster. This paper will deal with possible complications and early intervention for visual enhancement.

**E-Poster No.:** EP-0313

**Case Report of High Myopia With Periventricular Leukomalacia**

**First Author:** Praveen JEYASEELAN

**Purpose:** To report unusual high myopia and ocular associations of periventricular leukomalacia (PVL) in a 2 1/2-year-old child.

**Methods:** A case report.

**Results:** A full term 2 1/2-year-old female child with a history of subacute meningitis presented to us with complaints of right eye inward deviation since birth. On examination, she had right eye esotropia, poor fixation, inattention to moving objects, and inferior field defect. Lens was clear and fundus tessellated. Refraction revealed –16 DS in both eyes. Ultrasound B scan showed axial diameter of 24.7 mm (normal is 16.8 mm) and no evidence of Stickler syndrome. Neuroimaging showed features of periventricular leukomalacia.

**Conclusions:** Periventricular leukomalacia is also seen in term infants, although it is more commonly seen in preterm low birth weight infants. They present with delayed visual maturation, visual perceptual–cognitive problems, abnormal visual acuity, crowding, nystagmus, visual field defects, optic disc abnormalities, strabismus, and deficient visually guided eye movements. The patient was prescribed spectacles. Squint correction is not a priority as the relation between the spiral of tillaux and limbus is variable due to differential growth of the eye ball. Early diagnosis of refractive error in PVL is of utmost importance to preserve existing vision and prevent amblyopia.

**E-Poster No.:** EP-0297

**Clinical Characteristics in Taiwanese Families With Congenital Nystagmus–X-Linked Foveal Hypoplasia**

**First Author:** Hsiao FANG

**Co-Author(s):** Min-hsiu SHIH

**Purpose:** To describe the phenotype of 7 Taiwanese families with foveal hypoplasia presenting with congenital nystagmus.

**Methods:** Cases and pedigrees are presented.

**Results:** All patients had congenital nystagmus since infancy and most corrected visual acuity was less than 0.3 on Landolt C chart. Loss of foveal reflex with variable retinal hypopigmentation were observed in the 7 probands, but not in the carriers. There were no cutaneous findings of white skin and hair and no iris hypopigmentation. All the probands presented with grade 4 foveal hypoplasia on spectral–domain optical coherence tomographic imaging. In our study, the patterns of inheritance of these 7 families were X-linked recessive as indicated by the pedigrees.

**Conclusions:** All children with presumed congenital nystagmus should be thoroughly investigated for any underlying ocular abnormalities. Isolated foveal hypoplasia without ocular albinism leads to congenital nystagmus with low vision in Asian children. The current study reveals the X-linked inheritance pattern. Genetic study for isolated foveal hypoplasia is in the pipeline in Taiwan.

**E-Poster No.:** EP-0284

**Clinical Profile of Pediatric Keratitis in National Eye Center Cicendo Eye Hospital, Indonesia**

**First Author:** Grimaldi IHSAN

**Co-Author(s):** Irawati IRFANI

**Purpose:** To describe clinical characteristics of patients with keratitis who came to the pediatric ophthalmology unit at Cicendo Eye Hospital.

**Methods:** All pediatric patients with clinically diagnosed keratitis from January 2012 to December 2014 were reviewed. Patient characteristics were analyzed.

**Results:** There were 82 patients diagnosed with keratitis. Among these patients, 55 were male. Mean age was 8.6 years old. Most of these patients lived in West Java. There were 85 lesions, and most of them occurred in the right eye. The most frequent size of the lesions was 2–6 mm, and most of them were located paracentrally. Corneal smears obtained show Gram–positive coccus as the most common etiology. An improvement in lesions occurred in 45% of patients, with corneal scar as the leading complication. Mechanical trauma was
the most common risk factor.

**Conclusions:** Keratitis in pediatric patients was more frequent in males. Most of them were of medium size (2–6 mm) and located paracentrally. Gram-positive coccus were the most common finding in corneal smear examinations. The most common risk factor was mechanical trauma, and corneal scar was the leading complication in keratitis.

**E-Poster No.:** EP–0301

**Comparison of Visual Motor Integration in Amblyopic and Nonamblyopic Children**

**First Author:** Mario PAPILAYA  
**Co-Author(s):** Feti KARFIATI, Erna TJAHJANINGTYAS

**Purpose:** To compare the visual motor integration in amblyopic and nonamblyopic children.

**Methods:** A comparative cross-sectional study was conducted to compare the visual motor integration in children aged 6–13 years old that came to the pediatric unit in our hospital. Beery VMI test was used to assess visual motor integration. Statistical analysis was performed using $\chi^2$ test to compare patient characteristics and $t$ test analysis to compare mean age, mean standardized score of VMI test, visual perception test, and motoric coordination test.

**Results:** Subjects in this study consisted of 50 children divided into 2 groups. The results showed a better score in visual motor integration in the nonamblyopic group (102.56) compared with the amblyopic group (97.2). Statistical analysis showed a statistically significant difference in visual motor integration between both groups ($P = 0.019$).

**Conclusions:** The nonamblyopic group in this study showed a better VMI score compared with the amblyopic group.

**E-Poster No.:** EP–0315

**Complications and Visual Outcomes After Primary Intraocular Lens Implantation in Children Younger Than 12 Months**

**First Author:** Connie CAO

**Purpose:** To investigate outcomes after cataract surgery with primary intraocular lens (IOL) implantation in children younger than 12 months with congenital or infantile cataract.

**Methods:** A prospective, consecutive, interventional case series. Eighteen eyes of 11 children (7 bilateral, 4 unilateral) who underwent primary IOL implantation or congenital cataract surgery in Shenzhen C–MER Dennis Lam Eye Hospital, China, were analyzed. A minimum of 3 months of follow-up after surgery was required for inclusion in the study. Eyes with traumatic cataracts and other associated ocular comorbidities were excluded. Main outcome measures were intraoperative and postoperative complications and visual outcome at the last follow-up.

**Results:** Mean age at primary IOL implantation was 10.08 ± 1.23 months (7–11.50 months). The mean follow-up was 12.37 ± 2.51 months. Mean axial length was 16.21 ± 0.17 mm before the operation. Overall, 15 eyes (83.31%) attained a final therapy without requiring repeat general anesthesia. IOL implantation was independently associated with better visual outcome in bilateral [odds ratio (OR), 2.72; 95% confidence interval (CI), 1.56 to 8.31; $P = 0.003$] but not unilateral disease. The postoperative complications included optic capture (3 eyes; 16.7%), IOL decentration (1 eye; 5.56%), and secondary glaucoma (1 eye; 5.56%).

**Conclusions:** Primary IOL implantation in children under 12 months of age is a relatively safe procedure and leads to favorable postoperative visual outcomes. Axial length more than 16.2 mm might be one of the important determinants of long-term visual outcomes in children.

**E-Poster No.:** EP–0291

**Contrast Sensitivity Visual Acuity Change Analysis in Strabismus Before and After Surgery**

**First Author:** Hongwei DENG

**Purpose:** To analyze the contrast sensitivity visual acuity changes in strabismus before and after the operation.

**Methods:** Eleven cases of horizontal strabismus with 1.0 corrected visual acuity were tested in 3 different environments of contrast sensitivity vision before and 3 days after strabismus surgery using the visual function test instrument STEREO. Contrast sensitivity vision in 3 kinds of environments were measured in normal light with the natural pupil test, first checking the right eye, then the left eye, and finally inspecting binocular contrast sensitivity vision. The test results were stored and processed by the corresponding software to automatically generate the data. The contrast sensitivity of the patients before and after the operation was statistically analyzed by SPSS 16.0 software.

**Results:** All 11 cases with strabismus correction surgery were successful (horizontal gradients less than ±5 PD). In standard high contrast and brightness low contrast environments, the contrast sensitivity visual acuity in the dominant eye before and after surgery was statistically significantly increased. In the other 2 kinds of circumstances, the contrast sensitivity visual acuity difference was not statistically significant before and after strabismus correction surgery.
**Conclusions:** Contrast sensitivity vision is a sensitive detection method for visual function. Strabismus correction surgery can improve the contrast sensitive visual quality.

**E-Poster No.: EP–0296**

**Diplopia on Postoperative Day One: Good or Bad?**

**First Author: Chee Ming LEE**
**Co-Author(s): Men-ling YANG**

**Purpose:** To determine the predictor of success of strabismus surgery in exotropic patients.

**Methods:** Exotropic patients who underwent surgical correction between November 2013 and August 2014 were included. The preoperative angle of deviation, spherical equivalents, visual acuity, and binocularity were evaluated. Anisometropia was defined as spherical equivalents between 2 eyes of 1 diopter or more. Amblyopic patients were excluded. Binocularity was evaluated with Titmus stereo test and Worth four dot test at 30 cm, respectively. The presence of diplopia and deviation on the first postoperative day was documented. Motor success was defined as a measurement of prism cover test within 8 prism diopters (PD) of esotropia or 4 PD of exotropia.

**Results:** We included 58 patients (53.4% male and 46.6% female) with a mean follow-up of 4. 163. 8 months. The mean preoperative angle of deviation was 40. 015. 1 PD. Nine (15.5%) of the patients were anisometropic. Diplopia was present in 23 (39.7%) patients on the first postoperative day, and all except 2 (3.4%) patients reported no diplopia at 2 weeks postoperatively. Stereopsis improvement was noted in 5 (8.6%) of the patients, whereas 1 (1.7%) of the patients had decreased stereopsis postoperatively. A total of 30 patients (51.7%) achieved a successful surgical result on the first postoperative day and the only factor associated with a higher success rate (P = 0.001).

**Conclusions:** Postoperative day 1 diplopia is not uncommon in exotropic patients receiving strabismus surgery, and spontaneous resolution within 2 weeks could be anticipated. The presence of diplopia on the first postoperative day may be a positive predictor of success of strabismus surgery in exotropic patients.

**E–Poster No.: EP–0319**

**Early Surgery for Congenital Esotropia**

**First Author: Xuan LE**
**Co–Author(s): Tinh NGUYEN**

**Purpose:** To determine clinical characteristics and motor and sensory results after early surgical correction of patients with congenital esotropia.

**Methods:** A noncomparative interventional case series. Participants were 106 consecutive patients enrolled in a prospective study of infantile esotropia who were operated on from January 2006 to December 2010 and followed up at least 3 years in the pediatric department at Vietnam National Institute of Ophthalmology (VNIO).

**Results:** Mean age at initial surgery was 3.61 ± 1.27, ranging from 6 months to 5 years. Mean preoperative deviation was 22.7 degrees (10 degrees to 45 degrees). A total of 37.7% of patients had IOOA; 13.3% of patients had dissociated vertical deviation (DVD). Bilateral medial rectus recession was done in 32% (34/106); resect–resect horizontal rectus was done in 74.5% (79/106). Combined inferior oblique myectomy was done in 37.7% (40/106). After follow-up, good surgical alignment was 70.8% (75), fair results were 21.7% (23), and bad results were 7.5% (8). Before surgery, no patients had binocular vision; after follow-up 53.5% of patients had binocular vision and 8.9% gained stereopsis.

**Conclusions:** Good results of congenital esotropia could be achieved in 70.8%. Early surgical correction of patients with congenital esotropia may enhance stereopsis and alignment during the first year of life may be optimal. There were no complications during and after surgery.

**E–Poster No.: EP–0279**

**EEC Syndrome With Ophthalmic Manifestations—A Report of Two Cases**

**First Author: Syeed KADIR**

**Purpose:** To report 2 rare cases of ectodactyly, ectodermal dysplasia, clefting (EEC) syndrome.

**Methods:** Thorough clinical evaluation and radiological imaging techniques confirm the diagnosis of EEC Syndrome.

**Results:** EEC syndrome is also known as “split hand–split foot–ectodermal dysplasia–cleft syndrome.” EEC is characterized by the triad of ectodactyly, ectodermal dysplasia, and facial clefts. It is a multiple congenital anomaly syndrome which requires a multidisciplinary approach to managing patients. Two male patients (aged 22 and 37 years old) with EEC presented with photophobia, microdontia, anodontia, hypernasality in speech, dry and scale–like skin, sparse and almost blonde scalp and body hair, ectrodactyly, syndactyly, and conductive hearing loss.

**Conclusions:** This syndrome requires a multidisciplinary approach for management. Early diagnosis allows parents to receive counseling and in particular, obtain reassurance regarding the low risk of mental handicap.
E-Poster No.: EP-0295

Effectiveness of Combined Strabismus and Cataract Surgery—Our Experience

First Author: Swarna UDAYAKUMAR
Co-Author(s): Rajesh PRABU, Smita KAPOOR, Sagar DUKALE

Purpose: To study the effectiveness of combined cataract and strabismus correction in a community outreach center.

Methods: A retrospective study involving 100 patients who underwent cataract extraction combined with strabismus correction from January 2014 to June 2015 was done. Patients were divided into 2 groups based on the amount of squint: less than 60 prism diopters and more than 60 prism diopters.

Results: The results were analyzed based on motor alignment, visual outcome, and patient satisfaction. Good motor alignment (<10 prism diopters) was achieved in 83.5% of patients. In patients where the preoperative angle of deviation was more than 60 prism diopters, a second surgery in the other eye was needed to attain satisfactory motor alignment. Visual success (UCVA > 20/40) was achieved in 71% of the patients.

Conclusions: Strabismus correction in adults is a worthwhile exercise as it is more than a cosmetic correction. It adds to patient satisfaction and improves their quality of life. Thus, when there is cataract along with strabismus, it is all the more imperative that selected cases can be effectively corrected in a single sitting.

E-Poster No.: EP-0288

Factors Influencing Binocular Visual Function in Patients After Strabismus Surgery

First Author: Hsiu-mei HUANG

Purpose: To determine which factors affect binocular visual function after strabismus surgery.

Methods: This was a retrospective longitudinal review of 53 consecutive patients with strabismus who underwent strabismus surgery. After excluding those patients with follow-up duration less than 6 months, information about the type of strabismus, patient age at onset of deviation, patient age at surgery, interval between onset and surgery, amount of surgery performed, preoperative and postoperative deviation, refractive errors, and binocular vision function including macular fusion capacity by worth 4 dot (W4D) and stereoacuity were evaluated.

Results: Strabismus deviation angle, stereoacuity, and macular fusion capacity improved with time. Seventy-two percent of patients achieved stereoacuity improvement after strabismus surgery. The stereoacuity at 6 months after surgery was obviously correlated with postoperative deviation angle at 1 week, stereoacuity at 1 and 3 months, and macular fusion capacity at 1 and 6 months. The stereoacuity change before and after strabismus surgery was significantly correlated with preoperative stereoacuity and macular fusion capacity 1 month after the operation. Patients in the stereoacuity improvement group had lower deviated angle at postoperative 1 week and better stereoacuity preoperatively, 3, and 6 months after surgery than the no improvement group. Neither squint duration nor deviation angle and macular fusion capacity changes before and after surgery affected stereoacuity restoration.

Conclusions: Surgical correction of strabismus is associated with recovery of stereopsis in patients of all ages. Factors associated with stereoacuity outcome include pre- and postoperative stereoacuity and residual deviated angle after surgery.

E-Poster No.: EP-0320

Fiberoptic Microcatheter-Assisted 360-Degree Trabeculotomy in Primary Congenital Glaucoma: Two Cases

First Author: Savino D’AMELIO
Co-Author(s): Christian Luigi DEMASI

Purpose: The most common primary childhood glaucoma (PCG) is congenital, with onset from birth up to 2–3 years. As it is a vision-threatening disease, medical management is often only a temporary measure, making surgery the first-line definitive treatment. Goniotomy, external trabeculotomy, and trabeculectomy or an association of both, with or without mitomycin, are commonly used. Classic trabeculotomy for PGC requires a functional canal and other downstream outflow pathways and may inadvertently create false passages into the anterior chamber angle and suprachoroidal space. Indeed, a single incision may not suffice to open the full circumference of the canal. Therefore, circumferential trabeculotomy was proposed using only suture, however, this was technically difficult because the suture had to be passed “blindly.” More recently, a microcatheter with an illuminated atraumatic tip has been proposed to overcome these difficulties. We present 2 consecutive cases of congenital glaucoma in which we performed microcatheter-assisted circumferential (360-degree) trabeculotomy. Both cases yielded final satisfactory results.

Methods: We performed a 360-degree external trabeculotomy using an illuminated ophthalmic microcatheter iTrack 250A (iScience Interventional, Menlo Park, CA). A dissection of a fornix–based elliptical conjunctival flap was made and a 4 x 4 mm scleral flap created, just posteriorly to the limbus, with a scleral depth of two thirds of its thickness. A second deep scleral flap...
was prepared and removed to identify and deroof the Schlemm canal. The fiberoptic microcatheter was then introduced into the Schlemm canal and passed around the limbus, constantly monitored by the illuminated tip. Lastly, each end of the fiberoptic microcatheter was grasped and pulled, creating a 360-degree trabeculotomy. The scleral flap was closed using interrupted 10-0 monofilament nylon suture; 8-0 absorbable sutures were used for the conjunctival flap.

**Results:** Case 1: An 8-month-old girl was referred to us for intensive photophobia and epiphora. The right eye (OD) presented a clear cornea with Haab striae, horizontal diameter (CR) 14 mm, thickness 517 μm, cup-to-disc ratio (C/D) 0.8, axial length (AL) 22.73 mm, and intraocular pressure (IOP) 28 mm Hg. The left eye (OS) had a clear cornea, CR 13 mm, thickness 530 μm, C/D 0.7, AL 22.56 mm, and IOP 26 mm Hg. Combined trabeculotomy–trabeculectomy with mitomycin was performed OD without complication. Temporary therapy with tafluprost 2% and carteolol 1% were prescribed OS. After 1 month OD had a clear cornea with Haab striae, CR 13.5 mm, thickness 516 μm, C/D 0.8, AL 22.12 mm, and IOP 12 mm Hg. OS had clear cornea, CR 13.5 mm, thickness 528 μm, C/D 0.7, AL 22.82 mm, and IOP 21 mm Hg. We then performed a microcatheter–assisted 360-degree trabeculotomy OS without complications. After 20 days OD had CR of 13.2 mm, AL 22.31 mm, and IOP 13 mm Hg. OS had clear cornea, CR 13.2 mm, AL 22.18 mm, and IOP 12 mm Hg, without need for medication. At 190 postoperative days, OD had an AL of 22.18 mm and IOP 13 mm Hg. OS had AL of 22.25 mm and IOP 11 mm Hg. Both eyes had a C/D reduction of 0.4–0.5. Case 2: A 4-month-old boy was referred to us for blephalom and epiphora: OD had clear cornea, CR 12.1 mm, thickness 597 μm, AL 20.98 mm, and IOP 8 mm Hg. OS had edematous cornea with Haab striae, CR 13.5 mm, thickness 595 μm, C/D 0.6, AL 23.23 mm, and IOP 20 mm Hg. An external classic trabeculotomy was performed immediately OS without complications. At 1 month IOP was 14 mm Hg and the corneal edema had regressed. At 2 months, the IOP was 17 mm Hg but the cornea was still clear. Temporary treatment with carteolol 1% was prescribed. At 3 months OS had cloudy cornea with Haab striae, CR 14 mm, thickness 517 μm, C/D 0.5, AL 24.32 mm, and IOP 24 mm Hg. A microcatheter–assisted 360-degree trabeculotomy was performed without postoperative complications. At 4 postoperative months, the OS had a clear cornea with Haab striae, CR 14.0 mm, AL 23.7 mm, and IOP 14 mm Hg, without need for medication.

**Conclusions:** We are aware that this contribution does have limitations, as there are only 2 cases and there is a short follow-up. However, as far as we know, this is the first time a “conventional technique” and an innovative one has been carried out on the same patient. In case 1, where both eyes were affected, the classical technique used in the right eye and microcatheter–assisted trabeculotomy in the left gave the same good outcome. In case 2, where only the left eye was affected, the conventional technique was used first with poor results, followed by a second operation with the new technique with a good result. In our limited experience, microcatheter–assisted trabeculotomy avoids undetected catheter misdirection, allows injection of viscoelastic material into the Schlemm canal if necessary, and reduces postoperative inflammation and hyphema. The disadvantages include longer learning curves and high costs of the catheter (disposable) in a period where funds are limited the world over.

**E-Poster No.: EP-0306**

**Hemorrhagic Optic Disc Drusen: OCT Findings**

**First Author:** Hyosook AHN

**Purpose:** To report optical coherence tomography (OCT) findings of hemorrhagic optic disc drusen in children.

**Methods:** A case review.

**Results:** We reviewed 2 cases: an 11-year-old girl and a 13-year-old boy with unilateral disc hemorrhage, moderate to high myopia, and normal intraocular pressure. Fundus showed a small disc with bean-shaped elevation and pseudo disc edema with papillary hemorrhage. OCT findings revealed buried optic disc drusen as a hyperreflective oval mass with intraretinal and subretinal blood. Visual fields showed an enlarged blind spot. Disc hemorrhage resolved in 2 months with well preserved visual function.

**Conclusions:** For differential diagnosis of disc hemorrhage in children, OCT is a very useful tool to identify the buried disc drusen.

**E-Poster No.: EP-0292**

**Inferior Rectus Muscle Hypoplasia Corrected With Inferior Oblique Muscle Transposition in Children**

**First Author:** Yuan-yao FAN

**Co-Author(s):** Men-ling YANG

**Purpose:** To describe 2 pediatric patients with unilateral inferior rectus muscle hypoplasia and the results of surgical correction with inferior oblique anterior transposition.

**Methods:** Complete ophthalmologic examinations and strabismus examinations were performed on the patients before and after surgery. Orbital computed tomography (CT) scans was done preoperatively in 1 patient and postoperatively in another to confirm the diagnosis. Surgical correction involving inferior oblique muscle anterior transposition was performed in both patients.
Results: All patients showed improvement in head posture and decreased degree in vertical deviation during long-term follow-up.

Conclusions: Unilateral inferior rectus muscle hypoplasia is a rare condition in which ipsilateral moderate to large primary position hypertropia is usually seen. Inferior oblique muscle anterior transposition could be an appropriate procedure to offer significant improvement for these patients.

E–Poster No.: EP–0289

Intraocular Pressure Decreases After Correction of Consecutive Exotropia Involving Abnormal Insertion

First Author: Hiroko SUZUKI
Co-Author(s): Shion HAYASHI, Miwa KOMORI, Akiko HIKOYA, Yoshihiro HOTTA, Miho SATO

Purpose: To investigate intraocular pressure (IOP) changes in consecutive exotropia (CXT) involving abnormal insertion of the medial rectus muscles.

Methods: Our study included the following groups: 7 eyes from 7 patients with CXT involving insertion abnormalities (slipped muscle: 3 eyes; stretched scar: 4 eyes); 9 eyes from 9 patients with intermittent exotropia (IXT); and 23 eyes from 23 age-matched subjects without strabismus. In all groups, IOP was measured in the primary, abducting, and adducting positions using an icare tonometer. The recessed medial rectus muscles were advanced in all CXTs, either with or without lateral rectus muscle recession (n = 2 and n = 5, respectively). All IXT patients underwent a recess-and-resect procedure. IOPs were compared among groups; furthermore, the IOP before surgery was compared with that after surgery in both groups of exotropia patients. The Wilcoxon rank-sum test and ANOVA were used for statistical analysis, and the Games–Hawell test was used as a post hoc test.

Results: There were no significant IOP differences among the groups before surgery. No significant IOP changes occurred after surgery in the IXT group. In the CXT group, the IOP in the adduction position significantly decreased after surgery (16.0 mm Hg vs 13.4 mm Hg; P < 0.05). After surgery, the IOP of the CXT group was significantly lower in all gaze positions than the IOPs of both the IXT group and the nonstrabismus control group (P < 0.05).

Conclusions: IOP decreases after the second surgery in CXT involving abnormal insertion of the medial rectus muscle.

E–Poster No.: EP–0293

Intraocular Pressure Monitoring by Rebound Tonometry in Myopic Children With Atropine

First Author: Ya-chuan HSIAO
Co-Author(s): I-lun TSAI, Ching-yao TSAI, Li-lin KUO, Shiow-wen LIOU, Lin-chung WOUNG

Purpose: Low–dose atropine treatment is generally accepted to retard the progression of myopia, but topical atropine is associated with short–term side effects such as photophobia and elevation of intraocular pressure (IOP). For all practitioners, IOP measurements in children are challenging. The purpose of this study was to evaluate the IOP of myopic children under regular topical atropine treatment.

Methods: This was a prospective study measuring IOP using rebound tonometer in myopic children under regular low–dose atropine treatment. IOP measurements were performed by application tonometer (Tono–Pen–XL, Reichert) and rebound tonometer (icare, Finland Oy). We recruited children who tolerated IOP measurement well with refractive error showing myopia over −0.5 D with regular atropine treatment of at least 1 month. Detailed ocular examinations were performed including best corrected visual acuity, refractive error, and optic nerve head appearance. Eyes with infectious diseases, uveitis, or a history of trauma were excluded.

Results: A total of 88 myopic eyes were included. The mean age of these participants was 10 years (range, 5–16). Median age was 10 years old. The average IOP of the right eye was 17.4 ± 3 mm Hg (range, 11–24 mm Hg) by rebound tonometer and 17.1 ± 3 mm Hg (range, 12–22 mm Hg) by application tonometry. Almost 20% of the IOP readings were the same by the 2 tonometry methods. Seventy–six percent of IOP differences were less than 2 mm Hg (a clinically significant difference) between the 2 tonometry methods, and over 90% of the differences were less than 3 mm Hg.

Conclusions: IOP measurement by rebound tonometry is better tolerated than application tonometry. Rebound tonometry has a good correlation with standard application tonometry, and 76% of the differences between the 2 tonometers were less than 2 mm Hg. Rebound tonometry tends to overestimate pressure and should be used with caution in monitoring myopic children with regular atropine treatment.

E–Poster No.: EP–0300

Iris Claw Lenses for the Correction of Aphakia in Children

First Author: Mohammad MOSTAFA HOSSAIN
Co-Author(s): Mastura KHATUN, Quazi IFTEKHAR, Milind KILLEDAR

Purpose: Surgical treatment of aphakia without capsular support in children is a great challenge particularly in uniocular aphakia and noncompliant patients. This
clinical trial was undertaken to evaluate iris claw lens implants in children with aphakia.

**Methods:** A prospective interventional case series on 7 eyes of 5 children with aphakia without capsular support who underwent anterior iris claw lens implantation positioned retroiridally by traditional enclavation of both haptics into the iris midperiphery anteriorly from October 2014 to April 2015. Detailed records of visual acuity, slit-lamp examination, and fundus evaluation were taken. Patients were followed up for 9 months.

**Results:** Patient age ranged from 5 to 10 years. The children showed improvement in mean best corrected visual acuity (BCVA) from 1/60 preoperatively to 6/18 postoperatively. We encountered no postoperative complications. Amblyopia is a great vision limiting factor.

**Conclusions:** This study revealed that retropupillary iris claw lens implants are simple, safe, and effective in aphakia with no capsular support in children when noncompliance with spectacles and amblyopia are great concerns. However, further study with a larger sample size and longer follow-up is warranted.

**E-Poster No.: EP-0308**

**Ocular Anomalies of Pediatric Patients With Incontinentia Pigmenti**

**First Author:** Peiquan ZHAO

**Purpose:** To describe the ocular manifestations in a cohort of pediatric patients with incontinentia pigmenti (IP).

**Methods:** Sixty children referred to our department were observed. Ocular manifestations and auxiliary examinations were collected. Vitreoretinal changes were classified according to the following criteria: retinal pigment epithelium changes only (stage 1); retinal vascular disorders (stage 2); retinal neovascularization, exudation, or vitreous hemorrhage (stage 3); retinal detachment (stage 4); and end-stage diseases (stage 5).

**Results:** The male-to-female ratio was 1:20. The median age of the patients at the first ocular examination was 3.8 months (range, 0.2~57.3 months). Ocular lesions were found in 78.33% (47/60) of the patients. A total of 42.56% (20/47) of patients presented with unilateral changes and 57.45% (27/47) with bilateral changes. Severely affected eyes often manifested as microphthalmia. Among all 120 eyes, 52.50% (63/120) presented with posterior segmental lesions, and 18.33% (22/120) of eyes presented with anterior segmental lesions, including 2 primary corneal lesions and 20 lesions secondary to posterior segmental changes. Thirty percent (36/120) of eyes were severely visually impaired. According to our staging criteria of vitreoretinal changes, most eyes were normal (29.17%), followed by stage 4 (25.83%), stage 2 (16.67%), stage 1 (7.50%), stage 3 (6.67%), and stage 5 (4.17%). A total of 12.50% (15/120) of eyes received surgical interventions, 10.00% (12/120) of eyes underwent laser ablation, and 8.33% (10/120) of eyes underwent intravitreal injections of antivascular endothelial growth factor (anti-VEGF) drugs.

**Conclusions:** A high prevalence of ocular lesions can be detected in IP patients. Early-stage ocular lesions may progress to more advanced stages, resulting in vision loss because of retinal disease. Early screening, regular follow-up, and timely treatments contribute to vision preservation for IP patients.

**E-Poster No.: EP-0310**

**Pattern of Anisometropia; Management and Outcome of Anisometropic Amblyopia**

**First Author:** Rajib HUSAIN

**Purpose:** Amblyopia is a frequent cause of monocular blindness in children. It can cause unilateral or bilateral reduction of best corrected visual acuity, associated with decreases in visual processing, accommodation, motility, spatial perception, or spatial projection.

**Methods:** About 50 anisometropic amblyopia subjects aged from 3 to 13 years without previous amblyopia treatment, whose parents were interested to participate, were examined and given a questionnaire. Patients diagnosed with strabismic amblyopia were excluded. Patients were first corrected with the best correction for a month. When the VA in the amblyopic eye did not improve over 1 month, then occlusion treatment was started. Occlusion was done daily for 6–8 hours (full time) together with vision therapy.

**Results:** About 8% subjects had anisometropia from myopia, 18% from hyperopia, and 74% from astigmatism. The initial mean visual acuity was 0.74 ± 0.39 log MAR, and after intervention of amblyopia therapy with active vision therapy mean visual acuity was 0.34 ± 0.26 log MAR. About 94% of subjects improved by at least 2 lines. The depth of amblyopia was associated with the type of anisometropic refractive error and magnitude of anisometropia (P < 0.005). In performing this study, 10% mild amblyopia, 64% moderate, and 26% severe amblyopia were found.

**Conclusions:** Occlusion therapy with at least 1 instructed hour of active visual activity practiced out of school hours was effective in anisometropic amblyopes who were diagnosed at the age of 8 years or older, and the patients complied well with treatment.

**E-Poster No.: EP-0286**

**Postoperative Results of Horizontal Strabismus Surgery in IIEI&H, Dhaka,**
Methods: This was a retrospective analysis of 853 patients in 1 of the main hospitals providing strabismus care in Bangladesh from 2011–2014. Refractive error, anisometropia, amblyopia, and stimulus deprivation were common associations. Inclusion criteria were all horizontal strabismus, moderate to large deviation, with no obvious oblique overaction or underaction. Exclusion criteria were horizontal strabismus with oblique muscle over– or underaction associated with hyper– or hypotropia.

Results: Among 853 cases, 492 were esotropia and 361 were exotropia. Preoperative deviation range was 25–90 PD, with postoperative deviation 15 PD or less considered successful. There were no major surgical complications. Few patients complained about diplopia, which resolved gradually. Postoperative refraction was done after 6 weeks, followed by glasses and amblyopia therapy where required. Follow-up period was 6 to 50 weeks.

Conclusions: Preoperative orthoptic measurements, refractive correction, amblyopia therapy, amount of muscle recession/resection, and surgical skill should assure better surgical outcomes.

E–Poster No.: EP–0294
Preliminary Report of Computer Software—Assisted Orthokeratology Lens Fitting in Taiwanese School-Aged Children
First Author: Chen-cheng CHAO
Co-Authors: Yow-jia HUANG, Chao-kai CHANG

Purpose: To report the clinical results of orthokeratology (ortho–K) lens fitting with a computer–assisted system after 1 month of lens wear in school–aged children.

Methods: School–aged children were fitted with the ortho–K lens using computer–assisted fitting. Appropriate lens designs were ordered according to the results of computer software analysis. Lens centration, myopic reduction, uncorrected visual acuity (UCVA), spherical equivalent (SE), and ocular health status were evaluated.

Results: A total of 5 patients with 10 eyes were enrolled. The initial SE was −1.71 ± 0.76 D. The first fit success rate was 90%. UCVA before lens use was logMAR 0.85 ± 0.35. LogMAR UCVA after 1 night and 1 week were 0.21 ± 0.14 and 0.03 ± 0.05, respectively. At the 1-month visit, the mean reduction in SE was 90% with logMAR UCVA of 0.03 ± 0.04. No cornea staining was found at the follow–up visits. No major complications were noted.

Conclusions: A computer–assisted system for ortho–K lens fitting yielded a high first fit success rate. It was effective in myopic reduction and provided stable vision after 1 month of lens wear.

E–Poster No.: EP–0314
Prevalence of Amblyopia and Strabismus in Elementary School Children in the Hengduan Mountain Region of China
First Author: Hui ZHU

Purpose: To investigate the prevalence of amblyopia and strabismus in elementary school children between age 6 and 15 in the Hengduan Mountains in China.

Methods: All the children from primary schools in Yangbi County underwent comprehensive eye examinations from October 2014 to January 2015, including visual acuity, ocular alignment and movements, autorefraction, and anterior segment examination. Cycloplegic refraction and fundus examination were performed if necessary.

Results: Of the 7412 eligible primary school students, 5828 (78.6%) completed all ocular examinations. The mean age of the participants was 10.0 ± 1.9 years. Amblyopia was present in 51 students (0.8%), of whom 37 (72.5%) had unilateral and 14 (27.5%) had bilateral amblyopia, including 29 anisometropic without strabismus, 3 strabismic, 5 combined strabismic/anisometropic, 13 binocular refractive, and 1 deprivation amblyopia. Strabismus was found in 249 children (4.27%), including 226 (90.8%) with concomitant esotropia, 9 (4.4%) with concomitant exotropia, 10 (4.0%) with superior oblique palsy, and 2 (0.8%) with type I Duane syndrome.

Conclusions: The prevalence of amblyopia and strabismus in elementary school children in the Hengduan Mountain region of China were 0.88% and 4.27%, respectively. Refractive error and strabismus were the main causes of amblyopia. Concomitant exotropia was the main type of strabismus.

E–Poster No.: EP–0317
Rare, But They Stare: Ophthalmic Features of Rare Pediatric Syndromes
First Author: Abhishek ONKAR
Co-Author(s): Suwarna SUMAN

Purpose: To bring into perspective the ophthalmic fea-
ticipants of rare pediatric syndromes.

**Methods:** Cases of ectopia lentis et pupillae (ELeP), Jacobsen syndrome, Seckel syndrome, neurofibromatosis, Axenfeld anomaly, and Ehlers–Danlos syndrome were evaluated.

**Results:** Cornea plana with megalocornea and superotemporal lens subluxation was seen in ELeP. Jacobsen syndrome had megalocornea with disc edema. Seckel syndrome presented with antimongoloid slant and proptosed eyes. Neurofibromatosis type 1 presented with Lisch nodules and alternate divergent squint. Axenfeld anomaly had posterior embryotoxon with foveal hypoplasia and tilted disc. Ehlers–Danlos syndrome presented with mild ptosis and purplish–blue sclera.

**Conclusions:** Pediatric syndromes can have varied unusual ophthalmic manifestations that should be taken into consideration when planning their management.

**E-Poster No.:** EP-0303

**Refraction and Visual Acuity in Children With Isolated Foveal Hypoplasia**

*First Author: Min-hsiu SHIH*

**Purpose:** To present the refractive errors and visual acuity in children with foveal hypoplasia.

**Methods:** Children presenting with horizontal pendular nystagmus were included based on fundus pictures and optical coherence tomography findings. Refraction and best corrected visual acuity (BCVA) were collected by chart review.

**Results:** Ten boys with isolated foveal hypoplasia were included after the exclusion of 1 case with WAGR syndrome (aniridia). All had binocular involvement and were brought to the clinic in infancy due to nystagmus. Refraction varied from -4.88 diopters (D) to +8.5 D in spherical equivalent (average, 2.19 ± 4.03 D in the right eye and 2.44 ± 3.80 D in the left eye). After follow-up of amblyopia for 8.8 years, BCVA was 0.1 to 0.6 with the Landolt C chart (logMAR 0.71 ± 0.27 in the right eye and 0.73 ± 0.22 in the left eye). Most (17/20 eyes, 85%) BCVA was not better than 0.3 in the C chart. Five children had a familial history of nystagmus with pedigree charting showing X-linked inheritance pattern.

**Conclusions:** Foveal hypoplasia is very rare and tends to result in poor visual acuity. Congenital nystagmus is the most common characteristic. The susceptibility of boys and familial history indicated the possibility of X-linked recessive inheritance.

**E-Poster No.:** EP-0299

**Retinal Vessel Oxygen Saturation and Vessel Diameter in Anisometropic Amblyopia**

*First Author: Yuxian NING*

**Purpose:** This study was conducted to determine whether oxygen saturation and retinal blood vessel diameter are affected by anisometropic amblyopia.

**Methods:** Retinal oxygen saturation was measured in retinal blood vessels in 7 anisometropic amblyopia patients using the Oxymap T1 retinal oximeter. Paired t test was used to analyze the oxygen saturation and diameter of retinal arterioles and venules and arteriovenous differences between the anisometropic amblyopic eye and the fellow eye.

**Results:** The arteriovenous differences in oxygen saturation were higher in amblyopic eyes. Vessel diameter was the same in amblyopic eyes.

**Conclusions:** The shifting characteristics of retinal vessel oxygen saturation suggest that the pathological mechanism of retinal oxygen metabolic disorder differs by amblyopia.

**E-Poster No.:** EP-0282

**Screening of Children for Amblyopia in Urban Slum of Bangladesh: Using the Pulseoptix Photo-Screener**

*First Author: Nahid FERDAUSI*

*Co-Author(s): Enayet HUSSAIN, Ava HOSSAIN*

**Purpose:** A screening program for amblyopia in children, followed by appropriate treatment, is effective in significantly reducing the prevalence and severity of amblyopia in children. The purpose of this study was to evaluate the sensitivity, specificity, and predictive values of the Plusoptix photo-screener in children.

**Methods:** This population-based study was conducted during the period of October to December 2014. Children aged 6–72 months were first examined with the Pulseoptix photo-screener in a selected slum by a nontechnical lay person, supervised by an ophthalmologist. Then each child underwent complete ophthalmological examination in a tertiary eye hospital by ophthalmologists. Sensitivity, specificity, positive predictive value, and negative predictive value were calculated using ophthalmic examination as the gold standard.

**Results:** Sixty–seven children completed both photo-screener and ophthalmological examination. The mean age of the children was 36.95 ± 4.55 months. Fifty-four percent were boys and 46% were girls. Thirteen children were identified as disease–positive by the photo-screener examination. However, during ophthalmic examination, 4 test–positive children were determined to have no disease and 1 test–negative child was diagnosed as having disease. Finally, 10 children were found to have amblyopia. Out of 10 children, 9 had refractive error and 1 had congenital cataract. Sensitivity, specificity, and positive and negative predictive values were calculated to be 90%, 91%, 69.23%, and 98%,
respectively, for the Pulseoptix photo-screener.

**Conclusions:** This study suggests that photo-screening could be used to prompt referral to an ophthalmologist for further evaluation and can provide significant information about the presence of sight-threatening conditions such as refractive errors and cataract.

**E-Poster No.:** EP–0283

**Smaller Degree of Oblique Astigmatism May Contribute to Amblyopia**

*First Author: Ke-hung CHIEN*  
*Co-Author(s): Da-wen LU*

**Purpose:** To compare the effects of oblique astigmatism on refractive amblyopia in children aged 3–7 years with those having orthogonal astigmatism.

**Methods:** The medical records of patients attending Tri–Service General Hospital in Taiwan from January 2003 to December 2010 were reviewed and summarized. Seventy–two children with oblique astigmatism–related refractive amblyopia (group 1) and 82 children with orthogonal astigmatism (group 2) were chosen. Characteristics such as baseline visual acuity (VA), the time course of VA improvement, refractive error, and family history were assessed.

**Results:** Group 1 showed a worse baseline mean VA (± SD) of 0.61 (0.13) vs 0.52 (0.16) logMAR (P < 0.01), a slower rate of amblyopia improvement, and higher prevalence of parental oblique astigmatism (29% vs 5.5%; P < 0.01) than did group 2. The cylinder power of astigmatism (in D) causing amblyopia in group 1 of 2.48 (0.82) was lower than that in group 2: 2.93 (0.71) (P = 0.006). However, group 1 achieved a noninferior resolution of amblyopia (mean final VA 0.18 vs 0.16 logMAR) after longer treatment of 6.45 (2.44) vs 5.86 (2.92) months (P < 0.039).

**Conclusions:** A smaller degree of initial oblique astigmatism caused more amblyopia than did orthogonal astigmatism. Although the children with oblique astigmatism achieved equal resolution rates after treatment, this took longer. Therefore, we should pay more attention to children with mild oblique astigmatism, as they are more likely to develop oblique astigmatism–related amblyopia. Moreover, early diagnosis and prompt treatment might help visual improvement.

**E-Poster No.:** EP–0309

**Surgical and Visual Outcomes of Cataract Surgery With IOL Implantation in Traumatic Cataract Among 189 Children in a Tertiary Eye Hospital in Eastern Nepal**

*First Author: Lila PURI*

**Purpose:** To determine the demographic profile, etiology, and surgical and visual outcomes of cataract surgery among children with traumatic cataract after trauma to the eye in a tertiary hospital located in eastern Nepal.

**Methods:** This was a prospective longitudinal study of 189 consecutive subjects who underwent cataract surgery with intraocular lens (IOL) implantation for traumatic cataract at Sagarmatha Choudhary Eye Hospital, Lahan, Nepal from October 2012 to March 2014. All the subjects were children aged 15 years or below. Subjects with lesions in the posterior segment were excluded from the study. Informed consent was received from accompanying parents or guardians after delivering detailed explanations of the procedures involved in the study.

**Results:** Among 189 subjects, a majority of them were males (73%) and the average age was 8.8 ± 3.6 years.
The time until presentation ranged from 3 days to 8 years (median, 2 months). A wooden stick was the most common cause of injury (34.4%) followed by wooden splinters (6.9%), with blunt injury in 63.5%. The average preoperative visual acuity in logMAR was 1.6. The average postoperative visual acuity in logMAR was 0.8.

**Conclusions:** Eye injuries with traumatic cataract are associated with significant visual impairment. If managed properly, satisfactory visual outcomes can be achieved. Cataract surgery with IOL implantation is a preferred method for visual rehabilitation in these children.

**E-Poster No.:** EP–0280

**Surgical Experience in Duane Syndrome**

**First Author:** Muh-chiou LIN

**Purpose:** To evaluate the clinical characteristics and surgical results in patients with Duane syndrome in southern Taiwan.

**Methods:** This was a retrospective chart review of 14 patients with Duane syndrome from 1994 until 2014, 6 of whom received surgery for strabismus, severe up- or downshoot in adduction, or face turn. The clinical characteristics and surgical results of these patients are reported.

**Results:** There were 8 male and 6 female patients. Four of them had right eye involvement, 7 had left eye involvement, and 3 were bilateral. Ten of them were type I, 1 was type II, and 3 were type III. One patient was esotropic, and 6 were exotropic. None of them were amlyopic. Stereocuity was good in 9 of 10 tested. Six patients received recession of medial and lateral rectus muscle for strabismus, severe up- or downshoot in adduction, marked enophthalmos in adduction, or face turn. Three of them also had Y-splitting of the lateral rectus at the time of recession. All patients improved significantly in up- or downshoot, lid narrowing, and face turn; however, the limitation of extraocular movement was the same or slightly worse after surgery.

**Conclusions:** Duane syndrome is thought to be a congenital innervational abnormality, and no surgical procedure can solve the innervational problem. However, when severe lid narrowing with or without up- or downshoot are blemishes, they can be significantly improved through a delicate surgical approach.

**E-Poster No.:** EP–0298

**Surgical Reinforcement of Pulley Suspensions to Restore Displaced Lateral Rectus and Superior Rectus Paths in Myopic Strabismus Fixus**

**First Author:** Kinei RA

**Purpose:** To describe our long-term results using a novel technique of surgical reinforcement of the pulley suspensions to restore the displaced lateral rectus (LR) and superior rectus (SR) paths in myopic strabismus fixus.

**Methods:** We perform an adjustable silicone suspension by the SR and LR without concurrent muscle splitting or scleral fixation. This was a retrospective analysis of the records of 3 patients with myopic strabismus fixus who underwent our novel pulley reinforcement procedure between 2009 and 2014. Pre- and postoperative orthoptic measurements, MRI (3.0T), and EOG were recorded and analyzed. Surgical complications were noted. Success was deemed patient satisfaction.

**Results:** All patients requested surgery for aesthetically unacceptable strabismus. The mean preoperative horizontal deviation was 70 PD (50 to 90 PD) esotropia, and the mean vertical deviation was 20 PD (10 to 30 PD).
hypotropia. The mean postoperative horizontal deviation was 7.0 PD (0 to 10 PD), and vertical deviation was 5.0 PD (0 to 10 PD) hypotropia. There were no surgical complications.

Conclusions: In high myopic strabismus fixus, if the deviant paths of the LR and SR muscles are demonstrated by MRI, this novel procedure to restore the pulley band between the SR and LR muscles is effective and recommended. EOG is useful in evaluating the recovery degree of the EOM.

E–Poster No.: EP–0278

Surgical Results for Consecutive Exotropia

First Author: Muh-chiou LIN

Purpose: To evaluate the factors influencing the surgical result of muscle advancement with or without recession of antagonist muscle for consecutive exotropia.

Methods: Medical records from 27 patients who received medial rectus muscle recession with consecutive exotropia were retrospectively reviewed. Success was defined as alignment within 10 PD of orthotropia at distant. The characteristics of patients in the success group were compared with those in the failure group. The surgical effect with advancement alone was compared with those with advancement and recession.

Results: Seventeen of the patients showed alignment within 10 PD of orthotropia at distant at 3 months or longer follow-up. Stereoaucity was noted in 2 of the success group but none in the failure group. We also noted a high percentage of amblyopia and anisometropia in these patients. Patients who received muscle advancement showed a 50% success rate, with a mean of 11.63 PD exotropia at the last visit (0~35 PD). Patients who received advancement and recession showed a success rate of 71%, with a mean of 7.86 PD exotropia at the last visit (~8~30 PD). Patients with inferior oblique muscle overaction had surgery at younger age (6.63 vs 11.61) and better alignment (75% vs 57.89% success).

Conclusions: Consecutive exotropia is commonly seen after medial rectus muscle recession. Early surgery did not guarantee long-term alignment. In this study, we found an overall successful rate of 62.96%. Advancement with recession yielded good success (71%) compared with advancement alone (50%).

E–Poster No.: EP–0287

The Accuracy of Anterior Segment Optical Coherence Tomography in Measuring Ocular Rectus Muscle Insertion

First Author: Cheryl NGO
Co-Author(s): Stephen KRAFT, David SMITH

Purpose: Anterior segment optical coherence tomography (AS–OCT) is a noncontact, high-resolution cross-sectional imaging modality that can image the ocular rectus muscles. We aimed to evaluate the application and accuracy of AS–OCT in children in measuring the distance of insertion of primary and reoperated vertical and horizontal rectus muscles (in mm) from the limbus compared with the “gold standard” surgical caliper at the time of surgery.

Methods: This was a prospective, double masked, observational study comparing the distance of extraocular muscle insertion from the limbus measured by AS–OCT preoperatively and using surgical calipers intraoperatively. All patients aged 4–18 years old undergoing strabismus surgery between September 2013 and May 2014 were eligible. This included primary surgery or reoperations, unilateral or bilateral surgery, and horizontal or vertical rectus muscles. Patients with orbital bony anomalies or any eye conditions that interfered with imaging were excluded.

Results: A total of 65 muscles were evaluated, including 9 muscles undergoing reoperation and 10 vertical rectus muscles. Sixty-two muscles were successfully imaged. In all reoperated eyes, the AS–OCT measurements were within 1 mm of the surgical measurements. Overall, 89.7% [95% confidence interval (CI),
were statistically different in all 3 groups (P < 0.0001). When comparing the cycloplegic effects of these 3 drugs, Cyclogyl and Mydrin–P were statistically significantly better than Mydriacyl in the right eye; Cyclogyl was statistically significantly better than Mydrin–P, and Mydrin–P was better than Mydriacyl in the left eye.

Conclusions: The cycloplegic effect of Cyclogyl was the best in this citywide study. Our results suggest Mydrin–P may have comparable cycloplegic effects with Cyclogyl, and Mydriacyl was the least effective cycloplegic drug.

E-Poster No.: EP-0285
Variation of Retinoblastoma Management in National Eye Center Cicendo Eye Hospital, Indonesia: A Case Series
First Author: Grimaldi IHSAN
Co-Author(s): Irawati IRFANI

Purpose: To report a case series of retinoblastoma presenting to the pediatric ophthalmology unit at Cicendo Eye Hospital and the different management options.

Methods: A case report.

Results: A 1.5-year-old girl presented to the hospital diagnosed with bilateral retinoblastoma grade C in the right eye and D in the left eye. The patient underwent enucleation of the left eye and planned chemotherapy. The second case was a 3-year-old boy diagnosed with retinoblastoma grade D in the right eye without any intracranial involvement. The patient received chemotherapy and was followed up for any regression after chemotherapy before enucleation. In the third case, a 3-month-old girl was diagnosed with bilateral retinoblastoma grade C in the right eye and grade D in the left. The patient underwent chemotherapy, then enucleation of the left eye.

Conclusions: Management of retinoblastoma requires proper screening examinations to determine tumor malignancy. Treatment in the early stages of disease holds a good prognosis for survival and salvage of visual function. In very late stages, the prognosis for ocular function and even survival is jeopardized.
before the baseline assessment. Dates of death occurring between baseline and April 30, 2014, were obtained from the National Death Index data. Information on socioeconomic factors was obtained from questionnaire interviews. Cox proportional hazards regression models were used to assess the hazard ratios (HRs) and 95% confidence intervals (CIs).

**Results:** At baseline, there were 48 participants who had undergone cataract operation without VI and 78 participants who had cataract-related VI and were unoperated. In the operated participants, 21 (43.8%) returned for 10-year follow-up examination. This figure for unoperated participants was 19 (24.4%). The 10-year mortality rates were similar for the operated and unoperated participants (46.2% vs 62.4%; HR, 0.55; 95% CI, 0.30–1.03; P = 0.063). After adjustment for age, sex, history of diabetes and hypertension, body mass index, education level, and personal income, the operated group did not have a higher chance of survival than the unoperated group (HR, 0.92; 95% CI, 0.38–2.24; P = 0.856).

**Conclusions:** After adjusting for a number of possible confounders, the operated cases did not have a different mortality rate in comparison with the unoperated cases.

**E-Poster No.: EP-0324**

**A Retrospective Hospital-Based Study of New Referrals to First Visit Clinics of the Eye Department at an Urban Tertiary Center: A Case Series**

**First Author:** Thet NAING  
**Co-Author(s):** Clement TAN

**Purpose:** To identify the common cases seen at first visit clinics; to learn which types of cases can possibly be treated in primary care centers by interactive health education; to find ways to reduce clinic workloads by efficiently discharging without compromising quality of care; and to observe the effectiveness of ophthalmic public screenings.

**Methods:** This was a review of electronic charts from all the cases seen at first visit clinics for a 6-month period (January 1 to June 30, 2015).

**Results:** A total of 5026 subsidized and 2354 private cases were seen. Common diseases were cataract (17%), diabetic retinopathy (13%), conjunctivitis (7%), refractive errors (6%), glaucoma (5%), chalazion (4%), squint and pseudo squint (4%), floaters (3%), dry eye (3%), no pathology (3%), and keratitis (2%). Sixty percent of all patients could be discharged. Of the cases possible to discharge, 22% defaulted, 16% have been open dated, and 5% have been discharged. Seventy-two percent of diabetic retinopathy cases were from public screenings, of which 50% were correctly graded. All cases of amblyopia and squint were identified by screening at schools.

**Conclusions:** A bird’s eye view of identified common diseases helps to best manage by modifying resources so as to reduce costs. Public diabetic screenings and screenings by school health teams are effective.

**E-Poster No.: EP-0325**

**Agreement of Interpretation of Preschool Visual Acuity by Doctor-Screener Compared With Teacher-Screener: A Preschool Vision Screening Model**

**First Author:** Sunisa SINTUWONG  
**Co-Author(s):** Siwaporn KITTIYANPANYA, Angkana PIM-DEE, Natthira CHAISIRAWADSUK

**Purpose:** To assess the agreement of interpretation of preschool visual acuity between a doctor–screener and a teacher–screener.

**Methods:** A study was performed between August and October 2011. Preschool children aged between 3 and 6 years old from 3 childcare centers were enrolled. All participants were measured by a well–trained third–year resident, a well–trained teacher from a childcare center, and 1 of 2 ophthalmologists. The agreement analysis of visual acuity measurements was done between teacher and resident, teacher and ophthalmologist, and resident and ophthalmologist. Sample size was calculated using the agreement formula.

**Results:** Two hundred seventy–five eyes met the criteria. The mean age was 3.7 years (range, 3.0–4.3 years). The agreement of all 3 groups of visual acuity measurement was 1.

**Conclusions:** A well–trained teacher reliably measured visual acuity in preschool children compared with ophthalmologists.

**E-Poster No.: EP-0326**

**Ayurvedic Management of Cataract—Review of Clinical Studies Conducted From 1992 Onwards at IPGT & RA, Gujarat Ayurved University**

**First Author:** Manjusha RAJAGOPALA

**Purpose:** To evaluate the efficacy of ayurvedic treatment in the management of senile immature cataract experimentally and clinically.

**Methods:** A total of 7 clinical and 5 experimental studies have been conducted and 1 clinical study is in progress at IPGT & RA, Jamnagar. In these studies, kriyaklapas (ie, specialized ocular therapeutic procedures like tarpana and anjanahas) have been tried, and internally, chakshushya rasayana drugs, which are beneficial for
ocular health and disease conditions, have been tried. Experimental studies were conducted in suitable animal models, and the efficacy of the trial drugs were assessed on hematological and biochemical parameters; pathological study of the lens was also done. For clinical evaluation of the trial drugs, random sampling technique was used. Duration of therapy was minimum 3 to maximum 6 months.

**Results:** All the experimental studies showed excellent results in lenticular health in ayurvedic medicine–treated groups. In clinical studies, significant improvement was found in visual acuity, clinical refraction, and in the area and density of opacities. These clinical studies establish that ayurvedic drugs can reduce and control the progress of timira/cataract. Detailed results of all these studies will be discussed in the presentation.

**Conclusions:** Results of these studies show that these ayurvedic formulations can reverse cataractous changes. These studies provide hope for medical ophthalmologists working on medical management of cataract that, if these recipes are given before the onset of cataractous changes, they can probably delay the onset of cataractogenesis.

**E-Poster No.: EP–0328**

**Identification of Successful Factors in Eye Care Program**

*First Author: Chet PANT*

**Purpose:** The purpose of the study was to identify successful factors in reducing blindness.

**Methods:** This was a retrospective study. The methods adopted in the reducing blindness program were as follows: 1, launching a national blindness survey; 2, people participation; 3, donor support; 4, inception and expansion of the targeted avoidable blindness disease control program; and 5, innovation in human resource development.

**Results:** Three decades ago, there were only 7 ophthalmologists and 2 eye care departments in the country. The national blindness survey revealed a 0.84% prevalence of blindness. The major avoidable blindness diseases found were cataract, trachoma, and xerophthalmia. Today, the prevalence of blindness is reduced to one third. After successfully controlling cataract blindness, the trachoma and xerophthalmia reduction programs were launched nationwide. As a result, the prevalence of trachoma was reduced from 20% to less than 5%, and xerophthalmia blindness reduced from 0.9% to 0.2%. Thus, overall blindness was reduced to 0.35% from 0.84%.

**Conclusions:** Launching a blindness survey, the initiation and implementation of a targeted avoidable blindness disease control program, community participation, innovation of ophthalmic assistants, and national

and international donor commitment and support set an unique example of successful eye care programs in Nepal, which could be replicated in other parts of the world.

**E–Poster No.: EP–0322**

**New Initiatives for Controlling Childhood Blindness in Bangladesh**

*First Author: Enayet HUSSAIN  
Co-Author(s): Ava HOSSAIN, Nahid FERDAUSI*

**Purpose:** The purpose of this study was to document the initiatives undertaken by the National Eye Care (NEC) of Bangladesh and international nongovernment organizations (INGOs) to address and control the problems of childhood blindness.

**Methods:** This descriptive study was conducted from January to December 2014. All the documents for childhood blindness reduction programs were reviewed meticulously.

**Results:** Several innovative initiatives have been undertaken to address childhood blindness. A module has been prepared for primary health workers on potentially blinding conditions among children. Three hundred primary health workers were oriented with the expectation that they would help in the early identification of children with eye problems and would be able to refer them to nearby eye hospitals. With the aim of early case findings, 50 technicians of an expanded program on immunization were oriented to detect white pupils in children by simple torch light during the immunization program. Messages on potentially blinding conditions among children have been disseminated to 200 village doctors who could help raise awareness in rural communities. Pediatric ophthalmology protocol guidelines have been prepared to ensure unique treatment all over the country. Appropriate coordination between ophthalmologists, pediatricians, and obstetricians can help to develop an effective and comprehensive screening model for early diagnosis and timely intervention. With this aim, several seminars have been organized involving the 165 pediatricians and obstetricians all over the country.

**Conclusions:** A strong monitoring system is needed to evaluate these initiatives and make valuable recommendations for future planning to control childhood blindness.

**E–Poster No.: EP–0326**

**Pattern of Refractive Error, Knowledge, Attitude, and Practice Regarding Eye Health Among Primary School Children in Bangladesh**

*First Author: Rajib HUSSAIN*
Purpose: Uncorrected refractive error is a common cause of preventable visual impairment in the pediatric age group. Glasses are the cheapest and commonest form of correction for refractive errors. To achieve this, patients must exhibit good compliance to spectacle wear. A patient’s attitude and perception of glasses and eye health could affect compliance.

Methods: A prospective community-based cross-sectional study was designed to evaluate the knowledge, attitude, and practices regarding refractive errors and eye health among primary school children.

Results: Among 140 respondents, 72 were males and 68 were females. We found 50 children were myopic, and out of them 26 were male and 24 were female; 27 children were hyperopic, and out of them 14 were male and 13 were female. About 63 children were astigmatic, and out of them 32 were male and 31 were female. The level of knowledge and attitude was satisfactory. The attitude of the students, teachers, and parents was cooperative, which helps when performing cycloplegic refraction. Practice was not satisfactory due to social stigma and information gap.

Conclusions: Knowledge of refractive error and acceptance of glasses for the correction of uncorrected refractive error was noted. Public awareness programs such as vision screening programs, eye camps, and teacher training programs are more beneficial for wearing and prescribing spectacles.

E-Poster No.: EP-0332

Best Visual Acuity of a High Myopic Patient Wearing Rigid Gas Permeable Contact Lenses

First Author: Lucia SUTEDJA

Purpose: To report the best visual acuity (VA) of a high myopic patient wearing rigid gas permeable (RGP) contact lenses (CLs).

Methods: A case report of a 44-year-old woman. Right eye vision (VOD): 1/60 correction S–23.00 diopters (D) obtained 6/60; left eye vision (VOS): 1/60 correction S–19 obtained 6/9. The K readings OD were K of 8.00 mm and k of 7.60 mm; OS, K was 8.10 mm and k was 7.90 mm. A comprehensive eye examination was performed at each visit. The RGP CLs used were as follows: OD base curve (BC) 7.90, power S–18.50 D; OS BC 8.10, power –16.00 D. The adaptation period was 8 days. Follow-up was scheduled for 1 week, 1 month, and every 6 months. The patient was also educated about a healthy lifestyle: eating healthy food, spending time in outdoor activities for 1 to 2 hours per day, decreasing near work time.

Results: After wearing the RGP CLs for 1 week, VOD (+RGP) was 6/25 and VOS (+RGP) was 6/7. After 1 month, VOD (+RGP) was 6/12 and VOS (+RGP) was 6/6.

Conclusions: The VA of a high myopic patient can be improved by wearing RGP CLs. The best VA achieved while wearing RGP CLs was OD 6/12 and OS 6/6.

E-Poster No.: EP-0340

Clinical Results of Presbyopia Treatment With Technolas SUPRACOR

First Author: Ming-cheng TAI

Purpose: To investigate the clinical effect of presbyopia treatment with SUPRACOR.

Methods: In this prospective clinical study, 25 eyes of 15 presbyopic patients underwent the SUPRACOR treatment. The procedure was carried out on the TECHNOLOGAS Excimer Workstation 217P (Technolas Perfect Vision) using the system’s iris recognition and eye-tracker technology (Advanced Control Eyetracker). Patients had good ocular health and thorough patient selection and counseling before the procedure. All patients required a near addition of at least 1.50 diopters (D). LASIK SUPRACOR treatment was bilateral in 10 cases and unilateral in 5 cases, using an optical zone of 6.0 mm. Both eyes received the same algorithm, aiming for a slight residual myopia. Primary measured outcomes were manifest refraction, uncorrected near visual acuity (UCNVA), uncorrected distance visual acuity, and distance best spectacle corrected visual acuity (BSCVA) obtained by Snellen readings under photopic conditions. Postoperative follow-up was at 1 day, 1 week, 1, 3, and 6 months.

Results: The mean patient age was 50.5, ranging from 46 to 57 years. Preoperative spherical equivalent, sphere, and cylinder were 1.30 ± 0.71 D, 1.64 ± 0.30 D, and –0.45 ± 0.25 D, respectively. Mean refractive spherical equivalent (MRSE) remained stable after 1 month. At 6 months postoperative follow-up, MRSE was –0.51 D, and sphere and cylinder were –0.42 D and –0.24 D. A total of 85.8% of the patients achieved monocular uncorrected near visual acuity of 0.8 or better. Monocularly, 96% had a UCNVA of 0.8 or better. Binocularly, 92.4% of patients had a UCNVA of 0.8 or better. Six-month postoperative results for distance vision showed 79% of patients had a monocular UCVA of 0.8 or better. Binocularly, 96% had a UCVA of 0.8 or better.

Conclusions: The SUPRACOR procedure provides a very safe and effective treatment for presbyopia. All patients gained a significant improvement in near vision while maintaining and controlling very good distance vision.

E-Poster No.: EP-0336

REFRACTIVE SURGERY

E-Poster No.: EP-0336

Clinical Results of Presbyopia Treatment With Technolas SUPRACOR

First Author: Ming-cheng TAI

Purpose: To investigate the clinical effect of presbyopia treatment with SUPRACOR.

Methods: In this prospective clinical study, 25 eyes of 15 presbyopic patients underwent the SUPRACOR treatment. The procedure was carried out on the TECHNOLOGAS Excimer Workstation 217P (Technolas Perfect Vision) using the system’s iris recognition and eye-tracker technology (Advanced Control Eyetracker). Patients had good ocular health and thorough patient selection and counseling before the procedure. All patients required a near addition of at least 1.50 diopters (D). LASIK SUPRACOR treatment was bilateral in 10 cases and unilateral in 5 cases, using an optical zone of 6.0 mm. Both eyes received the same algorithm, aiming for a slight residual myopia. Primary measured outcomes were manifest refraction, uncorrected near visual acuity (UCNVA), uncorrected distance visual acuity, and distance best spectacle corrected visual acuity (BSCVA) obtained by Snellen readings under photopic conditions. Postoperative follow-up was at 1 day, 1 week, 1, 3, and 6 months.

Results: The mean patient age was 50.5, ranging from 46 to 57 years. Preoperative spherical equivalent, sphere, and cylinder were 1.30 ± 0.71 D, 1.64 ± 0.30 D, and –0.45 ± 0.25 D, respectively. Mean refractive spherical equivalent (MRSE) remained stable after 1 month. At 6 months postoperative follow-up, MRSE was –0.51 D, and sphere and cylinder were –0.42 D and –0.24 D. A total of 85.8% of the patients achieved monocular uncorrected near visual acuity of 0.8 or better. Monocularly, 96% had a UCNVA of 0.8 or better. Six-month postoperative results for distance vision showed 79% of patients had a monocular UCVA of 0.8 or better. Binocularly, 92.4% of patients had a UCNVA of 0.8 or better. Six-month postoperative results for distance vision showed 79% of patients had a monocular UCVA of 0.8 or better. Binocularly, 96% had a UCVA of 0.8 or better.

Conclusions: The SUPRACOR procedure provides a very safe and effective treatment for presbyopia. All patients gained a significant improvement in near vision while maintaining and controlling very good distance vision.

E-Poster No.: EP-0340
Comparison of Near Work—Induced Transient Myopia Between Myopic and Emmetropic Sundanese Children

First Author: Andrea Silitonga  
Co-Author(s): Syumarti Mansyur

Purpose: To compare the initial near work–induced transient myopia (NITM) between myopic and emmetropic Sundanese children.

Methods: This was a cross–sectional study. Subjects were emmetropic and myopic Sundanese children aged 7–15 years old who fulfilled the inclusion criteria and did not fulfill exclusion criteria. Baseline refractive aspects were determined through ophthalmic examination. Each child was asked to binocularly view and perform a sustained near task (5 diopters, 5 minutes). Soon after, the initial NITM and its decay time were assessed objectively using an autorefractor (RM A7000; Topcon).

Results: Fifty–two children (18 boys and 34 girls) were enrolled. Initial NITM (myopic shift) was significantly larger in myopic children (median, −0.25 D; range, −0.75–0.25 D) compared with emmetropic children (median, 0.00 D; range, −0.25–0.50 D) in all ages (P < 0.001). Decay time was longer in myopic children (median, 60 seconds) than emmetropic children (median, 30 seconds) with a significant difference (P = 0.001).

Conclusions: The initial NITM magnitude was significantly larger and the decay duration was significantly longer in myopic children than in emmetropic children. Further research is needed to determine the possible role of NITM in the development of progressive myopia.

E-Poster No.: EP–0333

Comparison of Offset Adjustment Between OcuEye and Topolyzer Vario Topography—Guided LASIK for Myopia by EX500 Excimer Laser

First Author: Fengju Zhang

Purpose: To evaluate and compare the function of angle kappa adjustment between OcuEye and Topolyzer Vario topography–guided ablation in situ keratomileusis (LASIK) by EX500 excimer laser for myopia.

Methods: A case–control retrospective analysis was conducted. One hundred forty–five cases in 29 consecutive eyes with myopia received LASIK with a target of emmetropia. The ablation for 86 cases (172 eyes) was guided manually based on OcuEye topography (study group), whereas the ablation for 59 cases (118 eyes) was guided automatically by Topolyzer Vario topography (control group). Measurement of adjustment values included data, respectively, in horizontal and vertical directions of the cornea.

Results: Horizontally, synclastic adjustment accounted for 35.5% in the study group, with mean dxmanual/dxocu (manual actual values/OcuEye topography data) of 0.78 ± 0.48; whereas in the control group, synclastic adjustment accounted for 54.2%, with mean dxauto/dxocu (automatic actual values/OcuEye topography data) of 0.79 ± 0.66. Vertically, synclastic adjustment accounted for 55.2% in the study group, with mean dymanual/dyocu of 0.61 ± 0.42; whereas in the control group, synclastic adjustment accounted for 66.1%, with mean dyauto/dyocu of 0.66 ± 0.65. There was no statistically significant difference in the ratio of actual values with OcuEye topography–guided data in horizontal and vertical directions between the 2 groups (P = 0.951, 0.621).

Conclusions: There is high consistency in offset adjustment guided manually by OcuEye and guided automatically by Topolyzer Vario topography during corneal refractive surgery with the WaveLight EX500 Excimer Laser.

E-Poster No.: EP–0341

Contrast Sensitivity Outcomes With the WaveLight Refractive Suite (Excimer EX500 and Femtosecond FS200 Lasers)

First Author: Ravvaughn Williams  
Co-Author(s): James Gow, Matthais Maus, Arthur Cummings, Daniel Durrie, Michael Gordon

Purpose: To evaluate contrast sensitivity after LASIK treatment for myopia using the WaveLight Refractive Suite.

Methods: This was a prospective, postmarket, open label trial at 4 sites: 2 sites each in the United States and Europe. Myopic subjects 18 years of age or older underwent LASIK treatment with the WaveLight Refractive Suite. Subjects completed visits preoperatively and at 1 day, 1 month, 3 months, and 6 months postoperatively. Contrast sensitivity was assessed at all postoperative visits. Binocular best corrected contrast sensitivity was measured with the manifest refraction at 8 feet, with the room lights on and the chart luminance > 85 cd/m². Contrast sensitivity was tested at 3 cpd, 6 cpd, 12 cpd, and 18 cpd.

Results: Ninety–seven subjects underwent LASIK treatment, and 96 subjects were included in the full analysis set. The mean spherical equivalent at baseline was −3.67 D ± 1.98 D. At baseline, binocular contrast sensitivity in log CS was 1.808 ± 0.140 at 3 cpd, 2.020 ± 0.188 at 6 cpd, 1.739 ± 0.209 at 12 cpd, and 1.281 ± 0.201 at 18 cpd. At 6 months, binocular contrast sensitivity was 1.917 ± 0.133 at 3 cpd, 2.148 ± 0.126 at 6 cpd, 1.876 ± 0.144 at 12 cpd, and 1.432 ± 0.130 at 18 cpd.

Conclusions: Subjects’ contrast sensitivity was improved at 6 months after LASIK treatment for myopia with the WaveLight Refractive Suite compared with...
baseline.

**E-Poster No.: EP–0330**

**Corneal Haze After Photorefractive Keratectomy**

_First Author: Hsin-chung LIN_  
_Co-Author(s): Ching-hsi HSIAO, Hsin-yuan TAN, David Hui-kang MA, Lung-kun YEH_

**Purpose:** To report the incidence and clinical course of a series of patients who developed clinically significant progressive haze after photorefractive keratectomy (PRK).

**Methods:** In this retrospective case series, the charts of 43 patients (79 eyes) who had undergone PRK for mild to moderate myopia (<−7D) with the VISX Star S4 Excimer (Customvue, IR, Abbott Medical Optics, Inc) between July 2007 and February 2015 and who had a minimum of 6 months of follow-up were reviewed. Three eyes of 2 patients developed progressive haze 3 months or more after PRK. The historical and clinical features were reviewed.

**Results:** The incidence of progressive haze was 3.8%. The average age was 30.5 years. Two patients were female. The median spherical equivalent (SE) attempted correction was −5.50 D. One patient who underwent bilateral PRK had unilateral involvement. The mean SE regression was −0.50 ± 0.79 D. Topical steroid treatment was attempted in 3 eyes with symptomatic improvement in 1 eye.

**Conclusions:** Haze and myopic regression in moderate myopia can occur 3 months after PRK. Patients may need at least 6 months of follow-up to achieve a stable refraction and level of haze.

**E-Poster No.: EP–0329**

**Criminal Court Cases in Japan: Two Cases of Laser-Assisted In Situ Keratomileusis**

_First Author: Kenji MINEMURA_

**Purpose:** To introduce examples of medical criminal court cases in Japan and make some comments on them.

**Methods:** The judicial decisions are presented and the administrative punishments discussed.

**Results:** Case 1: An ophthalmologist ran a laser-assisted in situ keratomileusis (LASIK) clinic. He placed little importance on hygiene to save money; for example, he did not sterilize surgical instruments. Even after some patients developed bacterial keratitis, he continued to not sterilize for several months. As a result, approximately 70 patients developed bacterial keratitis. The criminal process dealt with 7 out of these approximately 70 cases, and he was charged with criminal negligence resulting in injury. He was sentenced to imprisonment for 2 years. Case 2: Another ophthalmologist performed LASIK surgeries. One of the staff members mistook one patient for another, and the doctor did not notice the fact. The doctor removed too much cornea from the mistaken patient. The patient developed hyperopia. The doctor was charged with criminal negligence resulting in injury. A fine of 1 million JPY, or approximately 10,000 USD, was imposed on him.

**Conclusions:** The doctor in the former case committed malpractice deliberately, whereas the malpractice in the latter case was an honest mistake. Despite a large gap in performance between them, both were treated in the same category. It is important to consider what kind of malpractice would be classified as a criminal case.

**E-Poster No.: EP–0335**

**Femtosecond-Assisted Intracorneal Ring Implantation for Correction of Irregular Astigmatism Post PKP, Post RK, and After Corneal Trauma**

_First Author: Osama IBRAHIM_  
_Co-Author(s): Moones ABDALLA_

**Purpose:** To evaluate the safety, efficacy, and predictability of intracorneal rings (ICRs) implanted using femtosecond laser in refractive errors after keratoplasty.

**Methods:** A prospective noncomparative clinical trial. Patients had ICRs implanted by femtosecond laser (VisuMax, Carl Zeiss Meditec), in total 12 eyes of 12 patients. Uncorrected visual acuity (UCVA), best spectacle corrected visual acuity (BSCVA), manifest refraction, and K value were measured in all cases.

**Results:** Mean follow-up was 4 months (range, 2–6 months). The mean UCVA (Snellen decimal) changed from 0.14 (range, 0.05–0.3) preoperatively to 0.68 (range, 0.4–0.8) postoperatively. The mean BCVA changed from 0.73 (range, 0.5–0.9) to 0.81 (range, 0.6–0.9) at last follow-up postoperatively. There was no loss of lines of UCVA nor BCVA in any of our patients postoperatively.

**Conclusions:** ICR can be a safe, effective, and reversible way to correct irregular astigmatism.

**E-Poster No.: EP–0337**

**Outcomes of LASIK for Myopia or Myopic Astigmatism Correction With the FS200 Femtosecond Laser and EX500 Excimer Laser Platform**

_First Author: Muanploy NIPARUGS_  
_Co-Author(s): Napaporn TANANUVAT, Winai CHAIDAROON, Chulaluck TANGMANKONGVORAGUL, Somsan-
**Purpose:** To evaluate the efficacy, predictability, stability, and safety of laser in situ keratomileusis (LASIK) using the FS200 femtosecond laser and EX500 excimer laser platform.

**Methods:** A total of 254 eyes of 129 consecutive patients with myopia or myopic astigmatism who underwent full correction femtosecond laser–assisted LASIK were reviewed. Pre- and postoperative parameters at 1, 3, 6, and 12 months including manifest refraction, uncorrected distance visual acuity (UCVA), corneal topography, and tomography were analyzed. Any intra– or postoperative complications were reviewed.

**Results:** The change of mean spherical equivalent (SE) was from $-5.15 \pm 2.41$ diopters (D) (range, $-0.50$ to $-11.50$ D) to $-0.13 \pm 0.28$ D, $-0.13 \pm 0.27$ D, $-0.13 \pm 0.28$ D, and $-0.14 \pm 0.30$ D at 1, 3, 6, and 12 months, respectively. At 12 months, the proportion of eyes achieving UCVA $\geq 20/20$ was 90.0% and $\geq 20/40$ was 98.8%. The proportion of eyes achieving postoperative mean SE $\pm 0.5$ D was 91.3% and $\pm 1.0$ D was 98.5%. No serious complication was found. The low to moderate myopic group had a statistically significantly greater proportion of eyes achieving better UCVA when compared with the high myopic group at 1 ($P = 0.017$) and 3 months ($P = 0.014$), but there was no difference at 6 ($P = 0.061$) or 12 months ($P = 0.091$). The mean SE was also better in the low to moderate myopia group at every follow-up visit ($P = 0.001$, $0.007$, $<0.001$, and $<0.001$).

**Conclusions:** One–year clinical results of LASIK with the FS200 femtosecond laser and EX500 excimer laser showed high efficacy, predictability, stability, and safety.

**E–Poster No.:** EP–0339

**Postoperative Uncorrected Visual Acuity vs Preoperative Best Corrected Visual Acuity with the WaveLight Refractive Suite**

**First Author:** James GOW  
**Co–Author(s):** Ravaughn WILLIAMS, Arthur CUMMINGS, Matthais MAUS, Daniel DURRIE, Michael GORDON

**Purpose:** To evaluate postoperative uncorrected visual acuity (UCVA) compared with preoperative best corrected visual acuity (BCVA) in LASIK treatment for myopia using the WaveLight Refractive Suite.

**Methods:** This was a prospective, postmarket, open label trial at 4 sites: 2 sites each in the United States and Europe. Myopic subjects 18 years of age or older underwent LASIK treatment with the WaveLight Refractive Suite. Subjects with myopia up to $-12$ D sphere and $-6$ D cylinder were eligible. Subjects completed visits at screening, 1 day, 1 month, 3 months, and 6 months postoperatively. Binocular UCVA and BCVA were measured with an ETDRS chart at 4 meters. Noninferiority of postoperative UCVA at 1 month to preoperative BCVA was judged against a margin of 0.1 logMAR. After the noninferiority hypothesis was confirmed, superiority was tested of 1 month, 3 months, and 6 months postoperative UCVA compared with preoperative BCVA.

**Results:** Ninety–six subjects completed the study, and 73 subjects were analyzed in the per–protocol set. The difference between postoperative UCVA and preoperative BCVA at 1 month was LS adjusted mean of $-0.0601$, standard error (SE) of $\pm 0.0201$, $P = 0.0031$. The difference between postoperative UCVA and preoperative BCVA at 3 months was LS adjusted mean of $-0.0684$, SE of $\pm 0.0201$, $P = 0.0008$. The difference between postoperative UCVA and preoperative BCVA at 6 months was LS adjusted mean of $-0.0719$, SE of $\pm 0.0201$, $P = 0.0004$.

**Conclusions:** Postoperative UCVA was significantly superior to preoperative BCVA at 1 month, 3 months, and 6 months postoperatively with LASIK treatment for myopia using the WaveLight Refractive Suite.

**Quality of Life Outcomes with the WaveLight Refractive Suite (Excimer EX500 and Femtosecond FS200 Lasers)**

**First Author:** Ravaughn WILLIAMS  
**Co–Author(s):** James GOW, Arthur CUMMINGS, Matthias MAUS, Daniel DURRIE, Michael GORDON

**Purpose:** To evaluate quality of life outcomes with LASIK treatments for myopia using the WaveLight Refractive Suite.

**Methods:** This was a prospective, postmarket, open label trial at 4 sites: 2 sites each in the United States and Europe. Myopic subjects 18 years of age or older underwent LASIK treatment with the WaveLight Refractive Suite. Subjects with myopia up to $-12$ D sphere and $-6$ D cylinder were eligible. Subjects completed visits at screening, 1 day, 1 month, 3 months, and 6 months postoperatively. Quality of life was evaluated with the Refractive Status and Vision Profile (RSVP) questionnaire. Questions 3, 10, and 17 of the RSVP questionnaire were evaluated.

**Results:** Ninety–seven subjects underwent LASIK treatment, and 96 subjects were included in the full analysis set. For question 3, 100% of subjects did not wear glasses or contact lenses at 6 months compared with 1% at screening. For question 10, on a scale of 0 to 10, the mean score for vision over the past 4 weeks with no glasses or contact lenses was 3.6 (1.71) at baseline and 9.4 (0.78) at 6 months. For question 17, “I worry about my vision,” a response of “never” was reported by 10.4% and 52.6% of subjects at baseline and 6 months,
Conclusions: At 6 months postoperatively, all subjects did not wear glasses or contact lenses for distance vision, subjects had an improvement in their vision compared with the screening visit, and more subjects never worried about their vision compared with baseline.

E-Poster No.: EP–0334
The Effect of Static Cyclotorsion Compensation in OUP–SBK for Myopia and Astigmatism With EX500 Workstation
First Author: Fengju ZHANG
Purpose: To compare the refractive and visual outcomes using WaveLight EX500 excimer laser in patients with astigmatism (≥1 D) with and without the static cyclotorsion compensation (SCC) algorithm.
Methods: A case–control retrospective analysis was conducted. The patients had sub–Bowman keratomileusis (SBK). Patients had preoperative myopic astigmatism of 1.0 diopters (D) or greater and more than 3 months of follow–up. Patients received the treatment with SCC (SCC group) or not (control group).
Results: There were no significant differences in refractive error or magnitude of astigmatism in the 2 groups before the surgery. After the surgery, the refractive outcome of the 2 groups was similar, with a mean sphere of 0.19 ± 0.33 D versus 0.28 ± 0.41 D (P = 0.312), a mean cylinder of −0.15 D ± 0.20 D versus −0.18 D ± 0.21 D (P = 0.594), and a mean spherical equivalent of +0.16 ± 0.32 D versus +0.17 ± 0.41 D (P = 0.931). However, astigmatism vector analysis in the SCC group was significantly better than in the control group, with the axis rotation (EA) of 1.43 ± 2.07 degrees versus 3.44 ± 3.81 degrees (P = 0.013). The 2 groups were similar in the postoperative UDVA, CDVA, and HOAs when the aspheric algorithm was used, although there was a trend of increased number of lines gained in the SCC group. The mean static cyclotorsion value in the SCC group was 2.97 ± 2.45 degrees (maximum 10 degrees).
Conclusions: The treatment of SCC using the aspheric ablation algorithm profile in patients with moderate astigmatism produces a significant improvement in refractive and astigmatic outcomes.

E-Poster No.: EP–0338
Topography-Guided LASIK Using the ALLEGRETTO WAVE Eye–Q Excimer Laser System
First Author: James GOW
Co-Author(s): Ravaughn WILLIAMS, Doyle STULTING
Purpose: To evaluate the safety and effectiveness of the ALLEGRETTO WAVE Eye–Q Excimer Laser for topography–guided LASIK treatment of manifest and cornea–based myopic refractive errors.
Methods: Eligible subjects 18 years of age or older with myopia up to −9 D sphere and 6 D cylinder underwent topography–guided LASIK as primary treatment. The treatment plan was created using the ALLEGRO Topolyzer image files and the topography–guided custom ablation treatment software. The ablation was performed with the ALLEGRETTO WAVE Eye–Q laser system. Subjects completed 12 months of follow–up. Assessments included uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) measured with an ETDRS chart at 4 meters, manifest refraction at 4 meters, aberrometry, and patient reported outcomes with the RSVP questionnaire.
Results: Two hundred forty–seven eyes underwent treatment. Refractive stability was demonstrated at 3 months. At 3 months, 92.7% of eyes had UCVA of 20/20 or better, 91.9% of eyes had MRSE within ± 0.50 D of target, and 0% of eyes lost 2 or more lines of BCVA. At 3 months, nearly 40% of eyes had either a reduction or no change in spherical aberrations compared with baseline. The RSVP showed an improvement in all sub scales at 3 months or later postoperatively compared with baseline. Dry eye was the most frequent complication at 3 months or later.
Conclusions: The ALLEGRETTO WAVE Eye–Q Excimer Laser System used for topoguided LASIK is effective and safe as primary treatment for myopia.

E-Poster No.: EP–0331
Wavefront Analysis in Orthokeratology Corneal Reshaping—A Case Report
First Author: Chen-cheng CHAO
Co-Author(s): Chao-kai CHANG
Purpose: We report 2 cases with overnight orthokeratology (OOK) lens wear using wavefront aberrometry to evaluate changes of wavefront aberrations before and after OOK lens wear.
Methods: A case report.
Results: Case 1 was a 12-year–old girl with best corrected visual acuity of −3.75/−3.00 x 175/1.0 in the right eye (OD) and −3.75/−3.00 x 175/1.0 in the left (OS). Corneal K was 42.12/46.37 (OD) and 42.00/46.87 (OS). After 1 month of lens wear, uncorrected visual acuity was 1.0/1.0. All order aberration – log 50% with Eff. Blur (D) was 5.89/4.91 (OD) and 6.35/5.92 (OS) before and after OOK lens use. Higher order aberration – Rms Error (μ) was 0.26/0.43 (OD) and 0.15/0.39 (OS) before and after OOK lens use. Case 2 was a 15-year–old girl with best corrected visual acuity of −3.25/1.0 (OD) and −3.00/1.0 (OS). Corneal K was 43.00/43.50 in the right eye and 42.75/43.50 in the left eye. Uncorrected visual
acuity after 1 month was 1.0/1.0. All order aberration was 3.79/2.97 (D) (OD) and 3.98/3.35 (D) (OS) before and after OOK lens use. Higher order aberration was 0.52/0.43 (μ) (OD) and 0.59/0.47 (μ) (OS).

Conclusions: All order aberrations decreased in these 2 cases, and higher order aberrations were not apparently increased; therefore, night vision symptoms are less likely to be induced in OOK patients.

E-Poster No.: EP-0414
Spectral-Domain OCT Patterns of Macular Edema Associated With Retinal Vein Occlusion

First Author: Neha CHANDAK

Purpose: To study SD-OCT characteristics of macular edema in retinal vein occlusion (RVO) patients in a tertiary care hospital in rural central India.

Methods: This was a cross-sectional study. Patients with new onset RVO (BRVO, CRVO, HCRVO) underwent SD-OCT on the day of presentation. Imaging protocols used were HD 5 line raster and macular cube 512 x 218. The following characteristics were analyzed: integrity of inner segment (IS)–outer segment (OS) junction, integrity of external limiting membrane (ELM), central foveal thickness (CFT), and presence or absence of serous macular detachment.

Results: RVO was detected in 104 eyes (0.25 ± 0.05%) of 100 subjects (0.13 ± 0.03%). BRVO (0.19%) was more prevalent than CRVO (0.03%). Macular edema was detected in 42 (40%) RVO eyes. Photoreceptor IS–OS junction was disrupted in 71.6% of eyes, and ELM was disrupted in 61.9% of eyes. In 8 patients with disrupted IS–OS junction, ELM was intact. No patient developed serous detachment. CFT ranged from 164–748 μm (mean, 382.84 μm). Integrity of IS–OS junction correlated with better VA (P < 0.05), whereas CFT was inversely correlated with VA. CFT was higher in ischemic CRVO (mean, 698 μm) than in nonischemic CRVO (mean, 420 μm; P < 0.01).

Conclusions: Loss of IS–OS junction and higher CFT on SD-OCT significantly correlated with poorer visual outcomes in RVO patients. OCT is a safe, noninvasive, reliable, and reproducible method for detecting macular edema in RVO patients.

E-Poster No.: EP-0348
A Case of Diabetic Retinopathy Treated With Autologous Plasmin Enzyme

First Author: John Michael LAO

Purpose: To report a case of a 47-year-old patient diagnosed as diabetic retinopathy with macular edema of the right eye treated conservatively with autologous plasmin enzyme (APE) and to emphasize the importance of APE, which is an underutilized procedure that promotes pharmacologic vitreolysis by intraocular injection of plasmin enzyme.

Methods: The patient underwent APE treatment. Documentation of symptomatic progression through visual acuity and fundus photography (preoperatively, 5 days postoperatively, and 1 month postoperatively) was done for comparative reasons.

Results: Posterior vitreous detachment was achieved, hence macular edema and visual acuity of the right eye improved 1 month postoperatively.

Conclusions: The patient came to our institution for a minimally invasive and conservative option for her failing right eye. APE was done on her right eye, later improving her vision. APE creates a safe, atraumatic nonsurgical posterior vitreous detachment (PVD) and hence was a valuable tool in saving our patient’s vision.

E-Poster No.: EP-0396
A Case of Retinoschisis Arising During Treatment of Branch Retinal Vein Occlusion

First Author: Ayako HAYASHI
Co-Authors: Naoki KIMURA, Hisashi IWAMI, Hisako TANAKA, Osamu MIMURA

Purpose: Macular retinoschisis is a complication of high myopia. We report our experience of a case with complications of macular retinoschisis during combination therapy for branch retinal vein occlusion (BRVO) using intravitreal bevacizumab injection (IVB) and subtenon injection of triamcinolone acetonide (STTA).

Methods: This was a retrospective case report.

Results: The case subject was a 65-year-old woman, who was examined by our department upon experiencing reduced visual acuity of the left eye. The subject’s medical history included BRVO treatment of the right eye using IVB + STTA 3 years previously. Visual acuity was RV = (0.1 × –8.00 D) and LV = (1.0 × –9.50 D). Slit lamp findings revealed mild cataracts in both eyes. Fundoscopy revealed BRVO on the temporal lower of the left eye. Spectral domain optical coherence tomography (SD-OCT) revealed cystic macular edema (CME) and serous retinal detachment. Upon administration of IVB + STTA, the CME and retinal detachment disappeared. Six months later, CME recurred and was improved with administration of IVB + STTA. However, 4 months later, retinal hypertrophy was observed, and despite administration of IVB + STTA, no improvement was achieved. OCT imaging revealed no cyst-like changes, and there was a bridge structure in the retinal gap. Fundus fluorescein angiography revealed
no petaloid leakage of the fluorescein, and macular retinoschisis was diagnosed. Six months later, the subject had visual acuity of 0.8, and there have been no changes observed on OCT.

Conclusions: During the course of BRVO in high myopia, there may be complications of retinoschisis.

E-Poster No.: EP–0402

A Case Report: Solar Light–Induced Harada Disease in a Healthy Middle-Aged Male Patient

First Author: Hao-en HSU
Co-Author(s): Chih-chun CHUANG

Purpose: To report a case of solar light–induced Harada disease.

Methods: A case report.

Results: We report a healthy middle-aged male patient who suffered from sudden onset of blurred vision in the left eye after sunbathing for 2 days, with best corrected vision of 20/50. Color fundoscopic picture showed multiple cystic serous retinal detachments at the posterior pole. Optical coherence tomography also revealed serous chorioretinopathy. We gave him pulse steroid therapy with intravenous injection of soludemrol 250 mg every 6 hours for 12 doses. The treatment outcome was excellent, and his best corrected vision returned to 20/20 in 2 weeks.

Conclusions: We report 1 healthy middle-aged male who suffered from Harada disease after sunbathing and was treated successfully with pulse steroid therapy.

E-Poster No.: EP–0426

Adherence to Treatment Defines Long-Term Outcomes of Anti-VEGF Therapy in Neovascular AMD

First Author: Robert WILKE
Co-Author(s): Helmut SACHS

Purpose: Real-life outcomes of anti-VEGF therapy in neovascular AMD (nAMD) regularly fall behind respective data from large prospective trials. We analyzed a large cohort of our patients, asking if this finding can be attributed to more advanced stages of AMD, an inability to provide the high number of injections needed, or an inability to adhere closely to treatment plans.

Methods: This was a retrospective evaluation of 1500 cases of nAMD treated with ranibizumab, bevacizumab, or aflibercept. German public healthcare covers full costs of label-conforming therapy; therefore, access to therapy was excellent.

Results: In the general study population, after an initial gain in letter score (LS) (+1.4 in year 1) there was a steady decline in visual acuity with a loss in LS starting from the end of year 2. Subgroup analysis demonstrated one group with significantly higher numbers of injections (7.1 vs 5.1 in year 1) and significantly better functional outcome (LS +6.6 and +1.4 in year 1 and 2, respectively). This group was also characterized by a significantly better visual acuity at baseline, most likely indicating earlier stages of AMD. In contrast, a group characterized solely by high adherence to therapy showed even better long-term functional results (LS +2.2 at year 3), without being selected toward earlier stages of AMD.

Conclusions: Later stages of AMD certainly contribute to less favorable outcomes in real-life data. Our data, however, suggest that even under optimal access to treatment, it is rather the adherence to treatment than later stages of AMD that affects long-term outcomes.
Results: Twenty-eight patients with DME were enrolled. Patients with DME had a greater proportion of females (P = 0.045), longer duration of diabetes (P = 0.002), higher body mass index (BMI) (P = 0.001), and lower high density lipoprotein cholesterol (P = 0.007). Logistic regression model demonstrated that insulin resistance index (P = 0.000) was associated with DME.

Conclusions: Insulin resistance is associated with DME.

E-Poster No.: EP-0420

Body Composition Measures as Emerging Risk Factors for Diabetic Retinopathy in Persons With Type 2 Diabetes in Yogyakarta: The JOGjakarta Eye Diabetic Study in the COMmunity (JOGED.COM)

First Author: Muhammad SASONKO
Co-Author(s): Angela AGNI, Agus SUPARTOTO, Suhardjo PRAWIRORANU

Purpose: Previous studies failed to demonstrate consistent associations between obesity and diabetic retinopathy (DR). This study aimed to investigate the associations of body composition parameters (body age, body fat, subcutaneous fat, skeletal muscle percentage, visceral fat, and resting metabolic rate) with DR in type 2 diabetes in the community.

Methods: This was a cross-sectional study, involving nearly 500 diabetic participants aged ≥30 years in the community. All clinical data, fundus photographs, anthropometry, and body composition measurements were collected. Logistic regression with post-hoc estimation was used.

Results: There were 492 persons with diabetes included in this analysis. The mean age was 57 (11.9) years. The prevalence of DR in this population was 36.6% (8.9% vision-threatening DR). After adjusting for age, sex, diabetes duration, fasting blood glucose, systolic blood pressure, smoking, and body mass index, there were no significant associations of increasing body age [odds ratio (OR), 0.77; 95% confidence interval (CI), 0.56–1.05], body fat (OR, 0.90; 95% CI, 0.68–1.21), subcutaneous fat (OR, 0.87; 95% CI, 0.63–1.21), skeletal muscle (OR, 1.07; 95% CI, 0.81–1.43), visceral fat (OR, 0.79; 95% CI, 0.59–1.05), or metabolic rate (OR, 0.91; 95% CI, 0.65–1.27) with DR. Increasing each of these parameters was also not significantly associated with increasing severity of DR and only had a very small contribution to DR (0.1%–0.8%).

Conclusions: In this study, body composition parameters were not associated with DR and only had very small contributions to DR; therefore, they are less likely risk factors for DR in type 2 diabetes.

E-Poster No.: EP-0423

Cardiovascular Risk Factors of Diabetic Macular Edema

First Author: Muhammad SASONGKO
Co-Author(s): Angela AGNI, Agus SUPARTOTO, Suhardjo PRAWIRORANU

Purpose: Previous studies failed to demonstrate consistent associations between obesity and diabetic retinopathy (DR). This study aimed to investigate the associations of body composition parameters (body age, body fat, subcutaneous fat, skeletal muscle percentage, visceral fat, and resting metabolic rate) with DR in type 2 diabetes in the community.

Methods: This was a cross-sectional study, involving nearly 500 diabetic participants aged ≥30 years in the community. All clinical data, fundus photographs, anthropometry, and body composition measurements were collected. Logistic regression with post-hoc estimation was used.

Results: There were 492 persons with diabetes included in this analysis. The mean age was 57 (11.9) years. The prevalence of DR in this population was 36.6% (8.9% vision-threatening DR). After adjusting for age, sex, diabetes duration, fasting blood glucose, systolic blood pressure, smoking, and body mass index, there were no significant associations of increasing body age [odds ratio (OR), 0.77; 95% confidence interval (CI), 0.56–1.05], body fat (OR, 0.90; 95% CI, 0.68–1.21), subcutaneous fat (OR, 0.87; 95% CI, 0.63–1.21), skeletal muscle (OR, 1.07; 95% CI, 0.81–1.43), visceral fat (OR, 0.79; 95% CI, 0.59–1.05), or metabolic rate (OR, 0.91; 95% CI, 0.65–1.27) with DR. Increasing each of these parameters was also not significantly associated with increasing severity of DR and only had a very small contribution to DR (0.1%–0.8%).

Conclusions: In this study, body composition parameters were not associated with DR and only had very small contributions to DR; therefore, they are less likely risk factors for DR in type 2 diabetes.
**First Author: Rongle ZHOU**

**Purpose:** To assess the cardiovascular risk factors of diabetic macular edema (DME).

**Methods:** Two hundred twenty–three patients with diabetic retinopathy were retrospectively included. Routine information, clinical features, and laboratory parameters were analyzed, and binary logistic regression was used to assess the cardiovascular risk factors of DME.

**Results:** Seventy patients with DME were enrolled. Patients with DME had more females, longer duration of diabetes, higher levels of systolic pressure, fasting blood glucose, low density lipoprotein cholesterol, body mass index (BMI), and lower high density lipoprotein cholesterol ($P < 0.05$). Logistic regression model demonstrated that duration of diabetes, blood pressure, blood sugar, low density lipoprotein cholesterol, and BMI ($P < 0.05$) were all associated with DME.

**Conclusions:** Duration of diabetes, blood pressure, blood sugar, low density lipoprotein cholesterol, and BMI are all associated with DME.

**E-Poster No.: EP–0383**

**Cell Cycle Regulation of Hexahydrocurcumin in Human Retinal Pigment Epithelial ARPE-19 Cells**

**First Author: Chien-neng KUO**

**Co-Author(s): Ching-hsein CHEN**

**Purpose:** The present study aimed to clarify the role of hexahydrocurcumin in the cell cycle and the effects of DNA synthesis on human ARPE-19 cells and to provide an understanding of the molecular pathway of the function of hexahydrocurcumin in cell cycle regulation.

**Methods:** In this study, we used flow cytometry analysis to evaluate if hexahydrocurcumin notably induced G1/S phase arrest.

**Results:** The G1/S phase cycle–related protein analysis illustrated that the expressions of cyclin–dependent kinase (CDK) 2, CDK4, CDK6, and cyclin E were reduced. However, the phosphorylation of retinoblastoma tumor suppressor protein (ppRB) production was found to be slightly increased by hexahydrocurcumin. The protein levels of p53, p16, p21, and p27 were increased in hexahydrocurcumin–treated ARPE-19 cells.

**Conclusions:** The events of G1/S arrest induced by hexahydrocurcumin in ARPE-19 cells suggest that a preventive effect of hexahydrocurcumin exists in age–related macular degeneration.

**E-Poster No.: EP–0369**

**Central Retinal Artery Occlusion Resembling Purtscher-Like Retinopathy**

**First Author: Ting-yu WU**

**Co-Author(s): Yun-dun SHEN, Wen-ming HSU**

**Purpose:** To report a case of central retinal artery occlusion presenting with Purtscher-like retinopathy.

**Methods:** A case report.

**Results:** A 56–year–old man with hypertension complained of sudden onset of blurred vision in his left eye. Visual acuity was 0.4 initially and downgraded gradually to hand motions within 5 days. Fundus examination showed apparent macular edema with cherry–red spots. Multiple cotton–wool spots or Purtscher fleck–like lesions around the optic disc were also noted, resembling a feature of Purtscher–like retinopathy. Fluorescein angiography revealed narrowing of the retinal arterioles without obvious delayed filling time. He had no recent history of head trauma, pancreatitis, chest compression, fracture, or other systemic disease.

**Conclusions:** We report a case of central retinal artery occlusion with atypical fundus findings of multiple cotton–wool spots resembling Purtscher–like retinopathy. In addition to cardiovascular diseases, we should carefully rule out other systemic events associated with Purtscher–like retinopathy in those cases.

**E-Poster No.: EP–0430**

**Changes of Foveal Shape and Structure After Intravitreal Ranibizumab for Diabetic Macular Edema**

**First Author: Tingting LIU**

**Purpose:** To evaluate changes in the area of the foveal avascular zone (FAZ), choroidal thickness, and retinal thickness in diabetic macular edema (DME) over the course of intravitreal antivascular endothelial growth factor (anti–VEGF) treatment with ranibizumab.

**Methods:** This retrospective study examined 25 eyes of 25 patients with DME treated with intravitreal ranibizumab; 25 eyes of 25 patients with DME not treated with ranibizumab were included in this study as a control group. In all subjects, fluorescein angiography (FA) and spectral–domain optical coherence tomography (SD–OCT) cross–sectional scans were obtained.

**Results:** The preoperative overall mean FAZ area was $0.67 \pm 0.26 \text{ mm}^2$; 6 months after intravitreal ranibizumab, it was $0.52 \pm 0.20 \text{ mm}^2 (P = 0.003)$. Central retinal thickness (CRT) decreased significantly over the course of treatment from 469.78 $\pm$ 148.29 $\mu$m to 322.48 $\pm$ 71.88 $\mu$m ($P = 0.001$). Choroidal thickness improved over the course of treatment from 142.61 $\pm$ 41.08 $\mu$m to 161.43 $\pm$ 45.26 $\mu$m, but was not significant ($P = 0.076$). Macular volume changed from 14.34 $\pm$ 2.75 $\text{ mm}^3$ to 11.58 $\pm$ 1.25 $\text{ mm}^3 (P < 0.0001)$. Correlation analyses revealed no significance between the size and CRT or choroidal thickness before and over the course
of treatment. However, no significant differences were found in control group.

**Conclusions:** The results confirm the safety and efficacy of intravitreal ranibizumab in patients with DME. Foveal shape and structure were much improved, and an increase in retinal ischemia was not found over the course of intravitreal anti-VEGF treatment with ranibizumab.

**E-Poster No.: EP-0380**

**Characteristic Changes on Optical Coherence Tomography in Acute Central Serous Chorioretinopathy Predicting the Need for Intervention**

**First Author:** Wei-yu LAI  
**Co-Author(s):** Chui-lien TSEN, Shwu-jiuan SHEU

**Purpose:** To investigate the characteristic changes on optical coherence tomography (OCT) in acute central serous chorioretinopathy (CSC) predicting the need for intervention.

**Methods:** A retrospective chart review of patients diagnosed with acute CSC in our department from July 2011 to December 2014 was performed. Acute CSC was defined as disease onset within 6 weeks. Those who were not followed up for at least 6 months or had insufficient data recorded were excluded. Data recorded included age, sex, disease duration, vision, biomicroscopic examinations, OCT images, and fluorescein angiography (if eligible). The OCT images were further classified into serous retinal detachment, pigment epithelial detachment (RPED), fibrinous exudates, RPE bumps, and hyperreflective dots. Correlation between those OCT parameters and the need for intervention were analyzed.

**Results:** A total of 27 eyes from 27 patients were included in this study. Among those, 14 eyes needed treatment but 5 of them refused. Ultimately, a total of 9 patients received photodynamic therapy, laser, or intravitreal injection of anti-VEGF. Those with serous retinal detachment involving the foveal region and the absence of fibrin were found to have a statistically significant association with the need for treatment ($P = 0.023, P = 0.012$, respectively). The presence of RPE bumps, hyperreflective dots, and location of the PED did not have a significant association with the need for treatment.

**Conclusions:** Serous retinal detachment at the foveal region and the absence of fibrin in acute CSC predict the need for intervention.

**E-Poster No.: EP-0379**

**Characteristics of Shaken Baby Syndrome in a Tertiary Referral Center**

**First Author:** An-lun WU  
**Co-Author(s):** Shao-hsuan HSIA, Chi-chun LAI, Wei-chi WU

**Purpose:** To report the characteristics of Taiwanese shaken baby syndrome (SBS) in a tertiary referral center.

**Methods:** This was a retrospective review of the medical records of 82 patients with child abuse consistent with the diagnosis of shaken baby syndrome at Chang Gung Memorial Hospital between January 1, 2000, and December 31, 2011. Patients were identified and their physical examination, ophthalmologic examination, neuroimaging by CT or MRI, and skeletal radiographic survey were statistically analyzed.

**Results:** The age of the patients ranged from 1 to 54 months, with an average age of 6.3 months. Neuroimaging was abnormal in 85% of the cases, mostly associated with subdural hemorrhage (82%). Retinal hemorrhages were detected in 55% of the examined children. The retinal hemorrhages were bilateral in 89% of affected children and varied in type and location. Flame-shaped hemorrhages were the most common. Six eyes of 5 children underwent vitrectomy for sustained vitreous hemorrhage as a consequence of shaken baby syndrome. Poor visual outcome was observed with disruption of the ellipsoid zone, optic atrophy, and cortical damage. Fathers were the predominant perpetrators, and a history of premature birth was present in 7% of the cases.

**Conclusions:** Our study supports the previous observations of characteristic ocular and cranial findings in shaken baby syndrome. Infantile ambylogetic vitreous hemorrhage may be effectively managed by trans pars plicata vitreous surgery. Visual outcome may be limited as a consequence of intraocular structural damage or cerebral visual impairment. Ophthalmologists play an important role in detecting shaken baby syndrome. However, prevention is the most important way to combat the terrible serious sequelae.

**E-Poster No.: EP-0360**

**Chi-Ju-Di-Huang-Wan Protects Against Retinal Ischemia in the Rat by Downregulating Matrix Metalloproteinase-9 via p38 Mitogen-Activated Protein Kinase Inhibition**

**First Author:** Hsiao Ming CHAO  
**Co-Author(s):** Jorn-hon LIU

**Purpose:** Retinal ischemia plays a pivotal role in vision-threatening retinal disorders. The aim was to examine whether and how Chi-Ju-Di-Huang-Wan (CJDHW) can protect against retinal ischemia.

**Methods:** High intraocular pressure–induced retinal
ischemia was established by raising intraocular pressure (IOP) to 120 mm Hg for 60 minutes in a Wistar rat eye. This ischemic insult was followed by 1 or 7 days of reperfusion. The treatment and mechanisms were studied utilizing electroretinogram (ERG), biochemistry, and histopathological methods.

**Results:** The defined retinal ischemic alterations included the following features: a reduction in ERG b-wave amplitudes, a decrease in inner retinal thickness, a decrease in choline acetyltransferase (ChAT) immunolabeling, enhanced vimentin/glial fibrillary acidic protein (GFAP) immunoreactivity, more numerous apoptotic cells in the ganglion cell layer, and less numerous retinal ganglion cells. Moreover, a decrease and an increase in the mRNA levels of Thy-1 and matrix metalloproteinase-9 (MMP-9) were found in the ischemic retina, respectively. Furthermore, the protein level of B-cell lymphoma 2 (Bcl-2) was decreased, whereas the levels of heme oxygenase-1 (HO-1), phosphorylated-p38 mitogen-activated protein kinase (MAPK), and MMP-9 were increased. Importantly, the ischemia–induced changes were significantly modulated by pretreatment of 4.2 g/Kg/day CJDHW. In particular, the ischemia–associated P-p38 and MMP-9 increases were blunted by both CJDHW and 2 nmole of p38 MAPK inhibitor.

**Conclusions:** CJDHW appears to protect against retinal ischemia via inhibiting apoptosis, by increasing antioxidative activity, and through the downregulation of MMP-9 via p38 MAPK inhibition.

**E–Poster No.:** EP–0417

**Choroidal Neovascularization Treated With Intravitreal Ranibizumab in a Young Female Diagnosed at the Vitelliruptive Stage of Best Vitelliform Macular Dystrophy**

First Author: Faruk OZTURK  
Co-Author(s): Onur İNAM, Medina FARZİYEVA

**Purpose:** To report a case of Best vitelliform macular dystrophy (BVMD) at vitelliruptive stage treated with intravitreal ranibizumab.

**Methods:** A 12-year–old white female patient came to our clinic with the complaints of decrease in vision gradually for 10 months and metamorphopsia. There was no pathological finding at the outer biomicroscopic examination, whereas detailed fundoscopic examination showed that yellowish yolk–like deposits were present in the macula with a dome–shaped appearance in the right eye and subretinal hemorrhage under the foveal region in the left eye. Further tests of spectral-domain optical coherence tomography (SD–OCT), fundus autofluorescence (FAF), fundus fluorescein angiography (FFA), and electrooculography (EOG) were performed to investigate the underlying condition.

**Results:** Based on clinical findings and consistent test results, BVMD or “Best disease” diagnosis was made. Because it was at the vitelliruptive stage and choroidal neovascularization (CNV) was seen, ranibizumab, an intravitreal anti–vascular endothelial growth factor (anti–VEGF) agent, was used as bilateral therapy.

**Conclusions:** Ranibizumab, an anti–VEGF agent, can be used for regression of CNV in BVMD.

**E-Poster No.:** EP–0378

**Choroidal Thickness as a Prognostic Factor of Photodynamic Therapy With Antivascular Endothelial Growth Factor for Polypoidal Choroidal Vasculopathy**

First Author: Yoichi SAKURADA  
Co-Author(s): Atushi SUGIYAMA, Naohiko TANANBE, Wataru KIKUSHIMA, Hiroyuki IJIMA

**Purpose:** To investigate the clinical factors, including subfoveal choroidal thickness (SCT), associated with vision improvement and the need for additional treatment due to residual or recurrent exudative changes 12 months after the combination of intravitreal injection of ranibizumab or aflibercept followed by photodynamic therapy (PDT) for polypoidal choroidal vasculopathy (PCV).

**Methods:** The changes at 3, 6, 9, and 12 months in best corrected visual acuity (BCVA) and subfoveal choroidal thickness of the retina and choroid were studied in 50 eyes with PCV treated initially with a combination of either intravitreal ranibizumab injection (IRI) (n = 23) or intravitreal aflibercept injection (IAI) (n = 27) followed by PDT. Clinical factors associated with vision improvement and the need for additional treatments were investigated.

**Results:** BCVA significantly improved with significant reduction in central macular thickness and SCT at each 3–month evaluation irrespective of treatment with either IRI or IAI combined with PDT (P < 0.001). Better BCVA and improvement of BCVA at 12 months was associated with thicker SCT (P = 0.018, P = 0.018) along with smaller greatest linear dimension (P = 0.0057, P = 0.0057). Absence of additional treatments during 12–month follow–up was also associated with thicker SCT (P = 0.024).

**Conclusions:** Irrespective of the differences in treatment with either ranibizumab or aflibercept, visual outcome at 12 months was excellent in eyes with PCV treated by a combination therapy involving intravitreal injections of anti–VEGF agents followed by PDT. Thicker SCT was associated with better visual outcome and a
reduction in the need for additional treatments.

**E-Poster No.: EP-0384**

**Choroidal Hemangioma Complicated With Subretinal Fluid and Intraretinal Cysts Treated With Photodynamic Therapy and Laser Photocoagulation—A Case Report**

*First Author: Ting-yu WU*

*Co-Author(s): Yun-dun SHEN, Allen LIN*

**Purpose:** To report a case of choroidal hemangioma complicated with subretinal fluid and intraretinal cysts. We performed photodynamic therapy and laser photocoagulation as treatment.

**Methods:** A case report.

**Results:** A 46-year-old man complained of progressively blurred vision in his left eye for months. An orange–colored tumor was noted at the nasal upper quadrant of the retina. The size was about 10 disc diameters, and the margin was colored with pigments. The OCT showed subretinal fluid and intraretinal cysts in the macular area. The FAG/ICG images showed no predominant vessels in the tumor. Under the diagnosis of choroidal hemangioma, photodynamic therapy (PDT) was performed with 690 nm laser under the intensity of 600 mW/cm² for 3 spots (4000, 4000, 4500 μm) with totally 123 seconds to cover the tumor. The subretinal fluid was totally reabsorbed after PDT, but the intraretinal fluid persisted and even increased after 1–2 months. The patient still experienced blurred vision, and we performed laser photocoagulation with a long duration of 0.5–0.9 seconds and a large spot size of 500 μm with grade 3 intensity on the tumor. The intraretinal cysts finally disappeared.

**Conclusions:** PDT is an effective treatment of choroidal hemangioma with subretinal fluid. Laser photocoagulation can be the subsequent treatment for inadequate outcome or for recurrence after PDT.

**E-Poster No.: EP-0394**

**Clinical Imaging Evaluation of Macular Degeneration in Patients With Retinitis Pigmentosa**

*First Author: Jong-jer LEE*

*Co-Author(s): Yi-hao CHEN, Pei-chang WU, Hsi-kung KUO, Jung LO, Tsung-han LEE*

**Purpose:** Progressive degeneration of the macula causes severe visual disability in late stage retinitis pigmentosa (RP). The purpose of this study was to explore the role of imaging used in daily practice in evaluation of macular function of patients with RP.

**Methods:** Combined imaging of patients with RP was conducted at a tertiary center in Taiwan between 2014 and 2015. The clinical data including visual acuity (VA), spectral–domain optical coherence tomography (OCT), microperimetry (Nidek MP-1), and hyperautofluorescence (hyper–AF) detected by confocal scanning laser ophthalmoscopy (Spectralis HRA) were analyzed to determine their association with visual outcome and macular function in RP patients.

**Results:** Six patients with RP including 2 with Usher syndrome were enrolled. Three types of hyper–AF were identified: 1, well–defined circular hyper–AF ring without foveal involvement (CAF); 2, hyper–AF islands within hyper–AF ring (IAF); 3, no definite hyper–AF ring (NAF). Patients in the CAF group had a better VA (20/25) than those in the IAF (20/60) and NAF (20/50) groups. MP-1 showed that the percentage of fixation...
within 2 degrees in patients with CAF (94%) was higher than in IAF (45%) and NAF (78%). Loss of IS/OS lining on SD-OCT in the parafoveal area was compatible with the zones with loss of light sensitivity demonstrated by MP-1.

Conclusions: The pattern of hyper-AF may have prognostic value in the visual function of RP patients. Nonetheless, factors including small case number, inconsistent genetic background, and frequent loss of follow-up made this study challenging. A large prospective cohort is desired in future studies.

E-Poster No.: EP-0368

Coats Disease Associated With Epiretinal Membrane

First Author: Yu-jang CHAO
Co-Author(s): Tai-chi LIN, Shih-jen CHEN, Catherine LIU

Purpose: Few reports expound on the association between Coats disease and epiretinal membrane (ERM). Although rare, it is one of the major causes of visual acuity reduction. Herein, we report a case of combined Coats disease and ERM.

Methods: A case report.

Results: This case was a 41-year-old male with adult-onset Coats disease combined with a huge retinal flap tear. ERM and subretinal fluid developed after he received laser photocoagulation to the retinal tear and intravitreal injection of Avastin. The ERM regressed spontaneously after multiple intravitreal injections of anti-VEGF agent and laser photocoagulation, but the subretinal fluid remained. He was treated with 23-gauge pars plana vitrectomy, and during the operation remaining premacular membrane was recognized and removed.

Conclusions: ERM may resolve spontaneously after PVD, which could be induced after laser photocoagulation or intravitreal injection. In firmly attached cases, surgical intervention should be considered. In cases that clinically suggest PVD but with no improvement in symptoms and vision, surgical intervention might still be of benefit.

E-Poster No.: EP-0399

Comparison of Handheld Portable Retinal Camera With Nonportable Fundus Photography for Grading Diabetic Retinopathy

First Author: Hendra KUSUMA
Co-Author(s): Habibah MUHIDDIN, Ichsan ANDI

Purpose: This study aimed to assess the accuracy and reliability of a handheld portable retinal camera (Kowa) compared with nonportable fundus photography (Topcon) to grade diabetic retinopathy.

Methods: This study was conducted using a diagnostic test design with 36 patients (72 eyes) with diabetes mellitus.

Results: Spearman correlation test was used to assess the association of diabetic retinopathy grading result using the Topcon and Kowa devices. There was a significant correlation between the grading results (P < 0.001), and both had a strong correlation (R = 0.833 or 83.3%). However, using the McNemar test to assess the comparative results of the detection of macular edema with the Topcon and Kowa devices showed a significant difference (P = 0.001), indicating a discrepancy amounting to 26.28% (2.68% + 23.6%). The sensitivity and
Comparison of Vitreomacular Interface After Antivascular Endothelial Growth Factor Injections in Age-Related Macular Degeneration, Diabetic Macular Edema, and Retinal Vein Occlusion

First Author: Wei-ning LIN
Co-Author(s): Wen-chuan WU

Purpose: To evaluate the incidence of posterior vitreous detachment (PVD) induced by intravitreal injections of antivascular endothelial growth factor (anti-VEGF) in cases of age–related macular degeneration (AMD), diabetic macular edema (DME), and retinal vein occlusion (RVO).

Methods: This study was conducted by retrospective chart review. Patients with AMD, DME, and RVO who presented with vitreomacular adhesion (VMA) detected by spectral-domain optical coherence tomography (OCT) at baseline were included. All patients received at least 3 monthly intravitreal injections of anti-VEGF agents. Follow-up visits were arranged after each intravitreal injection and included OCT analysis to evaluate the incidence of PVD.

Results: The mean age, mean follow-up period, and number of intravitreal injections were recorded in AMD, DME, and RVO groups. Intravitreal drugs used in this study were ranibizumab and bevacizumab. Incidence of PVD induced by intravitreal anti–VEGF injections in each group was analyzed. The incidence of PVD after intravitreal injections appeared to be higher in the DME group than that in the AMD group.

Conclusions: Intravitreal injections of commonly used anti–VEGF drugs may induce PVD in patients with AMD and DME. Incidence of PVD after intravitreal anti–VEGF injection is higher in cases of DME compared with those of AMD.

E-Poster No.: EP–0424

Correlation Between Visual Acuity and Microstructural Changes After Intravitreal Bevacizumab Therapy in Treatment-Naive Idiopathic Choroidal Neovascularization

First Author: Syed Nasir SHAH

Purpose: We correlate visual acuity and microstructural changes after intravitreal bevacizumab injection in eyes with treatment–naive idiopathic choroidal neovascularization (ICNV).

Methods: In this chart review, we included 40 symptomatic eyes that received an intravitreal injection of bevacizumab (1.25 mg/0.05 mL) followed by additional doses based on optical coherence tomography findings, including intraretinal fluid, subretinal fluid, and pigment epithelial detachment. After the final follow-up, 2 groups were allocated based on visual improvement:

Conclusions: Both ranibizumab and bevacizumab are effective for the treatment of RVO and appear to have similar visual and anatomic outcomes. The average number of injections was significantly lower in the ranibizumab group than in the bevacizumab group.

E-Poster No.: EP–0421
the good function group with best corrected visual acuity ≥0.3 logarithm of minimum angle of resolution (logMAR) and the poor function group with <0.3 logMAR. We analyzed best corrected visual acuity, central retinal thickness, neovessel size (thickness and diameter), and disrupted photoreceptor layer length.

**Results:** Thirty-one eyes (77%) showed good and 9 eyes (23%) showed poor improvement in visual acuity. No significant differences at baseline were observed. Best corrected visual acuity improved by 0.37 ± 0.20 logMAR in the good function group and 0.12 ± 0.49 logMAR in the poor function group, but was not statistically significant (P = 0.249). The change in photoreceptor disruption length was 369.09 ± 128.4 µm in the good function and 234.84 ± 144.83 µm in the poor function group and was statistically significant (P = 0.038). Decreases in choroidal neovessel thickness (46.90 ± 25.34; 32.54 ± 27.54 µm) (P = 0.045) and central macular thickness (105.80 ± 22.31; 85.76 ± 32.78 µm) (P = 0.043) showed significant changes at final follow-up. However, no significant difference in changes in choroidal neovessel diameter was observed.

**Conclusions:** Intravitreal bevacizumab therapy is safe and well tolerated in ICNV eyes. Restoration of disrupted photoreceptor length and decreases in central retinal thickness and choroidal neovessel thickness are associated with visual improvement.

**E–Poster No.: EP–0354**

**Correlation Between Visual Acuity Changes and Optical Coherence Tomography Morphological Findings in Idiopathic Epiretinal Membrane**

*First Author: I-mo FANG Co-Author(s): Chih-chao HSU, Li-ri CHEN*

**Purpose:** To analyze the influence of spectral–domain optical coherence tomography (SD–OCT) features on visual acuity changes in patients with idiopathic epiretinal membranes (ERM).

**Methods:** Seventy-nine eyes of 71 patients were included. SD–OCT was performed for all patients; data were collected upon ERM diagnosis and at the final visit. The patients were divided into subgroups based on their SD–OCT features. The initial best corrected visual acuity (BCVA) and changes in BCVA for each subgroup were compared. Multivariate analysis was performed to assess the factors associated with changes in BCVA.

**Results:** During a mean follow-up period of 20.78 months, the mean change in logMAR VA was 0.052 ± 0.089. Eyes with IS/OS junction disruption and cystoid macular edema (CME) had a significantly lower mean initial BCVA than those without disruption and CME (P = 0.036 and P = 0.012, respectively). However, only eyes with CME had significant changes in BCVA compared with those without CME (P = 0.034). Multivariate analysis revealed the presence of CME as the only factor that had a significant correlation with visual acuity changes.

**Conclusions:** In patients with idiopathic ERM, the presence of CME and IS/OS disruption detected by OCT correlated with a poorer initial BCVA. Most patients’ visual acuity remained stable during follow-up. The presence of CME on OCT represented a predictor of the progression of visual acuity. These results may provide valuable clinical information regarding the management of patients with idiopathic ERM.

**E–Poster No.: EP–0345**

**Correlation Between Visual Outcomes and Pretreatment Factors Including Hyperreflective Foci in Neovascular Age-Related Macular Degeneration**

*First Author: Hyung Chan KIM Co-Author(s): Hyung Woo LEE*

**Purpose:** To investigate the correlation between hyperreflective foci (HF) on spectral–domain optical coherence tomography (SD–OCT) at baseline and visual outcomes after intravitreal ranibizumab injection in neovascular age-related macular degeneration (nAMD).

**Methods:** We retrospectively reviewed the medical records of 44 eyes of 44 nAMD patients. The number of HF was counted according to the location of HF on SD–OCT: neurosensory retinal layer, outer retinal layer, and subretinal layer. Statistical correlations among final visual acuity (VA) and pretreatment OCT parameters including number of HF, foveal thickness (FT), thickness of choroidal neovascularization (CNV), status of external limiting membrane, and photoreceptor inner and outer segments (IS/OS) were evaluated.

**Results:** The number of HF was reduced in all retinal layers in nAMD patients after treatment. In multivariate regression analysis, final VA was associated with baseline VA, number of subretinal HF, and IS/OS disruption length (P = 0.028, P = 0.046, and P = 0.009, respectively) in nAMD patients. The baseline number of subretinal HF was correlated with final FT and CNV thickness (P = 0.002 and P = 0.009, respectively).

**Conclusions:** The baseline number of subretinal HF on SD–OCT might predict final VA after intravitreal ranibizumab treatment in nAMD patients.

**E–Poster No.: EP–0431**

**Cytomegalovirus Retinitis—A Review of 4 Cases**

*First Author: Cheong Yi FONG*
**Purpose:** To review different causes of cytomegalovirus (CMV) retinitis and their presentations and treatments.

**Methods:** Four cases of CMV retinitis from 2011–2014 were identified and reviewed.

**Results:** All 4 cases had different causes of immunosuppression. The presentation of CMV retinitis was highly variable among them. The treatment options were also different.

**Conclusions:** CMV retinitis has a wide range of presentation that may not be classical as in AIDS patients. Patients also received different treatment modalities and suffered from different side effects. We must maintain a high level of vigilance against CMV retinitis in patients who are immunocompromised and present with posterior segment signs and symptoms.

**E-Poster No.:** EP-0357

**Determining Subthreshold Laser Conditions for Retinal Scar Formation in Rabbits: A Comparison of Two Different Laser Devices**

First Author: Maryam HAMANDI  
Co-Author(s): Satoshi KATO, Fumiyuki ARAKI, Takashi UETA, Nobuharu ASAI, Abe HITOSHI

**Purpose:** One of the treatment methods for macula edema is subretinal photocoagulation. We studied the effects of varying laser scars on rabbit retina treated with 2 different laser devices histologically and structurally.

**Methods:** Two different laser devices—Pascal (Topcon, Tokyo) and MC-500 Vixi (Nidek, Gamagori)—were used to perform retinal photocoagulation in 6 Dutch–belted rabbits. Laser photocoagulation was performed with varying duration times and powers to determine the optimal parameters for subthreshold photocoagulation. Immediately after laser treatment, retinal scars were observed using OCT. Two days after photocoagulation, the retinas were extracted and immunohistochemical analysis was performed. Retinal scar diameters were measured and subsequently correlated with the particular laser device and parameters used to determine specific subthreshold conditions.

**Results:** With the Pascal laser (duration 10 ms), scars were visible under the conditions at power settings of endpoint 100%, 80%, and 60% (power: 100mW; duration time: 10 ms). Some scars were invisible under the condition of endpoint 40%. With the MC-500 Vixi (duration time: 10 ms), scars were visible at power settings of 100 mW and 80 mW, but scar formation was not observed at a power setting of 60 mW.

**Conclusions:** The subthreshold laser conditions (power and duration time) were uncovered.

**E-Poster No.:** EP-0413

**Different Levels of Inflammatory Factors and VEGF in Kidney, Serum, and Retina of Diabetic Rats**

First Author: Tingyu XIE

**Purpose:** To explore the levels of VEGF and inflammatory factors in the kidney, retina, and serum of STZ-induced rats at different time points.

**Methods:** Forty clean male rats weighing 300–320 g were used. Ten were the blank group without any intervention, and 30 rats received ordinal feeding for 1 month and then STZ was used to induce the diabetic rat modeling formation. Fasting plasma glucose more than 11.1 mmol/L twice was considered modeling success. Blood was taken from the aorta abdominalis under intraperitoneal anesthetic, then the kidney was removed for VEGF, IL-1β, IL-6, TNF-α, and ICAM-1 tests by ELISA methods.

**Results:** Compared with the blank group, every inflammatory factor in the serum of the 2-month diabetic rats was increased in varying degrees and was statistically different (P < 0.001). TNF-α increased more than others (t = -11.383, P < 0.001). Inflammatory factors increased in the kidneys of the diabetic rats as well (P < 0.001), but IL-1β (81.050/32.994 ng/mL) and IL-6 increased more (14.650/3.099 ng/mL). Compared with the blank group, as diabetes continued, all of the inflammatory factors had a tendency to rise (P < 0.001), except for ICAM-1 and TNF-α, which were not statistically different between 2 weeks and 2 months in the kidney of the diabetic rats.

**Conclusions:** VEGF, TNF-α, IL-1β, IL-6, and ICAM-1 levels in kidney and serum increased with the course of diabetes. ICAM-1 and TNF-α increased more in the early stage.

**E-Poster No.:** EP-0346

**Endophthalmitis Rates in an Ambulatory Surgical Center Setting**

First Author: Harvey UY  
Co-Author(s): Pik Sha CHAN, Franz-marie CRUZ

**Purpose:** To determine the endophthalmitis rates and risk factors for infection in an ambulatory surgical center (ASC) setting.

**Methods:** A retrospective case series. The records of patients who underwent surgery or intravitreal injection in ophthalmology ASCs by a single surgeon over a period of 14 years were searched for the diagnosis of endophthalmitis. The identified patients’ medical and operative records were examined for potential risk factors for endophthalmitis. All procedures were performed in an operating room using disposable drapes, standard face masks, 30–second intraoperative 10% povidone–iodine wash, flash–autoclaved instruments,
and postprocedural use of third or fourth generation fluoroquinolone drops.

**Results:** Two cases of culture positive endophthalmitis from a total 14,872 procedures were identified, specifically 0 of 8820 surgical cases (0%) and 2 of 6052 (0.03%) intravitreal injections. The overall infection rate was 0.013%. Both cases occurred after intravitreal injection of bevacizumab. One patient was a 55-year-old female with polypoidal choroidal vasculopathy with no comorbidities and the other was a 77-year-old male with wet age-related macular degeneration with hypertension and hypercholesterolemia. Both cases were treated within 2 to 3 days with intravitreal injection of vancomycin and ceftazidime and resolved without sequelae.

**Conclusions:** These results are comparable with published rates of endophthalmitis (0.001 to 0.3%). Intraocular procedures performed in an ASC setting appear to have comparable risk for infection when prophylactic measures are followed. Immediate treatment may lead to favorable outcomes.

**E-Poster No.:** EP–0418

**Findings at Peripheral Fundus and Ora Serrata in Normal Eyes by Ultra-Widefield Fluorescein Angiography**

**First Author:** Jing LU
**Co-Author(s):** Guiying MAI, Hong YAN, Mei LI, Yan LUO, Lin LU

**Purpose:** To characterize the normal appearance of ora serrata and peripheral fundus via ultra-widefield fluorescein angiography (UWFA).

**Methods:** Ninety-four eyes of 64 subjects with best corrected visual acuity > 0.8 and without any pathologic changes in the posterior retina underwent Heidelberg Spectralis UWFA. According to UWFA findings, eyes without any UWFA findings, eyes with mottled hyperfluorescent line only, and eyes with leakage only were allocated into the control group, hyperfluorescent line group, and leakage group, respectively. Ciliary body thickness (CBT) of the 3 groups was measured by ultrasound biomicroscopy and differences were compared.

**Results:** In the ora serrata region, a mottled hyperfluorescent line was detected in 32 eyes (34.0%). It was observed in patients of all age groups, but the incidence increased significantly with advancing age ($P = 0.032$) and was more likely in females ($P = 0.043$). In the far retinal periphery just posterior to the ora serrata, a hyperfluorescent granular band appeared in 90 eyes (95.7%); mild degeneration was observed in 21 eyes (22.3%); leakage was observed in 32 eyes (34.0%). CBT of the 3 groups was significantly different, indicating potential inflammation in eyes with a mottled hyperfluorescent line.

**Conclusions:** Standard peripheral fundus has a hyperfluorescent granular band, without any mottled hyperfluorescent lines at the ora serrata. The mottled hyperfluorescent line should be categorized as an abnormality rather than a developmental variation, and long-term observation at follow-up visits is needed to determine its clinical significance.

**E-Poster No.:** EP–0393

**Foveal-Avoiding Photodynamic Therapy for Myopic Choroidal Neovascularization**

**First Author:** Milton CHEW
**Co-Author(s):** Colin TAN, Tock-han LIM

**Purpose:** To evaluate the visual outcomes of choroidal neovascularization (CNV) secondary to pathological myopia in eyes treated with photodynamic therapy (PDT) and to determine the effect of foveal involvement on visual prognosis.

**Methods:** An interventional case series of 24 consecutive patients with myopic CNV who were treated with PDT over a 2-year period. The main outcome measure was logMAR visual acuity (VA). Eyes with extraretinal CNV lesions were subdivided into foveal–avoiding PDT (where the PDT laser spot did not involve the foveal center) and foveal–involved PDT (where the PDT laser covered the fovea).

**Results:** Overall, the mean logMAR VA at 24 months was 0.72. Extrafoveal CNV lesions achieved significantly better final VA compared with subfoveal CNV (logMAR 0.45 vs 1.05, $P = 0.012$). The group with foveal–avoiding PDT had significantly better VA compared with the foveal–involved group at all time points until 24 months. The final logMAR VA for the foveal–avoiding PDT group was 0.26 compared with 1.00 for the foveal–involved PDT group ($P = 0.003$). At 24 months, 77.8% of foveal–avoiding PDT cases achieved VA of ≥20/40, compared with 25% of foveal–involved PDT and 9.1% of subfoveal CNV lesions ($P = 0.006$).

**Conclusions:** For patients with myopic CNV, foveal–avoiding PDT results in significantly better long-term visual outcomes compared with those with foveal–involved PDT. Foveal–avoiding PDT may be of value for the treatment of myopic CNV patients who are not suitable for treatment with antivascular endothelial growth factor injections.

**E-Poster No.:** EP–0370

**Fundus Autofluorescence in Retinal Artery Occlusions**

**First Author:** Hsien Chung LIN
**Co-Author(s):** Horng-jiun WU, Wen-chuan WU

**Purpose:** To describe the findings of fundus autofluorescence (FAF) in patients with retinal artery occlusion.
Methods: In this retrospective, observational case series, FAF was evaluated in 10 eyes with retinal artery occlusion in 10 consecutive patients. All of these patients received detailed clinical examinations, color fundus photographs, optical coherence tomography (OCT), and carotid Doppler.

Results: Fundus autofluorescence in these 10 eyes all demonstrated hypoautofluorescence of the nonperfused retina. OCT manifested the well-demarcated thickening of the inner retina in the acute phase of arterial occlusions that correlates with the areas of blocked autofluorescence. Color fundus photography showed retinal whitening in the occlusive areas. The retinal arterial plaque was not obviously visible in these 10 patients from the color fundus photography, but a hyperautofluorescent retinal arterial plaque was revealed in 3 eyes. Carotid Doppler demonstrated obvious plaques in the carotid system among these 3 patients. One eye with spontaneous regression showed quick resolution of the previously hypoautofluorescent area.

Conclusions: FAF has proven to be a noninvasive tool in pointing out areas of retinal artery occlusion. It is also a useful modality to identify retinal arterial plaque. The technique can be used to objectively assess response to therapy or a natural reduction in the severity of the disease.

E-Poster No.: EP-0381

Half-Dose Photodynamic Therapy for Older-Aged Central Serous Chorioretinopathy—A Case Report

First Author: Chia-ming HSU
Co-Author(s): Tsung-tien WU, Shwu-juiuan SHEU

Purpose: To report older-aged chronic central serous chorioretinopathy (CSC) treated successfully with half-dose photodynamic therapy (PDT).

Methods: A case report.

Results: A 61-year-old male presented to our clinic with blurred vision in the left eye for 1 week. He had type 2 diabetes mellitus and hypertension under regular control. He had taken some herbal medicine for muscular pain and arthritis 1 week previously. Best corrected visual acuity was 6/12 in the right eye and 6/15 in the left eye at initial presentation. The fundus exam showed a few lipid exudations at the posterior pole and subretinal fluid (SRF) at the macula in the left eye. Optical coherence tomography (OCT) revealed retinal pigment epithelium detachment (RPED) with subretinal fluid accumulation at the macula in the left eye. Fluorescence angiography revealed typical smoke-stack leakage in the left eye. The SRF and RPED persisted after 3-month follow-up, and half-dose PDT was performed. The SRF and RPED resolved completely 2 weeks later.

Conclusions: Although rare, CSC can happen in older-aged patients. Half-dose PDT may provide a treatment choice for chronic CSC, especially in those not indicated for laser coagulation.

E-Poster No.: EP-0415

Hospital-Based Prevalence and Risk Factors of Retinal Vein Occlusion: Rural Hospital-Based Study

First Author: Neha CHANDAK

Purpose: To estimate the hospital-based prevalence and risk factors of retinal vein occlusion (RVO) in a tertiary care hospital in rural central India.

Methods: This was a cross-sectional study of 38,989 individuals >18 years old who underwent eye examination. Diagnosis of RVO was determined by fundus examination and photographs. Risk factor data was obtained by interview, clinical examination, and laboratory analyses of blood samples.

Results: RVO was detected in 104 eyes (0.25 ± 0.05%) of 100 subjects (0.13 ± 0.03%). BRVO (0.19%) was more prevalent than CRVO (0.03%). BRVO was more common in the superotemporal quadrant (70%). Macular edema was detected in 40% of RVO eyes. BRVO was more common in older age and CRVO among younger age groups (odds ratio, 2.40). Systemic hypertension was the most frequent association (P < 0.001). Although raised cholesterol and triglycerides (both P < 0.05) were significantly associated with RVO, body mass index, serum creatinine, diabetes mellitus, sickling, erythrocyte sedimentation rate, and history of smoking were not (P > 0.05 for all).

Conclusions: RVO was detected in 0.1% of adults, with BRVO 6 times more common than CRVO. BRVO was more prevalent among higher age groups, whereas CRVO was more common in younger patients. Systemic hypertension and end-organ damage from dyslipidemia cause arteriosclerosis, atherosclerosis, and endothelial dysfunction, which seem to be major risk factors for RVO. Ophthalmologists should emphasize to patients and physicians the importance of managing systemic medical conditions associated with RVO.

E-Poster No.: EP-0366

Improvement of Myopic Choroidal Neovascularization After Intravitreal Injection of Aflibercept

First Author: Chi-huang CHANG
Co-Author(s): Alice WU, Kuo Chiao TSENG

Purpose: To present a case of myopic choroidal neovascularization after intravitreal injection of aflibercept.
Methods: A case report.

Results: A 46-year-old woman presented with image distortion in her right eye for 2 months. Her ocular history was remarkable for refractive error of −19.50 / −3.00 x 015 in the right eye and −15.25 / −2.25 x 165 in the left. Best corrected visual acuity (BCVA) was 6/30 in her right eye and 6/6 in her left eye. Optical coherence tomography and fundus fluorescein angiography confirmed subfoveal choroidal neovascularization. The patient received 1 intravitreal aflibercept injection of 2 mg in the right eye. After 3 and 9 months of treatment, her right eye vision recovered to BCVA 6/9 and 6/6.7, respectively.

Conclusions: Myopic choroidal neovascularization treated with antivascular endothelial growth factor (anti–VEGF) agents, in our case 1 intravitreal injection of 2 mg aflibercept, revealed sustained visual improvement.

E–Poster No.: EP–0373

Incidence of Retinopathy of Prematurity in a Tertiary Neonatal Care Unit in Bangladesh

First Author: Dipak NAG
Co–Author(s): Pankaj ROY, Rinku PAUL, Ava HOSSAIN

Purpose: To determine the incidence of retinopathy of prematurity (ROP) and treatment requirements in a tertiary neonatal intensive care unit (NICU) in Bangladesh.

Methods: A prospective ROP screening survey was performed enrolling all premature infants of the NICU from July 2013 to July 2014, with a gestational age ≤34 weeks at birth and a birth weight ≤1750 g. ROP was classified as type 1, type 2, and APROP. Type 1 ROP was assigned for laser therapy. In cases of APROP where laser could not be applied satisfactorily, both laser and intravitreal bevacizumab (IVB) were given simultaneously; in cases of APROP where the pupil was not well dilated or with vitreous haze, only IVB was given.

Results: A total of 100 babies were evaluated. A total of 70 eyes of 35 babies (35%) were found to have ROP [27 eyes (13.5%), type 1; 4 eyes (2.0%), APROP; 5 eyes (2.5%), retinal detachment; and 34 eyes (17.0%), type 2]. Among them, 19 (52.8%) eyes received laser, 10 (27.8%) eyes received both laser and IVB, 2 eyes (2.6%) had only IVB, and 5 (13.9%) were advised for surgery.

Conclusions: The incidence of ROP was high in this unit–based study. A comprehensive countrywide survey on ROP in Bangladesh is recommended to determine the actual incidence.

E–Poster No.: EP–0419

Innovative Stem Cell Therapy for the Treatment of Retinitis Pigmentosa

First Author: Wei HE

Purpose: Retinitis pigmentosa (RP) is one hereditary disease that causes blindness and has a relatively high incidence. Effective treatment for retinal degeneration (including RP) has been widely investigated. However, so far the knowledge of the mechanisms of this disease is still very limited, and there are no effective drugs available.

Methods: Gene replacement therapy has also been shown to be a less effective treatment, even though it can improve visual function in inherited retinal disease. In recent years, the field of stem cell–based therapy holds great potential for the treatment of retinal degenerative disease.

Results: In this review, we will summarize the progress of stem cell–based therapy in the treatment of retinal degenerative diseases, particularly focusing on using induced pluripotent stem cell (iPSc)–based technologies and retinal progenitor cell (RPC)–based therapy, in which we have demonstrated the ability of RPCs to differentiate into functional retinal cells and improve visual function.

Conclusions: These results support the hypothesis that stem cell transplants are a potential treatment for retinal degenerative diseases.

E–Poster No.: EP–0350

Intravitreal Aflibercept for Patients With Diabetic Macular Edema Refractory to Bevacizumab and/or Ranibizumab

First Author: Jia-kang WANG
Co–Author(s): Ting-hsuan LIN

Purpose: To investigate the short–term efficacy and safety of intravitreal aflibercept in a case series of patients with diabetic macular edema (DME) refractory to bevacizumab and/or ranibizumab.

Methods: From September 2013 to June 2015, we collected patients with DME who developed resistance to bevacizumab and/or ranibizumab. Three monthly intravitreal aflibercept injections were performed to treat these refractory cases. Nonresponders to aflibercept were defined as having central foveal thickness (CFT) paradoxically increased and best corrected visual acuity (BCVA) gains less than 1 line 1 month after treatment compared with those before aflibercept administration.

Results: Of 36 eyes in 36 refractory patients, 22 eyes (61.1%) responded to aflibercept injections. The BCVA and CFT were 0.59 ± 0.37 logMAR and 438.5 ± 80.1 μm, respectively, before aflibercept treatments and significantly improved to 0.33 ± 0.16 logMAR (P = 0.016) and 297.9 ± 19.1 μm (P = 0.0004) 1 month after 3 aflibercept injections in these responders. There was no
difference between responders and nonresponders in baseline characteristics including age, sex, glycosylated hemoglobin, creatinine, total cholesterol, lens status, grades of diabetic retinopathy, and CFT/BCVA before aflibercept management ($P > 0.05$). There were 8 vitrectomized eyes in 14 nonresponders (57.1%), significantly higher than those in 22 responders (0%) ($P = 0.00005$). No serious ocular and systemic adverse effects were reported after use of aflibercept.

**Conclusions:** Three monthly intravitreal aflibercept injections were helpful for nearly two thirds of cases with DME resistant to bevacizumab and/or ranibizumab in short-term follow-up. Vitrectomized eyes responded poorly to aflibercept treatments. Serious systemic and ocular adverse effects were not found in this case series.

**E-Poster No.:** EP–0401

**Intravitreal Dexamethasone Implant for the Treatment of Hypotony With Proliferative Vitreoretinopathy After Retinal Detachment Surgery**

**First Author:** Yu-bai CHOU  
**Co-Authors:** Yu-chien CHUNG, Fang-yi TSAI, Shih-jen CHEN

**Purpose:** To report 3 cases of hypotony with proliferative vitreoretinopathy after retinal detachment surgery treated with intravitreal dexamethasone implant.

**Methods:** We retrospectively reviewed these 3 cases that suffered from hypotony and proliferative vitreoretinopathy after vitrectomy for several months. Low intraocular pressure, choroidal folding, anterior chamber inflammation, and rubeosis irides were noted. We administered intravitreal dexamethasone implant injection to control the inflammation and then observed the variations of intraocular pressure.

**Results:** After follow-up for more than 6 months, intraocular pressure had increased to the normal range in 2 cases after 2 injections but failed to normalize in the other case, which had marked corneal decompensation. In case 2, the implant had migrated into the anterior chamber but gradually resolved, and this case who was not previously treated with silicone oil tamponade vision improved by 1 Snellen line for 2 months.

**Conclusions:** Intravitreal dexamethasone implant may play a role in the treatment of hypotony with proliferative vitreoretinopathy after retinal detachment surgery. It could be considered as an off-label treatment.

**E-Poster No.:** EP–0391

**Intravitreal Ranibizumab for the Treatment of Choroidal Neovascularization Secondary to Pathologic Myopia**

**First Author:** Tsui-kang HSU  
**Co-Authors:** Jorn-hon LIU

**Purpose:** Macular choroidal neovascularization (CNV) is one of the most vision-threatening complications of myopia, which can lead to severe central vision loss. The purpose of this study was to evaluate the safety and efficacy of intravitreal ranibizumab in the treatment of myopic CNV.

**Methods:** We conducted a prospective, consecutive, interventional study of patients with subfoveal or juxtapfoveal CNV secondary to pathologic myopia (PM) treated with intravitreal injection of ranibizumab in Cheng–Hsin General Hospital from June 2012 to February 2015. Best corrected visual acuity (BCVA), optical coherence tomography (OCT), and fluorescein angiography (FA) were performed at baseline and monthly for all patients. Indications for retreatment were loss in BCVA associated either with persistent leakage from CNV shown on FA or evidence of CNV activity on OCT.

**Results:** The study included 12 eyes of 12 patients. The mean spherical equivalent refractive error was −13.5 (range, −8.0 D to −22.0 D). Mean follow-up time was 10.4 months (range, 3 to 17 months; SD, 3). The mean number of intravitreal injections administered for each patient was 2.12 (SD, 1.5). The mean initial visual acuity (VA) was 0.15 decimal equivalent (logMAR, 0.73; SD, 0.31). A statistically significant improvement to a mean VA of 0.51 decimal equivalent (logMAR, 0.32; SD, 0.27) was demonstrated at the final follow-up. VA improved by a mean of 3.75 (SD, 2.74) lines. Eight patients (66%) demonstrated a gain of 3 or more lines. Mean central macular thickness (CMT) measured with OCT was 355 µm (SD, 39) at baseline and was reduced significantly at the final follow–up to 153 µm (SD, 23). Average CMT reduction was 167 µm (SD, 57). No injection complications or drug-related side effects were noted during the follow–up period.

**Conclusions:** Intravitreal ranibizumab was a safe and effective treatment for CNV secondary to PM, resulting in functional and anatomic improvements.

**E-Poster No.:** EP–0400

**Ischemic Retinopathy in a Child With Atrial Septal Defect**

**First Author:** Chun Ting YEH  
**Co-Authors:** Laura LIU, Nan-kai WANG, Yih-shiou HWANG, Chi-chun LAI, Wei-chie WU

**Purpose:** To describe a pediatric case of atrial septal defect presenting with retinal ischemia, neovascularization, and fibrovascular membrane with retinal hemorrhage.

**Methods:** This study was designed as a case report.

**Results:** A 2–year–2–month–old girl presented with
exotropia in the right eye since age 1. Fundoscopy examination revealed posterior segment ischemia with the findings of fibrovascular membrane and retinal hemorrhage at the superior retina and vascular tortuosity in right eye. Fluorescein angiography showed partial obstruction of retinal arteries, nonperfusion in the midperipheral retina, and dye leakage from multiple areas of neovascularization in the right eye. Due to the typical features of ischemic retinopathy noted in this patient, she was subsequently treated with panretinal endolaser photocoagulation. Later, detailed cardiac examinations including echocardiography were performed in this child with the confirmed diagnosis of atrial septal defect.

Conclusions: A case of ischemic retinopathy caused by atrial septal defect was reported. This highlights the importance of prompt systemic surveillance with multidisciplinary approaches in patients with ischemic retinopathy to find the underlying causes of compromised retinal circulation.

E-Poster No.: EP–0412

Long-Term Outcomes After Treating Different Types of Polypoidal Choroidal Vasculopathy: A Real-Life Experience

First Author: Ling YEUNG
Co-Author(s): Yi-hsing (inda) CHEN, Chi-chun LAI, Kuan-jen CHEN

Purpose: To evaluate the outcomes of Taiwanese polypoidal choroidal vasculopathy (PCV) patients treated in a real-life experience.

Methods: A retrospective, single center study. One hundred nine PCV patients (130 eyes) treated with photodynamic therapy only or in combination with antivascular endothelial growth factor therapy were enrolled. Patients were grouped as exudative PCV with neurosensory retinal detachment (group I), hemorrhagic PCV less than 2 disc areas (group II), and hemorrhagic PCV more than 2 disc areas (group III). The initial characteristics, outcomes, and the recurrent condition were recorded and compared.

Results: The mean age was 66.2 ± 8.7 years. The average follow-up period was 49.5 ± 18.6 months. A total of 32.4% of eyes gained more than 0.3 logMAR best vision, and 8.6% of eyes lost more than 0.3 logMAR best vision at 3-year follow-up. After treatment, the effect was significant on optical coherence tomography at 1 month and remained stable, but vision only improved significantly up to the 1-year visit in all patients. Group III patients generally had the worst vision. Group I had significantly better vision than group II patients up to the 2-year visit. Final visual acuity was associated with the location of the lesions (P < 0.05), area (P = 0.001) and size (P = 0.005) of the lesions, and type of poly (P < 0.005) on the initial ICGA findings. Recurrence was found in 37 eyes (28.4%) at an average of 19.6 ± 12.8 months, which was similar among the 3 groups. The only risk factor related was the initial central foveal thickness (P = 0.001).

Conclusions: The types of initial presentation of PCV patients were related to their prognosis but not recurrence. Further studies are required to prolong the treatment effect on PCV patients.

E-Poster No.: EP–0428

Long-Term Outcomes of Diabetic Macular Edema After Initial Intravitreal Ranibizumab Injection
Purpose: To investigate 3-year outcomes of diabetic macular edema (DME) after receiving intravitreal injection of ranibizumab for the first year.

Methods: Thirty-three eyes of 33 patients with DME were classified according to OCT features: DRT, CME, SRD. All patients received 3 consecutive monthly intravitreal injections of 0.5 mg ranibizumab. After the first 3 injections, patients received an additional injection and Ozurdex implantation was added from 1 year as needed. The primary outcome was the number of treatments undertaken by DME type over 36 months. BCVA, retinal thickness, and macular volume changes were also evaluated.

Results: Mean number of injections over 3 years was 4.25, BCVA improved from 0.50 to 0.29, central foveal thickness (CFT) decreased from 356.72 µm to 282.58 µm, and macular volume decreased from 11.5 mm³ to 10.64 mm³. The mean number of injections over 12 months was significantly lower in the DRT group: DRT (3.69), CME (6.5), and SRD (6.6; \( P = 0.028 \)). Twenty patients (62.5%) did not require additional treatment after 1 year; among them, 13 patients (65.0%) were classified as DRT. Six patients received Ozurdex implantation with a mean number of 2.5 from year 1 to 3.

Conclusions: Visual gains and retinal anatomy improvement were maintained at 3 years in all 3 types of DME after initial intravitreal ranibizumab injection with less additional treatment after 1 year. DRT especially maintained a good response to ranibizumab in a fewer number of injections. Additional Ozurdex implantation treatment is effective in anatomical improvement of macular cystoid change.

E-Poster No.: EP-0349

Macular Edema Caused by Branch Retinal Vein Occlusion Treated With Intravitreal Aflibercept or Bevacizumab

First Author: Jia-kang WANG
Co-Author(s): Ying-yu TSENG

Purpose: To compare the efficacy of intravitreal aflibercept and bevacizumab for patients with macular edema secondary to branch retinal vein occlusion (BRVO).

Methods: Fifty-two eyes of 52 patients with treatment-naïve macular edema associated with perfused BRVO from October 2012 to July 2014 were retrospectively reviewed. Twenty-seven cases received intravitreal bevacizumab as needed, and 25 cases were treated with intravitreal aflibercept as needed with monthly follow-up for 12 months. Primary outcome measures included change in central foveal thickness (CFT) by 1 mm on spectral-domain optical coherence tomography and best corrected visual acuity (BCVA) at month 12. Complications after injections were recorded. The intragroup changes in CFT and BCVA were compared with Wilcoxon signed-rank test, and the between-group difference was compared with Wilcoxon rank-sum test.

Results: The baseline demographics, duration of symptoms, BCVA, and CFT did not differ significantly \( (P > 0.05) \). The CFT was significantly reduced 12 months after either bevacizumab or aflibercept injections \( (P < 0.05) \). The BCVA significantly improved 12 months after either bevacizumab or aflibercept treatment \( (P < 0.05) \). There was no significant difference between the bevacizumab and aflibercept groups in final BCVA and CFT \( (P > 0.05) \). The injection number of aflibercept was 2.14 ± 1.26, comparable with that of bevacizumab \( (2.21 ± 1.31) \) during the 12-month period \( (P = 0.21) \). There were no systemic thromboembolic events, elevated intraocular pressure, retinal detachment, or infectious endophthalmitis after injections in both groups.

Conclusions: Intravitreal aflibercept and bevacizumab had similar efficacy and duration of single treatment for macular edema associated with BRVO during a 12-month period. No serious systemic or ocular adverse events were reported.

E-Poster No.: EP-0385

Microstructural and Functional Presentation of Multiple Evanescent White Dot Syndrome on Spectral-Domain Optical Coherence Tomography and Microperimetry

First Author: Tsung-han LEE
Co-Author(s): Jong-jer LEE, Pei-chang WU, Hsi-kung KUO, Yi-hao CHEN, Yong-jen CHEN

Purpose: To report a typical case of multiple evanescent white dot syndrome (MEWDS) and its clinical features on spectral-domain optical coherence tomography (SD-OCT) and microperimetry (MP-1).

Methods: A case report with history, clinical features of images, and functional study.

Results: A 26-year-old female patient presented with a 3-day history of acute onset blurred vision in her left eye, and her initial best corrected visual acuity (BCVA) was 20/40. Fundus examination of her left eye revealed multiple evanescent white dots scattered across the retina. Serial examinations with SD-OCT, fundus autofluorescence (FAF), fundus fluorescein angiography (FAG), indocyanine green angiography (ICGA), and microperimetry (MP-1) were made to confirm the diagnosis of MEWDS. After follow-up for 1 month, her BCVA returned to 20/20. However, parafoveal obliteration of the photoreceptor outer segments was observed on SD-OCT images. Mild and diffuse decreases in sensitivity were detected on MP-1.
Conclusions: Even with the recovery of visual acuity after MEWDS, long–lasting changes of photoreceptors at the parafoveal zone may exist. SD–OCT provides highly detailed images to identify histopathological changes of the macula. MP–1 could further aid in the visual functional assessment of the patient. Both modalities can provide a greater understanding of retinal pathophysiology throughout the natural course of MEWDS.

E–Poster No.: EP–0433

Multifocal Electroretinogram in Eyes Undergoing Removal of Intraocular Iron Foreign Body
First Author: Pranita SAHAY
Co–Author(s): Mahesh CHANDRA, Pradeep VENKATESH, Rajpal VOHRA, Devesh KUMAWAT, Pranav RANJAN

Purpose: To analyze the role of multifocal electroretinogram (mfERG) in eyes with intraocular iron foreign body (IOFB) undergoing pars plana vitrectomy.

Methods: Twenty eyes with IOFB were evaluated with mfERG and electroretinogram (ERG) at baseline. Patients were further followed up at postoperative 1 week, 1 month, 3 months, and 6 months with mfERG. Fellow eyes served as control.

Results: Median age of the patients was 25 years (range, 18–55 years). All patients were male. Hammer–chisel injury was the most common mode (95%). Baseline photopic and scotopic ERG showed no significant difference in both a and b wave mean amplitude and mean latency compared with controls. In mfERG, the baseline mean amplitude of P1 wave (595.55 µV) was significantly reduced (P < 0.01) in <2 degrees compared with controls (1167.25 µV). P1 wave amplitude in <2 degrees after 6 months of surgery increased significantly (P = 0.01) to 776.89 µV, though it was still significantly worse (P < 0.01) than the controls (1115.50 µV). Baseline mean implicit time of P1 wave (44.59 msec) was significantly increased (P = 0.02) in <2 degrees compared with controls (41.33 msec). P1 wave implicit time in <2 degrees after 6 months of surgery did not show any significant change (P = 0.50).

Conclusions: MFERG is a better electrophysiological test than ERG to evaluate patients with IOFB at baseline. Eyes showed significant improvement in mfERG P1 wave amplitude from baseline after removal of IOFB but continued to have lower P1 wave amplitude compared with the fellow eyes at 6 months.

E–Poster No.: EP–0371

Multiple Evanescent White Dot Syndrome Associated With Herpesviridae Group Viruses
First Author: Huan-i SU
Co–Author(s): Chang-sue YANG, Yih-shiuan KUO, Shih-jen CHEN

Purpose: To investigate the etiologies of multiple evanescent white dot syndrome (MEWDS) and its possible connection to virus infection.

Methods: Clinical data were retrospectively reviewed in patients with characteristic findings of MEWDS. The diagnosis was confirmed by typical white dots on fundoscopic examination and other ocular examinations including spectral–domain optical coherence tomography, fluorescein angiography, indocyanine green angiography, visual field, and electroretinography. During the disease course, patients received detailed viral serology examination, inflammatory parameters, and immune survey.

Results: A total of 7 cases were identified for analysis, comprising 4 women and 3 men with a mean age of 42 (range, 26–63 years). Acute Herpesviridae virus infection was confirmed in 2 cases by serologic study during the acute phase of MEWDS; 1 was varicella–zoster virus IgM positive and the other was Epstein–Barr virus viral capsid antigen IgM positive. Follow–up virus serology data of both cases showed negative in recovery stage of MEWDS. Two of these 7 MEWDS patients had positive antinuclear antibodies (ANA) test; however, they denied any underlying autoimmune diseases.

Conclusions: Multiple evanescent white dot syndrome may be associated with Herpesviridae group virus infection or virus–induced immune inflammatory reaction.

E–Poster No.: EP–0432

Optic Disc Edema After Anterior Uveitis and Ocular Hypertension—A Case Report
First Author: Ching-lung CHEN
Co–Author(s): Yi-hao CHEN, Jiann-torng CHEN

Purpose: To describe a case of optic disc edema after anterior uveitis and ocular hypertension.

Methods: A case report.

Results: A 24–year–old female underwent sudden onset of headache and vomiting and went to our ER. Disc edema was found in the right eye. Due to signs of increased intracranial pressure, emergency brain CT was done. After negative findings of brain CT, she was admitted to OPH with the diagnosis of optic neuritis in the right eye. After admission, her ocular examination showed best corrected visual acuity of 0.7 in her right eye and 1.0 in her left eye. Intraocular pressure was 19 mm Hg in both eyes. Slit lamp biomicroscopy showed mild aqueous cells and flare in her right eye and no aqueous cells and flare in her left eye. Her fundus examination revealed optic disc swelling and macular edema in her right eye. Fundus fluorescein angiogram showed optic disc hyperfluorescence in her right eye. Her ophthalmic history included anterior uveitis and...
ocular hypertension in both eyes with irregular medication treatment. According to her history, the laboratory studies associated with uveitis and optic neuritis were arranged. The results were negative. Intravenous methylprednisolone (250 mg) per Q6H was used for 3 days and then shifted to oral prednisolone. After 1 month follow-up, visual acuity was 0.9 in her right eye and 1.0 in her left eye. Fundus examination revealed disc swelling in her right eye.

Conclusions: Optic disc edema after anterior uveitis and ocular hypertension is a rare condition that can present with increased intracranial pressure and be treated with steroid. In this case, visual acuity could be recovered under persistent disc edema after medical treatment.

E-Poster No.: EP-0386

Optical Coherence Tomographic Features and Prognosis of Pneumatic Displacement for Submacular Hemorrhage

First Author: Hakyoung KIM
Co-Author(s): Hyeon CHUNG, Se Woong KANG

Purpose: To identify prognostic factors, including optical coherence tomographic features, of visual outcome in exudative age-related macular degeneration with submacular hemorrhage treated with pneumatic displacement.

Methods: This retrospective interventional case series included 37 eyes with exudative age-related macular degeneration and submacular hemorrhage, all of which underwent pneumatic displacement. Best corrected visual acuity (BCVA) was measured at diagnosis and at 3 and 6 months after treatment. In addition to demographic and funduscopic parameters, tomographic features such as reflectance of the submacular hemorrhage were analyzed with regard to BCVA at 6 months.

Results: After pneumatic displacement and a subsequent treatment such as laser or antivascular endothelial growth factor therapy, BCVA at 3 and 6 months improved significantly (P < 0.001, respectively). Higher baseline BCVA (P < 0.001), shorter symptom duration (P = 0.007), and younger age (P = 0.014) were significant positive prognostic factors on regression analysis. Among optical coherence tomography characteristics, reflectance of the submacular hemorrhage, the shortest radius of the submacular hemorrhage centered on the fovea, and defects in the inner segment, outer segment, and external limiting membrane affected BCVA at 6 months (P < 0.05).

Conclusions: A favorable visual outcome was demonstrated after initial pneumatic displacement and subsequent treatment for submacular hemorrhage. The submacular hemorrhages exhibiting lower reflectance on optical coherence tomography with a smaller shortest radius from the foveal center were found to be good candidates for pneumatic displacement.

E-Poster No.: EP-0425

Optical Coherence Tomography Characteristics of Responders to Intravitreal Bevacizumab in Idiopathic Choroidal Neovascularization Patients

First Author: Syed Nasir SHAH

Purpose: To investigate factors associated with good response to intravitreal bevacizumab (IVB) in treatment-naïve idiopathic choroidal neovascularization patients.

Methods: We retrospectively reviewed clinical data of 40 eyes of idiopathic choroidal neovascularization patients who received single or multiple intravitreal bevacizumab injections on an as-needed basis (1.25 mg/0.05 mL). One month after the first injection, subretinal fluid volume was evaluated, and the eyes were divided into 3 groups based on the percentage decrease in volume. Good responders were defined as having 60–99% resolution of subretinal fluid on spectral domain optical coherence tomography. Moderate responders were defined as subretinal fluid resolution of 30–60% of baseline volume and poor responders as subretinal fluid resolution <30%

Results: The mean number of IVB injections was 1.28 ± 1.09, and mean follow-up time was 5.60 ± 1.20 months. At postoperative 1 month, there were 8 (20%) eyes in the good response, 20 (50%) in the moderate response, and 12 (30%) eyes in the poor response group. At last visit, there were 28 good responders (70%), 8 (20%) moderate responders, and 4 (10%) poor responders. Decreases in choroidal neovessel thickness (P = 0.029), subretinal fluid height (P = 0.049), and subretinal fluid volume (P = 0.031) predicted good responders 1 month after treatment.

Conclusions: Optical coherence tomography is a valuable diagnostic tool. Decreases in choroidal neovessel thickness and subretinal fluid height and volume predict a favorable response of idiopathic choroidal neovascularization to intravitreal bevacizumab therapy.
Methods: We retrospectively analyzed the records of 39 consecutive eyes with treatment-naive ME secondary to BRVO, treated with either Ozurdex (group 1, n = 18) or Lucentis (group 2, n = 21) injections. Recorded parameters included the percent of patients with ≥3 lines gain, best corrected visual acuity (BCVA), central macular thickness (CMT), number of injections, and occurrence of any complications.

Results: The mean follow-up duration was 12 months. Mean BCVA and CMT improved significantly in both groups (P = 0.001). Fourteen eyes (67%) at 1 month and 8 eyes (44%) at 3 months gained ≥3 lines in group 1. In group 2, 15 eyes (71%) at 1 month and 8 eyes (38%) at 3 months showed a gain ≥3 lines. The average number of Ozurdex injections required was 1.56 (range, 1–3), with only 6 eyes (33%) requiring more than 1 injection. The average number of Lucentis injections was 2.8 (range, 1–11), with 10 eyes (48%) requiring more than 1 and 5 eyes (24%) requiring more than 3 Lucentis injections. No serious adverse events were recorded.

Conclusions: Both Ozurdex and Lucentis are effective and have a favorable safety profile in the management of ME secondary to BRVO. However, the recurrence of ME is more frequent with Lucentis as compared to Ozurdex injection. The need for repeated injections is less with Ozurdex, and hence it is more cost-effective also.

E–Poster No.: EP–0364

Photodynamic Therapy in a Patient With Subfoveal Retinal Pigment Epithelial Detachment Associated With Chronic Central Serous Chorioretinopathy

First Author: Jian-sheng WU
Co-Author(s): San-ni CHEN

Purpose: To present the effect of half-fluence photodynamic therapy in a patient with subfoveal retinal pigment epithelial detachment associated with chronic central serous chorioretinopathy.

Methods: A case report.

Results: A 38-year-old male presented with blurred vision in the right eye (OD) for months. The visual acuity was 20/20 in both eyes. Fundus examination revealed serous retinal detachment with retinal pigment epithelial detachment (RPED) at the macula OD. Fluorescein angiography (FA) and indocyanine green angiography (ICGA) disclosed central serous chorioretinopathy (CSC). Subthreshold diode micropulse photocoagulation was performed. Serous retinal detachment OD subsided, but RPED persisted. The RPED improved after half-fluence photodynamic therapy (PDT). The visual acuity remained 20/20 in both eyes, and RPE change at the macula OD was noted 6 years later.

Conclusions: Reduced-fluence PDT is beneficial in resolving RPED associated with chronic CSC.

E–Poster No.: EP–0365

Photopic Negative Response of Multifocal Electroretinogram in Normal Subjects

First Author: Ka Hee PARK
Co-Author(s): Young Hoon OHN, Yoon Jin KONG

Purpose: To evaluate the nature of photopic negative response (PhNR) on multifocal electroretinograms (ERGs) (mfERGs) elicited by low-frequency stimuli in normal subjects and to determine the correlation of PhNR with macular ganglion cell thickness.

Methods: The mfERG waves were recorded in 26 eyes of 13 normal subjects. The stimulus frequency was 6.25 Hz, and the stimulus was a circle with a 6.8-degree radius that was centered on the fovea (center). mfERGs were also elicited by a quarter of an annulus placed around the macula. The radius of the inner border of the annulus was 6.8 degrees and that of the outer border was 20 degrees. We measured the response density of a negative wave (N1) followed by a positive wave (P1), then followed by a slow negative wave (N2). The thickness of the macular ganglion cell–inner plexiform layer (mGCIPL) and ganglion cell complex (mGCC) were measured by swept source optical coherence tomography.

Results: There were no significant differences in the N1 and P1 wave response densities in the different retinal regions. In contrast, the N2 amplitude was significantly greater in the center area. The N2 response density elicited by the stimulus of circle with a 6.8-degree radius was significantly correlated with the mGCIPL (P = 0.000, r = 0.779, Pearson coefficients of correlation) and mGCC (P = 0.000, r = 0.813, Pearson coefficients of correlation) thickness. There was no significant correlation with other responses.

Conclusions: The N2 component of the slow-sequence mfERGs in the central retinal area correlated with mGCIPL and mGCC thickness. This could be interpreted to mean that the N2 component on MFERG corresponds with PhNR on full-field ERG.

E–Poster No.: EP–0362

Posterior Subtenon Bevacizumab Injection for Central Serous Chorioretinopathy: A Case Report

First Author: Weng Sut SIO
Co-Author(s): I Chia LIANG, Kwan-rong LIU

Purpose: To present a case of central serous chorioretinopathy (CSC) successfully treated with posterior subtenon bevacizumab injection (PSTB).
Methods: A case report.

Results: A 46-year-old man presented with blurred vision in the right eye for 4 days. His visual acuity (VA) was 1.0 in both eyes. Fundus examination and optical coherence tomography (OCT) revealed serous retinal detachment in the posterior pole of the right eye with a central retinal thickness (CRT) of 636 µm. Fluorescence angiogram (FA) showed pinpoint leakage in the early phase, and the leakage enlarged with ink blot pattern in the late phase. Acute CSC was suspected, and oral acetazolamide was prescribed. Three weeks later, his right eye VA decreased to 0.2 and OCT showed increased subretinal fluid (SRF). After discussion about the treatment options, the patient decided to receive a relatively low risk treatment modality: PSTB, which has been demonstrated to be effective in the treatment of myopic CNV. The patient received 12.5 mg (0.5 mL) PSTB injection in right eye. Nine days after PSTB, OCT showed absorption of SRF. His right eye VA improved to 0.5 and CRT decreased to 241 µm 25 days after PSTB. FA was repeated, no leakage was noted in the right eye. SRF of his right eye resolved 79 days after PSTB. Five months after PSTB, his right eye VA recovered to 1.0. No recurrence was noted in the following 6 years.

Conclusions: PSTB might be an alternative treatment for CSC in selected cases.

E-Poster No.: EP-0405

Preliminary Investigation of Induced Pluripotent Stem Cells in Treating Retinal Diseases

First Author: Jenchieh WENG
Co-Authors: Lin-chung WOUNG, Chih Wei SHIH, Ching-yao TSAI, Shih-hwa CHIOU

Purpose: Induced pluripotent stem (iPS) cells are similar to embryonic stem cells in self-renewal and differentiation. We used in vitro and in vivo models to evaluate the effects of iPS cells in rescuing damaged retina and in cone–loss transgenic mice.

Methods: Two experiments were conducted. First, we used 10,000 lumens 2-hour light exposure to simulate oxidative stress on the retina of rats. We injected iPS cells intravitreally into the photo–damaged eyes. Electroretinography, histologic staining, and immunohistochemistry staining was performed before and after injection. In the second study, we injected iPS into the subretinal space of cone–loss transgenic mice. We also compared retinal function by ERG after 2 months.

Results: Positive signals of green fluorescence by iPS were detected in treated eyes. Our preliminary data supported that iPS treatment could be helpful to decrease photo damage on the retina and to recover retinal function according to partial recovery of a and b wave amplitude on ERG in both experiments.

Conclusions: Our results demonstrated that the impairment of retina in rats could be partially reversed and protected by iPSC treatment.

E-Poster No.: EP-0374

Prevalence of Diabetic Retinopathy in a Tertiary-Level Hospital in Bangladesh

First Author: Dipak NAG
Co-Authors: Pankaj ROY, Rinku PAUL, Billal HOSSAIN, Ava HOSSAIN

Purpose: To report the spectrum of diabetic retinopathy by photographic screening technique and to determine the proportion of patients requiring treatment for diabetic eye disease at a tertiary-level setting in Bangladesh.

Methods: This prospective observational cohort study used data from all patients presenting to the diabetes retinal screening service over the 5-month period between November 2014 and March 2015. Patients who attended the retina department underwent mydriatic fundus photography technique according to the National Screening Committee (NSC), UK guidelines. Images were graded at the time of acquisition in Optimize software for diagnosis and treatment referral.

Results: A total of 1067 patients were screened over the stipulated period, of which 685 (64.2%) were male. There were 25 (2.3%) suffering from type 1 diabetes and 1042 (97.7%) were type 2. It was observed that 598 (62.0%) patients had no retinopathy, 179 (15.0%) patients had background retinopathy, 104 (7.0%) had preproliferative, and 186 (16.0%) patients had proliferative retinopathy. Regarding maculopathy, 364 (28.0%) had vision–threatening maculopathy. Laser was given to 21.0% of the affected patients followed by intravitreal Avastin and surgery in 5.0% and 3.0%, respectively. Two percent declined to receive treatment for various reasons.

Conclusions: Severe sight–threatening diabetic retinopathy was found in these screened patients who required various treatment modalities.

E-Poster No.: EP-0392

Purtscher–Like Retinopathy in a Patient With Adult-Onset Still Disease

First Author: Yu Ti TENG

Purpose: Adult–onset Still disease (AOSD) is a rare systemic inflammatory disorder that may involve various organs including the eyes. We present a patient who had AOSD complicated by Purtscher–like retinopathy.

Methods: A case report.

Results: The patient was a 35–year–old male who developed progressive blurred vision in both eyes.
Conclusions: Purtscher–like retinopathy is a rare but possible manifestation of AOSD. Ocular sequelae may persist even if systemic conditions are under control.

E–Poster No.: EP–0356
Purtscher–Like Retinopathy in Systemic Lupus Erythematosus—A Case Report
First Author: Shih-lin CHEN
Co-Author(s): Shih-chou CHENG

Purpose: To report Purtscher–like retinopathy in systemic lupus erythematosus.

Methods: A case report and literature review.

Results: A 16–year-old girl had systemic lupus erythematosus (SLE) under regular medical control. Neither recent physical nor ocular trauma were noted by the patient. She presented with progressive blurred vision in her left eye for about 1 week. Intermittent fever, diarrhea, and bilateral knee joint pain were also noted. Ocular examination showed visual acuity of counting fingers and macular edema in her left eye and diffuse Purtscher flecken, cotton–wool spots, and retinal hemorrhages in both eyes. Systemic survey was compatible with SLE flare up. Despite immediate methylprednisolone pulse therapy and immunosuppressant treatment, the patient’s vision only partially improved.

Conclusions: Purtscher–like retinopathy is a rare but severe ocular complication of SLE and was noted to be highly associated with disease activity of SLE. Though long–term visual prognosis is poor for the majority of such patients, early diagnosis and management are still the key to save the eyes.

E–Poster No.: EP–0398
Quantitative Analysis of Color Change After Intravitreal Anti–VEGF Injection for Retinal Capillary Hemangioma and Vasoproliferative Tumor
First Author: Wu-ting CHANG
Co-Author(s): Cheng-kuo CHENG

Purpose: Retinal angiomias are full of vascularity and red in color. After intravitreal injection (IVI) of anti–vascular endothelial growth factor (anti–VEGF), the angiomias become white. We used an RGB–based (red, green, blue) model to quantify the brightness value and red ratio of retinal angiomias after intravitreal anti–VEGF injection.

Methods: Using the free ImageJ software, RGB analysis was applied to color fundus pictures of retinal angiomias. The brightness value was the mean RGB value, and the red ratio was the red value divided by the sum of the green and blue values. Both brightness value and red ratio were divided by reference values for calibration. We compared the calibrated brightness value and red ratio before and after anti–VEGF injection.

Results: There were 7 eyes in 7 patients: 3 had retinal vasoproliferative tumor (VPT) and 4 had von Hippel–Lindau disease (VHL) with retinal hemangioma. After intravitreal anti–VEGF agent (Avastin, Lucentis, or Eylea), the vascularity of the angiomias decreased and the color turned from red to white. The total calibrated brightness value increased from $1.43 \pm 0.31$ to $1.53 \pm 0.3$ after IVI ($P = 0.07$). The total calibrated red ratio decreased from $1.04 \pm 0.26$ to $0.83 \pm 0.26$ after IVI ($P = 0.0002$). In the VHL group, the calibrated brightness value increased from $1.41 \pm 0.36$ to $1.58 \pm 0.32$ after IVI ($P = 0.02$) and the red ratio decreased from $1.04 \pm 0.71$ to $0.84 \pm 0.16$ after IVI ($P = 0.006$). In the VPT group, the calibrated brightness value decreased from $1.46 \pm 0.75$ to $1.38 \pm 0.13$ after IVI ($P = 0.27$) and the red ratio decreased from $1.03 \pm 0.42$ to $0.82 \pm 0.19$ after IVI ($P = 0.17$). The increasing whitening effect and the decreased red component were more prominent in the VHL with RCH group than in the VPT group.

Conclusions: The brightness value and red ratio quantify the whitening and decreased red component of angiomias after IVI. IVI can reduce the vascularity of angiomias and facilitate subsequent laser treatment. This effect was more prominent in the VHL than in the VPT group.

E–Poster No.: EP–0404
Rapid Progression From Asymmetric Hypertensive Retinopathy to Unilateral Central Retinal Artery Occlusion in a Patient With Hypertensive Crisis—Case Report
First Author: Fang-ting CHEN

Purpose: To report a woman with severe hypertension and rapid progression of unilateral vessel-occlusive retinopathy.

Methods: A case report.

Results: A 38–year-old woman denied any systemic disease on the first visit. She complained of slight blur...
in her right eye for 3 days. The visual acuity was 20/20 in both eyes. Fundus exam revealed diffuse arterial narrowing with 1 spot of flame-shaped hemorrhage in the right eye. Some cotton-wool spots at the juxtapapillary area and posterior pole were noted as well. The retina in the fellow eye showed only barely detectable arterial narrowing. Systemic survey identified severe hypertension (SBP 275 mm Hg/DBP 161 mm Hg) reaching the criteria of hypertensive crisis. Antihypertensive medications were prescribed. However, she developed central retinal artery occlusion (CRAO) with no visible emboli in the right eye 2 weeks later despite fairly controlled blood pressure, and her visual acuity dropped to hand motion (HM) since then. Other causes of CRAO were excluded. Carotid and cardiac echography showed no significant finding except mild cardiomegaly, probably due to prolonged undetected hypertension.

Conclusions: In eyes presenting with evidence of retinal ischemia/infarction such as arterial narrowing and cotton-wool spots, systemic hypertension must always be considered as a possible cause even in young patients with no related history. Even after normalization of blood pressure, disease progression may still occur to cause vision deterioration. Therefore, explanation of possible risks of retinal artery or vein occlusion is mandatory for patients with hypertensive retinopathy.

E-Poster No.: EP-0351
Recurrent Vitreous Hemorrhage After Diabetic Vitrectomy Treated by Intravitreal Ranibizumab
First Author: Jia-kang WANG
Co-Author(s): Li-han CHENG

Purpose: To investigate the efficacy of intravitreal ranibizumab for recurrent vitreous hemorrhage after vitrectomy in diabetic patients.

Methods: From October 2013 to August 2015, diabetic patients underwent 23-gauge vitrectomy, removal of epiretinal traction tissue, supplemental diode laser retinal photocoagulation, cryotherapy of anterior retina and 3 sclerotomies, and perioperative bevacizumab intravitreal injection. Vitrectomy was performed with or without C3F8 infusion. Patients with recurrent vitreous hemorrhage after vitrectomy were retrospectively reviewed. Oral tranexamic acid 500 mg per day was given for 1 month. The patients with persistent hemorrhage signed the informed consent and received a single dose of intravitreal ranibizumab. They were followed up for at least 3 months. Primary outcome measures included change in fundus and best corrected visual acuity (BCVA) at the last follow-up. Complications after injections were recorded. The changes in BCVA were compared with Wilcoxon signed-rank test.

Results: There were 6 patients who received a single ranibizumab treatment. The hemorrhages (6/6, 100%) all disappeared within 3 months after injection. No recurrence of hemorrhage was found at the last follow-up visit. The BCVA significantly improved from baseline to the last follow-up (P < 0.05). There was no systemic thromboembolic event, elevated intraocular pressure, retinal detachment, or infectious endophthalmitis after injections.

Conclusions: Intravitreal ranibizumab might be useful in treating recurrent vitreous hemorrhage in vitrectomized diabetic eyes. No patient required repeated vitrectomy for recurrent diabetic hemorrhage. No serious systemic or ocular adverse events were reported.

E-Poster No.: EP-0429
Repeatability of Retinal Macular Thickness Measurements in Patients With Diabetic Macular Edema After Intravitreal
Dexamethasone (Ozurdex) Implantation Using Two Different Spectral-Domain Optical Coherence Tomography Devices

First Author: Min Seok KANG
Co-Author(s): Eung-suk KIM, Seung Young YU, Hyung-woo KWAK

Purpose: To evaluate the repeatability of spectral-domain optical coherence tomography (SD-OCT) retinal thickness measurements in diabetic patients with clinically significant macular edema after intravitreal dexamethasone (Ozurdex) implantation using 2 different SD-OCT devices.

Methods: Thirty-two eyes of 32 diabetic patients with diabetic macular edema, examined using the Cirrus HD-OCT and Spectralis HRA+OCT, were retrospectively reviewed. Mean foveal thickness, mean sectional thickness, and total macular volume measurements in the 9 Early Treatment Diabetic Retinopathy Study areas were compared before and 1 week after intravitreal dexamethasone (Ozurdex) implantation, evaluating the repeatability and the relationship between devices. Macular cube 512 x 128 raster scans were performed with the Cirrus and 768 x 121 volume scans with the Spectralis, which were repeated every 2 times by 1 experienced examiner. Within results, the coefficient of variation (COV) and the intraclass correlation coefficient (ICC) were calculated for each parameter studied to evaluate repeatability.

Results: The ranges of foveal thickness of the respective COV and ICC values were 1.68%/1.54% and 0.925/0.927 for Cirrus HD-OCT and 1.19%/1.09% and 0.941/0.958 for Spectralis HRA+OCT. The Pearson correlation coefficients of macular thickness and total macular volume between the 2 OCT methods were statistically significant.

Conclusions: Both OCT devices proved reliable for macular thickness measurements in diabetic macular edema. Thickness measurements at 1 week after injection show better repeatability than those at baseline for both OCT devices.

E-Poster No.: EP-0388

Retinal Artery Occlusions With Severe Carotid Occlusions

First Author: Jiunn-feng HWANG
Co-Author(s): San-ni CHEN

Purpose: To determine the incidence and pattern of severe carotid occlusion in patients with acute visual loss due to retinal artery occlusion.

Methods: We conducted a review of cases with acute retinal artery occlusion combined with carotid occlusion of high grade stenosis (more than 60%) determined by carotid angiography and/or color Doppler study.

Results: Among 79 cases of acute retinal artery occlusion manifested by retinal whitening with a cherry red spot in the posterior pole, 8 patients (10.1%) posed severe carotid hazards. Multiple emboli in the retinal artery were found in 5 cases. Case 4 suffered from simultaneous bilateral retinal artery occlusions with total occlusion of bilateral internal carotid artery. Case 7 was diagnosed as ocular ischemic syndrome with a cherry red spot. Case 8 had retinal artery obstruction due to carotid artery dissection. Retrograde flow of the external carotid artery was noted in 2 cases (no. 4, 5) with common carotid artery occlusion. Reversed flow of the ophthalmic artery was found in 2 cases (no. 4, 7). Two patients (no. 1, 6) with high grade stenosis underwent successful carotid stenting, whereas others were not candidates for the operation.

Conclusions: Carotid occlusions may originate from complicated mechanisms. Carotid angiography and color Doppler study are very helpful in the differential diagnosis for cases suffering from retinal artery occlusion.

E-Poster No.: EP-0434

Retinal Detachment as a Manifestation of Ocular Sarcoidosis

First Author: Mong Ping SHYONG
Co-Author(s): Yu Mei CHANG, Feng Log LEE

Purpose: To report the rare occurrence of retinal detachment in a patient with ocular sarcoidosis.

Methods: A case report.

Results: A 60-year-old female complained of blurred vision of the right eye for 6 months. Visual acuity was 6/60. Due to dense cataract and retinal detachment disclosed by ultrasonography, the patient underwent vitrectomy combined with lensectomy. Periphlebitis, segmental cuffing and sheathing associated with choroidal granulomas, and retinal detachment was noted during surgery. Chest computed tomography disclosed mediastinal lymphadenopathy, and biopsy proved to be sarcoidosis. After topical steroid, oral cyclosporin, and methylprednisolone treatment for 1 year, no detachment was noted. The granulomas resolved and led to areas of hypopigmentation and fibrotic scarring. The final visual acuity was 6/20.

Conclusions: Ocular disease is an important manifestation of sarcoidosis. Our case illustrates the rare association of retinal detachment with ocular sarcoidosis.

E-Poster No.: EP-0359

Retinal Ischemia: Xuefu Zhuyu Decoction’s Effect and Therapeutic Mechanisms

First Author: Jiunn-feng HWANG
Co-Author(s): San-ni CHEN

Purpose: To determine the incidence and pattern of severe carotid occlusion in patients with acute visual loss due to retinal artery occlusion.

Methods: We conducted a review of cases with acute retinal artery occlusion combined with carotid occlusion of high grade stenosis (more than 60%) determined by carotid angiography and/or color Doppler study.

Results: Among 79 cases of acute retinal artery occlusion manifested by retinal whitening with a cherry red spot in the posterior pole, 8 patients (10.1%) posed severe carotid hazards. Multiple emboli in the retinal artery were found in 5 cases. Case 4 suffered from simultaneous bilateral retinal artery occlusions with total occlusion of bilateral internal carotid artery. Case 7 was diagnosed as ocular ischemic syndrome with a cherry red spot. Case 8 had retinal artery obstruction due to carotid artery dissection. Retrograde flow of the external carotid artery was noted in 2 cases (no. 4, 5) with common carotid artery occlusion. Reversed flow of the ophthalmic artery was found in 2 cases (no. 4, 7). Two patients (no. 1, 6) with high grade stenosis underwent successful carotid stenting, whereas others were not candidates for the operation.

Conclusions: Carotid occlusions may originate from complicated mechanisms. Carotid angiography and color Doppler study are very helpful in the differential diagnosis for cases suffering from retinal artery occlusion.
**Retinal Microstructure Abnormalities and Segmentation Errors in Optical Coherence Tomography Imaging of Patients With a History of Retinopathy of Prematurity**

*First Author: Wei-chi WU*

**Purpose:** To evaluate retinal microstructural abnormalities and segmentation errors from spectral-domain optical coherence tomography (SD-OCT) imaging (MM5 protocol of RTVue–100; Optovue, Inc, Fremont, CA) in school-aged patients with a history of retinopathy of prematurity (ROP).

**Methods:** This study was designed as a a prospective case–controlled study in a referral medical center. Study population was school-aged children with a history of prematurity and full–term controls. Patients were grouped as those who were treated for ROP (ROP-Tx-group); those with spontaneously-regressed ROP without treatment (ROP–non–Tx-group); premature patients without ROP (premature group); and full–term age–matched children (full–term group). OCT images of the retina from children with or without a previous history of ROP were evaluated and compared. Main outcome measures were retinal microstructural abnormalities and segmentation errors on SD–OCT.

**Results:** Images were collected from 133 eyes of 133 patients. The mean age at assessment was 9.5 years (range, 4–16 years). The external limiting membrane and the cone outer segment tips (COST) line were least identified in patients in the ROP-Tx-group (65.2% and 47.8%, P = 0.002 and P < 0.001, respectively). The visual acuity of the patients did not correlate significantly with the absence of COST line (P = 0.140) but correlated with the absence of ELM (P < 0.001). The presence of artifacts, including misidentification of the inner retina, misidentification of the outer retina, out of register artifacts, off–center scans, and degraded scan images, was observed to range from 0.6% to 50.0% in different groups of patients. All types of errors occurred more frequently in patients in the ROP–Tx–group than in patients in the full–term group (all P < 0.05). The higher segmentation errors in patients with prior treatment might be related to microstructural abnormalities in these patients.

**Conclusions:** Retinal microstructural abnormalities were commonly observed in patients with prior treatment for ROP. Segmentation errors of SD–OCT imaging can occur in patients with or without ROP, but these errors happened more often in ROP patients with prior treatment. Future studies are needed to investigate the mechanisms for these structural changes and whether they may explain why some ROP patients have decreased vision despite normal ophthalmoscopically examination.

**E-Poster No.: EP–0483**

**Delayed Macular Hole Closure After Ocriplasmin Treatment: A Case Report**

*First Author: Szu-yuan LIN*

**Co-Author(s): Kai WANG, Weng Sut SIO, Shwu-huey LEE, I Chia LIANG*

**Purpose:** To report a case of a 63-year–old man with early vitreomacular adhesion (VMA) separation but delayed full–thickness macular hole (FTMH) closure after ocriplasmin treatment.

**Methods:** A case report.

**Results:** One third to one half of patients in accordance with indication can achieve FTMH closure with or without separation of VMA after ocriplasmin treatment within 28 days. A 63-year–old man received ocriplasmin treatment for FTMH. Early vitreoretinal separation was achieved by day 4, but hole closure was not achieved. Posterior vitreous detachment at the optic disc occurred in the 4 weeks after ocriplasmin treatment, and FTMH reduction began to take place thereafter. FTMH closure was finally achieved 10 weeks after treatment with minimal subretinal fluid left. Vision improved from 0.8 logMAR before treatment to 0.3 logMAR 12 weeks after treatment.

**Conclusions:** This case suggests that delayed FTMH closure can still be expected 28 days after treatment.
E-Poster NO.: EP-0382

Retinal Vessel Caliber Change and Electrophysiology Findings After Intravitreal Ranibizumab in Ischemic Central Retinal Vein Occlusion

First Author: Yu-chien CHUNG  
Co-Author(s): An-fei LI, Ling-ting LAU, Shih-jen CHEN

Purpose: To evaluate vessel caliber change and electrophysiology findings along with visual acuity and central macular thickness after monthly injections of ranibizumab in ischemic central retinal vein occlusion (CRVO).

Methods: A prospective interventional case series. Patients who had treatment-naive ischemic CRVO were enrolled in this study. All patients underwent monthly intravitreal ranibizumab with a total of 6 injections. Best corrected visual acuity in ETDRS letters, optical coherence tomography (OCT), and fundus photography were recorded at baseline and in every monthly visit. Fluorescein angiography and electroretinogram were done at baseline, 1 month after the third injection (midterm), and 1 month after the sixth injection (final). Retinal vessel calibers (CRAE, CRVE, AVR) were measured using semiautomated imaging software (IVAN software).

Results: There were 10 patients enrolled in the study. Nine patients completed the protocol. One patient underwent the 3-month treatment, but dropped out of the study due to personal reasons. After treatment, significant improvements in ETDRS letters and central macular thickness (CMT) were found (mean ETDRS letters: 41.0 at baseline, 61.4 at midterm, 68.9 at final, \( P = 0.002 \); mean CMT: 643.0 μm at baseline, 267.6 μm at midterm, 245.8 μm at final, \( P = 0.000 \)). Trends of decrease in central retinal vein equivalent (CRVE) (mean CRVE: 216.9 μm at baseline, 200.7 μm at midterm, 168.9 μm at final), increase in central retinal artery equivalent (CRAE) (mean CRAE: 94.9 μm at baseline, 96.4 μm at midterm, 99.3 μm at final), and increase in artery-to-vein ratio (AVR) (mean AVR: 0.46 at midterm, 0.53 at final) were also found. Implicit time of both a and b wave in scotopic condition significantly reduced after 3 months of treatment (implicit time of a wave: 22.61 ms at baseline, 20.44 at midterm, \( P = 0.007 \); b wave: 58.89 ms at baseline, 52.67 at midterm, \( P = 0.001 \)).

Conclusions: Our results showed positive clinical and electrophysiological treatment response in ischemic CRVO after intravitreal ranibizumab. A trend of vessel caliber change was observed, but a greater number of patients is needed for further analysis.

E-Poster NO.: EP-0416

Serum Homocysteinemia: Risk Factor for Retinal Vein Occlusion

First Author: Neha CHANDAK

Purpose: To determine homocysteine levels and their association with visual outcome in patients with retinal vein occlusion (RVO) in a tertiary care hospital in rural central India.

Methods: This was a case control study with participants >18 years old. We measured homocysteine in 100 newly diagnosed RVO patients and 96 age- and sex-matched healthy controls (77 BRVO, 15 CRVO, 5 HCRVO, 3 macular RVO). Strict inclusion and exclusion criteria were used. Blood samples were drawn after overnight fast of at least 8 hours and measured by high performance liquid chromatography and fluorescence detection (normal homocysteine: 5–13.9 μmol/L).

Results: Mean homocysteine was higher in cases than controls. Hyperhomocysteinemia was seen in 78% of...
In CRVO patients, visual acuity was better in patients with normal homocysteine compared with those with elevated homocysteine. No comparison was done in BRVO patients due to different variables like macular edema, macular ischemia, and the specific location of the branch occluded that influence visual outcome.

Conclusions: Patients with RVO have higher levels of homocysteine. Homocysteine, a marker for vascular disease, is a modifiable risk factor that can be easily tested. Treatment of hyperhomocysteinemia is relatively simple, safe, and inexpensive with dietary supplementation of folate along with vitamins B12 and B6.

E-Poster No.: EP-0352

Sterility of Bevacizumab Rubber Cap After Direct-From-Vial Multiple Dosing for Intravitreal Injection

First Author: John Alfred LIM

Purpose: This study aimed to determine the sterility of bevacizumab rubber caps after multiple dosing for multiple patients. It also aimed to outline a protocol for intravitreal injections at our set-up.

Methods: Five bevacizumab vials, used in multiple patients in a span of 1 month, were included in this study. The rubber caps were swabbed for microbial culture studies before and after disinfecting with 70% isopropyl alcohol swab then 10% povidone iodine at weeks 1, 2, 3, 4, and month 2. All patients received intravitreal injections in the operating room under sterile conditions, following the guidelines for intravitreal injection formulated by an expert panel. The patients were followed up at day 3 and 1 month after injection to monitor for signs of endophthalmitis.

Results: All culture specimens tested negative for microbial growth. There was no infection in the 59 injections in 37 patients included in the study. A guideline for intravitreal injections specific to our set-up was adopted from revised international recommendations.

Conclusions: The bevacizumab vial rubber cap remains sterile after 2 months and may be used as an indirect measure of sterility. Proper preparation of vials and strict adherence to guidelines/protocols for intravitreal injections may minimize the risk of infection.

E-Poster No.: EP-0375

Study on the Differentiation of Retinal Photoreceptors From Adult Pig Müller Cells In Vitro

First Author: Ni XU

Purpose: To test whether adult pig Müller cells can be differentiated to retinal photoreceptors (the primary transmission neurons of the retina) in vitro.

Methods: Müller cells were isolated from the neural retina of adult pig eyes, then adherent cultured and passaged for several generations. There were monolayer–cultured only second, third, and fourth generation adult pig Müller cells and others that were forced to form spheres in suspension in ultra–low adherent dishes for 2−3 days first and then reseeded in normal adherent plates. Both were cultured in a specifically formulated medium for retinal photoreceptor differentiation for various days. The identity of the adult pig Müller cells was verified by immunocytochemistry. Cell morphology and immunofluorescence staining were utilized in combination to measure the effects of the differentiation.

Results: The second, third, and fourth generation Müller cells all expressed glutamate synthetase (GS), a specific marker of Müller cells. In addition to GS, the third generation also expressed glial fibrillary acidic protein (GFAP), another specific marker of Müller cells. Three visual fields under fluorescence microscope were randomly chosen to calculate the average rhodopsin positive differentiation ratio, as rhodopsin is the most widely used specific marker for mature photoreceptors. The photoreceptor differentiation ratio of the second generation adult pig Müller cells for monolayer culture only and with additional sphere suspension culture were 27.99 ± 6.53% and 16.54 ± 3.40%, respectively. Over passages, the number of rhodopsin–positive cells became less and less, and the intensity of rhodopsin expression became weaker and weaker. The directed average rhodopsin positive differentiation ratio of the second, third, and fourth generation adult pig Müller cells from sphere formation were 56.23 ± 7.32%, 36.26 ± 8.55%, and 12.68 ± 3.18%, respectively. Although the rhodopsin expression became less intense over passages, the differentiated cells were more slender and elongated.

Conclusions: Adult pig Müller cells can be differentiated to retinal photoreceptors in vitro. The morphology of the differentiated cells appeared more slender and elongated if the sphere–induced differentiation method was used and/or the directed differentiation time was further extended. This study explored a new adult stem cell resource for stem cell basic research and cell-based therapeutic treatments of age–related macular degeneration and retinitis pigmentosa.

E-Poster No.: EP-0376

Suppression of H2O2-Induced Oxidative Stress Damage by Curcumin on RPE Cells Differentiated From AMD Patient-Specific Induced Pluripotent Stem Cells

First Author: Yu-chien CHUNG
Purpose: To investigate a possible mechanism of age-related macular degeneration (AMD) and drugs that may suppress the damage by using AMD patient–specific induced pluripotent stem cells (iPSc).

Methods: We generated AMD patient–specific induced pluripotent stem cells (iPScs) and then differentiated iPScs into retinal pigment epithelial (RPE) cells that were used as an expandable platform for in vitro drug screening and preclinical trial study.

Results: RPE with the AMD–associated background exhibited reduced antioxidative ability, whereas control RPE had a greater antioxidative protective capacity. Among several candidate drugs that were screened, curcumin caused less reduction of antioxidative capacity in AMD–related RPE cells and exhibited potential benefits. Curcumin prevented AMD–related RPE cells from H2O2–induced cell death and ROS production. In addition, curcumin with its pleiotropic activities can modulate the expression of many oxidative stress regulatory genes such as HO1, VEGF, SOD2, and GPX1.

Conclusions: Our findings demonstrate the RPE derived from AMD patients decreased antioxidative defenses, making them more susceptible to oxidative damage and thereby contributing to AMD pathogenesis. Curcumin represents an appropriate drug that can lessen the reduction of antioxidative capacity in human AMD–related RPEs, making it an effective option for macular degeneration therapy.

E–Poster No.: EP–0389

Terson Syndrome After Embolization Therapy in a Patient With Ruptured Intracranial Aneurysm

First Author: Chih Wei SHIH
Co–Author(s): Yi–ling LU, Ching–yao TSAI, Shiow–wen LIOU, Lin–chung WOUNG

Purpose: To report Terson syndrome after embolization therapy in a case of ruptured intracranial aneurysm.

Methods: A case report.

Results: A 52–year–old female received embolization therapy due to ruptured intracranial aneurysm with subarachnoid hemorrhage. Blurred vision of both eyes was noted the next morning. Best corrected visual acuity was counting fingers at 10 cm in both eyes. Fundus exam revealed vitreous hemorrhage, along with preretinal and intraretinal hemorrhage. After conservative treatment for 6 months, best corrected visual acuity was 20/100 in the right eye and 20/200 in the left eye.

Conclusions: Terson syndrome should be considered in patients with visual symptoms after embolization therapy for ruptured intracranial aneurysms, as demonstrated in our case.

E–Poster No.: EP–0377

The Effect of Aflibercept in the Treatment of Polypoidal Choroidal Vasculopathy: Experience From Taipei Veterans General Hospital

First Author: Yu–chien CHUNG
Co–Author(s): An–fei LI, Ling–ing LAU, Shih–jen CHEN

Purpose: To report the clinical outcome of intravitreal aflibercept in treatment–naive and switch cases of polypoidal choroidal vasculopathy (PCV).

Methods: A retrospective interventional study. All patients received intravitreal aflibercept (2 mg/0.05 mL) with a treat–and–extend regimen.

Results: In this study, 24 eyes of 23 patients (6 naive cases and 18 switch cases) were included, with a mean follow–up period of 12.42 ± 5.29 months. The mean central macular thickness (CMT) decreased significantly from 321.79 μm to 224.96 μm (P < 0.0001), whereas the mean logarithm of the minimum angle of resolution of best corrected visual acuity (logMAR BCVA) remained stable (pretreatment logMAR BCVA, 0.76; posttreatment logMAR BCVA, 0.77; P = 0.872). The mean interval between injections was 2.24 months. After treatment, polyps regressed in 53.3% of cases. Retinal pigment epithelium detachment (PED) regressed in 61.9% of cases after a mean of 2.77 injections in 4.46 months, and subretinal fluid (SRF) regressed in 95.5% of cases after a mean of 2.14 injections in 3.48 months. There were no significant differences between treatment–naive cases and switch cases in all of the outcome parameters.

Conclusions: In our case series with long–term follow–up, intravitreal aflibercept was found to reduce CMT and achieve dry retina effectively with satisfactory resolution of polyps and PED.

E–Poster No.: EP–0363

The Effect of Dexamethasone Intravitreal Implant for Macular Edema Due to Retinal Vein Occlusion: A Retrospective Case Series

First Author: Cheng SU

Purpose: To evaluate the effect, duration of action, and safety of dexamethasone (Ozurdex) intravitreal implant in patients with macula edema (ME) due to retinal vein occlusion (RVO).

Methods: Patients from October 2013 to August 2015...
with a diagnosis of ME due to RVO were enrolled in this study. Intravitreal implant of Ozurdex was given. Medical conditions, best corrected visual acuity (BCVA), intraocular pressure (IOP), retinal thickness by OCT, and the occurrence of complications were reviewed. Time to additional Ozurdex treatment was analyzed. Multivariant logistic regression was used to identify risk factors for repeated treatment.

**Results:** Twenty-nine patients diagnosed with ME were enrolled, with BRVO in 18 patients (62.07%) and CRVO in 11 patients (37.93%). Nineteen (65.52%) patients received only 1 dose of Ozurdex; 9 patients (31.03%) and 1 patient (3.45%) received 2 and 3 doses of Ozurdex, respectively, due to recurrent ME. Final CRT and VA significantly improved compared with initial status \( (P = 0.006) \). Mean and median additional treatment–free time were 10.96 months and 15.9 months, respectively. The probability of the need for a second treatment was 36.68% at 6 months and 42.44% at 12 months, respectively. DM was a significant risk factor for earlier repeated treatment.

**Conclusions:** With Ozurdex treatment, two thirds of patients remained adjunctive treatment–free, and one third needed additional treatment. The BCVA remained relatively stable in the group with repeated therapy; and a more aggressive algorithm might be tested to achieve significant VA benefit as in the one–treatment group. Factors associated with poorer outcomes include male sex, CRVO, and DM.

**E-Poster No.: EP-0347**

The Incidence and Risk Factors of Vitreomacular Interface Abnormality in Diabetic Macular Edema Treated With Intravitreal Anti-VEGF (Bevacizumab and Ranibizumab)

**First Author:** Cheng-kuo CHENG

**Purpose:** To report the incidence and associated factors of the development of vitreomacular interface abnormality (VMIA) in patients with diabetic macular edema (DME) who received intravitreal antivascular endothelial growth factor (anti–VEGF) (bevacizumab and ranibizumab) treatment.

**Methods:** A retrospective observational study. Patients with DME followed at least 6 months from January 2006 to May 2015 were reviewed. Records of ophthalmoscopic examination, fundus pictures, fluorescein angiography, and optical coherence tomography were examined to identify the formation of VMIA during the follow–up period.

**Results:** A total of 201 eyes in 142 patients were included in the study. VMIA developed in 44 eyes (21.89%) of patients during a mean follow–up period of 40.84 months. The estimated mean annual incidence of VMIA development (rate of VMIA formation/follow–up duration) was 6.09% per year. Poor initial best corrected visual acuity (BCVA) was found to be a risk factor for VMIA formation \( (P = 0.001; \text{odds ratio}, 5.299; 95\% \text{confidence interval, 1.972 to 14.238}) \). The final BCVA improved significantly both in eyes without VMIA formation (improved by \(-0.18 \text{logMAR} \) units) and in eyes with VMIA formation (improved by \(-0.14 \text{logMAR} \) units). There was no difference between the 2 groups \( (P = 0.557) \).

**Conclusions:** This study revealed the estimated incidence of VMIA formation in anti–VEGF–treated DME eyes to be 6.09% yearly. Poor initial BCVA was found to be a risk factor for VMIA formation. Both eyes with and without VMIA development had a significant response to anti–VEGF treatment.

**E-Poster No.: EP-0420**

The Levels of Transforming Growth Factor Beta 1 in Serum and Vitreous in Proliferative
**Diabetic Retinopathy With or Without Laser Panretinal Photocoagulation**

*First Author: Rosmiaty ZAINAL ABIDIN*

**Purpose:** To find the levels of transforming growth factor beta 1 (TGFβ1) in serum and vitreous of proliferative diabetic retinopathy (PDR) patients with or without a history of laser panretinal photoagulation and to determine the correlation of laser burns and timing with levels of TGFβ1.

**Methods:** An observational, cross-sectional study conducted in 14 patients with PDR undergoing vitrectomy surgery. There were 8 patients with a history of laser and 6 patients with no history of laser. Laser spots varied from 632–2004 spots, and timing varied from 1–96 weeks. Serum was collected before vitrectomy surgery, and vitreous was collected using vitrectomy machine before dilution.

**Results:** Using Mann–Whitney U test, TGFβ1 serum in the laser group was mean 14,187.5 pg/mL (SD 5338.9) and in the no laser group was mean 11,000.0 pg/mL (SD 4987.6); in both groups, there was no statistically significant difference (P = 0.245). TGFβ1 vitreous in the laser group was mean 3587.5 pg/mL (SD 352.3) and in the no laser group was mean 3833.3 pg/mL (SD 273.3); in both groups, there was no statistically significant difference (P = 0.104). There was a tendency of lower TGFβ1 levels in the laser group. With Spearman correlation test, the number of laser spots in TGFβ1 serum and vitreous had no correlation between groups, with the laser group mean of 14,187.5 pg/mL (SD 5338.9) and the no laser group mean of 11,000.0 pg/mL (SD 4987.6); in both groups, there was no statistically significant difference (P = 0.366).

**Conclusions:** Although we found no significantly different levels of TGFβ1 in both groups, there was a tendency of lower TGFβ1 levels in the laser group. There was no correlation between the number of laser spots and timing with levels of TGFβ1.

**E-Poster No.: EP–0344**

**The Rescue Effect of Intravitreal Aflibercept in the Treatment of Stage IIib Idiopathic Occlusive Vasculitis**

*First Author: Chun-ju LIN*

*Co-Author(s): Jane-ming Lin LIN, Wen-Iu CHEN, Peng-tai TIEN, Yi-hao HO, Yi-ju TSAI*

**Purpose:** We report the rescue effect of intravitreal aflibercept injections in the treatment of stage IIib idiopathic occlusive vasculitis.

**Methods:** Interventional case reports.

**Results:** Case 1 was a 36-year-old female. Her presenting vision was counting fingers in the left eye. Intravitreal aflibercept was used as adjunctive therapy due to persistent retinal neovascularization after focal retinal photoagulation, pericentral depot triamcinolone acetonide, and intravitreal ranibizumab injections. After the first intravitreal aflibercept injection, retinal neovascularization regressed. Retinal neovascularization and vitreous hemorrhage recurred after 5 months. Supplemental retinal photoagulation was performed, and the second intravitreal aflibercept injection was given. The retinal neovascularization regressed again, and her vision improved to 0.7. Case 2 was a 27-year-old female. Her presenting vision was 0.6 in the right eye. Intravitreal aflibercept was used as adjunctive therapy due to persistent cystoid macular edema and retinal neovascularization after pericentral depot triamcinolone acetonide injection and topical nepafenac. After the first intravitreal aflibercept injection, macular edema subsided. Her vision improved to 0.8. However, macular edema recurred after 3 months. The second...
intravitreal aflibercept injection was given, and macular edema subsided again. The treatment was well tolerated by the patients without significant adverse events.

**Conclusions:** Intravitreal aflibercept was effective to regress retinal neovascularization, but repeated injections were necessary in cases of recurrence. This small-scale and short-term study revealed the rescue effect of intravitreal aflibercept in the treatment of idiopathic occlusive vasculitis. More cases and long-term follow-up are mandatory.

**E-Poster No.: EP-0387**

**Torpedo Maculopathy: A Case Report**

*First Author: Hung Da CHOU*  
*Co-Author(s): Nan-kai WANG, Laura LIU*

**Purpose:** To describe the clinical features of a case of torpedo maculopathy.

**Methods:** Complete ophthalmic examinations and color fundus photos, fundus autofluorescence (AF) imaging, and spectral-domain optical coherence tomography (SD-OCT) were performed.

**Results:** A 9-year-old boy was referred to our clinic due to atypical macular lesion found accidentally. Dilated fundus examination revealed a pointed oval-shaped hypopigmented lesion at the temporal macula of the right eye. SD-OCT showed disruption of the outer retinal layers from the outer plexiform layer to the retinal pigment epithelium (RPE)–Bruch membrane complex and attenuation of the outer nuclear layer over the torpodo lesion. Fundus AF revealed hypoa autofluorescence at the rounded head of the lesion and hyperautofluorescence at the pointed tail. The boy’s vision was not affected, and the lesion size appeared to be stationary during the 1-year follow-up period.

**Conclusions:** The distinct location of torpedo maculopathy suggested a congenital etiology. OCT findings are heterogeneous among different publications but mostly include RPE atrophy. Retinal cavitation or sub-RPE cleft has also been reported. Fundus autofluorescence area reduced, suggesting RPE dysfunction or absence. Similar conditions included congenital hypertrophy of the RPE (CHRPE), grouped pigmentation (“bear tracks”), and RPE lesions in Gardner syndrome, but they have different ocular and systemic features. Detailed ophthalmic and systemic examinations can differentiate the above conditions.

**E-Poster No.: EP-0358**

**Treatment of Macular Hole With Topical Brinzolamide—A Report of 2 Cases**

*First Author: Yi-ru LIN*  
*Co-Author(s): Weng Sut SIO, Kwan-rong LIU*

**Purpose:** To report 2 cases of macular hole successfully treated with topical brinzolamide.

**Methods:** Topical brinzolamide was applied 3 times per day in 2 patients with macular hole with retinal edema.

**Results:** Edema decreased and macular hole sealed after brinzolamide treatment.

**Conclusions:** Topical brinzolamide may be an initial treatment option in the management of macular hole with edema.

**E-Poster No.: EP-0367**

**Treatment of Subretinal Hemorrhages Without Significant CNV for Pathologic Myopia**

*First Author: Yi-hao CHEN*  
*Co-Author(s): Pei-chang WU, Hsi-kung KUO*

**Purpose:** To evaluate the effects of intravitreal bevacizumab (IVB) for pathologic myopia with subretinal hemorrhages.

**Methods:** We reviewed the clinical records of adult subjects with pathologic myopia. General ocular examinations and fluorescein angiography were performed at the initial visit. Eyes without mCNV were included. Depending on the physician, either IVB or observation without treatment was performed. The follow-up duration was more than 6 months.

**Results:** Sixteen eyes in 16 patients (6 male and 10 female) were found to have refractive errors of minus 6 or more diopters and subretinal hemorrhages at the initial visit. The mean age was 37.9 ± 11 years, and the mean refractive error was 10.39 ± 3.7 diopters. The initial and final Snellen visual acuity were 0.43 ± 0.4 and 0.53 ± 0.3, respectively. The follow-up duration was 19.4 ± 14 months. Patients were divided into 2 groups according to whether IVIA was performed. Group 1 included 8 eyes treated with IVIA. Group 2 included 8 eyes with observation only. The average number of IVIA was 3 (range, 1 to 8). Between the 2 groups, there was no difference in age, refractive error, initial and final vision, or follow-up duration. However, 1 eye with vision increase was found to be in the untreated group.

**Conclusions:** IVB seems to be safe and can maintain vision for patients with subretinal hemorrhages without significant mCNV.

**E-Poster No.: EP-0395**

**Variation of Choroid in Vogt-Koyanagi-Harada**

*First Author: Yun-chen CHEN*  
*Co-Author(s): Tsui-kang HSU, Yei-ching CHEN, Chia-chen TSAI, Hsiao Ming CHAO, Jorn-hon LIU*

**Purpose:** To evaluate the effects of intravitreal bevacizumab for pathologic myopia with subretinal hemorrhages.
**Purpose:** To evaluate the morphologic features using enhanced depth imaging optical coherence tomography (EDI-OCT) before and after the initiation of high-dose corticosteroid treatment in a 57-year-old Chinese woman with the first onset of Vogt–Koyanagi–Harada (VKH) disease.

**Methods:** To calculate the ratio of choroidal stromal area to the choroidal vessel lumen area, custom software was established using ImageJ software and was calculated according to the threshold level obtained by the Otsu method. Total choroidal thickness was measured on EDT-OCT at the fovea and at 750 µm intervals from the foveal center in both temporal and nasal directions.

**Results:** The mean choroidal thickness was measurable 1 week after the initiation of treatment [448 µm in the right eye (OD), 448 µm in the left eye (OS)] and decreased thereafter (at 1 month, OD 275 µm, OS 219 µm). Ratio of the thickness of the medium choroidal vessel layer and choriocapillaris layer to choroidal thickness was decreased after treatment. The software-generated ratio of choroidal stromal area to the choroidal vessel lumen area increased compared with the normal data, suggesting increased choroidal stromal thickness in acute VKH disease.

**Conclusions:** Choroidal thickness, ratio of choroidal stromal area to the choroidal vessel lumen area, and the change of morphologic features as measured by EDI-OCT may serve as a marker for the degree of choroidal inflammation in acute onset VKH disease. Measurement of the choroid using noninvasive EDI-OCT is useful for longitudinal evaluation of the activity of VKH in progression.

**E–Poster No.:** EP–0409

**Visual Acuity and Morphologic Changes in High Myopia Patients With Patchy Atrophy by Spectral Domain Optical Coherence Tomography**

*First Author: Pei-chang WU*  
*Co-Author(s): Yi-chieh POON, Mei-ching TENG, Yi-hao CHEN*

**Purpose:** To investigate the appearance of patchy atrophy in spectral domain optical coherence tomography (SD-OCT) images and its association with visual acuity.

**Methods:** Patients with patchy atrophy secondary to high myopia were assessed in a prospective cross-sectional study by SD-OCT. The presence and integrity of the external limiting membrane, photoreceptor inner segments/outer segments, and the retinal pigment epithelium (RPE) were assessed. The association of visual acuity (VA) and patchy atrophy with foveal involvement was assessed.

**Results:** Twenty-two eyes of 14 patients (11 women, 3 men) aged 35 to 86 years were examined. The mean spherical refraction was −12 diopters (D) (−8° to −20 D). Retinal layer alterations in patchy atrophy included disintegration of the external limiting membrane, photoreceptor inner and outer segments, and RPE. The mean logMAR VA of patchy atrophy involving the fovea was significantly poor in comparison with nonfovea-involved patchy atrophy.

**Conclusions:** This study provides further valuable insight into patchy atrophy pathology. The morphologic change involving the subfovea is associated with visual acuity in high myopia patients.

**E–Poster No.:** EP–0473

"MENON 2"—A New Noncontact Wide-Angle System for Pars Plana Vitrectomy

*First Author: Mustafa ELCIOGLU*

**Purpose:** Contact and noncontact wide-angle systems used in vitreoretinal surgery have various advantages. Investigations into the ideal systems are proceeding.

**Methods:** The recently developed mechanical system that we designed consists of a mechanical stand (magnet base comparator stand used in industry), which is connected to a small metal platform, and a magnetic lens finger, moving freely on this platform. At the beginning of surgery, another metal plate is placed under the patient’s head. After a sterile drape is placed over the patient, the sterile magnet base is placed near the patient’s neck and turned on. The small metal platform connected to the magnet base is set at the patient’s cheek level. A noncontact wide-angle lens is attached to the magnetic metal finger. During the operation, this small magnetic finger is set according to the optical axis, 5 mm up to the corneal center by moving it on the small plate at cheek level. This system was used in more than 400 vitrectomies.

**Results:** The new mechanical system (MENON) was compared with the Volk–Rols and Oculus–BIOM systems. It was concluded that the new system does not have the disadvantages of contact wide-angle systems (corneal edema and assistance dependency) or noncontact wide-angle systems (impairment of the microscope pedal focusing feature).

**Conclusions:** The new MENON system does not have the basic disadvantages of contact and noncontact systems. It has an ergonomic mechanical structure that combines the advantages of both systems.

**E–Poster No.:** EP–0470
Advanced Coats Disease—Surgical Treatments and Histopathological Study

First Author: Jorn-hon LIU
Co-Author(s): Yei-ching CHEN, Chia-chen TSAI, Yun-chen CHEN, Hsiao Ming CHAO, Wei Cheng CHANG

Purpose: To present clinical features, surgical treatments, and histopathological findings in a series of cases with advanced Coats disease.

Methods: A retrospective review of the records of Coats disease cases with extensive retinal detachment (RD) undergoing vitreoretinal surgery (VRS) between 1996 and 2012.

Results: Twelve eyes of 12 male patients, aged from 4 to 9 years old with retinal telangiectasia and total RD secondary to Coats disease, were enrolled. There were thick subretinal dirt—like exudates in 3 eyes, profused heavy lipid deposits in 4, additional subretinal circular fibrous cord in 2, and formation of ballooning elevation of the retina in 3. The operation consisted of pars plana vitrectomy with removal of all subretinal fluid and deposit materials. The adjunct procedures performed included encircling buckling in 4 and silicone oil injection in 5. The anatomical results showed attached retina in 9 eyes and redetached retina with continuous periretinal fibrous proliferation in 3 eyes. Long-term visual results showed that vision improved in 3 eyes, remained the same in 6, and worsened to no light perception in 3. Pathology and histobiochemistry studies on the surgically excised tissue specimens revealed cholesterol clefts, histiocyte (marker KPI), retinal pigment epithelial cells (marker cytokeratin), glial cells (marker GFAP), collagen fibers, and fibroblasts. The subretinal fibrous cord was composed of fibroblasts and glial cells.

Conclusions: VRS can be useful in the treatment of advanced Coats disease. Visual prognosis is generally poor for those cases of delayed surgery. Early detection with early intervention is mandatory.

E-Poster No.: EP-0463

Antivascular Endothelial Growth Factor for Proliferative Diabetic Retinopathy

First Author: Chaoyi FENG

Purpose: To assess the effectiveness of intravitreal antivascular endothelial growth factor (anti-VEGF) pretreatment in vitrectomy for proliferative diabetic retinopathy (PDR).

Methods: A comprehensive literature search was performed using the Cochrane Collaboration methodology to identify randomized controlled trials (RCT) and comparative studies of vitrectomy with or without anti-VEGF pretreatment for PDR. Meta-analyses were performed for intraoperative (including intraoperative bleeding, endodiathermy, and mean surgical time) and postoperative outcomes (including best corrected visual acuity, recurrent vitreous hemorrhage, and silicone oil tamponade).

Results: Vitrectomy with anti-VEGF pretreatment achieved better visual acuity [MD -0.24 logMAR; 95% confidence interval (CI), -0.4963 to 0.0114], less intraoperative bleeding (MD 0.1573; 95% CI, 0.0781 to 0.3170), shorter overall surgical time (MD -23.6118; 95% CI, -30.9191 to 16.3046), smaller number of endodiathermy applications (MD -2.9689; 95% CI, -6.4310 to 0.4932), and less recurrent vitreous hemorrhage (MD 0.1554; 95% CI, 0.0912 to 0.2647). Reasons for downgrading the quality of the evidence included risk of bias in included studies, imprecision of the estimates, inconsistency of effect estimates, and indirectness.
Conclusions: There was low quality evidence from RCTs for the efficacy and safety of anti-VEGF agents when used to treat PDR over and above current standard treatments. However, the results suggest that anti-VEGFs can reduce the risk of intraocular bleeding in people with PDR. Further carefully designed clinical trials should be able to improve this evidence.

E–Poster No.: EP-0443

Association of Macular Choroidal Thickness With Optical Coherence Tomography Morphology in Patients With Idiopathic Epiretinal Membrane

First Author: I-mo FANG
Co-Author(s): Chih-chao HSU, Li-li CHEN

Purpose: To compare macular choroidal thickness of eyes with idiopathic epiretinal membrane (ERM) and fellow eyes before and after vitrectomy in terms of the morphological features on spectral-domain optical coherence tomography (SD-OCT).

Methods: Eighty–one patients with unilateral idiopathic ERM were involved. Patients were categorized into group 1, ERM without membrane contraction; group 2, ERM with membrane contraction and retinal folding; and group 3, ERM with membrane contraction and macular edema. Twenty–two patients received surgical removal of ERM. Choroidal thickness was compared between eyes with ERM and fellow eyes before and after treatment.

Results: Mean choroidal thickness was significantly greater in ERM eyes than in fellow eyes (234.3 ± 22.6 vs 220.8 ± 21.0 mm; P < 0.01). Group 1 (n = 18) showed no significant difference in choroidal thickness between ERM and fellow eyes. Eyes in group 2 (n = 26) and group 3 (n = 37) showed statistically significant differences in mean choroidal thickness between ERM and fellow eyes (229.6 ± 23.8 vs 220.7 ± 20.0 mm; 242.6 ± 27.8 vs 221.0 ± 21.8 mm, respectively; P < 0.05). In group 2 (n = 8) and group 3 (n = 16), choroidal thickness in ERM eyes decreased significantly at 1 month and 6 months after surgery compared with that before surgery (P < 0.05 for all comparisons).

Conclusions: Membrane contraction contributed to the increase in choroidal thickness in idiopathic ERM patients. This finding may help to elucidate the pathophysiologic features of idiopathic ERM and the response to treatment in these patients.

E–Poster No.: EP-0445

Changes of Fovea Contour in Epiretinal Membrane After Pars Plana Vitrectomy

First Author: Chieh-yin CHENG
Co-Author(s): San-ni CHEN

Purpose: We evaluated the changes of foveal contour with idiopathic epiretinal membrane (ERM) before and 6 months after pars plana vitrectomy with internal limiting membrane (ILM) and ERM peeling, along with postoperative foveal thickness changes.

Methods: Retrospective chart review of consecutive patients undergoing surgery with pre– and postoperative optical coherence tomography (OCT). Foveal thickness was measured according to the thickness of the fovea relative to the surrounding macula on OCT.

Results: There were 30 eyes that received vitrectomy with ILM peeling. Postoperatively at 6 months, OCT showed temporal retinal thinning.

Reports

First Author: Toshiya SAKURAI

Purpose: Pars plana vitrectomy (PPV) combined with inverted internal limiting membrane (ILM) flap technique for refractory macular hole (MH) is useful. However, inverting the ILM flap is not an easy technique. We experienced unexpected extrication of the ILM flap from the edges of the macular hole in PPV with inverted ILM flap technique for 2 cases of MH, which led to autologous ILM transplantation.

Methods: Case 1: A 51–year-old male complained of deterioration of visual acuity (VA) in his left eye for 2 months. He was referred to our clinic with a diagnosis of MH. His decimal best corrected visual acuity (BCVA) in the left eye was 0.4, and the axial length of his left eye was 28.66 mm. Case 2: A 39–year-old male complained of deterioration of VA in his right eye for 6 months. His decimal BCVA in the right eye was 0.1, and the axial length of his right eye was 27.45 mm. Due to the extended axial length of the eye, PPV with inverted ILM flap technique was performed in both cases. However, because both cases showed unexpected extrication of the ILM flap from the edges of the macular hole, ILM from the surrounding area was removed and used for autologous ILM transplantation on the MH.

Results: Successful MH closure was achieved in both cases. Postoperative decimal BCVA improved to 1.0 in case 1 and 0.5 in case 2. Neither case showed any complications more than 24 months after surgery.

Conclusions: Autologous ILM transplantation might be useful for a refractory MH case in which the ILM flap was unexpectedly extricated from the edges of the MH during PPV with inverted ILM flap technique.
Conclusions: A reduction of the macular thickness was observed after vitrectomy with indocyanine green-guided ILM peeling for idiopathic macular pucker, especially in the temporal area.

E-Poster No.: EP-0446

Clinical Characteristics and Treatments of Retinal Vasoproliferative Tumors

First Author: Yi Ming HUANG
Co-Author(s): Shih-jen CHEN, Catherine LIU

Purpose: To report the features and management of retinal vasoproliferative tumors (VPT).

Methods: A retrospective chart review at Taipei Veterans General Hospital from 2006 to 2015.

Results: Four eyes with retinal vasoproliferative tumors (VPT) in 4 patients were recruited. Three occurred in isolation (primary), and 1 was secondary to previous retinal detachment surgery. Complications of VPT included macular pucker and lamellar hole (n = 3), cystoid macular edema (n = 1), and dense cataract with rigid anterior capsule and vitreous opacity (n = 1). Management included vitrectomy and membrane peeling with tumor excision (n = 2), combined therapy with photodynamic therapy (PDT) and antivascular endothelial growth factor (anti-VEGF) intravitreal injection (n = 3). Tumor shrinkage was achieved in all the patients treated with PDT and intravitreal anti-VEGF injection. Pathology of 1 excised tumor after PDT revealed massive gliosis with positive CD31 stain of vascular endothelium.

Conclusions: The most common complication of VPT was rapid development of macular pucker in our series. We also found 1 patient with dense cataract and rigid anterior capsule during cataract surgery. Possible beneficial treatments for VPT include PDT combined with intravitreal injection of anti-VEGF, with or without vitrectomy and membrane peeling.

E-Poster No.: EP-0475

Clinical Characteristics of Rhegmatogenous Retinal Detachment in Highly Myopic Eyes

First Author: Tadashi ORIHARA
Co-Author(s): Makoto INOUE, Yuji ITO, Takashi KOTO, Kazunari HIROTA, Akito HIRAKATA

Purpose: To evaluate the clinical characteristics of rhegmatogenous retinal detachment in highly myopic eyes.

Methods: The subjects were 1174 eyes of 1146 patients with phakic rhegmatogenous retinal detachment that underwent an initial vitreoretinal surgery between 2006 and 2011. The eyes with macular hole retinal detachment and secondary retinal detachment were excluded. The 486 eyes with high myopia [spherical equivalent ≤ -6.0 diopters (D) or axial length ≥ 26.5 mm] and the 688 eyes with non–high myopia were compared regarding types and location of retinal breaks, retinal reattachment rates, and retinal complications in the fellow eyes.

Results: The mean age was significantly younger in the high myopia group (42.7 ± 14.2) with a single peak of higher incidence at 40 years old compared with the non–high myopia group (52.5 ± 16.5, P < 0.001) with 2 peaks. The retinal detachment caused by retinal hole was significantly more frequent in the high myopia group (P < 0.001) and that caused by retinal tear was less frequent (P = 0.021). The initial retinal attachment rate and the final reattachment rate were not significant. In the fellow eye of the high myopia group, the incidences of retinal detachment (16.7%) and lattice degeneration (20.4%) were more frequent compared with the non–high myopia group (12.2% and 13.7%, respectively).

Conclusions: The incidences of the retinal detachment at a younger age and those caused by retinal holes were higher in the high myopia group. A higher incidence of retinal detachment and lattice degeneration in the fellow eyes of the high myopia group indicates that careful observation in the fellow eyes is recommended.

E-Poster No.: EP-0484

The Treatment of Choice for Primary Rhegmatogenous Retinal Detachment

First Author: I Chia LIANG
Co-Author(s): Cheng-lien HO, Kai WANG, Kwan-rong LIU, Hsiang-wen CHIEN, Suzu-juan LIN

Purpose: We undertook this study to evaluate the visual outcomes after retinal reattachment surgery.

Methods: This was a retrospective study of 176 patients with primary rhegmatogenous retinal detachment (RDRD), including 145 phakic eyes and 33 pseudophakic eyes, who received either scleral buckling (SB) or pars plana vitrectomy (PPV) as primary intervention. Statistical comparisons between SB and PPV were performed.

Results: The single surgery anatomic success rates and complication rates between the 2 different surgical techniques were studied. The lens status and features of retinal break(s) played the most important role in the choice of surgical procedure. There was no significant difference in the single surgery anatomic success rate between the SB (93.3%) and PPV (96.4%) groups (P = 0.506). Further multivariate analysis revealed that pseudophakic status was the only significant factor that affected the single surgery anatomic success rate in the SB group. Regarding complications, the PPV group had
Conclusions: According to the results, we suggest that SB should be chosen for patients with younger age, phakia, or limited breaks because of less cataract formation. PPV should be chosen as primary intervention for pseudophakic patients because it yields a higher single surgery anatomic success rate and better final visual outcome.

E–Poster No.: EP–0444
Comparison of Visual Outcome and Morphologic Change Among Different Surgical Techniques in Idiopathic Epiretinal Membrane Surgery
First Author: Pei-kang LIU
Co-Author(s): Chia-lin LEE, Wen-chuan WU
Purpose: To investigate the morphological and functional outcomes of macular pucker surgery among 3 different surgical techniques: whole–piece internal limiting membrane (ILM) peeling, maculorrhexis ILM peeling, and epiretinal peeling only. In the novel maculorrhexis technique, the ILM is grasped away from the central fovea and peeled off in a circular fashion, and care must taken not to peel off the central foveal area. The peeled ILM is trimmed with a high–speed vitreous cutter.

Methods: We retrospectively reviewed the patients with epiretinal membrane (ERM) scheduled for surgery between January 2012 and December 2014. All patients underwent a transconjunctival 25-gauge vitrectomy and triamcinolone–assisted ERM peeling. ICG-assisted ILM peeling as a whole piece was performed after ERM peeling between July 2012 and July 2013. Surgeries performed after July 2013 were done with the newly–developed maculorrhexis ILM peeling technique. The surgical outcome was evaluated by visual acuity change and central macular thickness (CMT) measured on OCT preoperatively and up to 6 months postoperatively.

Results: There were 18, 17, and 22 patients in the ERM peeling, whole–piece ILM peeling, and maculorrhexis groups, respectively. Mean best corrected visual acuity (BCVA) improved significantly in all 3 groups 6 months postoperatively (P < 0.05). Visual acuity in the maculorrhexis group improved significantly more than the ERM group at 1 month and 3 months postoperatively, and also significantly more than the whole–piece ILM peeling group at 3 months postoperatively. There was significant CMT reduction at 1 month postoperatively in the ERM peeling and the maculorrhexis group but not the whole–piece ILM peeling group. Comparison of CMT reduction among the 3 groups revealed significantly more reduction in the maculorrhexis group than the whole–piece ILM peeling group at 1 month and 3 months, but not 6 months postoperatively (P = 0.005, 0.03, 0.12).

Conclusions: All 3 techniques used in ERM surgery resulted in visual acuity improvement and macular thickness reduction. Maculorrhexis resulted in better visual outcomes within 3 months postoperatively. Macular edema recovery was slower with whole–piece ILM peeling but not the maculorrhexis technique.
Endothelial cell loss was observed in both pseudophakic and phakic eyes after pars plana vitrectomy in the early postoperative period. In the absence of silicone oil, intraoperative fluctuations of intraocular pressure, surgical trauma, and post–vitrectomy anterior chamber inflammation could be possible factors responsible for the loss of endothelial cells.

E-Poster No.: EP-0464

Corneal Endothelial Cell Loss After Pars Plana Vitrectomy

First Author: Bhuvan CHANANA

Purpose: To investigate short–term alteration in corneal endothelial cell counts after pars plana vitrectomy in phakic and pseudophakic eyes.

Methods: The corneal endothelial cell counts of 11 eyes of 11 consecutive patients were evaluated prospectively before and after pars plana vitrectomy. All patients had a nonresolving vitreous hemorrhage preoperatively, and neither gas nor silicone oil was injected in any patient after vitrectomy. Endothelial cell counts were measured preoperatively and at 1 week and 1 month postoperatively.

Results: All patients underwent a successful surgery. In pseudophakic eyes (n = 5), the average endothelial cell loss was 19.08 ± 10.0% at 1 week and 26.32 ± 11.8% at 1 month postoperatively. Phakic eyes (n = 6) also showed an average endothelial cell loss of 10.26 ± 7.2% at 1 week and 21.86 ± 14.6% at 1 month postoperatively. Overall, the mean endothelial cell density in the 11 eyes decreased significantly from 2691 ± 557 cells/mm² preoperatively to 2344 ± 628 cells/mm² and 2079 ± 622 cells/mm² at 1 week (P = 0.0001) and 1 month (P = 0.0001) postoperatively, respectively.

Conclusions: Endothelial cell loss was observed in both pseudophakic and phakic eyes after pars plana vitrectomy in the early postoperative period. In the absence of silicone oil, intraoperative fluctuations of intraocular pressure, surgical trauma, and post–vitrectomy anterior chamber inflammation could be possible factors responsible for the loss of endothelial cells.

E-Poster No.: EP-0438

Effectiveness of “As-Needed” Intravitreal Aflibercept for the Treatment of Polypoidal Choroidal Vasculopathy

First Author: Cheng-kuo CHENG
Co-Author(s): Yu-tien CHI

Purpose: To evaluate the regression of polypoidal lesions in patients with polypoidal choroidal vasculopathy (PCV) who underwent intravitreal aflibercept treatment.

Methods: We studied all the treatment–naive patients with PCV who were scheduled for treatment with monthly intravitreal aflibercept until complete dryness of the macula on optical coherence tomography (OCT) examination, and then the treatment was stopped and patients were followed monthly thereafter. Best corrected visual acuity (BCVA) was compared before treatment, 1, 3, and 6 months after the initial treatment. Changes in central foveal thickness and presence/absence of subretinal fluid were also evaluated. The regression of the polyps was assessed using indocyanine green angiography.

Results: We evaluated 17 eyes of 18 patients with PCV who were treated with scheduled intravitreal aflibercept. Overall, a complete resolution of subretinal fluid was obtained in 94% of the cases (17/18) at the last follow-up. Furthermore, the rate of complete polyp regression was 50% (9/18) and partial polyp regression was 39% (7/18) during 6 months of follow-up. Additionally, 9 eyes (50%) showed improvement in BCVA of ≥0.3 logMAR unit, and 2 eyes (11%) had a decrease in BCVA of ≥0.3 logMAR unit because of macular scar formation and vitreous hemorrhage at the 6-month follow-up.

Conclusions: Intravitreal aflibercept was well tolerated and had improved the vision of treatment–naive patients with PCV when evaluated at short–term follow–up examinations. Intravitreal aflibercept might be associated with a high possibility of achieving involution of polyps and reducing subretinal fluid.
Familial Exudative Vitreoretinopathy—Four Case Reports From a Family

First Author: Chao-chien HU
Co-Author(s): Yi-syun SHEN

Purpose: Familial exudative vitreoretinopathy (FEVR) is a rare inherited disorder of retinal angiogenesis. Cases can be autosomal dominant, autosomal recessive, or X-linked. FEVR patients have an avascular peripheral retina which, depending on the degree of ischemia, causes the secondary complications of the disease. Expressivity may be asymmetric and is highly variable.

Methods: Four case reports in 1 family.

Results: Four young patients (all of them are siblings from the same family) reported blurred vision for more than half a year. They went to the ophthalmic department one after another. Decreased best corrected visual acuity (BCVA) in both eyes, exudative retinal detachment with peripheral ischemic zone, and some neovascularizations were found under fluorescein angiography, although there was no history of premature oxygen administration during the neonatal period. The condition was deemed FEVR from both the fundus and fluorescein angiographic findings in affected members of the family. It was emphasized that the disease may be asymptomatic and nonprogressive before adolescence. This report presents the ophthalmoscopic and fluorescein angiographic features noted in patients in 1 family. In addition, differential diagnoses, similarities, and dissimilarities between FEVR and retinopathy of prematurity, and the possible mechanism of the development of retinal vascular abnormalities, will be considered. The genetic factors have been identified, suggesting a critical role for this pathway in retinal angiogenesis.

Conclusions: In FEVR patients for whom molecular testing is not easily accessible, detailed histories and fluorescein angiography can help in diagnosis. Treatment can be initiated to reduce the risk of complications caused by genetic factors, not only retinopathy, but also others like bone fractures.

Free-Floating Vitreous Cyst in an Adult Male

First Author: Jing HE

Purpose: To report an unusual case of solitary unilateral vitreous cyst in an adult male.

Methods: A complete ocular examination, fundus photography, B-scan ultrasound, and fundus fluorescence angiography were performed in the patient. Additionally, blood serology tests were examined for Toxoplasma gondii, Toxocara canis, cysticercosis, and Echinococcus.

Results: The patient (an 80-year-old man) reported a slow visual deterioration in both eyes over the past 2 years. He was referred to the eye hospital because of cataract in both eyes. The patient had no history of ocular trauma or intraocular inflammation. Slit lamp examination showed nuclear cataract in both eyes, but anterior segments were otherwise normal. Fundus examination performed with 90 D-lens was unremarkable in the left eye, but in the right eye a single oval cyst was identified floating freely in the vitreous. B-scan ultrasound revealed a round-shaped cyst that was localized at the posterior vitreous. Fundus fluorescence angiography showed a clear-edged hypofluorescence. Simultaneously, the results of blood serology for parasites were negative. After all examinations, a diagnosis of congenital vitreous cyst was made.

Conclusions: Vitreous cysts are rare clinical findings. They can be observed in normal eyes or associated with previous eye pathology. When the vitreous cyst floats into the visual axis area, it can cause blurred vision or disturb visual function. A prompt clinical examination is necessary for differentiating this rare condition.

How to Improve the Success Rate and Visual Acuity After Macular Hole Surgery

First Author: Horng-jiun WU
Co-Author(s): Hsien Chung LIN, Wen-chuan WU

Purpose: Macular hole is a vision-threatening disease, especially at advanced stages, and it was thought untreatable until 1991. Now, we can treat macular hole by vitrectomy with internal membrane peeling and expandable gas tamponade. However, increasing the closure rate of macular holes and improving visual acuity after surgery are still problems.

Methods: We performed pars plana vitrectomy and removed vitreous after inducing posterior vitreous detachment for treating macular hole. Internal limiting membrane (ILM) was removed to close the macular hole; residual tissue along the macular hole was grasped with forceps and stretched to the opposite side of the macular hole, then gently removed.

Results: Through these procedures, we observed the closure rate of macular holes and the improvements in visual acuity. All macular holes were smaller or closed, and visual acuity had improved. Some patients had best corrected visual acuity of 1.0.

Conclusions: Not only removing the ILM but also removing residual tissue at the margin of the macular hole can increase the closure rate and improve visual acuity postoperatively even in cases of advanced macular hole.
Inverted Internal Limiting Membrane Flap Technique for Large Long-Standing Macular Hole

**First Author:** Mingshan HE  
**Co-Author(s):** Jia-rong ZHANG, Yuan-chieh LEE

**Purpose:** To describe the functional and anatomic results of inverted internal limiting membrane (ILM) flap technique for chronic large macular hole.

**Methods:** Two cases with chronic large macular hole underwent 23-gauge pars plana vitrectomy, inverted ILM flap, and gas tamponade. Best corrected visual acuity and macular microstructures determined by spectral-domain optical coherence tomography were measured preoperatively and 1, 2, 3, and 6 months postoperatively.

**Results:** After surgery with the inverted ILM flap technique, the external limiting membrane sealed in both eyes. In case 1, the ellipsoid zone (EZ) regained continuity gradually. However, the EZ did not regain in both eyes by 6 months. Additionally, preoperative paramacular hole EZ atrophic change might be a poor factor for EZ restoration.

**Conclusions:** With the ILM inverted flap technique, even chronic large macular hole could seal after surgery. Despite anatomical closure, visual acuity did not show improvement by 6 months. Additionally, preoperative paramacular hole EZ atrophic change might be a poor factor for EZ restoration.

Large Series and Long-Term Results of Foveolar Nonpeeling Internal Limiting Membrane Surgery in Myopic Traction Maculopathy

**First Author:** Tzyy-chang HO  
**Co-Author(s):** Muh-shy CHEN

**Purpose:** To investigate the long-term surgical results of a large series of eyes with myopic traction maculopathy treated with a novel technique to preserve the foveolar cone without peeling off foveolar internal limiting membrane (ILM) during myopic traction maculopathy surgery.

**Methods:** Sixty-two patients (63 eyes) were retrospectively studied, and all were followed up for more than 1 year. Best corrected visual acuity (BCVA), refraction status, and optical coherence tomography data were collected and analyzed.

**Results:** Fovea flattened in 62 eyes (98%). Macular hole (MH) developed in none of the 63 eyes after an average of 26 months of follow-up. Ellipsoid zone recovered in 48 eyes (76%). The mean preoperative logarithm of the minimal angle of resolution BCVA (logMAR BCVA) was 0.89 (SD ± 0.82), and the mean postoperative VA was 0.42 (SD ± 0.23). Surgical complications included parafoveal retinal break in 2 eyes and shallow macular retinal detachment in 1 eye.

**Conclusions:** Preservation of the foveolar ILM by foveolar nonpeeling surgery prevents long-term macular hole formation, restored foveolar müller cell cone integrity, and achieved good visual outcomes in a large series study.

Macular Pucker: Peeling or Injection

**First Author:** Hsiao Ming CHAO  
**Co-Author(s):** Jorn-hon LIU

**Purpose:** Macular pucker (MP)–associated cyst-like macular edema (CME) is vision-threatening.

**Methods:** Best corrected visual acuity (logMAR) and OCT central retinal thickness (CRT) were evaluated preoperatively and postoperatively. Based on the OCT characteristics, group 1 MP showed single sheet (MU; n = 20) epimacular membrane and group 2 demonstrated MP with CME (n = 20); pucker was peeled accordingly. In group 3 of MP (n = 21) also with CME, an intravitrealous injection (IVI) of kenacort (4 mg; IVIK) was administered instead.

**Results:** The pucker was peeled 14.10 ± 4.62 months after the first diagnosis of MP (mean age, 67.68 ± 1.75 years old; n = 60). Group 1 patients (n = 20; logMAR: 0.66 ± 0.07; CRT: 544.14 ± 26.54 μm) had significantly improved BCVA after peeling (logMAR: 0.28 ± 0.07) and reduced CRT (395.02 ± 13.73). Their improved BCVAs (logMAR) after peeling were significantly different from those of group 2 (n = 20; logMAR: 1.18 ± 0.38). In group 3, there was a significant reduction in CRT after injection (preinjection vs postinjection: 430.76 ± 15.93 vs 369.53 ± 12.53; n = 20) but BCVA stabilized (logMAR; preinjection vs postinjection: 0.32 ± 0.03 vs 0.38 ± 0.05; n = 20). However, there was a trend of increased BCVA after injection (logMAR; preoperative vs postoperative: 0.32 ± 0.07 vs 0.30 ± 0.11; n = 8) for those who received first IVI. Compared with those preinjection MP cases with no CME (n = 4; 208.20 ± 67.99), the preinjection MP cases with CME (ME; n = 11; 1123.25 ± 257.45) had significantly higher aqueous monocyte chemoattractant protein–1, an inflammatory biomarker.

**Conclusions:** Macular pucker peeling performed in group 1 achieved significant postoperative BCVA improvement and CRT reduction. Inflammation might play a role in group 3 MP with CME. Relevantly, CRT was significantly reduced and vision tended to be stabilized/improved without CME.
Management for Postoperative Residual Submacular Perfluorocarbon Liquid

First Author: Jin MA

Purpose: To assess the reasons and the removal management for retained perfluorocarbon liquid beneath the macula after retinal surgeries.

Methods: We retrospectively investigated the medical records of patients who had retained perfluorocarbon liquid beneath the macula after successful vitrectomy. Records including preoperative diagnosis, surgical approach, perfluorocarbon liquid type, and when and how perfluorocarbon removal was performed were analyzed.

Results: Eighty-three percent of patients with retained submacular perfluorocarbon liquid had a surgical history of peripheral retinotomy or vitrectomy for retinal detachment with giant retinal tears. Other reasons for retained perfluorocarbon liquid were improper injection, cases with active retinal hemorrhage, or severe ocular trauma. Early perfluorocarbon liquid removal had a significant effect on postoperative prognosis. Premacular retinotomy could be chosen as an effective treatment. Functional and anatomical recovery of the macula after liquid removal was not satisfying in cases of retained submacular perfluorocarbon liquid that lasted for more than 1 month.

Conclusions: Retained submacular perfluorocarbon liquid should be noted after retinal surgeries, and early removal of perfluorocarbon liquid may be beneficial to recovery of visual function.

E-Poster No.: EP-0467

Modified Internal Limiting Membrane Peeling Technique (Maculorrhexis) for Myopic Foveoschisis Surgery

First Author: Wen-chuan WU
Co-Author(s): Yo-chen CHANG, Chia-lin LEE

Purpose: Myopic foveoschisis occurs in 9 to 34% of highly myopic eyes with posterior staphyloma. The pathogenesis is still not fully understood, but the relative inflexibility of the inner retina and a tangential traction–induced inward traction force in the posterior staphyloma are possible mechanisms. Surgical treatment includes pars plana vitrectomy with epiretinal membrane/internal limiting membrane (ILM) peeling followed by gas tamponade and postoperative face down positioning. It generally yields good results. However, a postoperative full-thickness macula hole happens in 13–28% of cases. Therefore, the present report describes a modified ILM peeling technique named “ILM maculorrhexis” to minimize the occurrence of postoperative macular hole in patients with foveoschisis.

Methods: The study design was a consecutive, retrospective case review. Ten eyes of 10 consecutive patients who underwent vitrectomy with ILM maculorrhexis to treat myopic foveoschisis were studied retrospectively. The ILM was grasped away from the central fovea and peeled off in a circular fashion; care must be taken not to peel off the central foveal area. After the ILM was peeled from the entire macula area except the central fovea, the peeled ILM was trimmed with a high-speed vitreous cutter. Complete ophthalmic examination and SD-OCT examinations were performed 1, 3, 6, 9, and 12 months postoperatively.

Results: After surgical intervention, the foveoschisis resolved dramatically in all 10 eyes. The mean CFT decreased significantly from 840 µm to 273 µm at 12 months postoperatively. Mean logMAR BCVA improved from 1.04 preoperatively to 0.59 12 months postoperatively. After follow-up of at least 12 months, the fovea in all 10 eyes remained attached, and none of the 10


**E-Poster No.: EP–0465**

**Neglected Long-Standing Vitreous Hemorrhage: Is Vitrectomy Beneficial?**

**First Author:** Bhuwan CHANANA  
**Co-Authoress:** Sudhank BHARTI, Vinod KUMAR

**Purpose:** Long–standing vitreous hemorrhages may be associated with permanent retinal damage or secondary glaucoma, which may limit visual recovery. The role of pars plana vitrectomy (PPV) in such cases is being evaluated.

**Methods:** This was a retrospective interventional case series. Ten eyes of 8 patients who underwent PPV for vitreous hemorrhage (VH) of more than 18 months’ duration were reviewed retrospectively. The cause of vitreous hemorrhage was Eales disease (3 eyes), diabetic retinopathy (DR; 2 eyes), trauma (2 eyes), megaloblastic anemia (2 eyes), and branch retinal vein occlusion (BRVO; 1 eye). Patients (3 eyes) with VH secondary to BRVO and DR had bilateral visual loss due to phthisis bulb, absolute glaucoma, and end–stage DR with macular scar in the second eye, respectively. The main outcome parameters studied were best corrected visual acuity (BCVA), intraocular pressure, and complications.

**Results:** All patients were followed up for at least 6 months. Most of the patients experienced an improvement in visual function. Some eyes had advanced posterior segment disorders leading to a decreased visual outcome. Surgery, however, helped to attain mobility in these patients. None of the patients developed postoperative retinal detachment or recurrent bleeding.

**Conclusions:** Long–standing vitreous hemorrhage, although a rare cause of visual loss, has a guarded visual prognosis due to associated complications. However, the present study showed vitrectomy for long–standing vitreous hemorrhage is beneficial and may help to salvage vision, especially in cases with bilateral blindness.

**E-Poster No.: EP–0457**

**Outcomes of Glued Intraocular Lens in Africa**

**First Author:** Nishant RADKE  
**Co-Authoress:** Snehal RADKE

**Purpose:** To study the profile and outcomes of glued intraocular lens (IOL) in central and sub–Saharan Africa.

**Methods:** A retrospective hospital–based case series. Sixty–seven eyes of 64 patients undergoing glued intrascleral haptic fixation were included. Eyes that completed final follow–up by 2 months were included in the study. All surgeries were done by a single vitreoretinal surgeon in 2 different hospitals, 1 in central Africa and 1 in sub–Saharan Africa.

**Results:** Male–to–female ratio was 1.29:1. Mean age was 63.97 years. Three (4.48%) patients needed glued IOL intraoperatively due to posterior capsular rent (PCR) with inadequate sulcus support. Sixty–four (95.52%) cases had preexisting aphakia. Previous postsurgical aphakia as an indication was seen in 57 (85.07%) cases. Five (7.46%) posttraumatic cases underwent glued IOL surgery. One pediatric case with Marfan syndrome underwent the surgery in both eyes (2.99%). Complications ranging from minor to vision–affecting ones were seen in 30 cases (44.78%). The most common was haptic kinking at the tip: 19 (28.36%) cases. IOL tilt occurred in 3 patients (4.48%). Cystoid macular edema (CME) and pigment dispersion was seen in 2 (2.99%). Dislocation of the IOL, prolonged uveitis, corneal decompensation leading to pseudophakic bullous keratopathy, and haptic fracture were seen in 1 each of the cases (1.49%).

**Conclusions:** Glued intrascleral haptic tucking seems to be an effective and relatively safe method to rehabilitate patients with aphakia.

**E-Poster No.: EP–0461**

**Pars Plana Vitrectomy Compared With Scleral Buckle Combined With Pars Plana Vitrectomy for Primary Management of Rhegmatogenous Retinal Detachment in Different Macular Status**

**First Author:** Teng-chieh YU  
**Co-Authoress:** Gow-lieng TSENG, Shiow-wen LIOU

**Purpose:** To compare pars plana vitrectomy (PPV) with scleral buckle combined with PPV (SB/PPV) in macula–on and macula–off status for the treatment of primary rhegmatogenous retinal detachment (RRD).

**Methods:** A single–center, retrospective review of patients who underwent primary retinal detachment surgery from 2010 to 2014 was conducted. The patients were separated into macula–on and macula–off groups according to indirect ophthalmoscopy. In each group, postoperative outcomes including reattachment rate and final best corrected visual acuity (BCVA) were compared between the 2 operative methods, PPV and SB/PPV.

**Results:** Included in the study were 76 eyes of 74 patients, with at least 3–month postoperative follow–up. Macular detachment was found in 59.2%. Except for significantly better preoperative BCVA in the macu-
la–on group, there was no significant difference in other preoperative baseline characteristics between the macula–on and macula–off groups. The most common primary treatment was SB/PPV (68.4%). Single–operation reattachment was accomplished in 64.5% of patients and eventual reattachment was found in 97.4% of patients. Single–operation reattachment rate was significantly higher in the macula–on group (83.9% vs 51.1%, $P = 0.004$). However, there were significantly more patients with postoperative visual improvement in the macula–off group (68.9% vs 38.7%, $P = 0.011$). No significantly different postoperative outcome was found when comparing PPV with SB/PPV whether in macula–on or macula–off status.

Conclusions: There was no significantly different outcome when comparing PPV with SB/PPV in the treatment of primary RRD, regardless of macula–on or macula–off status.

E–Poster No.: EP–0460

Recovery of Foveal Photoreceptor Integrity After Vitrectomy in Eyes With an Impending Macular Hole With Vitreomacular Traction Syndrome

First Author: Hum CHUNG
Co–Author(s): Eun Kyoung LEE, Jangwon HEO, Hyeong Gon YU

Purpose: To identify factors associated with the recovery of foveal photoreceptor disruption in eyes with an impending macular hole (MH) with vitreomacular traction syndrome after surgery.

Methods: This study comprised 33 consecutive patients who underwent vitrectomy for stage 1 impending MH with disrupted photoreceptor inner segment/outer segment (IS/OS) layer and were followed up for a minimum of 1 year after surgery. Preoperative optical coherence tomography (OCT) parameters were compared between eyes that achieved complete restoration of the IS/OS layer (group A) and those that did not (group B). Postoperative serial mean changes in best corrected visual acuity (BCVA), central foveal thickness (CFT), and IS/OS disrupted length were also investigated.

Results: Smooth and symmetric foveolar contour was restored in 29 eyes (87.9%). Complete recovery of IS/OS disruption was observed in 11 of 33 cases (33.3%, group A). Of the 22 eyes in group B, 4 developed a full–thickness macular hole (FTMH) after vitrectomy and required rescue interventions. Group A exhibited a larger percentage of foveal pseudocysts (54.5% vs 13.6%, $P = 0.033$) and a smaller mean aperture size (102.1 ± 182.1 μm vs 241.5 ± 163.8 μm, $P = 0.031$) than group B. Postoperatively, group A revealed a significantly better visual outcome than group B, which was the same as Group B, but with the 4 eyes that developed FTMH excluded.

Conclusions: Restoration of the foveal photoreceptor layer was more likely to occur in eyes with a foveal pseudocyst and smaller aperture size.

E–Poster No.: EP–0452

Removing Silicone Oil Droplets Adhering to the Posterior Surface of a Silicone Intraocular
Lens
First Author: Kai Ling PENG
Co-Author(s): Chih-ling HU

Purpose: We report a rare case of residual silicone oil droplets adhering to the posterior surface of a silicone intraocular lens which was removed with a 20-gauge vitrectomy system.

Methods: A case report.

Results: A 45-year-old male with a history of cataract surgery in both eyes and focal photocoagulation for retinal breaks in his left eye had pseudophakic retinal detachment with a large break at 4.5 to 6 o’clock of limbus 18 mm in the left eye. He received scleral buckling surgery and standard 3-port pars plana vitrectomy with silicone oil tamponade. With good retinal attachment for 7 months, he underwent removal of silicone oil in the left eye. However, silicone oil droplets were found on the posterior surface of the silicone intraocular lens with complaints of micropsia and poor vision a month later. Another pars plana vitrectomy with a 20-gauge system was performed to aspirate the largest oil droplets with vitreous cutter with higher aspiration. The residual smaller ones at the center of the visual axis were swept peripherally by 27-gauge bending tip cannula with swinging action from side to side and left alone. Fortunately, his vision regained to 6/6 without distortion and micropsia in his left eye.

Conclusions: This was a rare case of residual silicone oil droplets adhering to the posterior surface of a silicone intraocular lens found after removing silicone oil a month after surgery. We used a 20-gauge vitrectomy system to remove large droplets with smaller ones swept off the visual axis to improve vision and visual quality.

E-Poster No.: EP-0451

Retinal Pigment Epithelial Tear After Intravitreal Injection of Antiangiogenic Endothelial Growth Factor
First Author: Chih-chun CHUANG
Co-Author(s): San-ni CHEN

Purpose: To report 1 case of retinal pigment epithelial (RPE) tear after intravitreal injection of antiangiogenic endothelial growth factor (anti-VEGF).

Methods: Interventional case report.

Results: A 70-year-old man presented with blurred vision in the left eye. His best corrected visual acuity (BCVA) was 0.4 in the left eye at presentation. Fundus examination, spectral-domain optical coherence tomography, and fluorescent angiography showed polypoidal choroidal vasculopathy with active leakage in his left eye. RPE tear was noted 1 month after the first bevacizumab injection. The BCVA dropped to 0.1. He continued to receive 7 intravitreal injections of ranibizumab. The BCVA improved to 0.6 in the left eye.

Conclusions: Continued monitoring of RPE tears for exudative changes warranting anti-VEGF therapy may stabilize VA, reduce fibrosis, and decrease the risk of developing a large blinding end-stage disciform scar.

E-Poster No.: EP-0450

Scleral Fixation of Dislocated Foldable Intraocular Lens by 25-Gauge Vitrectomy Without Intraocular Lens Extraction
First Author: Chi-huang CHANG
Co-Author(s): Kuo Chiao TSENG

Purpose: To present a case of dislocated foldable intraocular lens (IOL) after phacoemulsification that was repositioned with scleral fixation by 25-gauge vitrectomy without IOL extraction.

Methods: A case report.

Results: A 55-year-old man was referred due to dropped IOL in his left eye after phacoemulsification that was done at local private clinic. The initial best corrected visual acuity (BCVA) of the right eye was 0.6 and 0.05 in the left eye. The intraocular pressure (IOP) of the right eye was 17 mm Hg and 15 mm Hg in the left eye. Anterior chamber showed residual cortex and partial nucleus. The corneal wound of phacoemulsification was clear and sutured with 10-0 nylon. Slit lamp exam showed aphakia, and indirect ophthalmoscopy found the dislocated IOL posteriorly over the macular area with vitreous traction with the patient in a supine position. B-scan showed the IOL in the vitreous cavity. We performed microsurgery with 25-gauge vitrectomy and scleral fixation of the dislocated lens without lens extraction via the previous corneal wound. His vision improved to 0.7 in the left eye at 1 month after surgery and 1.0 at 4 months after surgery.

Conclusions: The 25-gauge transconjunctival system is a modern surgical style that allows minimally invasive, sutureless vitrectomy through cannulated sclerotomies. Additionally, fixing a dislocated IOL without extraction is important to obtain good postoperative visual acuity without astigmatism and corneal endothelial cell loss.

E-Poster No.: EP-0436

Surgical Outcomes of Coats Disease
First Author: Hussain KHAQAN

Purpose: To evaluate visual outcomes of surgery for Coats disease.

Methods: A total of 13 patients were included in this study. All the patients were younger than 10 years of age. Thirteen eyes underwent 23-gauge pars plana vit-
Methods: A total of 37 patients with traumatic macular holes greater than 400 µm. All the patients underwent PPV, ILM peel (minimum 6 mm in size), 20% sulphur hexafluoride gas (SF6) as internal tamponade, and face down positioning for 2 weeks.

Results: In 29 (78.3%) patients, macular hole closed and visual acuity improved by 2 or more lines, whereas in 8 (21.6%) patients, macular hole closure was incomplete and visual acuity did not improve.

Conclusions: Large-size ILM peeling plays a significant role in the closure of large traumatic macular holes and improvement in visual acuity.

E-Poster No.: EP-0471

Surgical Results of 23-Gauge Vitrectomy for Massive Vitreous Hemorrhage Secondary to Polypoidal Choroidal Vasculopathy

First Author: Jie HU
Co-Author(s): Zhixi LI, Xiaoling LIANG, Lin LU

Purpose: To study the results of 23-gauge pars plana vitrectomy (PPV) for massive vitreous hemorrhage (VH) associated with polypoidal choroidal vasculopathy (PCV).

Methods: Sixty-two consecutive eyes of 62 patients with massive VH secondary to PCV who underwent vitrectomy were studied. Partial PPV was performed on all except those with retinal tear, who were recommended for complete vitrectomy with endophotocoagulation and silicone oil tamponade. Outcomes included best corrected visual acuity (BCVA), postoperative complications, and the recurrence of VH.

Results: The diagnosis of PCV was based on fundus examination, fluorescein angiography, and indocyanine green angiography (ICGA) postoperatively for 62 patients (62 eyes). Of the 62 eyes, 59 received partial vitrectomy and 3 underwent complete vitrectomy. The average follow-up period was 22.5 ± 7.7 months. Mean BCVA at baseline (2.14 ± 0.39 logMAR) had improved significantly both 1 month postoperatively (1.32 ± 0.51 logMAR; P < 0.001) and at last visit (1.13 ± 0.56 logMAR; P < 0.001). Adverse events included ciliary body detachment in 4 eyes at 1 week postoperation, which recovered within 4–12 weeks without treatment, and complicated cataract in 14 eyes. In 16 eyes (25.9%), active lesions were observed but were completely resolved by ranibizumab injections without/with PDT. During the follow-up period, no eyes had recurrent VH and all were in stable condition.

Conclusions: The results show that 23-gauge vitrectomy is effective for massive vitreous hemorrhage secondary to PCV with improvement or stabilization in visual function.
E–Poster No.: EP–0447

The Effect of Serum Soaking in Indocyanine Green—Assisted Internal Limiting Membrane Peeling Surgery

First Author: Kun-hsien LI
Co–Author(s): San-ni CHEN

Purpose: To determine if a serum–soaking procedure may shorten the duration of indocyanine green (ICG) remaining in the eye after low concentration ICG–assisted internal limiting membrane (ILM) peeling surgery and to determine if the procedure improves postoperative results.

Methods: Patients with macular pucker were randomized to serum–soaking and non–serum–soaking groups. They all received standard 3–port vitrectomy, membrane peeling, and low concentration ICG (0.167%)–assisted ILM peeling. Then patients in the serum–soaking group had serum injected to the vitreous cavity and irrigation. Patients in the non–serum–soaking group had irrigation with regular balanced salt solution. Duration of ICG remaining in the eye, postoperative visual acuity, and macular thickness were compared between the 2 groups.

Results: In a 1–year period, 82 eyes were enrolled in the study. The duration of ICG remaining in the eye was 31.3 ± 17.2 days in the serum–soaking group and 32.4 ± 15.0 days in the non–serum–soaking group. There was no significant difference between the 2 groups (P = 0.76). Postoperative visual acuity and macular thickness also showed no significant difference between the 2 groups at months 1, 2, 3, and 6. Both groups showed significant improvement in visual acuity and macular thickness after the operation.

Conclusions: A serum–soaking procedure does not shorten the duration of ICG remaining in the eye when low concentration ICG is used (0.167%), nor does it make a difference in postoperative visual acuity and macular thickness. We proposed that using lower concentrations of ICG is a better tactic to prevent ICG toxicity in macular surgeries. A serum–soaking procedure may be redundant in this condition.

E–Poster No.: EP–0447

Transconjunctival 23–Gauge Vitrectomy and Silicone Oil Tamponade as Initial Management in Diabetic Tractional Retinal Detachment With Macula Off

First Author: Mong Ping SHYONG
Co–Author(s): Shih-jen CHEN, Fenq-lih LEE

Purpose: To evaluate the outcomes and complications of transconjunctival 23–gauge vitrectomy using silicone oil (SiO) tamponade in diabetic tractional retinal detachment (TRD) with macula off.

Methods: This was a retrospective, noncomparative, consecutive case series including 20 patients who underwent vitrectomy for the initial management of TRD involving the macula associated with severe proliferative diabetic retinopathy (PDR). All eyes were tamponaded with SiO. The mean follow–up was 18 months.

Results: Preoperatively, TRD was accompanied by vitreous hemorrhage in 3 eyes, and concurrent rheumatogenous retinal detachment was present in 10 eyes. Mean best corrected visual acuity improved from logarithm of the minimal angle of resolution 1.82 to 0.94 postoperatively (P < 0.05). Primary reattachment was achieved in 20 eyes (100%), and final anatomical success occurred in 19 eyes (95%). Intraocular pressure (IOP)–lowering medications were used in 16 eyes. IOP of 5 mm Hg or less was not detected. Two patients lost light perception due to extensive proliferative vitreo–retinopathy and neovascular glaucoma.

Conclusions: Initial management with transconjunctival 23–gauge vitrectomy using SiO tamponade can achieve favorable anatomic and visual outcomes in selected patients with diabetic TRD with macula off.

E–Poster No.: EP–0454

Two Chinese Preeclamptic Women With Bilateral Serous Retinal Detachment: OCT Enhanced Depth Imaging and Mechanism

First Author: Hsiao Ming CHAO
Co–Author(s): Jorn-hon LIU

Purpose: Preeclampsia might be associated with bilateral serous retinal detachment (RD) and visual dysfunction. Management and pathophysiology is vital.

Methods: Two preeclamptic Chinese women with bilateral serous RD were evaluated with enhanced depth imaging (EDI) spectral–domain OCT (SD–OCT) to observe the changes in mean choroidal thickness. After treatment with oral prednisolone (1 mg/kg/d) for 7 days, visual outcome was evaluated.

Results: Two preeclamptic Chinese women with bilateral serous RD respectively developed hypertension, proteinuria, and generalized edema in the 33rd and 35th week of pregnancy. Immediately after cesarean section (CS), there was associated deterioration of BCVA, namely, 20/30 (case 1) and counting fingers/180 cm (case 2) in the right eye (RE) and 20/30 (case 1) and 20/100 (case 2) in the left eye (LE). EDI SD–OCT scans showed bilateral macular serous RD in both women. Choroidal thickness in the RE scan was 308 μm (2 weeks after onset) in case 1 and undetectable (massive subretinal edema) in case 2; in the LE, it was 292 μm in case 1 and 406 μm in case 2 subfoveally. The patients were treated with oral prednisolone. In case 1 and case 2, BCVA improved to 20/20 in both eyes. Fundus biomicroscopy/3D OCT revealed disappearance of bilat-
eral serous RD. In case 1, choroidal thickness on OCT decreased to 183 μm RE and 181 μm LE subfoveally. In case 2, choroidal thickness decreased to 231 μm RE and 185 μm LE subfoveally.

Conclusions: Inflammation seems to play a role in pre-eclamptic pathophysiology of serous RD.

E-Poster No.: EP–0440

Using Optical Coherence Tomography to Classify and Predict the Surgical Result of Macular Epiretinal Membrane Peeling

First Author: Shao-chun CHEN
Co-Author(s): Gow-lieng TSENG, Chun-chen CHEN, Shiow-wen LIOU, Lin-chung WOUNG

Purpose: This study uses optical coherence tomography (OCT) to classify and find prognostic factors of epiretinal membrane (ERM) peeling.

Methods: Best corrected visual acuity (BCVA) and OCT images of 50 eyes were collected. ERMs were classified into 6 groups by morphology. The outcome measures were improvement in BCVA and change in thickness.

Results: The class B ERMs (tightly attached without thickness change) had significantly worse pre- and postoperative BCVA (0.96 ± 0.44 logMAR, P = 0.10; 0.77 ± 0.55 logMAR, P = 0.05, respectively). The class A (no fovea involvement) and class D (outer retina cystic change) ERMs had significant differences in thickness.

Conclusions: With different OCT characteristics, ERMs had different presentations and surgical results. This can help us to predict the outcome of surgery.

E-Poster No.: EP–0456

Vitrectomy and Internal Limiting Membrane Peeling for a Case of Preretinal Pigmentation

First Author: Yung-jen CHEN

Purpose: To evaluate the visual acuity results of vitrectomy for a case of preretinal pigmentation.

Methods: An 84-year-old man complained of blurred vision and central scotoma in his right eye for about 6 months. Fundus examination demonstrated an ovoid pigmented lesion on the central macula, and optical coherence tomography examination demonstrated a hyperreflective layer on the central retina. The lesion was removed after vitrectomy and internal limiting membrane (ILM) peeling, and pathology showed cells with melanin.

Results: After 3 months of follow-up, his visual acuity improved from 0.01 to 0.1.

Conclusions: Our results suggest that vitrectomy with ILM peeling can improve visual acuity in a case of preretinal pigmentation.

E-Poster No.: EP–0439

Vitreomacular Traction Syndrome in Diabetic Retinopathy

First Author: Yi-ting HSIEH
Co-Author(s): Chung-may YANG, San-ni CHEN

Purpose: To describe the clinical course and surgical results of vitreomacular traction syndrome (VMTS) in eyes with diabetic retinopathy (DR).

Methods: From January 2010 to June 2015, all cases of DR with VMTS in 1 tertiary referral hospital were retrospectively reviewed. Those with any fibrovascular proliferation posterior to the equator were excluded. For cases receiving surgical intervention, best corrected visual acuity (BCVA) and morphological characteristics of the macula using optical coherence tomography (OCT) were measured before and after operation.

Results: Seventeen eyes (17 patients) were recruited in this study. Twelve eyes had nonproliferative DR; 5 had proliferative DR. Among the 17 eyes, 10 had tractional schisis, 5 had lamellar hole, 2 had serous foveal detachment, and 1 had macular hole with retinal detachment (MHRD). The vitreoretinal interface was characterized by thickened posterior hyaloid membrane (17/17) and multilayered traction from different directions (8/17). In the single case with MHRD, spontaneous resolution of vitreomacular traction with closure of macular hole was noticed without surgical intervention. The remaining 16 eyes received vitrectomy, epiretinal membrane, and internal limiting membrane peeling. The mean BCVA significantly improved and no case experienced visual deterioration postoperatively. Tractional schisis, lamellar hole, and serous foveal detachment all resolved after surgery.

Conclusions: VMTS in eyes with DR might have thickened vitreous membrane consisting of multiple layers; various severe macular structural changes might develop. Vitrectomy with internal membrane peeling resulted in good anatomical and functional outcomes. In rare occasions, spontaneous resolution of vitreomacular traction might occur.

E-Poster No.: EP–0478

Analysis of Cleavage Selectivity of Caspases in Ethanol-Induced Apoptosis

First Author: Chun-chen CHEN
Co-Author(s): I-jong WANG, Shiow-wen LIOU, Lin-chung WOUNG

Purpose: Caspases orchestrate the controlled demise of a cell after an apoptotic signal through specific protease activity and cleavage of many substrates, alter-
Fibroblast—Derived iPS Cells Through Cell Sorting

First Author: Tsan-chi CHEN
Co-Author(s): Shu-wen CHANG

Purpose: To enhance the efficiency of the induced pluripotent stem (iPS) gene expressions in primary human corneal fibroblasts (HCFs).

Methods: Three iPS genes (Oct4, Sox2, and Nanog) were individually constructed in a lentivirus–based bicistronic plasmid with 1 of the internal ribosome entry site (IRES)–controlled fluorescent reporters (E2CFP, GFP, and RFP). HCFs with triple iPS genes were analyzed and collected via cell sorting flow cytometry. The sorted cells were directly cultivated in mTeSR medium. Cell colony formation was monitored under light microscope and fluorescent microscope. Expression of the iPS genes and stemness markers in the sorted HCFs was analyzed by real-time PCR for transcriptional level and immunoblotting for protein level.

Results: The lentivirus–based bicistronic plasmids with different fluorescent proteins were efficiently applied in HCFs. Therefore, HCFs could simultaneously express 3 iPS genes. The triple iPS gene–expressed HCFs were successfully isolated via different flow patterns of E2CFP, GFP, and RFP, achieved by about 10%. In addition, a colony of the isolated HCF–derived iPS cells was found at 1 month after cell sorting. Three iPS genes and stemness proteins were significantly expressed in the isolated HCFs.

Conclusions: HCF–derived iPS cells with 3 colors can be efficiently isolated through the IRES–based bicistronic system and cell sorting process.

E–Poster No.: EP–0476

Magnification Correction for Retinal Ganglion Cell Layer Thickness Measurement in Myopia

First Author: Sheng-yao HSU
Co-Author(s): Hsin-yi CHEN

Purpose: To measure the retinal ganglion cell layer (RGCL) thickness with magnification correction in Taiwanese myopes.

Methods: Fifty–five eyes of 55 myopic subjects (25 females and 30 males) were enrolled in this cross–sectional study. The study analyzed the RGCL thickness measurements using OCT. The magnification correction was based on the Littman method. Linear regression analysis was used to investigate the correlation between the corrected RGCL thickness and spherical equivalent (SE).

Results: The mean age of the subjects was 35.9 ± 11.9 years (range, 18 to 58 years). The mean SE of the myopic eyes was −7.58 ± 3.79 D (range, −23.75 to −1.75 D).
The mean corrected RGCL thickness of the myopic eyes was 99.7 ± 14.7 μm (range, 58 to 123 μm). The corrected RGCL thickness was not significantly correlated with SE (P = 0.571).

**Conclusions:** The corrected RGCL thickness does not correlate with the spherical equivalent.

**E-Poster No.: EP-0477**

**Ocular Findings in a Case of Alagille Syndrome With Confirmed JAG1 Gene Mutation**

*First Author: Jen-hsiang SHEN*
*Co-Author(s): Kuan-jen CHEN, Yih-shiou HWANG, Wei-chi WU, Chi-chun LAI, Nan-kai WANG*

**Purpose:** To present a case with characteristic ocular findings of Alagille syndrome with confirmed genotyping.

**Methods:** Observational case report.

**Results:** A 9-year-old Taiwanese boy was referred to our clinic with diffuse fundus hypopigmentation. His visual acuity was 20/20 in both eyes. Slit lamp examination revealed bilateral posterior embryotoxon (360-degree line around angle). Fundus photography showed diffuse paucity of choroidal pigmentation and underlying large choroidal blood vessels. Spectral-domain optical coherence tomography revealed decreased neurofiber layer and choroidal thickness in both eyes. Electroretinogram showed decreased rod and cone response. Direct sequence of JAG1 gene found mutation, which confirmed the diagnosis of Alagille syndrome.

**Conclusions:** The combined presentation of diffuse fundus hypopigmentation with posterior embryotoxon should raise awareness of Alagille syndrome, but genetic study remains the most reliable test for diagnosis.

**E-Poster No.: EP-0481**

**Retinal Pigment Epithelial Cell Proliferation is Inhibited by the Effect of Atropine**

*First Author: Lin-chung WOUNG*
*Co-Author(s): Shih-hwa CHIOU, Chih-wei SHIH, Ching-yao TSAI*

**Purpose:** To establish using cultured retinal pigment epithelial cells (RPE) in vitro as a platform to explore this category of drugs and, because RPE cell proliferation is inhibited by the effects of atropine, to further explore the role of drugs on its molecular mechanism.

**Methods:** We evaluated the toxicity of atropine in vitro by using cultured rat RPE cells and also observed the in vivo responses of rat retinas after intravitreous injection of atropine. Histologic staining, immunohistochemistry staining, and quantitative polymerase chain reaction were used to evaluate the potential therapeutic paracrine effect of stem cells and atropine.

**Results:** Incubating the culture with 50 μM atropine before H2O2 exposure reduced the number of cells stained by trypan blue, and cell death was markedly reduced. ACh has a protective effect on neurotoxicity induced by glutamate. A similar effect was induced by application of atropine (50 μM).

**Conclusions:** Atropine may play a role in modulating the H2O2-induced neurotoxicity in iPSC-derived neural differentiated cells. The detailed mechanism involved in the atropine-related pharmacological effect to treat myopia should be further explored.
Effectiveness and Safety of a Novel Intracameral Silicone Device to Guide Capsulorrhexis Creation

First Author: Harvey UY

**Purpose:** To determine the effectiveness and safety of a disposable intraoperative device for guiding continuous circular capsulorrhexis (CCC) creation.

**Methods:** Ten eyes of 10 patients undergoing cataract surgery underwent CCC using a disposable intraoperative guidance device (Verus Ring, Mile High Ophthalmics). Main outcome measures were the completion of capsulorrhexis, circularity, deviation from intended capsulorrhexis diameter, degree of optic coverage, ease of use, and adverse events.

**Results:** All 10 eyes underwent successful completion of the capsulorrhexis using the silicone device. The size of the capsulorrhexis closely approximated the intended size of 5.0 mm with good optic coverage. No adverse events developed.

**Conclusions:** The disposable silicone device provided adequate guidance for creating a round, approximately sized capsulorhexis. The use of this device was safe and had a short learning curve.

Quantitative Evaluation of Red Reflex Between Nearly Collimated Beam and Focused Beam Microscope Illumination Systems for Cataract Surgery

First Author: Ramon DIMALANTA
Co-Author(s): David LUBECK

**Purpose:** To quantify the intensity and demonstrate the stability or range of the red reflex produced by ophthalmic surgical microscopes on a subject eye when using either a nearly collimated or focused illumination system on available ophthalmic microscopes used for cataract surgery.

**Methods:** This evaluation consisted of postproduction surgical video analysis of red reflex intensity. A microscope with nearly collimated beam illumination and a focused beam microscope were assessed. A novel application of a video imaging program allowing measurable analyses of viewing quality is demonstrated.

**Results:** Red reflex intensity and stability were greater with the nearly collimated microscope illumination system in both video observation and postproduction image analyses.

**Conclusions:** The microscope with nearly collimated illumination produced a more intense and observably more stable red reflex.

Safe and Simple Simcoe-Assisted Nucleus Hydroprolapsing in Manual Small Incision Cataract Surgery

First Author: Dini DHARMAWIDIARINI

**Purpose:** To feature a simcoe-assisted maneuver as a safe and simple procedure in manual small incision cataract surgery (MSICS).

**Methods:** MSICS was performed in mobile eye clinics for the poor in Indonesia. Peribulbar anesthetic was administered. An approximately 10-mm long conjunctival flap was initiated, followed by a straight incision 1.5 to 2 mm from the limbus, varying in length from 6 to 8 mm. Sclera tunnel was done and side port incision was made at 10 o’clock to the limbus. Can-opener capsulotomy was considered safe for any nucleus size, and hydrodisection was performed using a simcoe. The key to this technique was continuous hydrodissection from the simcoe to hydroprolapse the nucleus. The simcoe was positioned on the nucleus at 9 o’clock until a prolapse from 1 o’clock emerged from the capsulorrhexis. Then, the simcoe was positioned under the nucleus at 1 o’clock until water filled behind the nucleus. A complete nucleus prolapse to anterior was ensured by moving the simcoe tip from 1 to 9 o’clock, followed by nucleus dialing from 9 o’clock in a clockwise direction. Positioning the simcoe at 9 o’clock alone may allow the levitation of the nucleus to anterior. The cortex was cleaned by simcoe, and the lens was implanted, then closed by sutures.

**Results:** Simcoe-assisted MSICS is safe and efficient for mass cataract surgery, applying 1 instrument for the main step during MSICS.

**Conclusions:** A simcoe is a simple instrument for safe and simple MSICS.

Autologous Advanced Tenon Grafting Combined With Conjunctival Flap in Scleromalacia After Pterygium Excision

First Author: Jong Soo LEE
Co-Author(s): Young Min PARK

**Purpose:** To evaluate the efficacy of autologous tenon grafting combined with conjunctival flap as a treatment for scleromalacia or scleral thinning after pterygium excision without any additional donor graft tissue.

**Methods:** Twenty-six cases underwent autologous advanced tenon grafting combined with sliding or rotating conjunctival flap for scleromalacia after pterygium surgery. Surgical removal of all melting scleral and conjunctival tissues and calcific deposits around the affected scleral lesion were performed. The healthy
Deep Anterior Lamellar Keratoplasty and Phacoemulsification in Cases of Endothelium-Sparing Corneal Opacities

First Author: Shikha YADAV
Co-Author(s): Namrata SHARMA

Purpose: To evaluate the technique of deep anterior lamellar keratoplasty (DALK) and phacoemulsification in cases of endothelium-sparing corneal opacities.

Methods: In 23 cases of endothelium-sparing stromal opacities, anterior segment optical coherence tomography (AS-OCT)-guided anterior stromal lamellar dissection was done so as to reach a relatively clear plane of stromal dissection and aid visualization of underlying structures. This was followed by phacoemulsification and foldable intraocular lens implantation. Subsequently, deep lamellar keratoplasty was done using layer by layer manual dissection baring the Descemet membrane.

Results: Best corrected visual acuity (BCVA) of better than 20/40 was obtained in 22 eyes. The endothelial cell loss was 3.2% (SD 2.1). There were no intraoperative complications. Mean SEQ was 0.75 ± 0.25 diopters (D). Mean astigmatism was less than 1 D in all eyes.

Conclusions: DALK is safe and feasible when combined with phacoemulsification. A sandwich technique of phacoemulsification between the superficial and deep lamellar dissections is advocated.

Intrastromal Fluid Drainage With Air Tamponade: Anterior Segment Optical Coherence Tomography–Guided Technique for Management of Acute Corneal Hydrops

First Author: Vishal JHANJI
Co-Author(s): Rasik VAJPAYEE, Namrata SHARMA, Prafulla MAHARANA, Tushar AGARWAL

Purpose: To describe a new technique of intrastromal fluid drainage with intracameral air injection for management of acute corneal hydrops.

Methods: Five eyes underwent surgery using this technique. Anterior segment optical coherence tomography–guided intrastromal fluid drainage through multiple corneal stromal venting incisions with anterior chamber air tamponade was performed.

Results: Visual acuity improved from hand motions close to face preoperatively to best corrected visual acuity (BCVA) of greater than 20/200 in all eyes and BCVA of at least 20/80 in 2 eyes at 3 months. No intraoperative complications were seen. Descemet membrane attached on the first postoperative day in 4 eyes. Corneal edema resolved over 2 to 3 weeks.

Conclusions: The technique of intrastromal drainage of fluid combined with air tamponade can be effectively used as a treatment modality for the management of severe cases of acute corneal hydrops.

Novel Clinical Application of Processed Amniotic Membrane Allograft Transplant During Pterygium Surgery

First Author: Harvey UY
Co-Author(s): Kenneth KENYON, Headson DOMINGO, Richard NEPOMUCENO

Purpose: To evaluate the utility and safety of processed amniotic membrane allograft transplantation (AMT) among eyes undergoing pterygium surgery.

Methods: A prospective, noncomparative, intervention case series. Fifteen eyes of 15 patients with primary (10) or recurrent (5) pterygia underwent pterygium surgery. After dissection to bare sclera, excision of the pterygium head, and application of mitomycin-C, processed AMT (Amnio Tek, ISP Surgical, Methuen, MA) was applied over the corneal defect and scleral bed. The AMT was kept in place using bandage soft contact lenses and conjunctival wing sutures, which were all removed after 2 weeks. Main outcome measures were AMT integrity, epithelialization, patient comfort, recurrence rate, and postoperative complications.

Results: Postoperatively, AMT remained intact in all patients. Complete epithelialization over the transplanted membrane was observed after bandage contact lens removal at 2 weeks. All patients demonstrated early resolution of ocular inflammation and reported minimal to no ocular discomfort. Neither pterygium recurrences nor complications were observed after processed AMT allografts.

Adjacent tenon tissue was undermined and trimmed to fit the scleral defect. Then, the devitalized or thinning scleral defect was covered by the advanced flap of tenon graft and fixed to the margin of bare scleral lesion with vicryl sutures. Afterward, the rotating or sliding bulbar conjunctival flap was made from healthy adjacent conjunctiva and fixed to the sclera over the advanced flap of tenon graft.

Results: All cases achieved the covering of conjunctival and tenon or subtenon tissue over scleromalacia or scleral thinning with this procedure. Preoperative pain, inflammation, and choroidal exposure disappeared after surgery. Immediate postoperative complications, such as large wound dehiscence or reopening of the scleral wound, did not occur in any of the patients. There were no significant clinical complications during the mean postoperative follow-up period of 14.17 months in all cases.

Conclusions: We obtained excellent outcomes with fewer complications after autologous advanced tenon graft and conjunctival flap, without an additional donor graft, in scleromalacia or scleral thinning.
Conclusions: Processed dry AMT demonstrated excellent biocompatibility on the human ocular surface. This new biomaterial may be a promising alternative to conjunctival grafting for the treatment of pterygium.

The White Abyss

First Author: Namrata SHARMA
Co-Author(s): Tarun ARORA, Tushar AGARWAL, Prafulla MAHARANA, Vishal JHANJI, Rasik VAJPAYEE

Purpose: To report an unusual mechanism of acute chemical injury due to chuna (calcium hydroxide paste, a chewing tobacco additive marketed in pouches) in the Asia-Pacific region. If burst, the contents can cause severe ocular burns, especially among children who play with them. Despite irrigation with saline, it is difficult to remove, as it sticks on hydration.

Methods: This video demonstrates the mechanism of acute chemical injury after accidental bursting of packets containing chuna. The techniques to remove chuna from fornices, tarsal plates, conjunctival and corneal surfaces, and intrastromal and intracameral sites have been elucidated. Further amniotic membrane transplantation, stem cell transplantation, and rehabilitative procedures have also been highlighted, which were undertaken in 115 children.

Results: Despite removal, even after stem cell transplantation and keratoplasty, results were dismal, and visual acuity better than 6/60 was obtained in only 20% of the cases.

Conclusions: Doctors need to know that chuna injury cases must have residual particles removed meticulously. Manufacturers need to print explicit warnings on packets (“to be kept out of reach of children”) to address this preventable cause of blindness.

EYE TRAUMA, EMERGENCIES & INFECTIONS

Open Globe Repair With Traumatic Cataract: Dos and Don’ts
First Author: Rekha KHANDELWAL
Co-Author(s): Sumit GUPTA

Purpose: To classify open globe injury, calculate ocular trauma score (OTS), and discuss the step-by-step surgical management of globe repair with traumatic cataract.

Methods: This video discusses the methods of classifying injury and calculating OTS using various examples.

Results: This presentation covers the preoperative preparation and step-by-step approach to repair open globe injury cases and discusses dos and don’ts in these cases.

Conclusions: Participants will be able to classify open globe injury cases, calculate OTS, and determine the correct solution for the successful repair of open globe injury cases and management of traumatic cataract.

GLAUCOMA

Glaucoma Drainage Implant in an Eye With Preexisting Scleral Buckle and Secondary Glaucoma
First Author: Sirisha SENTHIL
Co-Author(s): Rashmi KRISHNAMURTHY

Purpose: Refractory glaucomas after vitreoretinal surgeries are increasing due to advancement in the surgical techniques and complex retinal surgeries being performed in eyes that were deemed inoperable a decade ago. Glaucoma drainage devices (GDDs) with posterior subconjunctival drainage are a useful option in managing intractable glaucoma after vitreoretinal surgery. However, GDD implantation in these eyes is technically challenging due to severe conjunctival scarring from multiple previous surgeries and further complicated by the presence of the encircling belt buckle.

Methods: Proper preoperative planning to identify the appropriate location for the implant, appropriate type and size of the implant, and modifications of surgical technique help in successful GDD implantation.

Results: Modifications are performed based on extent of conjunctival scarring, anterior or posterior position of encircling scleral buckle, and the height of the buckle. The tips and tricks of safe and successful GDD implantation described in this video will not only help in achieving good intraocular pressure control but also prevent serious sight-threatening complications like extrusion of the implant and erosions.

Conclusions: Glaucoma drainage device implantation is an effective surgical option in the management of intractable glaucoma in eyes with multiple vitreoretinal surgeries and encircling bands. Meticulous surgery and appropriate surgical modifications help in improving the efficacy and safety of GDD implantation in these eyes.

Techniques of Releasable Sutures in Trabeculectomy
First Author: Suria SUDHAKARAN
Co-Author(s): A.V. Sathi DEVI

Purpose: To demonstrate various techniques of releasable sutures in trabeculectomy.

Methods: Early postoperative control of intraocular pressure (IOP) after trabeculectomy is often difficult to achieve. Reducing IOP requires careful balance. Overfiltration will lead to hypotony, flat anterior chamber,
choroidal effusions, and hypotensive maculopathy. Underfiltration will lead to optic nerve damage, field progression, or venous occlusion. Titration of filtration in the postoperative period can be done with digital massage, laser suturelysis, or releasable–suture techniques. Laser suturelysis requires access to an argon laser and Hoskins or equivalent lens. The advantages of placing releasable sutures are that they need no laser to release, can be removed even if overlying tissue clarity is poor or if the patient has difficulty keeping the eye still, and allow flexibility in adjusting aqueous outflow both during surgery and postoperatively. We present a series of videos including animations to demonstrate various techniques of releasable sutures and tips and precautions in various conditions, thereby demonstrating the use of releasable sutures to minimize the incidence of hypotony in the early postoperative period to ensure good bleb function and lower long–term IOP.

**Results:** The different techniques demonstrated using surgical videos and animations include Cohen and Oshers technique, modified Cohen and Oshers technique, double–armed U–shaped releasable, modified U–shaped releasable, multiple releasable sutures, and the technique of removing releasable sutures postoperatively.

**Conclusions:** This video aimed to provide insight into a series of the most useful techniques of releasable sutures to prevent postoperative hypotony in the early postoperative period to ensure good bleb function and lower long–term IOP.

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**OCULAR IMAGING**

A “Third Eye” in Glaucoma Surgeries: Real-Time Optical Coherence Tomography—Guided Surgery

*First Author: Rajesh KUMAR*
*Co–Author(s): A.V. Sathi DEVI, Rohit SHETTY*

**Purpose:** To demonstrate the utility of a spectral–domain optical coherence tomography (SD–OCT)–integrated surgical microscope in glaucoma surgery.

**Methods:** An SD–OCT (Zeiss RESCAN 700) system was used to interface directly with an ophthalmic surgical microscope (Zeiss Lumera) to allow real–time intraoperative SD–OCT (iOCT) imaging during glaucoma procedures such as phacotrabeculectomy, Ahmed glaucoma valve (AGV) implantation, goniosynechiolysis, and bleb needling. The various surgical steps during glaucoma surgeries where iOCT can be of potential help in guiding the surgeon were recorded.

**Results:** High–resolution cross–sectional images of the relevant structures were achieved with the iOCT system in all procedures. The surgeon could determine the depth of the scleral dissection, the intrastomal bed, the path of the AGV tube in the eye, the release of peripheral anterior synechiae, and the efficacy of needling with respect to breakage of loculations; most of these are technically “blind” procedures, where the outcomes are determined postoperatively. Metallic instruments cast a shadow on tissues below, thereby restricting the utility of the device in its current state.

**Conclusions:** The iOCT system provided high–quality intraoperative real–time imaging, which could improve the safety and efficacy of the surgical procedures in glaucoma. Further studies and modifications to the iOCT are required to better understand and increase the uptake of this technology in daily practice.

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**SIMPLE, INEXPENSIVE, DO–IT–YOURSELF METHODS OF TAKING FUNDUS PHOTOS IN HUMAN AND ANIMAL EYES OF VARIOUS SIZES AND EXPLANATION OF THE PHYSICS INVOLVED**

*First Author: John AKKARA*

**Purpose:** To demonstrate and teach simple, inexpensive methods of taking fundus photographs using just a smartphone camera and a condensing aspheric ophthalmoscopic lens like a 20 D (or a 90 D) and provide comparison with other power lenses in adult humans, infants, and mice.

**Methods:** Using a smartphone camera and a condensing aspheric ophthalmoscopic lens, along with the special techniques being demonstrated, fundus photos were taken by what was essentially monocular indirect ophthalmoscopy. The physics, more specifically the optics involved, were studied in detail to assess the best method of reliably taking good quality photographs. Various techniques were tried out and demonstrated. In addition to adult and infant human eyes, the same technique was demonstrated in albino rats undergoing a diabetic retinopathy study.

**Results:** The final video demonstrates and teaches various methods of taking fundus photographs very inexpensively using just a smartphone camera and an ophthalmoscopic aspheric biconvex lens. The physics behind it are explained and various guidelines and tips are noted to obtain the best photographs. The use of various specialized photography apps and the adjustment of the exposure, ISO, light metering, and focusing settings are discussed for the benefit of the amateur photographer.

**Conclusions:** Smartphone photography turns out to be a very good method of taking inexpensive fundus photographs when expensive commercial equipment is not available. The photographs taken with these do–it–yourself devices appear to be quite comparable to the ones taken on much more expensive commercial ophthalmic photography equipment. The physics explain
Cortical Aspiration—A Clean Sweep

First Author: Viraj VASAVADA
Co-Author(s): Vandana C NATH, Shail VASAVADA, Abhay VASAVADA, Vaishali VASAVADA

Cortex aspiration is a very crucial step in cataract surgery, and yet it is something that is taken for granted. Surgeons do not pay enough attention to how this critical step is performed. It is not uncommon to see complications such as posterior capsule rupture or zonular dialysis happen during this step. Further, it is imperative to ensure a thorough cleanup of cortical fibers and lens epithelial cells to reduce posterior capsule opacification, particularly in the context of premium IOL implantation. This film takes an in-depth look into the finer nuances of cortex aspiration to ensure a safe, predictable, and efficient cortical removal.

Enucleation by the Myoconjunctival Technique—A Simple, Cost-Effective, and Safe Alternative to Biointegrated Implants

First Author: Raksha RAO
Co-Author(s): Santosh HONAVAR, Chalamala JANGAIH, Gangadhar JALLI

Purpose: To demonstrate a cost-effective technique of enucleation with silicone implants that provides good prosthesis motility and excellent cosmesis.

Methods: The goal of enucleation is to provide a life-like prosthesis with optimal static and dynamic match with the contralateral eye. A good surgical technique with adequate volume replacement provides gratifying static cosmesis. However, optimizing prosthesis motility can be challenging. Biointegrated implants with pegging can achieve satisfactory prosthesis motility but are complicated by a higher risk of implant exposure. Nonintegrated spherical implants by the conventional technique have a higher chance of displacement.

Results: In this video, we demonstrate a simple methodology of enucleation using a silicone implant by the myoconjunctival technique—a safe and a cost-effective alternative to provide prosthesis motility comparable with biointegrated implants while minimizing the complications.

Conclusions: The myoconjunctival technique with silicone implant is an inexpensive method of enucleation with good prosthesis motility and excellent cosmesis.

Implant exposure and migration are very uncommon. This technique may also be used in those requiring radiotherapy after surgery.

Evaluation and Management of Aponeurotic Ptosis: A Step-by-Step Guide

First Author: Sonal CHAUGULE
Co-Author(s): Santosh HONAVAR, Raksha RAO, Chalamala JANGAIH

Purpose: To demonstrate the methods of evaluation and surgical techniques required for the management of acquired aponeurotic ptosis.

Methods: Aponeurotic ptosis is the most common cause of acquired ptosis in adults. Management of such patients can be challenging. A meticulous and a detailed preoperative assessment and understanding of the patient’s need can help optimize results and patient satisfaction. Surgical repair for aponeurotic ptosis, when performed with careful dissection and intraoperative adjustment of eyelid height, can give excellent postoperative results in terms of predictability of eyelid position and symmetry.

Results: This video provides a demonstration of the important steps during preoperative evaluation and surgical management of aponeurotic ptosis.

Conclusions: The importance of accurate diagnosis and evaluation variables that impact the outcome are emphasized. This, coupled with meticulous surgical planning, can deliver excellent outcomes.

In a Tight Corner: Challenge of the Tight Muscle

First Author: Srikanth RAMASUBRAMANIAN
Co-Author(s): Meenakshi GOPALAKRISHNAN

Purpose: It is not uncommon for the squint surgeon to encounter very tight muscles during surgery in certain clinical conditions such as congenital fibrosis and thyroid-related squint. Useful tips on tackling such complex scenarios have been beautifully demonstrated.

Methods: This video demonstrates the tools and techniques that the surgeon could use to tackle such difficult situations involving tight muscles. They are explained in a step-by-step approach that can be helpful to both beginners and experienced surgeons.

Results: A step-by-step methodology is easy for learning purposes. Different scenarios of tackling tight muscles have been dealt with in this video.

Conclusions: The tips and techniques demonstrated in this video will be useful for all practicing ophthalmologists to be aware of the possible complications and ways to prevent potential problems.
Minimal Incision Posterior Approach Levator Plication For Aponeurotic Ptosis

First Author: Danny NG  
Co-Author(s): Edwin CHAN, Simon KO

Purpose: To assess the efficacy and predictability of a minimal incision posterior approach levator plication technique for correction of involutional ptosis.

Methods: This was a retrospective chart review of patients with involutional aponeurotic ptosis who underwent minimal incision posterior approach levator plication technique between August 2013 and June 2014 by a single surgeon. The upper lid was double everted, and the conjunctiva and Müller muscle layers were incised vertically until the levator aponeurosis could be identified. The incision(s) was similar to performing incision and curettage of chalazion, except that the site was above the tarsal plate and extended towards the fornix. Then, insertion of aponeurosis was dissected away from the anterior tarsal surface, and the more superiorly located levator was plicated on it with double-arm suture(s). No tissue was excised in this procedure. Surgical success was defined as a postoperative margin reflex distance (MRD) > 2 mm and < 4.5 mm, interlid height < 1 mm, and satisfactory contour.

Results: Forty-four lids of 27 patients were included. Preoperative mean MRD was 0.48 ± 0.56 mm. Severe ptosis of MRD < 1 mm was present in 34/44 patients (77.3%). The postoperative mean MRD was 2.49 ± 0.53 mm, and mean improvement was 2.02 ± 0.61 mm, which was statistically significant (P < 0.001). The overall success rate was 38/44 (86.4%).

Conclusions: Minimal incision posterior approach to levator plication was effective for the correction of aponeurotic ptosis with moderate to good levator function.

Synkinetic Ptosis Made Simple

First Author: Vishal SHARMA  
Co-Author(s): Santosh HONAVAR, Fairooz Puthiyapurayil MANJANDAVIDA

Purpose: To demonstrate a simplified surgical technique for congenital ptosis with Marcus–Gunn synkinesis.

Methods: Surgical video demonstration of synkinetic ptosis evaluation and its surgical management.

Results: Congenital ptosis with Marcus–Gunn synkinesis is a management challenge. Surgical options include management of ptosis alone or both ptosis and synkinesis depending upon the severity and patient’s perception of cosmesis. Options for the management of severe ptosis coupled with severe synkinesis include unilateral or bilateral levator excision with fascia lata tarsofrontal sling.

Conclusions: In this video, we demonstrate a simplified surgical technique for unilateral levator excision and 800 µm closed loop silicone tarsofrontal sling with impressive eyelid height symmetry and complete elimination of synkinesis.

Transconjunctival Orbitotomy—Tips and Tricks

First Author: Raksha RAO  
Co-Author(s): Santosh HONAVAR, Gangadhar JALLI, Chalamala JANGAIAH

Purpose: To demonstrate a simple technique of orbitotomy that is minimally invasive, provides scarless incisions, and is suitable for intra– and extraconal lesions.

Methods: Each orbitotomy technique is designed to provide the best surgical exposure to the lesion of interest, while causing the least surgical trauma to the orbital structures, with a goal to achieve optimal functional and cosmetic outcomes. The concept of minimally invasive surgery includes hidden incisions and minimal dissection. A conjunctival approach to orbital tumors is one such surgery.

Results: This video incorporates the indications and planning for an inferior fornical conjunctival approach to an intraconal orbital tumor and demonstrates key steps of the surgical procedure, relevant anatomy encountered during each step, and emphasizes the versatility of this simple, gratifying, yet relatively underutilized technique.

Conclusions: Inferior transconjonctival orbitotomy is a versatile technique that provides a scarless, minimally invasive, and safe approach to extra- and intraconal orbital tumors. Learning and using this technique in appropriate clinical situations provides optimal results.

Dye Extrusion Technique in a Challenging Case of Posterior Pole Retinal Detachment

First Author: Jay CHHABLANI  
Co-Author(s): Remya PAULOSE

Purpose: To describe the use of dye extrusion technique in identifying retinal breaks during vitrectomy in pathologic myopia associated with posterior pole retinal detachment. This video demonstrates the management of a 1-eyed patient with posterior pole detachment in myopia using subretinal injection of trypan blue.

Methods: After 23G anterior and core vitrectomy, fundus showed posterior pole detachment with no identifiable breaks. Meticulous induction of PVD, taking care of the underlying thin atrophic detached retina, was performed. The primary break remained undetected.
Using a 38-gauge needle, trypan blue was injected into the edge of the detachment carefully. Time was given for the dye to diffuse throughout the subretinal space. Extrusion of the dye through the primary break was noticed. The breaks were then marked with endodiathermy. The subretinal fluid was drained fully via the break using fluid–fluid, then air–fluid exchange. Retina was attached under air and laser was done to these breaks. Silicone oil was injected.

**Results:** This case demonstrates that posterior pole detachment associated with staphyloma, although difficult, can be managed successfully by careful detection of retinal breaks. The use of trypan blue injected subretinally helped the surgeon to identify them correctly. Thus it reduced the operating time, simplified surgery, and resulted in successful reattachment.

**Conclusions:** Dye extrusion technique was helpful in identifying the unseen primary break in posterior pole detachment in an eye with posterior staphyloma leading to successful repair.

**Bimanual Vitrectomy for Diabetic Combined Retinal Detachment**

**First Author:** Jay CHHABLANI  
**Co-Author(s):** Riddhima DESHPANDE

**Purpose:** To demonstrate bimanual vitrectomy for a challenging case of diabetic combined retinal detachment.

**Methods:** In advanced proliferative diabetic retinopathy, conventional 3-port pars plana vitrectomy may lead to incomplete removal of fibrovascular membrane and is associated with bleeding and iatrogenic retinal breaks. The safer alternative is to use bimanual vitrectomy with chandelier light to use 2 instruments, forceps and scissors, to segment and delaminate firmly adherent diabetic membranes with the least trauma to the thin retina.

**Results:** This video shows bimanual vitrectomy in an eye with combined retinal detachment in a diabetic subject leading to successful attachment of the retina.

**Conclusions:** Bimanual vitrectomy could be a safer alternative for complex diabetic tractional or combined retinal detachment.

**In Toto Removal of a Subretinal Cysticercus cellulosae by Pars Plana Vitrectomy**

**First Author:** Ravi CHANANA  
**Co-Author(s):** Sudhank BHARTI

**Purpose:** Video demonstration of the movement of a subretinal Cysticercus cellulosae and its extraction in toto in a 12-year-old boy by pars plana vitrectomy.

**Methods:** A 12-year-old child with neurocysticercosis presented to our outpatient department. On examination, uncorrected visual acuity in both eyes was 6/6. Fundus examination of the left eye revealed a single subretinal cyst measuring 2.5 by 2.5 mm adjacent to the inferotemporal major vascular arcade, with change in the shape of the cyst with whitish structure inside the cyst (scolex) suggestive of subretinal cysticercosis with a surrounding cuff of subretinal fluid. The patient underwent pars plana vitrectomy (25-gauge) with removal of the subretinal cyst in toto using silicone–tipped extrusion cannula through superonasal retinotomy (1.5-mm incision) with endolaser and 16% sulfur hexafluoride (SF6) as tamponading agent. Undulating smooth movements of the cyst wall on exposure to endoilluminator light during surgery is demonstrated in this video. Cyst was sent for histopathological examination.

**Results:** Retina was attached postoperatively with uncorrected visual acuity of 6/6 during all follow-up examinations. There was no evidence of intraocular inflammation postoperatively, as the cyst was removed in toto. Histopathological examination confirmed clinical diagnosis of cysticercosis.

**Conclusions:** Removal of subretinal cysticercosis in toto is a safe alternative to fragmentation of the cyst, with modern instrumentation and techniques which can avoid a toxic inflammatory reaction due to a cyst rupture.

**Pearl From Treasure of Retina**

**First Author:** Hussain KHAQAN

**Purpose:** To describe outcomes of surgery.

**Methods:** A patient with megalocornea, undilated pupil, dropped cataractous lens, retinal dialysis, and giant retinal tear underwent 23-gauge vitrectomy. Iris hooks were placed and air–fluid oil exchange done.

**Results:** The retina flattened and visual acuity improved from HM to 6/24.

**Conclusions:** The patient had good surgical outcomes.

**Surgical Videos of Intraocular Foreign Body Removal**

**First Author:** Bhuvan KHAQAN  
**Co-Author(s):** Vinod KUMAR, Sudhank BHARTI

**Purpose:** Large foreign bodies are usually removed through the anterior route by sacrificing the lens. We present 3 surgical videos demonstrating the removal of large oblong intraocular foreign bodies through the pars plana route, after posterior vitreous detachment and complete vitrectomy.

**Methods:** An iron foreign body was present in 2 cases and glass in 1. In the first case, an iron foreign body
was present in the vitreous cavity and in the second case, an iron foreign body was impacted in the retina close to the fovea. The third case had a very large glass foreign body entangled in the vitreous inferiorly with inferior retinal breaks and retinal detachment. All the eyes were phakic. All eyes underwent complete vitrectomy with posterior vitreous detachment using triamcinolone acetonide and removal of the foreign body through the pars plana route.

**Results:** The foreign bodies, although being large in size, had a greater length as compared with width. They could thus be successfully removed by marginally increasing the scleral port incision and rotating the foreign body in the eye with the help of an endoilluminator to align the foreign body along its longer axis. The lens was spared in all cases.

**Conclusions:** The videos demonstrate that large foreign bodies that are greater in length can be removed through the pars plana route by orienting them appropriately. This method also helps to preserve the lens and avoid anterior segment manipulation.

**Use of Silicone Oil Retention Sutures in Retinal Detachment Surgery in an Eye With Proliferative Vitreoretinopathy, Aniridia, and Aphakia After Open Globe Injury**

*First Author: Shaheeda MOHAMED Co-Author(s): Chi-wai TSANG*

**Purpose:** To demonstrate techniques in complex retinal detachment repair and the use of silicone oil retention sutures for sequestration of silicone oil from the anterior chamber.

**Methods:** This is a video showing surgery, with illustrative descriptions of the techniques and mechanism of silicone oil retention sutures.

**Results:** Pars plana vitrectomy, membrane peeling, retinectomy, perfluorocarbon liquid, endolaser, and 5700 centistokes silicone oil held back by silicone oil retention sutures were performed in a man with a history of open globe injury who underwent primary repair. Postoperatively, silicone oil was successfully sequestered from the anterior chamber.

**Conclusions:** Silicone oil retention sutures may allow the use of silicone oil in complex retinal detachment secondary to trauma in eyes with aniridia and aphakia. Factors contributing to success or failure in these eyes need to be further elucidated.

**Vitrectomy for Posttraumatic Vitreous Hemorrhage With Associated Macular Pathology**

*First Author: Bhuvan CHANANA*

**Purpose:** Two surgical videos demonstrating vitrectomy for posttraumatic vitreous hemorrhage with associated macular pathology observed intraoperatively are presented.

**Methods:** Case I: A 24-year-old male patient presented with nonresolving vitreous hemorrhage after falling from his bike 6 months previously. During pars plana vitrectomy, a large full thickness macular hole was observed. Internal limiting membrane peeling was done with trypan blue assistance (0.06%). Case II: An 8-year-old boy presented with a traumatic posterior subcapsular cataract and vitreous hemorrhage of 9 months’ duration after a firecracker injury. After performing pars plana lensectomy and vitrectomy, a dense epiretinal membrane (ERM) was observed over the macula causing macular distortion. The ERM was removed with internal limiting membrane forceps.

**Results:** Both patients underwent successful surgery and were followed up for at least 6 months. The first patient achieved a best corrected visual acuity (BCVA) of 20/200 with partial closure of the macular hole. In the second patient, BCVA improved to 20/60 after ERM removal.

**Conclusions:** From the above videos, we can conclude that, in cases of posttraumatic vitreous hemorrhage, a guarded visual prognosis should be given as unexpected macular pathologies may be observed during surgery.
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