

**Symposium 1 – Allied Health  
Main Symposium**

10 June 2006, Saturday, 0830-1000 Hrs  
Room 203, Level 2

**S501  
DECISIONS ABOUT MAGNIFICATION WITH OPTICAL  
AND ELECTRONIC AIDS**

Ian Bailey, USA

Deciding the magnification system needed for a patient requires a goal, a measurement of visual ability before the magnification, a determination of how much magnification is required and choices are made about the means by which the magnification effect is achieved. Magnification effect is best expressed as the Equivalent Viewing Distance (EVD) which is distance at which the original object would have to be held in order to subtend an angle equal to that subtended by the image.

Goals are commonly, but not always, set in terms of the print size that should be legible. The clinician first takes a measurement of reading acuity and efficiency when the patient is in focus and the viewing distance is noted. Using proportions, one calculates the viewing distance required to achieve the resolution goal. Any magnification providing an EVD that is the same or shorter will achieve resolution goal, provided the patient is in-focus and that luminance is unchanged. Reading glasses allow closer working distance and thus shorter EVD's. In general, hand held magnifiers provide an EVD that is about equal to the focal length of the lens. For stand magnifiers, the clinician must know the position of the image below the lens and the enlargement ratio and then  $EVD = \text{eye-to-image distance}/\text{enlargement ratio}$ . For near vision telescopes,  $EVD = \text{viewing distance}/\text{telescope magnification}$ . For display screens,  $EVD = \text{viewing distance}/\text{enlargement}$ .

The Field of View is an important factor affecting choices and practicality. The field of view can easily be estimated by knowing the diameter of the field limiter, its distance from the eye and the EVD.  $FoV = EVD (d/w)$ . For Keplerian telescopes,  $FoV = \text{approximately EVD}$ ; fields are smaller for Galilean telescopes. For display screens,  $EVD = FoV$  when the viewing distance is equal to the display width.

When the resolution task cannot easily be related to print size, the clinician should systematically change the patient's viewing distance using appropriate lenses in order to determine the distance at which the patient's task can be performed satisfactorily. Any magnification system providing the same EVD will allow the patient the same performance.

**S502  
AMBIGUOUS VERGENCE EYE MOVEMENTS DURING  
FIXATION CHANGES TO ISO-VERGENT TARGETS**

Elaine Cornell, Australia

Eye movement recordings of 31 subjects were examined for evidence of the 'ambiguous vergence eye movements' similar to those described by Collewijn et al in 1995'. These eye movements resulted in asymmetrical fixations, without diplopia, following vergence changes to targets on the midline. Most of these subjects had volunteered for a previous experiment that required similar vergence changes. Twenty nine subjects met the predetermined criteria for normal ocular alignment and were included in our report, one had a moderate exophoria that excluded her from that study, and another had an esophoria who presented for a unpublished experiment.

Of the 29 subjects with little or no heterophoria, five (17%) showed ambiguous vergence eye movements similar to those previously reported. The two other subjects with heterophoria showed evidence of ambiguous vergence eye movements that were consistent with their heterophoria, the exophoric subject tended to maintain fixation on the far target with one eye and shift the other eye from far to near whilst the esophoric subject tended to maintain fixation on the near target with one eye and shift the other eye from far to near. No subjects reported diplopia.

Static asymmetries without diplopia following vergence changes to isovergent targets are relatively common under experimental conditions. The resulting disparities of up to  $7.5^\circ$  are well outside the limits of Panum's fusional space and confirm previous reports of tolerance to disparity without diplopia in normal subjects.

1. Collewijn H, Erkelens CJ, Steinman RM. Voluntary binocular gaze-shifts in the plane of regard: dynamics of version and vergence. *Vision Research* 1995;35:3335-58.

**S503  
UPDATES ON AUTOFLUORESCENCE**

Dennis Orlock, USA

**S504  
PREVENTION OF COMPLICATIONS IN CONTACT LENS  
WEAR**

Khoo Chong Yew, Singapore

About 30% of contact lens wearers develop problems with their contact lenses lens wear at some stage of wearing the lenses. Most of these complications, such as dryness and allergy, are non sight-threatening and resolve with cessation of contact lens wear and treatment. However, about 0.04% of wearers develop corneal

ulcers, and this risk rises to 0.2% with overnight wear. Measures to prevent complications include:

- Public Health Education
- Continuing Optometric Education
- Certification of Contact Lens Practitioners
- Quality Control of Contact Lenses and Solutions.

Two important axioms for the contact lens wearer are:

1. If you develop any unusual eye symptoms, do not wear your lenses. Contact your practitioner.
2. Do not sleep with your contact lens in your eye.

### S505

#### CONTACT LENSES – THE PAST, PRESENT AND FUTURE

Anthony Phillips, Australia

The largest usage and development of contact lenses has occurred in the last few years. Yet the history and ideas go back considerably further than might be imagined.

The conceptual ideas, enthusiasm and, often, lucky coincidences have led to the plethora of modern designs. Nevertheless in more recent years the science has become more and more complex.

This talk is intended for the non-optometrist who wishes to learn more about this fascinating area and to see what the future holds.

### S506

#### LOOKING AHEAD TO SINGAPORE OPTOMETRY IN THE PROFESSIONAL ERA

Wilfred Tang, Singapore

In 1990, Singapore Polytechnic started the Certificate in Contact Lens Practice with the aim of upgrading the clinical skills of eye care practitioners in contact lens fitting. The Contact Lens Practitioners Act was subsequently passed in 1995 to govern the practice of all contact lens practitioners in Singapore.

In 1994, SP introduced the three year full-time Diploma course in Optometry to fulfill the shortage of manpower in primary eye care for the local population. The scopes of the training include the detection and screening for eye diseases, dispensing of spectacles and contact lens, and the referral of patients for specialized care if needed. The course is a major success at SP, attracting very good 'O' level school leavers and providing 100% employability to the graduates. In 2004, SP conducted the two year part-time Advanced Diploma in Optometry course to further upgrade the skills of optometrists.

In 2005, Ministry of Health in Singapore announced a consultative process with the intention of introducing the legislation

to govern the practice of Optometry and Opticianry by 2007. The legislation, when passed, will replace the existing Contact Lens Practitioner Act. This is an exciting prospect for optometrists and opticians, since the legislation will legalize the two professions.

The prospect of higher education for optometry is in the offing. SP is in close negotiation with a foreign university to offer undergraduate programme in Singapore for the Diploma graduates. The 'through train' approach for the new batch of student intake in 2006 will enable future optometrists to be trained at the Bachelor degree level at SP. The new era of professionalism in primary eye care will gradually unfold in the next 20 years with the emergence of better trained optometrists, and this in turn will greatly benefit the rapidly ageing population of Singapore.

### Symposium 2 – Allied Health Optometry

10 June 2006, Saturday, 1030-1215 Hrs

Room 306, Level 3

### S507

#### CONTACT LENS CALCULATIONS AND DESIGN MADE EASY!

Anthony Phillips, Australia

Although some practitioners have a natural affinity to carry out the calculations necessary in contact lens practice, most neither have the ability, or, in a busy practice, the time! Yet often it is important to work out the ocular power of a high powered lens at the eye, to recalculate an RGP fit from a small to a larger diameter lens; to work out the new power of a toric lens from the cylindrical over-refraction, etc., etc.! A group of optometrists have designed a CD-ROM that allows these and many more calculations to be done by even those who have the most basic knowledge of visual optics and lens design. This talk will demonstrate what can be done.

### S508

#### PERFECT VISION – TRUTH OR MYTH?

Jenny Deva, Malaysia

Modern Refractive Surgery includes many techniques like LASIK, EPI-LASIK and PRK. Despite Customised Software Programs of different Excimer Laser Machines, there is still a "Human Factor" to all this. Thus, these are techniques which still produce aberrations of different types, though in a very small proportion of patients. Other techniques include advanced technology like Phakic IOLs, Intracorneal Rings, Conductive Keratoplasty and Clear Lensectomy for High Myopia. Postoperative refractive errors do exist in a small number of patients, and this affects Patient Satisfaction, Quality of Vision, and their Quality of Life.

This paper addresses different techniques and different perspectives of Modern Refractive Surgery. The importance of postoperative management by the Ophthalmologist together as a team with the Optometrist and Optician is to be respected, to make Post-Refractive Surgery "Perfect Vision" nearer to the Truth, in this small group of patients with unsatisfactory, imperfect vision.

**S509**
**DO CHILDREN HAVE SNELLEN OR LOGMAR VISION?**

Wilfred Tang, Singapore

Snellen chart is the method of choice employed by eye care practitioners to measure the visual acuity of patients. The popularity of the chart stems largely from the easy to use features for both practitioners and patients alike. The Bailey-Lovie logMAR chart was introduced in the 1970s to overcome the limitations of the Snellen chart (e.g. it lacks the consistency in lettering size from large to small targets). However, the logMAR chart did not gain widespread use by eye care practitioners, mainly due to the time consuming nature of vision measurement. This chart was mainly confined to vision researches.

In Singapore, the myopia cohort studies have used both versions of the vision charts to measure the visual acuity of subjects relative to their myopic changes. There are several advantages and disadvantages of each type of vision chart in terms of research approaches and outcomes. There is a greater realization that visual acuity in children may not be easily quantified with vision charts, especially in pre-schoolers. It is also important to consistently chart the acuities of children in longitudinal studies such as SCORM. The implications of using logMAR charts in all clinical practices to measure visual acuity of children, and the importance of having a consistent approach to vision measurement of myopic children, will be discussed.

**S510**
**HYPEROPIC DEFOCUS AND MYOPIA**

Anna Yeo, Singapore

There is increasing evidence from animal studies that ocular elongation is visually guided. In the animal model, the eyes develop myopia in response to form deprivation or defocus with negative lenses (hyperopic defocus). Eye growth slowed down when positive lenses are worn before the eye (myopic defocus).

Various studies conducted to apprehend the accommodative system of the human subject found that myopic subjects tend to have a greater lag of accommodation for near targets as compared to the other refractive groups. The lag of accommodation creates a hyperopic defocus in the human subjects, and was thought to be one of the factors for myopia development, likened

the hyperopic defocus that causes axial elongation in the animal model. As myopia is commonly associated with near work which is typically linked to the works of accommodation system, the relationship between lag of accommodation and myopia development becomes more convincing.

This presentation discussed some of the findings on hyperopic defocus on the mechanism of eye growth or the emmetropization process. It will also report the findings of a study on accommodative system performed on a predominantly Chinese population in Singapore where the prevalence of myopia is one of the highest in the World.

**S511**
**APPLICATION OF MULTIFOCAL ELECTRORETINOGRAPHY (MERG) IN OPTOMETRY**

Norhani Mohidin, Malaysia

Multifocal electroretinography (MERG) was developed by Sutter and Tran in 1992 and provides for an alternative technique to assess retinal functions. The technique allows recording of multifocal electroretinograms (ERGs) from a large number of retinal locations. The system consists of a computer controlled stimulus display, a linked data acquisition card to record analog data detected from the surface electrode on the eye and software to perform cross-correlation between the stimulus signal and the detected input data stream. The signal used to control the display is a pseudo-random binary signal which is supplied to each of up to 241 stimulus elements on the screen, and a response is derived from every corresponding element in the subject's visual field. Depending on the stimulus configuration, an electrical response map of the retina can be obtained after as little as 2.5 minutes of recording. This paper describes the application of MERG on non-insulin dependent diabetes mellitus patients aged 39 years and above. All had no retinopathy. The results showed that a high proportion of the diabetic patients have reduced sensitivity on scattered areas across the visual field compared to controls.

**S512**
**CLINICAL EVALUATION OF TECNIS ZM900 MULTIFOCAL IOL**

Ryan Tay, Singapore

**Purpose:** To evaluate the Tecnis ZM900 Multifocal intraocular lens implant in terms of performance, patient satisfaction and quality of life.

**Setting:** A single ophthalmology center in Singapore (Singapore National Eye Centre).

**Methods:** A prospective clinical evaluation was conducted in 31 eyes. At month 1 postoperatively, parameters evaluated were

unaided distance and near visual acuities, best spectacle corrected distance and near visual acuities, photopic and mesopic contrast sensitivity, dilated aberrometry, patient satisfaction and quality of life through a questionnaire on daily visual tasks.

**Results:** The review, done at month 1 postoperatively after implantation, showed promising results. 87% of patients had 6/9 or better unaided distance visual acuity whilst all 31 patients had 6/9 or better best corrected distance acuity. 87% of patients also had unaided near visual acuity of N6 or better whilst the best corrected near acuity was 96% for those with N6 or better. Contrast sensitivity values in the eyes was found to be within the normal population range and similar when compared to eyes with monofocal implants. Spherical aberrations were found to be absent in patients with the Tecnis multifocal lenses. Majority of the patients were satisfied with the quality of vision in relation to their daily activities and in fact 77% of the patients preferred reading without spectacles.

**Conclusion:** The results show that the Tecnis ZM900 can potentially be the ideal multifocal intraocular lens. Further large scale, prospective, randomized controlled clinical trials are required to validate this data.

### S513

#### GUIDE DOGS FOR THE BLIND

Eidawatie Rosdi, Singapore

Guide dogs can provide intensive, disability-specific services for individuals who are blind or visually impaired. Besides aiding the blind or visually impaired to "see", guide dogs are "soul mates" to their masters.

Cultural attitudes toward blindness and guide dogs affect their acceptance and integration into the community. Thousands of people in many Western developed countries have had their lives transformed by guide dogs and the organisations that provide them. The provision of guide dog services is complex and expensive. However, with commitment and understanding from various vision rehabilitation professionals as well as relevant government agencies, it is possible to enhance the mobility, dignity and independence of the blind or the visually impaired through the use of guide dogs.

The use of guide dogs in Singapore is in its infancy. Guide Dogs for the Blind Singapore, a newly proposed society, aims to improve the quality of life of the blind and the visually impaired through the provision of guide dogs and to increase the awareness of this little understood mode of rehabilitation through public education.

## Symposium 3 – Allied Health Orthoptic

10 June 2006, Saturday, 1400-1530 Hrs

Room 306, Level 3

### S514

#### MYTHBUSTERS – WHAT IS TORSION FOR?

Elaine Cornell, Australia

Of the six oculorotary muscles in each eye, two are "oblique" muscles. Many clinical textbooks describe their 'main' action as depression (superior oblique) or elevation (inferior oblique), however, from the geometry of the angle they make with the visual axis, it is clear that their primary action is torsion, as many physiology textbooks state.

What is the main function of these muscles, particularly in animals (including humans) with forward placed eyes and stereoscopic vision? This presentation will evaluate current research on the relationship between torsion and binocular vision.

### S515

#### IMPAIRED SIMULTANEOUS PERCEPTION

Gordon Dutton, UK

The classical approach to vision is that information from the eyes is passed to the occipital lobes where a picture is formed and 'seen'. It is now recognised that human vision is far more complex. Basic visual data in the occipital lobes are passed to the temporal lobes of the brain where the information is compared with stored visual information to bring about recognition. This pathway is known as the ventral stream. The data are also passed to the posterior parietal lobes where the totality of the visual scene is appraised. The more complicated the visual scene the harder it is to find something and vice versa. Damage to the dorsal stream causes impaired ability to give attention to (and thus see) components of a crowded visual scene, and impaired visual guidance of movement (optic ataxia) of the upper and/or lower limbs. Causes of such damage include: Periventricular leukomalacia (often associated with prematurity), infection (meningitis or encephalitis), hypoxia, ischaemia or hypoglycaemia and congenital brain abnormalities. Dorsal stream damage, which is often associated with lower visual field impairment, gives rise to difficulties:

- Seeing things in the distance. (The further things are away, the more there is to see).  
*Action: Share a video camera, and zoom in. Get closer*
- Finding a toy in a toy box. (The toys are emptied out and separated to find the one which is wanted).  
*Action: Toys are kept separately in known locations*
- Finding a parent in a group. (The parent stands separately and waves in order to be found).

*Action: The child's friends must know to introduce themselves if they are in a group*

- Finding an item of clothing in a pile of clothes. (The clothes are laid out on the bed by the parent).

*Action: Arrange the clothes in a simple storage system*

- Reading. (Reading is enhanced by masking off surrounding text).

*Action: Work out and use amount of words which can be accessed at maximum speed*

- Using vision to guide reach. (The child may reach beyond what is wanted and bring the hand towards the body to grasp the item).

*Action: Use articles with larger handles for example*

- Navigating floor boundaries, uneven ground and steps. (The child holds on to a hand, or clothing (pulling down) or a toy pram, or similar to provide a tactile guide to the height of the ground ahead).

*Action: Encourage and train in the use of tactile guidance*

- Bumping into furniture if it has been moved.

*Action: involve the child in moving the furniture.*

Similar problems are seen in adults who have sustained head injuries and those with microvascular brain damage, and similar approaches can prove equally helpful.

### S516 SURGICAL MANAGEMENT OF NYSTAGMUS

Monte Del Monte, USA

Nystagmus is the rhythmic horizontal, vertical, torsional, or complex oscillation of the eyes which can result in decreased vision, oscillopsia, anomalous head posture, or poor cosmesis. A number of medical and surgical therapies have been described to treat these complications. This presentation will review the current status of surgical treatment for nystagmus by literature review and author experience. Less invasive treatments such as Botox injection as well as more extensive muscle recessions and transpositions will be discussed in terms of what is effective and why. After this presentation, the attendee should understand the current approach to patient selection and technique for medical and surgical treatment of nystagmus.

### S517 SURGICAL MANAGEMENT OF STRABISMUS

Monte Del Monte, USA

Strabismus surgery is an important modality of strabismus management. Extraocular muscles can be surgically manipulated to strengthen, weaken or redirect their vector force. This presentation will describe, for the orthoptist and allied health professional in ophthalmology, the indications and technique for rectus and oblique muscle recession, resection, tenotomy, tucking or plication and transposition. The clinical indications for each procedure will be presented

and the technique illustrated using step by step surgical photos and schematic line drawings from the authors surgical atlas. After attending his presentation, the attendee should better understand the indications for and complications of the major surgical procedures used to treat the strabismus patients they see in the office every day.

### S518 ASSESSING VISUAL FUNCTION USING VISUAL ELECTROPHYSIOLOGY

Audrey Chia, Singapore

Visual electrophysiological tests such as the electroretinogram (ERG) and visual evoked potentials (VEP) can be used to objectively assess visual function. It can be useful in the diagnosis and monitoring of various retinal and optic nerve diseases (eg. retinal dystrophy, inflammatory retinal disease, optic nerve compression and inflammation). In this talk, these tests are briefly introduced, and their clinical application demonstrated.

### S519 INCOMMITANT STRABISMUS IN CHILDREN – MORE COMMON THAN YOU THINK!

Frank Billson, Australia

**Introduction:** There is a traditional view still expressed that the majority of strabismus in child hood is concomitant. Those expressing the view will often emphasise that although incomitance occurs in children there is a tendency for it to become comitant.

**Method:** From personal series of cases and review of the literature evidence is made available as to the incidence of incomitance.

**Results:** It is clear that incomitance is common in childhood. With passage of time from infancy onwards incomitance often increases in frequency in the commonest forms of strabismus, particularly congenital esotropia. Urist in 1958 found that in almost half of all the cases of horizontal strabismus has a vertical component. The change in emphasis is reflective of the fact that recognition of the presence of A and V patterns has been the determinant. Evaluation of strabismic syndromes needs careful consideration, as does newly discovered incomitance following strabismus surgery.

**Discussion:** Centres on incomitance occurring in A and V syndromes together with the frequency of transient incomitance in infancy followed by a discussion of Incomitance in Horizontal strabismus and vertical strabismus both through the occurrence of isolated palsies, strabismic restriction syndromes, Disinnervation syndromes and occurrence postoperatively.

**Conclusion:** Incomitant squint is more common than previously thought. It is important to consider in strabismic syndromes, newly discovered cases post strabismic surgery and to include in the management plan for strabismus.

**Symposium 4 – Allied Health Nurses and Ophthalmic Technicians**

10 June 2006, Saturday, 1600-1730 Hrs  
Room 306, Level 3

**S520  
OPTIMAL POSTOPERATIVE OUTCOMES –  
IMPORTANCE OF FOREIGN DEBRIS CONTROL IN  
OPHTHALMIC SURGERY**

Wava Truscott, USA

**Overview:** The surgery was flawless or so it appeared. The IOL patient went home thrilled. However, the next few days his condition continually worsened. Inflammation, pain, diminishing loss of acuity accumulated, exacerbating his complications hourly. Finally, the culprit was identified — a tiny lint fragment (foreign debris) lay at the bottom of the anterior chamber. This program discusses the complications associated with micro-foreign debris, identifies its sources and provides recommendations for particulate control measures in ophthalmic surgery.

**Objectives:** 1. Discuss how foreign debris interferes with post-ophthalmic surgical healing. 2. Identify sources of foreign debris in the Operating Room. 3. List recommendations for reducing foreign debris.

**S521  
SHARPS AND SAFETY**

Lee Lai Chee, Singapore

Sharps injuries are an important and continuing cause of exposure to bloodborne infections among healthcare workers. Injuries are usually caused by tasks conventionally related to specific job classifications. In addition to huge operational and medical costs, the serious and fatal consequences of sharps injuries will subject the hospital to ethical and legal implications.

The use of Standard Precautions alone is no longer adequate in prevention of sharps injuries. The success relies on the hospital's commitment in promoting a safety culture, and greater collaborative efforts by all stakeholders in implementing a multifocused interventional programme. The programme should include an efficient incident reporting system, a comprehensive employee health programme, effective implementation of safety devices, as well as continuous surveillance and analysis of sharps injuries.

**S522  
BASICS OF PERIMETRY AND SCREENING**

Ravi Thomas, India

This presentation is targeted towards allied health professionals. It will reinforce fundamental aspects of automated perimetry. The clinical application of recent advances like SWAP and FDP as well as the Glaucoma Progression Analysis will be discussed. Examples will be used to highlight some problems in perimetry as well as some errors in testing that may cause potential issues in diagnosis and management. The role of perimetry in screening will be touched on.

**S523  
UNDERSTANDING PHACODYNAMICS CONTROL**

Jon Goh, Singapore

This course will present instruction on understanding the basics of phacodynamics for both peristaltic and venturi systems, and how phacodynamics control can be applied in relation to vacuum, flow, bottle height and power parameters for basic and advanced phaco techniques. It will also cover trouble-shooting in the course of surgery to avoid complications.

**Objective:** At the conclusion of this course, attendees will have a good understanding of phacodynamics and its control, including trouble-shooting in various situations to avoid intraoperative complications.

**S524  
BIOMETRY AND IOL CALCULATIONS**

Peter Tseng, Singapore

The results of any cataract operation with implantation of an intraocular lens depends greatly on the accuracy of the biometry and IOL calculations. There are many methods of performing biometry and some are more dependent on the user experience than others. I will cover the various methods such as the contact method, the immersion technique and the IOL Master.

There are many new IOL calculation formulas currently available and none of them are suitable for all situations. I will highlight the appropriate usage of each formula and present interesting complicated situations such as post refractive surgery and how to manage these cases.

## Symposium 5 – Neuro-ophthalmology Therapeutics in Neuro-ophthalmology

10 June 2006, Saturday, 1600-1730 Hrs

Room 304, Level 3

S525

### OPTIC NERVE DISORDERS

Norman Schatz, USA

Common optic neuropathies that can present with optic disk edema:

1. Optic Neuritis
2. Anterior Ischemic Optic Neuropathy (AION)
3. Infiltrative Optic Neuropathies (tumors)
4. Papilledema (IIH)

### OPTIC NEURITIS

PAPILLITIS

RETROBULBAR

#### (A) General Characteristics

- Under age of 45
- Pain on eye movements (retrobulbar)
- Acute (hours/days) monocular visual loss (bilateral in children)
- Reduced color vision (dyschromatopsia)
- Reduced contrast sensitivity
- (+) APD
- Improves in 2-8 weeks, improvement starts after 7 days (70-90% recover to 20/30 at 6 mo's)
- Resultant disc pallor/atrophy (50-80% of px's)
- Pt's c/o altered visual performance even with 20/20 VA

#### (B) Clinical Appearance of Disc

- Retrobulbar Optic Neuritis
  - without disc edema
- Papillitis
  - with disc edema
- Neuroretinitis
  - disc edema along with macular star (exudates suggests viral or post-viral infection)
- Peri-neuritis
  - disc edema with good VA(enlarged BS)
- Demyelinating disease (Multiple Sclerosis) \*optic neuritis form fruste of MS
- Idiopathic (viral, autoimmune disease)
- Collagen vascular disease, Wegener's granulomatosis, Sjogrens syndrome
- Masqueraders: sarcoid, SLE, syphilis, dysthyroid optic neuropathy, CMV

#### (C) Predictors of developing MS:

- LONS (Longitudinal Optic Neuritis Study)
  - \*\*Initial MRI with signal abnormalities\*\*
  - [BEST PREDICTOR]
- Optic neuritis in fellow eye
- Vague, nonspecific neurological symptoms
- Pain on eye movement
- Female
- Caucasian
- <30 y/o at presentation

#### (D) MRI Findings with MS

- Bright signal lesions (seen best with T2 wt scan) representing areas of demyelination (midline sagittal FLAIR)
- ONH edema lower risk of MS
- Neuroretinitis is not associated with MS

#### (E) Treatment

- Optic Neuritis Treatment Trial (ONTT)
- IV methylprednisolone followed by oral corticosteroids (VA < 20/40)
- Delays onset of MS by 2 years in patients with (+) MRI (no difference in tx'ed/non-tx'ed at 5 yrs)
- New Treatments:
  - Interferons > decreases inflammation
  - Betaseron (Interferon Beta-1b)
  - Avonex (Interferon Beta-1a)
  - Copaxone > serves as a myelin decoy for T-cell damage

S526

### STROKES

Norman Schatz, USA

### ANTERIOR ISCHEMIC OPTIC NEUROPATHY (AION)

#### (A) General Characteristics

- Over age 40
- Sudden/Painless loss of vision (unilateral)
- APD present
- Altitudinal (Central or Arcuate less common)

#### (B) Fundus Appearance

- Pale disc swelling
- Sectoral (Complete swelling less common)
- Peripapillary hemorrhages
- Attenuated retinal arterioles
- Delayed choroidal filling on FA
- Development of optic atrophy

## (C) Arteritic (AION)

- Giant cell arteritis (GCA) ..... 6%

## Non-arteritic (NAION)

- Hypertension ..... 40%
- Idiopathic ..... 27%
- Diabetes ..... 17%
- Arteriosclerosis ..... 14%
- Migraine ..... 2%

## (D) Arteritic AION/GCA

- Over age 70
- Females > males
- More common in Caucasians
- Over 50% with 20/200 or worse VA
- 65% risk of fellow eye involvement if untreated (days to weeks)
- Elevated Westergren ESR (beware->normal in 2-9% px's)
- Positive temporal artery biopsy (70%)

## Systemic signs GCA:

- Headache (Cardinal symptom)
- Scalp tenderness
- Swollen temporal arteries
- Jaw claudication
- Proximal muscle stiffness and myalgias (PMR)
- Weight loss (anorexia)

## Ocular signs of GCA:

- AION (most common)
- Amaurosis fugax (10%)
- CRAO (10%)
- Ophthalmoplegia (CN III most common) (10%)

## Arteritic AION

## GCA-AION

Note pale ONH

Note patchy poor chor. Perfusion

## (E) Non-arteritic AION

- Lack systemic symptoms
- Younger patients (40-65 yo)
- No sex or race preference
- 45% with 20/40 or better VA
- Normal Westergren ESR
- 20-40% risk of fellow eye involvement (Months to years)
- Small optic disc/cup

## (F) Treatment

Arteritic AION

- High dose systemic corticosteroids STAT
- Co-manage with rheumatologist, neurologist, neuro-ophthalmologist
- Low vision consult

Non-arteritic AION

- No proven efficacy of steroid tx
- Ischemic Optic Neuropathy Decompression Trial
- [TRIAL STOPPED → NO BENEFIT FOR OPTIC NERVE SHEATH DECOMPRESSION]
- Co-manage with internist
- Low vision consult

**S527****MYASTHENIA GRAVIS**

Norman Schatz, USA

**Etiology**

- Characterized by impaired transmission of impulses across the neuromuscular junction
- Antibodies to acetylcholine receptors located in motor end plate of striated muscles
- Visceral musculature not involved

**Myasthenia Gravis**

- Ocular signs (especially ptosis) is the initial manifestation in 75% of patients
- 80% progress to involvement of other muscle groups
- 20% only ocular complaints

## Ocular Myasthenia- Clinical Characteristics:-

- Acquired ptosis in presence of normal pupil
- Extraocular muscle involvement variable
- History of worsening symptoms as day progresses and with fatigue
- Sustained upgaze elicits worsened ptosis
- Cogan's lid twitch- Abnormal brief retraction lid when patient looks in primary position after looking downwards for 15 seconds

**Diagnostic Testing**

- Tensilon (Edrophonium chloride)
- Ice Test- Ice over closed eye 2 minutes
- Sleep/Rest test- Lids closed 2 min-30 min
- Acetylcholine Receptor Antibodies (specificity >99%)
- 60% of patients with ocular myasthenia have detectable antibody levels
- Clinical characteristics of seronegative patients do not differ
- Single-fiber EMG- (92% sensitivity)

### Treatment of Myasthenia Gravis

- Oral pyridostigmine bromide (Mestinon)
- Systemic corticosteroids
- Azathioprine
- Plasmapheresis
- IV immune globulin
- Further impair Thymectomy in patients with thymomas

### Drugs of Interest in Myasthenia

- Drug-Induced Myasthenia:
- Penicillamine
- Aggravation of Myasthenia
- Quinidine
- Procainamide
- Lithium
- Aminoglycosides

### Case Presentation

83 year-old male patient referred from the retina service for management of his glaucoma.

#### Ocular History:

- Cataract extraction OD 1989, OS 1991
- ARMD (diagnosed in 1994)
- Geographic atrophy OU with visual acuities 20/400 OU
- Glaucoma
- Treated by outside Ophthalmologist
- IOPs well-controlled on Alphagan bid and Cosopt bid OU

#### Past Medical History:

- PMH: Prostate cancer (remission)
- s/p radiation treatment, last 10 years ago
- Meds: Ocuville tablets, Alphagan OU bid, Cosopt OU bid
- All: NKDA
- PSH: Cholecystectomy and hernia repair
- FH: Father with glaucoma and macular degeneration
- SH: Retired waiter, denied alcohol or smoking

#### Chief Complaint:

- "I see wavy lines in my right eye for the last one week"

#### Ocular Examination:

- Best-corrected Va 20/400 OU
- T<sub>A</sub>: 15 OD, 19 OS
- Pupils: 5mm OD, 2mm OS (asymmetry noted since 8/1999)
- No APD
- EOMI
- Dilated Fundus Exam
- Fluorescein Study

#### Days Later:

- Patient called very upset
- States that the photography technician "damaged his eye" and that his right eye is now "very swollen and will not open"
- Also says an instrument (speculum) was used to open the eye which was painful
- The next morning his eye "was swollen shut"

#### External Exam

	OD	OS
IPD	0.5 mm	9 mm
MRD	-5 mm	4 mm
LF	13 mm	13 mm

#### Differential Diagnosis?

#### What Test Next?

- Tensilon Test
- Before and After
- Laboratory Tests
- Anti-Skeletal Muscle Antibody: Negative
- Acetylcholine Receptor Antibodies: Positive

Type	Value	Reference
Binding	20.0 nM/L	<0.1 nM/L
Blocking	35% of inhibition	<15% of inhibition

- Imaging Studies
- Chest CT scan: Negative for Thymoma

### S528

#### IDIOPATHIC INTRACRANIAL HYPERTENSION

Norman Schatz, USA

#### General Characteristics

- Young obese females
  - (Males = Females and obesity not factor in children)
- Normal imaging studies
- Increased ICP (>250 mm H<sub>2</sub>O)
- Normal CSF composition
- Headache
  - (Severe daily, pulsatile, nausea, vomiting)
- Pulsatile tinnitus
- TVO's, assoc. with postural change
- App. 25% develop visual loss
  - (Duration not critical)
- Normal VA and CV (unless macula involved)
- (-) APD
- Enlarged blind spot on VF, inferior nasal VF defect (progression)

- Neurological symptoms
  - (HA, nausea, vomiting)
- Transient visual obscurations [TVO's]
  - (Transient fluctuations in ONH perfusion)
- Bilateral CN VI palsy (diplopia)
- Increased intracranial pressure >200 mm H<sub>2</sub>O

#### Clinical manifestations

- Headache (75-99%)
  - Generalized, worse on awakening or with Valsalva
- Vision loss (50-90% mild; 10-25% severe)
- Axoplasmic stasis, attrition
- Vascular compression → BRAO, CRAO
- NFL hemorrhages and infarction
- Choroidal folds, CNVM
- Subretinal fluid → peripapillary or macular RD, exudates
- Clinical manifestations
- Transient visual obscurations (75%)
- Does not correlate with degree of disc edema or visual loss
- Intermittent axoplasmic stasis secondary to CSF pressure waves
- dysautoregulation at short posterior ciliary arteries
- Pulsatile tinnitus (60%)
- Transmission of intensified vascular pulsations via CSF under high pressure to the walls of the venous sinuses converts laminar to turbulent flow
- Other (due to dilation of nerve sheaths)
- Back, neck pain, radiating paresthesias
- Horizontal diplopia (CN VI palsy)
- Less common: CN III, IV, VII palsies
- Early Papilledema

Note mild blurring of disc margin inferior and superior OU and that cup is still present

#### Papilledema/IIH

- Normal VA and CV (unless macula involved)
- (-) APD
- Enlarged blindspot on VF, inferior nasal VF
  - Defect (progression)
- Neurological symptoms
- (HA, nausea, vomiting)
- Transient visual obscurations [TVO's]
  - (Transient fluctuations in ONH perfusion)
- Bilateral CN VI palsy (diplopia)
- Increased intracranial pressure >200 mm H<sub>2</sub>O

#### Pathophysiology

- Decreased CSF outflow at arachnoid villi
  - Idiopathic intracranial venous HTN
  - Post-meningitic or SAH inflammation
  - Elevated venous pressure (thrombosis)

- Increased CSF production
  - Choroid plexus regulated by neuroendocrine signaling (serotonin and norepinephrine)
  - Animal studies: pharmacologically increasing the levels of serotonin and NE decreases CSF production
  - Decreased levels of serotonin may alter appetite
  - THEORY: patients with IIH may have abnormally low serotonin levels → increased CSF production and depression
- Central obesity theory
  - Increased central obesity → increased intra-thoracic pressure → impaired venous return → increased intracranial pressure
- Pickwickian syndrome (Morbid obesity) → sleep apnea → hypercapnea → increased venous pressure → secondary increased ICP

#### S529

##### NYSTAGMUS

Pall Singh, Malaysia

Nystagmus is a periodic rhythmic ocular oscillation of the eyes. In the nervous system the three mechanisms involved in maintaining foveal centration are fixation, vestibular ocular reflex and neural integration. A disorder in any of the three mechanisms results in nystagmus.

Nearly fifty types of nystagmus have been described. In the clinical situation one has to decide the significance of the condition, whether any further investigations are necessary and if any treatment can be offered.

Nystagmus can be pendular or jerk in various directions and amplitude. Physiological nystagmus is of little significance whereas afferent nystagmus is due to poor vision and efferent nystagmus is due to ocular motor system disorders. Specific localizing types of nystagmus have diagnostic or prognostic clinical value. Other types of nystagmus may be non-specific and non-localize.

### **Symposium 6 – Cataract Innovations in Cataract Surgery**

11 June 2006, Sunday, 1400-1530 Hrs

Hall 603, Level 6

#### S530

##### POST-LASIK IOL CALCULATIONS

Fam Han Bor, Singapore

Post-LASIK eyes pose a challenge in IOL calculations due to the difficulty in measuring accurate corneal curvature in the postoperative eye. This paper will cover two important aspects of IOL power calculations in post-LASIK eyes: determining corneal

power, with or without clinical history and using the appropriate IOL calculation formula.

**S531**  
**PHACO FLUIDICS — A SIGNIFICANT ADVANCE**

Daniel Black, Australia

Fluidics is the cornerstone to safe and effective phacoemulsification. Proper fluid management results in a stable anterior chamber with efficient cataract extraction. Micro Incision Cataract Surgery reduces the tolerance for suboptimal fluidics.

I will present my personal experience with a new phacoemulsification fluidics paradigm that paradoxically allows increased vacuum and flow rates with improved chamber stability.

**S532**  
**APPLICATION OF HIGH VACUUM AND NEOSONIX BURST MODE FOR HARD NUCLEUS OF CATARACT**

Guo Haikē, China

**Purpose:** Observe the efficiency and safety to apply high vacuum and neosonix burst mode for hard nucleus of cataract.

**Methods:** 400 eyes having phacoemulsification with the Alcon Infiniti Vision system at the department of ophthalmology, Guangdong Province Peoples' Hospital. Two groups of 200 eyes each were formed based on using different vacuum. Using 600 mm Hg is A group, and 300 mm Hg is B group. Cataract grade is 4 and 5 nuclear sclerosis according to LOCS III. The other parameters of machine are the same, and both are Neosonix burst mode, at 50% power, 40 mL/min linear flow rate, dynamic rise 2.

**Results:** There are statistical difference of US time, mean US power and effective phaco time (EPT) between two groups.

**Conclusions:** Infiniti Vision system with high vacuum shows anterior chamber stability, good follow ability, and no surge fluid. Ultrasound energy consumption with high vacuum (>600 mm Hg) was significantly less than with ordinary vacuum (300 mm Hg or less).

**S533**  
**IN-THE-BAG PROCEDURE FOR SUCCESSFUL CATARACT SURGERY**

Lim Seung Jung, Korea

**Purpose:** For the past several decades, preservation of posterior capsule with insertion of intraocular lens in intact capsular bag has been a key factor of successful cataract surgery. However, the most important and frequent complication which must be solved in the near future, would be posterior capsular opacity, after

cataract. Concerning factors above in modern cataract surgery, surgeons' efforts to keep the posterior capsule intact may actually increase the incidence of the most important complication, the posterior capsular opacification. This is dilemma.

**Methods:** Anyway, to think of it collectively, without intact posterior capsule, we can perform PC-IOL capsular bag fixation without vitreous herniation. In addition, in elderly eyes, we cannot perform the removal of emulsified lens material solely within the capsular bag even though intact posterior capsule. If leaving posterior capsule intact alone cannot give of the advantages that many of ophthalmologists would expect, we might have to move on to think about the advantages of intentional removal of the posterior capsule which would abolish the chance of the most important complication in modern cataract surgery, posterior capsular opacification.

Conclusively, posterior capsule preservation is not the absolute requirement for successful cataract surgery anymore. Instead, "In the bag procedure" for cataract surgery is much more important requirement. All procedures during cataract surgery, especially lens material removal must be performed within the capsular bag, the so called immunologically privileged zone.

For this, lens material removal might be performed through the very small capsular puncture site completely in the near future. However, this kind of technology is not established so far.

**Conclusion:** Therefore, up to the present, it is very important to minimize the stress on the capsulozonular barrier during cataract surgery for "in the bag procedure". For this:

1. Avoid too much hydrodissection resulting lens nucleus subluxation.
2. Phacoemulsification should be done within the capsular bag. And lens manipulation including rotation and fracturing must be performed very cautiously.
3. During I & A, we must avoid unnecessary capsular capture and traction.

**S534**  
**THE CONCEPT AND DESIGN OF A LENS PLATFORM FOR THE 21ST CENTURY**

Charles Claoue, UK

The 21st Century will see a rapid evolution of IOL design. This will clearly differentiate the IOL PLATFORM from the IOL LENS.

The IOL LENS seems likely to evolve to an aspheric format and then to a true customised IOL in which conventional refractive error (sphere and cylinder) and also individual ocular aberrations (coma, trefoil) are corrected. The problem of presbyopia correction continues to challenge IOL optic design, and some developments (correcting spherical aberration) result in loss of depth of field and exacerbation of pseudophakic presbyopia. This will demand manufacturers to develop sophisticated mechanisms for data capture

and transmission and then translation into individualised lenses within a relatively short period of time.

The IOL PLATFORM is broadly speaking everything else about the IOL. It is more than the haptic, as whilst haptic designs now incorporate anti-decentration and anti-rotation technology, specific features to minimise PCO become important as we move towards more refractive lens exchange surgery. Unfortunately, some manufacturers introduce designs that are not as good as their previous offerings, with predictably poor results. Specific examples will be given.

### S535

#### THE RESTOR LENS — RESULTS AND CAVEATS

Richard Mackool, USA

Both FDA and post-FDA results of ReSTOR lens implantation will be presented. The treatment of pre-existing astigmatism, lens exchange techniques, and comparison with other multifocal/pseudo accommodative IOL's will be discussed.

### S536

#### ASPHERIC IOL DESIGNS — A CLINICAL COMPARISON OF AMO TECNIS AND BAUSCH & LOMB SOFPORT AO

Terence Devine, USA

**Purpose:** Conventional intraocular lenses have positive spherical aberration adding to the existing positive spherical aberration of the cornea. Aspheric IOLs are now available in both a negative SA version and an aberration free design. A clinical comparison was performed.

**Methods:** 152 AMO Tecnis negative aspheric lenses and 1414 Bausch & Lomb SofPort AO aberration free lenses were implanted by the same surgeon between January and November 2005. The Study intended to measure visual results including aberrometry at the 12 month follow up.

**Results:** The implantation of the Tecnis lens was discontinued after two patients complained of a persistent circular dysphotopsia which was unlike previously described positive or negative dysphotopsias. Slit lamp photography of the Tecnis lens in air revealed apparent lathe lines imprinted on the silicone optic. No persistent dysphotopsias were reported with the Bausch & Lomb Sofport AO aspheric lens.

**Conclusion:** A previously undescribed circular dysphotopsia has been identified with the Tecnis aspheric silicone lens. Possible causes including imprinted lathe lines will be discussed.

### S537

#### CLASSIFICATION OF SURFACE OPACIFICATIONS OF IOLS

David Apple, USA

The Rayner C-flex IOL has evolved into one of the best lenses on the market. It is important that it not be mistakenly associated with the calcification process that has occurred with some hydrophilic acrylic IOLs. I have examined from virtually all of the major IOL manufacturers and have determined that the calcium classification should be divided into two categories. This is extremely important in order not to inappropriately state that a given IOL may calcify simply because it is made of hydrophilic material. The primary form occurs because of some fault with the lens design/material. The classic examples are the two hydrophilic lenses, OII and MDR. This has never been seen with the Rayner lens.

Secondary calcification represents deposition onto the surface of an IOL optic caused by a pre-existing disease with a broken blood aqueous barrier and exudation of calcium-containing fluid onto the surface of the lens. This form may be seen on all IOL types, hydrophobic or hydrophilic.

### S538

#### IMPLANTATION OF AN ADDITIONAL SECOND IOL (PIGGY BACK LENS) TO CORRECT YATROGENIC HIGH MYOPIA INDUCED BY ERRONEOUS CALCULATION FOR PSEUDOPHAKIA

Joaquin Barraquer, Spain

In this patient a penetrating keratoplasty had been performed in 1972 with excellent result. Thirty years later he had cataract surgery with posterior chamber IOL implantation elsewhere. An error of calculation of the IOL power produced -20 D of myopia. After complete evaluation of the eye, we decided to implant an additional, negative, sulcus-supported IOL in front of the previously inserted IOL, which was left in place to avoid trauma inherent to the attempts of removal and replacement by a proper one. The optical result was excellent without any complications in the corneal graft, the iris, the vitreous body or the retina. The presentation will be illustrated by a DVD showing preoperative conditions, surgery and postoperative results.

**Symposium 7 – Oculoplastics  
Beauty & Breakthrough in Eye Aesthetics**

11 June 2006, Sunday, 1400-1530 Hrs  
Room 301-302, Level 3

**S539**

**AESTHETIC EYEBROW REJUVENATION**

Yip Chee Chew, Singapore

The eyebrow complements the eye in facial expression. Nonetheless, aging confers undesirable changes in the shape and position of the eyebrow to render a tired, saggy look. Eyebrow rejuvenation involves altering its shape and position to improve function and restore a youthful appearance. Conventional surgery such as direct eyebrow lift is effective but leaves a surgical scar that is unappealing to some patients. The trend in eyebrow rejuvenation has been in the improvisation of small, camouflaged or hidden surgical incisions to improve the cosmetic result. Some newer surgical techniques of eyebrow lifts include internal browpey, brow lift via forehead creases, endoscopic eyebrow lift, suture eyebrow lift and eyebrow fixation sutures. Botox<sup>®</sup> is another new advancement in the re-contouring and repositioning of the eyebrow without surgery. Given this palette of treatment options, the management decision should be individualized based on the underlying pathology, the surgeon's experience and the patient's desired result.

**S540**

**ASIAN UPPER LID BLEPHAROPLASTY**

Yoon-Duck Kim, Korea

There are differences in the upper eyelid anatomy between Asians and Caucasians. Besides the anatomic differences, the surgeon must take into consideration that many Asian patients may have different beauty standards and cultural backgrounds. The surgeon should try to assess what the Asian patient desires. In doing blepharoplasty in Asian patients, it is important to be aware that most Asians do not want to look Caucasian. Most patients do not want other people to notice that they underwent blepharoplasty. In Asia, an upper eyelid without a crease is called a single eyelid, and an eyelid with a crease, a double eyelid. For the young patients, the creation of an upper eyelid crease (double eyelid operation) has been the most popular cosmetic surgical procedure in Asia. A low, natural crease which blends with the patient's eyes and face is desirable. I usually make an eyelid crease 6 or 7 mm from the ciliary margin in women, and 5 or 6 mm in men and children.

For the double eyelid operation, there are two approaches - the suture ligation method and the external incision method. The suture technique is good for younger patients with a minimum amount of excess fat and skin. This technique gives a short healing time with little postoperative swelling and initial natural

appearance. But the crease may disappear with time. I prefer the external incision method because it is more permanent. The lid crease is formed by skin-levator or tarsus-skin suture or by levator aponeurosis or tarsus to inferior subcutaneous tissue. For the patients who want to have short down period and more permanent crease, small incision method is another choice.

In performing upper lid blepharoplasty for aged person, it is important to assess the amount of excessive skin and the amount and position of herniated orbital fat. The most important part of the upper lid blepharoplasty is marking where to place the eyelid crease incision and how much skin to remove vertically.

**S541**

**APPLICATION OF FILLER, IMPLANTS AND BOTOX**

Robert Goldberg, USA

Concepts for rejuvenation of the periorbital complex continue to evolve. Historically, periorbital aging was viewed as a problem of excess skin and fat, and paradigms of rejuvenation focused on removing skin, muscle, and fat from the upper and lower eyelids. Our concepts of periorbital aging now include deflation, bony contour changes and asymmetry, globe position, cheek and eyebrow relationships, and skin elasticity. A plan for rejuvenation of the periorbital begins with a detailed assessment of the relative role of these different factors, and the treatment plan is individualized. Treatment options might include upper facelift, traditional blepharoplasty, fat repositioning, midface lift, Botox, and volume restoration with implants, fat, or fillers. This course will stress precise diagnosis, and a customized, creative, problem-directed approach to decision making.

**S542**

**THE AGING LOWER EYELID TREATMENT OPTIONS**

Reynaldo Javate, The Philippines

The approach to rejuvenation of the periorbital area continues to evolve from strictly surgical procedures to the practice of new techniques that are safer and allow for greater aesthetic control.

With the increased emphasis on youth and beauty, even young adults are showing more interest in cosmetic surgery. In recent years, I have noticed an increased number of young adults requesting eyelid cosmetic surgery. One of the needs of people in their 30's and 40's, is to return to their activities as quickly as possible.

Cosmetic surgery with minimal bruising and swelling would allow a relatively rapid return to work or social activities. Radio-surgery which helps control bleeding and collateral tissue damage during dissection, is one method of producing a rapid recovery. It allows the surgeon to cut and cauterize at the same time. The

radiosurgery unit produces a frequency of four megahertz, which is so high that the total lateral heat causes very minimal tissue destruction. In my experience, the wound healing is similar to that produced by a scalpel. The value of radiosurgery to the surgeon performing a lower lid blepharoplasty is the ability to dissect tissues in a relatively bloodless field.

On the other hand, a novel technique to address the concern of patients regarding the appearance of hollow areas below the lower eyelid and how to improve the contour of the periorbital area will be presented.

#### S543

##### ADVANCES IN MIDFACE REJUVENATION

Robert Goldberg, USA

In order to optimally address both aesthetic and functional problems of the lower eyelid, the orbitofacial surgeon must be cognizant of the contribution of the midface to lower eyelid support and beauty, and technically competent to operate on the midface. Surgical concepts in midface surgery have evolved substantially over the past 20 years. I personally prefer a subperiosteal plane and temporal incision for aesthetic midface lift, and try to avoid eyelid or canthal incisions whenever possible. The eyelid approaches have a higher risk of eyelid retraction or abnormal change in shape. The cutaneous midface incision, through the lower eyelid and canthus, is particularly dangerous in my opinion, because of the double whammy of damaging the orbicularis and creating the opportunity for a full thickness scar contraction. Cable lift (suture suspension) is an evolving technology that can lift the facial soft tissues without the need for large incisions or extensive flap dissection.

#### S544

##### ADJUNCTIVE THERAPEUTICS IN PERI-OCULAR SKIN AESTHETICS

Lawrence Khoo, Singapore

Some of the common periorbital conditions that patients present to a dermatological clinic include:

1. Benign periorbital growths
2. Periorbital wrinkles and skin laxity
3. Periorbital dyspigmentation

The common periorbital growths include seborrheic keratoses, syringomas, melanocytic nevus and xanthelasma. Seborrheic keratoses and syringomas may be removed by electrocautery or carbon dioxide laser ablation. Small junctional nevi may be removed by laser vaporization, while bigger intradermal nevi may be removed by shaving or excision. Xanthelasma may be removed by laser vaporization, excision or chemical cauterization.

Periorbital wrinkles and laxity may be improved by topicals, botulinum toxin injections (for dynamic lines), fillers injections and non-invasive radiofrequency based or light based skin tightening procedures.

Periorbital hyperpigmentation may be improved by topicals, and occasionally by pigment laser therapy. Periorbital vitiligo may be improved by topicals and careful use of phototherapy.

#### S545

##### ADJUNCTIVE PROCEDURES IN BLEPHAROPLASTY SURGERY

Geoffrey Gladstone, USA

Blepharoplasty is often a straightforward simple surgery. Many times, however, other procedures or modifications of the basic surgery can be performed to greatly enhance the results. Fat removal or fat transfer, laser skin resurfacing, brow elevation, crease elevation, Botox and fillers are all worthwhile procedures to consider. Patient evaluation will be stressed in the presentation and several techniques demonstrated.

### **Symposium 8 – Cornea**

#### **Corneal Symposium – At the Forefront**

11 June 2006, Sunday, 1400-1530 Hrs

Room 303-304, Level 3

#### S546

##### ADVANCES IN KERATOPLASTY – FROM 1950 TO 2006

Joaquin Barraquer, Spain

The author emphasizes the reduced technical and pharmacologic advances and the limited knowledge of the biologic and immunologic problems, as well as of the mechanisms involved in corneal transparency which represented a considerable handicap for corneal transplantation in the past. The great change occurred with the progressive introduction of microsurgery with the development of microscopes, and slitlamps specially designed for ocular surgery and the advent of specific medications to inhibit immunologic reactions: especially local and systemic corticosteroids, later combined with immunosuppressive substances, applied systemically, such as Azathioprine and later also locally, such as cyclosporine A. Viscoelastics (Healon) represented another important advance. The basic aspects of the evolution of the surgical techniques and the pre- and postoperative care, as well as the possibilities and indications for combined surgery (simultaneous cataract removal, associated IOL implantation, etc), and large diameter optico-reconstructive keratoplasties are discussed and illustrated with cases from the personal casuistics of the author. The prevention of postoperative ocular hypertension and

the importance of longlasting postoperative follow-up are specially emphasized.

**S547**

**THE OSTEO-ODONTO KERATOPROSTHESIS FOR END-STAGE CORNEAL DISEASES — A TOOTH FOR AN EYE**

Donald Tan, Singapore

**Purpose:** The management of severe ocular surface diseases and end-stage dry eye disorders such as Stevens Johnson syndrome and chemical burns with conventional keratoplasty or keratolimbal allografting remains unsatisfactory. The Osteo-Odonto Keratoprosthesis (OOKP) is a form of keratoprosthesis surgery designed to treat the most severe of these cases, and good outcomes with long-term retention have been reported. We present the surgical video of our first case, and the clinical results of 14 Asian patients within our Singapore OOKP Program.

**Methods:** OOKP surgery involves a radical two-stage procedure — in stage 1, a canine tooth is removed, modified to receive an optical PMMA cylinder, and implanted into the cheek. The entire ocular surface is denuded and replaced with a full thickness buccal mucosal graft. Stage 2 surgery, performed 2-4 months later, involves retrieval of the tooth-cylinder complex and implanting it into the cornea, after lifting of the buccal mucosal flap, corneal trephination, iris and lens removal and anterior vitrectomy. Concurrent glaucoma and vitreoretinal procedures may also be performed at either stage, if required.

**Results:** In February 2004, the Singapore National Eye Centre embarked on its OOKP program, in collaboration with the National Dental Centre. We have now performed OOKP surgery on 14 patients, 13 of whom have completed Stage 2 surgery, with the longest follow-up being 24 months (mean follow-up = 12 months). To date, no significant or sight-threatening keratoprosthesis related complications have occurred. 7/13 patients (54%) have attained 6/6 vision, 9/13 (69%) have attained vision of at least 6/12 or better, while the rest have attained stable vision varying between 6/30 and 6/120 due to pre-existing glaucomatous optic neuropathy and previous retinal detachment.

**Conclusion:** OOKP surgery appears to be a highly promising procedure which has the potential to restore excellent vision to the most severe cases of end-stage corneal disease, when all else has failed. Longer follow-up of these cases is currently underway.

**S548**

**POSTERIOR LAMELLAR KERATOPLASTY (PLK)/DESCEMET STRIPPING ENDOTHELIAL KERATOPLASTY (DSEK)**

Gerrit Melles, The Netherlands

**Purpose:** To describe in detail the tips and tricks of the current technique for posterior lamellar keratoplasty (PLK) or Descemet stripping endothelial keratoplasty, for management of corneal endothelial disorders in the absence of corneal scarring.

**Methods and Results:** In an ongoing prospective study, PLK/DSEK surgeries were performed with various modifications, including preoperative preparation, the type of anaesthetic, the 12 o'clock or temporal approach, the method of excision of the recipient tissue, the method of preparing the donor tissue, the method for implantation of the donor tissue, the immediate postoperative care, and the postoperative medication.

**Conclusion:** Although preferences may vary with different clinical settings, PLK/DSEK surgeries can be performed under topical anaesthesia with a minimum of logistic infrastructure.

**S549**

**THE STATE-OF-THE ART BIOENGINEERING TECHNOLOGY FOR OCULAR SURFACE RECONSTRUCTION**

Shigeru Kinoshita, Japan

The purpose of this presentation is to better appreciate the state-of-the-art bioengineering technology and future directions for ocular surface reconstruction. The data obtained in our basic research and clinical trials are summarized by reviewing the pertinent literature. Briefly stated, for bilaterally, severely affected ocular surface disorders, two types of transplantable cultivated mucosal epithelial sheets can be used. One is an allogeneic/autologous corneal epithelial stem cell sheet, and the other is an autologous oral mucosal epithelial sheet. For this, we established the bioengineering system of creating cultivated corneal or oral mucosal epithelial stem cell sheets using autologous serum, co-culturing with 3T3 fibroblast and air-lifting on amniotic membrane. Over 70 severe ocular surface disorders received these cultivated mucosal epithelial sheets, for either corneal surface reconstruction or fornical conjunctival reconstruction. During follow-up (maximum; 7 years), the ocular surfaces were well restored, though there have been biological and/or immunological epithelial troubles in various degrees postoperatively. In conclusion, the transplantation of cultivated mucosal epithelial stem cell sheet is a cutting-edge surgical modality delivered by bioengineering technology, though several improvements are still necessary in the future.

S550

### A COMPARISON OF OCULAR PENETRATION AND MICROBIOLOGICAL EFFICACY OF FOURTH GENERATION FLUOROQUINOLONES

Terrence O'Brien, USA

**Purpose:** To correlate the ocular penetration and the microbiological activity of the fluoroquinolones moxifloxacin 0.5% ophthalmic solution (Vigamox<sup>®</sup>, Alcon Laboratories, Inc.) and gatifloxacin 0.3% solution (Zymar<sup>®</sup>, Allergan, Inc.) following topical administration before routine cataract surgery.

**Methods:** The penetration study was a prospective, randomized, double-masked, clinical trial involving 50 patients (moxifloxacin 0.5% n=25, gatifloxacin 0.3% n=25) undergoing routine cataract extraction. Patients were given one drop of antibiotic every ten minutes for four doses beginning one hour prior to surgery. Aqueous humor samples were obtained via paracentesis. At the time of the incision antibiotic concentrations were determined using standardized high performance liquid chromatography (HPLC) procedures. Comparative in vitro activity testing was also conducted on a recent clinical *Staphylococcus aureus* ocular isolate. Standard disk diffusion and broth dilution testing methods were used according to CLSI guidelines. Disk diffusion analyses were performed by applying 80  $\mu$ L of moxifloxacin (1.8  $\mu$ g/mL) or gatifloxacin (0.48  $\mu$ g/mL) to 13 mm disks.

**Results:** Antibiotic concentrations in the aqueous humor were 1.80 ( $\pm$  1.21)  $\mu$ g/mL for moxifloxacin and 0.48 ( $\pm$  0.34)  $\mu$ g/mL for gatifloxacin. This 3.8-fold difference was statistically significant ( $p$ = 0.00003). Moxifloxacin produced an MIC of 0.06  $\mu$ g/mL compared with 0.13  $\mu$ g/mL for gatifloxacin. The disks treated with moxifloxacin resulted in a 24 mm zone of inhibition while gatifloxacin showed no activity against the test organism, *Staphylococcus aureus*.

**Conclusions:** Moxifloxacin provided greater penetration into the aqueous humor than gatifloxacin. This concentration difference resulted in a marked differentiation in observed microbiological activity between moxifloxacin and gatifloxacin that may have clinical significance in the prevention of *Staphylococcus* infections following cataract surgery.

S551

### NEW CONSIDERATIONS IN THE MANAGEMENT OF DRY EYE DISEASE

Michael Lemp, USA

**Purpose:** To discuss new concepts in the pathogenesis of ocular surface damage in dry eye disease and management considerations.

**Methods:** A review of recent literature detailing concepts and new clinical data.

**Results:** In recent years our knowledge concerning events occurring in dry eye disease (DED) at the tear film-ocular surface interface has increased considerably. A number of interrelated factors occur which result in the breakdown in the stability of the tear film with ocular surface damage. Intervention at a number of strategic junctures can result in an improvement of the health of the ocular surface. One factor which has not been emphasized in recent years is the role of decreased lubricity in DED in the pathogenesis of ocular surface damage. Recent reports have documented the occurrence of conjunctival staining at the margin of the superior lid in DED; this has been termed "lid wiper epitheliopathy". This finding is correlated with symptomatology. The development of newer tear substitutes and stabilizers and their effects on lubricity will be discussed in the successful management of DED.

**Conclusions:** Newer tear substitutes and stabilizers increase lubricity in DED opening a new strategy in the management of ocular surface damage in DED.

## Symposium 9 – Neuro-ophthalmology Grand Rounds in Neuro-ophthalmology

11 June 2006, Sunday, 1400-1530 Hrs

Room 305, Level 3

S552

### PIGMENTED TUMOR OF THE OPTIC NERVE HEAD

Yen May Yung, Taiwan

**Purpose:** To present a case with pigmented tumor of the optic nerve head.

**Method:** Retrospective review of chart records, photographs, and MRI findings.

**Results:** A 34-year-old male was found to have a pigmented tumor on the right optic nerve head by routine check up. Best corrected Vision was 20/20 on each eye. He could read 15/15 of Ishihara color plates on each eye. Visual field of the right eye revealed a defect on the temporal of the blind spot. CT and MRI revealed a nodular lesion about 7 mm in length in the anterior portion of the right optic nerve, in favor of optic glioma. The patient was followed up for 1 year without obvious clinical and image change.

**Conclusions:** Differential diagnosis includes optic glioma, meningioma, melanocytoma, melanoma, etc.

S553

### BRAIN STEM EYE MOVEMENT DISORDER

Anuchit Poonyathalang, Thailand

A 57-year-old lady presented with diplopia for 5 months. Her systemic diseases included SLE with Antiphospholipid syndrome, Diabetes Mellitus and Hypertension. Ocular examinations revealed

visual acuity 20/20 OD, 20/25 OS, left homonymous hemianopia visual field defect. She also had exotropia in primary position, marked weakness of both medial rectus muscle, and mild weakness of other ocular muscle. Four months later her bilateral medial rectus weakness had improved but instead she developed left oculomotor nerve and right abducen nerve palsy. MRI and laboratory tests were done and she was treated by anticoagulant and medications for her systemic diseases.

#### S554

##### BLURRING OF VISION IN A HIV POSITIVE PATIENT

Muhammad Sidik, Indonesia

Unilateral retrobulbar optic neuritis developed in a 51-year-old man with HIV positive. There was history of unexplained sudden visual loss and the result of ophthalmologic examination on the right eye showed signs of optic nerve abnormalities such as visual acuity deterioration, afferent pupillary defect and visual field defect. The fundus appearance was normal and showed no evidence of retinitis. Brain MRI examination showed no abnormality and there was no history of other systemic disease except HIV positive. High dose intravenous corticosteroid injection being followed by oral corticosteroid gave no improvement of the visual function.

#### S555

##### OPTIC NEUROPATHY IN TWO BROTHERS

Gu Xinzu, China

**Case:** A 15-year-old boy presented to his hometown's local hospital with complaints of diminution of vision in both eyes almost simultaneously 3 years ago. His visual loss was painless and progressed rapidly. Initially bilateral optic neuritis was diagnosed and corticosteroids, as well as neurotropsins, were given. The boy experienced visual recovery to some extent after treatment. Subsequently, his elder brother, a 17-year-old boy, had similar diminution of vision, which was characterized by bilaterality and painlessness. His visual loss progressed gradually for more than 2 months. The diagnosis and treatment were same as his brother's. Unlike his younger brother, this boy had no improvement in visual acuity.

##### Examination and findings:

The younger one: VA: OD 0.5, no ametropia; OS 0.01, +0.50DC x 90°=0.01. Corneas were transparent in both eyes, with normal anterior chambers. Two pupils were circular and equal in size D=3 mm. Delitescence of pupillary light reflex was significantly prolonged bilaterally. Lenses were crystal and vitreous stayed clear. Fundus examination demonstrated pale optic discs (more severe in the right side), slightly constricted arteries and veins, but no foveate glisten. Perimetry revealed enlarged physiological blind

spots and significantly decreased photosensitivity in the central visual field of both eyes. In VEP: FVEP test, large square-shaped waves were shown with significant prolonged delitescence and reduced amplitude in the right eye, but no abnormality was detected in the left. There also abnormal wave shapes in FVEP test in both eyes. In addition, PV-16 test was performed and indicated almost normal color vision in both eyes.

The elder one: VA: OD 0.1 +1.75DS+0.50DC x 105°=0.2 VA OS 0.1,+2.00DS=0.2. Corneas were transparent in both eyes, with normal anterior chambers. Two pupils were circular and equal in size D=3 mm). Delitescence of pupillary light reflex was significantly prolonged bilaterally. Lenses were crystal and vitreous stayed clear. Fundus examination demonstrated hyperemic red optic discs with blur edges and mild edema. Arteries and veins were slightly dilated and foveate glisten was not seen. Perimetry revealed enlarged physiological blind spots and significantly decreased photosensitivity in the central visual field of both eyes. No abnormal wave shapes were shown in VEP: FVEP test. In FVEP test abnormal wave shapes were found with significantly prolonged delitescence, though the amplitude was normal. MtDNA test revealed the 11778 mutation in both of these two patients.

**Discussion:** Three mitochondrial DNA mutations (11778, 3460 and 14484) account for more than 90% of LHON cases, with the 11778 mutation responsible for the majority. And the 11778 mutation was detected in both of our patients mentioned above. In the process of LHON, spontaneous recovery of visual acuity may take place to a various extent. It is known that this phenomenon is associated with the mutational site. Generally, the incidence rate of spontaneous visual recovery in the 11778 mutation is just about 4-7% while it can be as high as 65% in the 14484 mutation, and in the 3460 mutation, the rate ranges between 7% and 65%. In our case, the visual acuity of one of the affected eyes improve to 0.5, and no abnormalities were found in FVEP in both eyes. Otherwise, colour vision is usually affected in most cases of LHON, but it was almost normal in both of our patients. These results suggest that there are some specialties in this case. In China, the average age, at which symptoms or signs of LHON are firstly presented, is 19.1 year, consistent with that reported abroad. And in respect to the 11778 mutation, the average onset age is about 19.3 year. We conclude that in order to prevent misdiagnosis, mtDNA examination should be performed routinely in cases that teenagers complain about severe bilateral visual loss associated with inflammatory appearance of their optic discs.

## **Symposium 10 – Allied Health Orthoptic Meeting**

11 June 2006, Sunday, 1400-1530 Hrs

Room 306, Level 3

**S556**

### **HEADACHE AND ASTHENOPIA**

Sharon Tow, Singapore

Tired eyes and headache are complaints commonly encountered in our practice. Awareness of asthenopia as a cause for these disturbing symptoms is important as such patients often benefit significantly from the appropriate vision therapy.

**S557**

### **ORTHOPTIC TREATMENT OF ASTHENOPIA**

Zoran Pejic, Singapore

Tremendous amount of literature documents the effectiveness of Orthoptic Vision Therapy in treating functional vision disorders such as eye coordination and alignment as well as oculomotor and focusing difficulties.

Orthoptist are engaged in prevention and remediation of disorders of functional vision-visual efficiency, through the examination, diagnosis and treatment of related systemic manifestations, which are established to preserve and enhance visual functions and therefore quality of life.

Asthenopia is a very common eye problem with wide range of symptoms interfering with effective visual functioning and consequently with quality of life. The modern life style, particularly prolonged usage of computers and excessive close work are inevitable environmental features that cause deterioration of functional vision. Accommodative disorders such as infacility or excessive accommodation and reduced fusional vergence are the most common clinical features in these groups of patients.

Orthoptic treatment is found to be very effective in treatment of asthenopia, either through recommendation of correction of the refractive error or through orthoptic vision therapy-orthoptic exercise.

Clinical features, diagnosis and effectiveness of the orthoptic treatment will be discussed for certain cases.

**S558**

### **COGNITIVE VISION AND ITS DISORDERS IN CHILDREN**

Gordon Dutton, UK

As eye professionals we need a basic model of how the higher visual system works and its common disorders. This presentation

aims to provide an outline of such a model. Our ability to survey a visual scene, locate and recognise an object of interest, move towards it and pick it up, recruits a number of complex cognitive higher visual pathways, all of which are susceptible to damage. The visual map in the mind needs to be co-located with reality and is primarily plotted by the posterior parietal lobes, which interact with the frontal lobes to choose the object of interest. Neck and extraocular muscle proprioceptors are probably responsible for maintaining this co-location when the head and eyes move with respect to the body. Recognition of what is being looked at is brought about by comparing the visual input with the 'image libraries' in the temporal lobes. Once an object is recognised, its choice is mediated by parietal and frontal lobe tissue. The parietal lobes determine the visual coordinates and plan the visually guided movement of the limbs to pick it up, and the frontal lobes participate in making the choice. The connection between the occipital lobes and the parietal lobes is known as the dorsal stream, and the connection between the occipital lobes and the temporal lobes, comprises the ventral stream. Disorders of neck and extraocular muscle proprioception are 'peripheral' causes of impaired visually guided movement, while bilateral damage to the parietal lobes can result in central impairment of visually guided movement, or optic ataxia. Damage to the temporal lobes can result in impaired recognition, problems with route finding and poor visual memory. Deficits in cognitive visual function can occur in different combinations in both children and adults depending on the nature and distribution of the underlying brain damage. In young children the potential for recovery can lead to significant improvement in parietal lobe function with time. Patients with these disorders needs characterisation of their deficits and a structured positive approach to their rehabilitation.

**S559**

### **THE ACCURACY OF CONVERGENCE WHEN THE NEAR TARGET IS NOT ON THE MIDLINE**

Elaine Cornell, Australia

**Introduction:** Although orthoptists usually assess convergence by moving a target closer to the eyes along the midline (similar to 'pursuit' movement), in everyday life we normally make quick changes of fixation to a near target, sometimes on the midline but more often it is displaced to one side. This requires asymmetrical convergence. The dynamics of these movements are now well known, and they are usually brought about by the highly integrated action of conjugate and disjugate mechanisms, both of which are expressed preferentially in fast, saccadic movements. In an asymmetrical situation, where one eye needs to converge more than the other, the accuracy of this movement may be affected if the eye that normally fails on convergence is the one that needs to make the larger movement.

The purpose of this study was to evaluate:

1. Whether the accuracy of ocular alignment following a convergence movement is affected by whether the movement is symmetrical (near object on the midline) or asymmetrical (near object displaced to one side), and
2. Whether the accuracy of asymmetrical convergence is related to the eye that normally 'fails' when testing the convergence near point.

**Method:** The accuracy of binocular fixation was assessed in twenty two subjects after converging 10° symmetrically (5° each eye) and asymmetrically to the right and left (2.5° one eye, 7.5° the other eye, or 10° with one eye only). For each subject ocular dominance was assessed by a sighting test and also by noting the eye that failed at the convergence near point.

**Results:** All subjects, except one, maintained fixation with the right eye at the convergence near point, that is, the left eye 'failed' in almost every case. Eighteen subjects had right eye dominance and four were left eye dominant as assessed by the sighting test.

In over half of the subjects (13/22) the accuracy of binocular alignment decreased as the position of the near target moved to one side. In eight subjects errors increased as the target was shifted to the left, in the other five the errors increased as the target was shifted to the right. In most of these cases, the errors were made by the eye that was making the larger adducting movement – this was more frequently the right eye.

**Conclusions:** Binocular fixations for near are more likely to be imprecise following asymmetrical vergence than those following symmetrical vergence. The findings from this study suggest that it is the adducting eye that tends to be less precise. This was most commonly the right eye, resulting in more errors on left gaze. Although there was a strong association between the right eye as the dominant eye and the eye that was less precise, it is not readily apparent how this would form a causal relationship. These findings are therefore not directly related to ocular dominance.

#### S560

##### THE ASSESSMENT OF THE APPARENTLY BLIND INFANT

Tony Moore, UK

**Purpose:** To discuss the clinical assessment and investigation of an infant with poor vision.

**Methods:** Literature review and summary of the authors own practice.

**Conclusions:** One of the most difficult problems in paediatric ophthalmology is the assessment and diagnosis of an infant who presents with poor visual responses. In most cases the eye examination will reveal an obvious cause for the visual impairment such as cataract or other developmental abnormality of the eye. However there is a substantial minority of infants who have poor vision but a normal eye examination. The differential diagnosis includes retinal dystrophies, ocular albinism, cortical visual impairment,

delayed visual maturation and saccade initiation failure. This talk will discuss how to approach this clinical problem logically, with appropriate investigations in order to arrive at the correct diagnosis.

#### S561

##### HOW TO HANDLE DIFFICULT CHILDREN

Linley Seenyen, Singapore

Assessment and examination of children — particularly those below 6 years of age - can be a dread in the clinic.

The moment they enter your consultation room and you see the fear in their eyes, you start thinking twice before proceeding to examine the child. You can keep children calm in the chair, obtain excellent assessment results and enjoy the entire experience if you employ these tips.

The aim of this topic is to share simple tricks and tips, some of which you may already know, to make the examination and assessment of a child an enjoyable experience.

### Symposium 11 – Refractive Innovations in Refractive Surgery

11 June 2006, Sunday, 1550-1740 Hrs

Hall 603, Level 6

#### S562

##### REFINING VISUAL QUALITY AND ACUITY WITH THE NEXT GENERATION OF LASER VISION CORRECTION

Marguerite McDonald, USA

**Purpose:** To compare variable single spot size (SSS) beams with variable spot size (VSS) beams for the creation of precise ablation shapes.

**Setting:** University practice.

**Methods:** A simulation model was developed to compare VSS with SSS for RMS and fitting error. Results of the simulation were evaluated by comparing the actual ablation to the ideal ablation. Error was reported as "uncorrected" microns of RMS. The lower the RMS level, the more accurate the ablation. Myopic, hyperopic, myopic astigmatism, hyperopic astigmatism, mixed and therapeutic cases were simulated.

**Results:** With a fitting error comparison the RMS was always better for VSS. With VSS, the achieved shape is excellent, even with an extremely complex shape. Aberration reduction is extremely high. For ablation speed, single spot scanning at 60Hz and Variable Spot Scanning at only 20Hz to make it a very fair comparison, it's still much faster to do VSS ablations in every single case.

**Conclusion:** For fitting and correcting simple and complex shapes, VSS performs better than SSS. For the same refractive correction, VSS is faster than SSS.

## S563

**ASPHERIC LASIK — RESULTS OF A MULTICENTRE TRIAL**

Chan Wing Kwong, Singapore

**Purpose:** To assess the efficacy and safety of an aspheric LASIK algorithm for the reduction of higher order optical aberrations induced in the correction of myopia and compound myopic astigmatism.

**Methods:** One hundred and seventy eyes of 85 patients were enrolled in a multicentre, prospective, randomized, controlled trial. Both eyes of a patient were assigned to undergo either Zyoptix Tissue Saving LASIK (TS group) or Zyoptix Aspheric LASIK (AS group). Preoperatively, the mean myopia was  $-4.58D \pm 1.92$  (range  $-1.0$  to  $-8.5D$ ) in the TS group and  $-4.31D \pm 1.94$  (range  $-1.0$  to  $-9.0D$ ) in the AS group. The mean astigmatism was  $-0.71D \pm 0.67$  (range  $0$  to  $-2.75D$ ) in the TS group and  $-0.81D \pm 0.71$  (range  $0$  to  $-2.75D$ ) in the AS group. All surgeries were performed with the Zyoptix XP microkeratome (Bausch & Lomb, USA) and the Technolas 217z100 excimer laser (Bausch & Lomb, USA).

**Results:** One month postoperatively, the mean spherical equivalent refraction was  $0.07D$  in the TS group and  $-0.06D$  in the AS group. Higher order aberrations were induced by  $0.35 \mu$  RMS in the TS group and  $0.15 \mu$  in the AS group. Spherical aberration induction was  $0.22 \mu$  in the AS group and  $0.04 \mu$  in the TS group. Vertical coma induction was  $0.26 \mu$  and  $0.13 \mu$  in the AS and TS groups respectively. The corneal asphericity (Q factor) was increased by  $0.73$  in the TS group and  $0.27$  in the AS group ( $p < 0.00001$ ).

**Conclusion:** The Zyoptix Aspheric algorithm is effective and safe for the correction of myopia and compound myopic astigmatism. The aspheric algorithm induces less higher order optical aberrations compared to the Zyoptix Tissue Saving algorithm, particularly with regards to spherical aberration and vertical coma. The aspheric algorithm also preserves the corneal asphericity significantly better after LASIK.

## S564

**IRIS REGISTRATION — THE NEXT STEP IN WAVEFRONT-GUIDED LASIK**

Michael Knorz, Germany

**Purpose:** Excimer laser ablation profiles have evolved from "standard" spherical profiles to "wavefront-optimized" profiles, and to truly customized wavefront-guided profiles. Wavefront-optimized profiles compensate the spherical aberration induced by the ablation in a normal eye, while wavefront-guided ablations measure the overall wavefront of the individual eye, and correct it. The success of all treatments is influenced by the match of the measured and the treated area. In wavefront-guided ablations, iris registration provides a means of matching wavefront measurement and laser ablation.

**Methods:** We used the Visx STAR S4 IR laser system (AMO Inc.) and the Visx WaveScan aberrometer (AMO Inc.) to perform customized ablations. In this system, a picture of the iris is taken during wavefront measurement and again under the laser. Iris registration then compensates for eye rotation and pupil centroid shift to provide a perfect match of the laser ablation to the wavefront map. We measured the amount of eye rotation and the size of the pupil centroid shift for all eyes treated. In addition, treatments were simulated without compensation of rotation and pupil centroid shift.

**Results:** Mean eye rotation was  $2.8^\circ$  ( $0.01^\circ$  to  $15^\circ$ ) and mean pupil centroid shift was  $0.3 \text{ mm}$  ( $0.02$  to  $0.8 \text{ mm}$ ). Simulation of the treatments without compensation of these errors showed a significant undercorrection of astigmatism and a significant induction of coma.

**Conclusion:** Compensation of eye rotation and pupil centroid shift using iris registration provides a perfect match of wavefront measurement and laser ablation. Customized wavefront-guided treatments with iris registration induce significantly less higher-order aberrations than treatments without iris registration.

## S565

**ZYOPTIX PERSONALIZED LASIK WITH IRIS RECOGNITION**

Robert Edward Ang, The Philippines

**Purpose:** To assess the safety, efficacy and predictability of wavefront-guided LASIK treatments using the Zyoptix Personalized system with Iris Recognition (IR).

**Method:** Wavefront measurements with IR were obtained in 288 eyes of 197 patients. LASIK was performed in these eyes using the Zyoptix Personalized platform with IR. The results were retrospectively reviewed and analyzed.

**Results:** Preoperatively, the mean spherical equivalent (SE) was  $-4.56D$  (range  $-0.37$  to  $-10.5D$ ) with mean sphere of  $-4.18D$  and mean cylinder of  $-0.75D$ . At 3 months postoperatively, mean SE was  $-0.07 \pm 0.29D$ , mean sphere was  $-0.06 \pm 0.34D$  and mean cylinder was  $-0.25 \pm 0.28D$ . Uncorrected visual acuity was 20/40 or better in 98% of eyes, 20/20 or better in 76% of eyes and 20/16 in 12% of eyes. 20% gained one line of best spectacle-corrected visual acuity (BSCVA), 2% gained 2 lines of BSCVA, no eye lost  $\geq 2$  lines of BSCVA whereas 6% lost one line of BSCVA. 92% of eyes were within  $\pm 0.50D$  SE while 100% were within  $\pm 1.00D$  SE.

**Conclusion:** Zyoptix Personalized LASIK with Iris Recognition is a safe, effective and predictable procedure in treating myopia and myopic astigmatism.

**S566**

**WAVEFRONT-GUIDED LASIK USING LADAR 6000**

Rick Wolfe, Australia

**Purpose:** To assess ocular aberrations and mesopic contrast sensitivity following wavefront-guided myopic keratorefractive surgery.

**Method:** We performed retrospective analysis of outcomes of over 1000 consecutive cases of myopic (including highly myopic) wavefront-guided surgeries and standard surgeries as controls. Usual clinical indices were recorded postoperatively as well as mesopic contrast sensitivity and aberrometry.

**Results:** No significant change in total aberrations, spherical aberration, coma or in mesopic contrast sensitivity was recorded for wavefront-guided cases. LASEK cases, despite their selection being based on suspicion of forme-fruste keratoconus (FFK), achieved slightly better results than refraction-matched LASIK cases.

**Conclusion:** Degradation of some indices of vision has been a constant feature of outcomes of keratorefractive surgery. Outcomes of wavefront-guided laser refractive surgery with this system mean this is no longer necessarily the case.

**S567**

**THE APPLICATION OF ONLINE PACHYMETRY AND ACTIVE ROTATIONAL EYETRACKING DURING LASIK**

John Chang, Hong Kong

Latest development in online technologies during the laser ablation delivers more safety and effectivity for LASIK treatments. A short introduction into the technology is given. The new eyetracker system includes intraoperative rotational eyetracking. This enables the surgeon to compensate active and passive eye movements during excimer laser ablation in 4 dimensions. With Optical Coherence Pachymetre, the flap thickness can be measured easily and without contact. Moreover the ablation of the cornea is monitored during the treatment. These technologies have been used to support more than 300 LASIK treatments in our clinic. A discussion on the clinical outcomes and the benefits using this technology on Bausch & Lomb's new Zyoptix Aspheric LASIK treatment will be provided.

**S568**

**A CLOSE LOOK AT THE INTRALASE FS LASER — ITS ADVANTAGES, DRAWBACKS AND LATEST GENERATION LASER**

Lee Hung Ming, Singapore

Since its introduction, Intralase Femtosecond (FS) Laser has continued to divide LASIK surgeons into 2 camps. While its

proponents hail it as the emerging gold standard of flap cutting, its detractors feel that its visual outcome and flap predictability do not justify its cost. As both the Intralase FS laser and the mechanical microkeratome continue to evolve and improve, the stage is set for a face-off.

This paper looks at the safety profile, mean flap thickness and flap predictability of Intralase in comparison with mechanical microkeratome, drawing on the author's experience in both the technology. It also discusses the advantages, specific drawbacks and visual outcome of Intralase FS laser. The specific features and advantages of the latest high-speed FS laser is also discussed.

**S569**

**CAN INTRALASE MAKE ALCON CUSTOM CORNEA WAVEFRONT LASIK BETTER?**

Michael Lawless, Australia

**Purpose:** To investigate whether IntraLase could improve the results of Custom Cornea LASIK for myopia and myopic astigmatism.

**Method:** Two groups matched for age and optical error, were compared. The first group had an Amadeus microkeratome and the second IntraLase flap creation. Both groups received wavefront excimer ablation with the Alcon LADARWave and LADARVision systems. Refractive error, uncorrected and best corrected acuity, photopic and scotopic contrast sensitivity, change in higher order aberration profile and psychometric analysis were undertaken for both groups, one and three months after LASIK.

**Results:** There was no statistical difference in refractive error between the groups. There was a trend toward, and improvement in, BCVA in the IntraLase group. There was no difference in scotopic contrast sensitivity, but there was a statistically significant improvement in photopic contrast sensitivity in the IntraLase group. The higher order aberration profile for coma, and spherical aberration, were better in the IntraLase group, and psychometric testing (subjective vision index) was better in the IntraLase group.

**Conclusion:** When wavefront LASIK is combined with IntraLase flap creation, it appears to improve some psychophysical and psychometric results compared to conventional mechanical flap creation. This may be due to better control of the LASIK anatomy with IntraLase.

**S570**

**RESULTS OF CUSTOMISED REPAIR WITH A NEW PLATFORM — MEL 80/NEW CRS MASTER**

Frank Goes, Belgium

**Purpose:** To develop and evaluate a new approach for Repair after previous Refractive Excimer laser surgery, combining Topography and Wavefront analysis.

**Methods:** The calculation for the ablation patterns is done with a new Zeiss-platform for customization. The existing CRS-Master with the Shack-Hartmann-Aberrometer "WASCA" was completed with an "Atlas" Topographer. The calculation now is based upon Topographic AND Aberrometric information while taking the topographic picture as the master information but taking additional aberrometric information (e.g. the spherical aberration) of the whole eye into account. This enables the correction of corneal irregularities which are not analysed with sufficient resolution by aberrometers, and additionally improves the wavefront outcome of the eye.

**Results:** Cases with decentrations, asymmetrical cylinders, central irregularities and too small optical zones were selected to demonstrate the efficacy and safety of this platform. The three month results of the first 22 treated eyes demonstrated a higher success rate than customized treatment based only upon topography. The subjective complaints disappeared in all but three eyes. Topography and Wavefront improved in 18/22 eyes. No eye lost more than one line. The mean UcvA improved from 20/50 before to 20/40 after treatment and the mean Bcva improved from 20/30 before to 20/25 afterwards. Results will be further analyzed in detail upon completion of the 3 months follow-up.

**Conclusion:** Customized laser, using a combined approach including -Topography and Aberrometry data - is highly successful and safe.

### S571

#### CUSTOMVIS SOLID STATE REFRACTIVE SURGERY TODAY

Pallikaris Ioannis, Greece

**Purpose:** To evaluate the efficacy and safety of PRK and LASIK in the correction of combined myopic astigmatism with the solid state laser system.

**Setting:** Operation were performed in the Institute of Vision and Optics-Greece, SynsLaser Clinic-Norway and The Lasik Surgery Clinic-Singapore.

**Method:** A study was conducted on 86 eyes of mean age at  $28.3 \pm 5.3$  years, which underwent PRK and on 180 eyes of mean age at  $33.8 \pm 9.3$  years which underwent LASIK. The PRK group had a mean SEQ of  $-2.93 \pm 0.93D$  ( $-1.13$  to  $-4.0$ ) and mean cylinder of  $-0.62 \pm 0.43D$  ( $-0.25$  to  $-1.75$ ). The LASIK group had a mean SEQ of  $-5.22 \pm 2.69D$  ( $-17.0$  to  $-1.00$ ) and a mean cylinder of  $-0.78 \pm 0.75D$  ( $-4.00$  to  $-0.00$ ). The CustomVis quintupled Nd:YAG Solid State laser at 213 nm was used.

**Results:** After 30 days follow-up for the PRK mean RSE was  $-0.25 \pm 0.40D$  and mean UCVA was  $0.94 \pm 0.18D$ ; 18 gained 2 lines (21%), 30 gained 1 line (35%), 37 had no loss or gain of lines (43%), 1 eye lost 1 line (1%). For the LASIK group at 15 days to 30 days follow-up the mean RSEQ was  $+0.09 \pm 0.58D$  and the mean

UCVA was  $0.81 \pm 0.22D$ ; 3 eyes gained 2 lines (2%), 5 eyes gained 2 lines (3%), 158 eyes had no loss or gain of lines (88%), 11 eyes lost 1 line (6%), 3 eyes lost 2 lines (2%).

**Conclusions:** PRK and LASIK were both effective and safe in the correction of myopic astigmatism.

### S572

#### REFRACTIVE SURGERY IN NAVAL AVIATION – PAST, PRESENT, AND FUTURE

Steve Schallhorn, USA

**Purpose:** To discuss how innovations in refractive surgery can provide safe and effective alternatives to glasses and contact lenses in aviators.

**Methods:** Two large, multicenter clinical trials were conducted to study the effect of surface ablation among 1) designated aviators, and 2) student aviators. Recent innovations (wavefront guided ablation and femtosecond flap creation) were studied to determine the role that LASIK can play in treating aviators.

**Results:** 760 designated aviators were treated with conventional surface ablation. All returned to flight status by 3 months post-operatively and 90% achieved 20/20. Hundreds of student aviator candidates were treated, of which 626 reached flight training. To date, 178 have completed. When compared to non-treated students, the surface ablation group had a lower attrition rate during flight training and equal or better flight scores. While surface ablation in aviators has been very successful, the most important advantage of LASIK is faster return to flight duty. Technologic advances in LASIK (wavefront guided surgery as well as femtosecond flap creation) overcome many of the inherent disadvantages of performing LASIK in aviators, including flap stability and the quality of vision.

**Conclusion:** Surface ablation in Naval Aviation has been very successful to date and very well-received. Recently Navy policy has been changed to allow surface ablation for both designated aviators and students who enter flight training. Studies have now demonstrated enhanced quality of vision outcomes with WFG LASIK using laser flaps has generated interest and support for a large program to study this among Naval Aviators.

## **Symposium 12 – Oculoplastics** **The Art and Science of Oculoplastic**

11 June 2006, Sunday, 1600-1730 Hrs  
Room 301-302, Level 3

### **S573**

#### **BREAD AND BUTTER OF EYELID INJURIES**

Fong Kee Siew, Singapore

This will be a comprehensive presentation on how to manage full thickness lid laceration as well as canalicular lacerations.

### **S574**

#### **BASICS OF ORBITAL TRAUMA MANAGEMENT**

Darmayanti Siswoyo, Indonesia

Facing the orbital trauma, should be kept in mind that may be we face with trauma of the facial skeleton which involves also fractures of the nose, zygomatic arc and dental arc. But the most frequent cases come to ophthalmologist can be divided into 5 type, fronto-orbital fracture, naso-orbital feature, tripod fracture which involves lateral, inferior orbital rim and zygomatic arc, inferior orbital rim and floor fracture, blow out fracture that involves only the orbital floor and or medial orbital wall without rim involvement. There are very rare cases of blow in fracture in which fracture fragments fill the orbital cavity and push the globe anteriorly. Establishing orbital fracture diagnosis should be done step by step, beginning with history taking: if there is any epistaxis, diplopia or hypesthesia. Then inspection, is there any asymmetry, contour deformity, flattening of the bridge nose, frontal area, maxillary area and cheek bone. Palpation should be done to reveal any crepitation, hypoesthesia and orbital rim discontinuation. The last procedure is a CT-scan examination.

Five steps in basics orbital fracture reconstruction should be as follows, exploration can be performed by bicoronal approach, subciliaris incision with lateral incision or with canthotomy lateral and lateral incision, inferior fornix conjunctival incision with canthotomy lateral and lateral incision, medial incision, or combination of those incisions. The second step, for new fracture, pull the fragment fracture to its normal position, while for old fracture, osteotomy should be done before pulling the fracture fragment to its normal position. The third step is to fixate all the fracture fragment either by prolene suture, wire or the best fixation material being plate and screw. The fourth step is closure of defects either by autogenous bone graft or synthetic material such as silicon, med-pore, film, titanium mesh and others. The last procedure should be soft tissues correction.

### **S575**

#### **BLINDING OCULOPLASTIC EMERGENCIES**

Alan McNab, Australia

Several oculoplastic emergencies may lead to blindness. These include:

- Orbital haemorrhage (traumatic or spontaneous)
- Orbital infection (bacterial or fungal)
- Penetrating orbital trauma and orbital foreign bodies
- Traumatic optic neuropathy
- Severe periocular burns
- Severe "malignant" exophthalmos/Graves' disease.

The clinical and imaging presentation of these disorders and their management will be summarized.

### **S576**

#### **BUILDING CONFIDENCE IN PAEDIATRIC OCULOPLASTICS**

Timothy Sullivan, Australia

**Purpose:** To give the general ophthalmologist confidence in assessment and management of common paediatric oculoplastic conditions.

**Method:** A case based presentation will be used to illustrate common paediatric oculoplastic conditions and their management.

**Cases:** Topics presented will include paediatric ptosis, congenital nasolacrimal duct obstruction, epiblepharon, dermoid and capillary haemangioma.

### **S577**

#### **BRINGING THE ART OF PTOSIS INTO YOUR PRACTICE**

Ashok Grover, India

**Purpose:** To present the author's approach to management of the wide spectrum of congenital ptosis and to help the audience incorporate the art and science of management of the condition into their practice based on appropriate clinical evaluation.

**Methods:** The clinical approach to evaluation and techniques of the surgical procedures for congenital ptosis based on author's experience of surgical management of over 2000 cases during the last 25 years.

**Results:** The congenital ptosis comprises congenital simple ptosis of varying severity and varying levator action, Jaw winking (Marcus Gunn) ptosis, blepharophimosis syndrome and ptosis with ocular motor abnormalities. A rational approach to management of the condition includes a meticulous evaluation a discussion with the patient to ensure a realistic expectation and choice of the appropriate surgical procedure. The surgical procedures include the Fasanella Servat Surgery, Levator resection, Frontalis Sling procedure including the Fascia Lata Sling surgery for management of

congenital simple ptosis. For jaw winking ptosis bilateral levator excision with bilateral fascia lata sling is the author's procedure of choice. For Blepharophimosis syndrome transnasal wiring with double Z plasty followed by bilateral fascia lata sling surgery gives the best results. For the cases of ptosis with superior rectus underaction or double elevator palsy, an appropriate extraocular muscle surgery corrects pseudoptosis and improves the Bell's phenomenon and allows the required ptosis surgery to be performed. The author's techniques and recommendations based on his experience is presented.

**Conclusion:** Congenital ptosis can be managed with extremely gratifying results in most cases by meticulous evaluation, choice and execution of appropriate surgical procedures and by ensuring realistic expectations from the patients.

#### S578

##### USES OF PERIOSTEAL FLAP IN THE EYELID RECONSTRUCTION

Zafar Ul Islam, Pakistan

**Purpose:** To describe the use of periosteal flap for posterior lamellar reconstruction where tissue is deficient near the canthi.

**Methods:** Retrospective case series. All the cases in which periosteal flap was performed for eyelid reconstruction were recruited for study. All the patients had tissue deficiency near canthal area and the posterior lamella was reconstructed by fashioning a periosteal flap.

**Results:** Periosteal flap was performed in 7 patients as a part of eyelid reconstruction. The cause of eyelid deficiency was trauma in three patients, basal cell carcinoma in 2 patients while 2 patients had sebaceous cell carcinoma. In 3 patients lateral lower eyelids were reconstructed with periosteal flap. While in one patients both medial and lateral oblique flaps were utilized in maximal Hughes flap procedure for the total lower eyelid defect. Postoperatively, 2 patients had relatively thin reconstructed eyelids while one patient had wound dehiscence which needed re-surgery. Over-all the results were good in all patients.

**Conclusion:** Periosteal flap is a useful procedure for the posterior lamellar reconstruction for the eyelid defect near the canthal angle. It also obviated the need for harvesting the graft elsewhere from the body.

#### S579

##### BREAKTHROUGHS IN LACRIMAL DRAINAGE SURGERIES

Geoffrey Rose, UK

The main true breakthroughs in lacrimal surgery lie in the improved understanding of lacrimal drainage dynamics, the role and expectations for lacrimal surgery, and in the understanding of mechanisms to enhance the success of surgical procedures.

The role of the "three compartment model" in lacrimal dynamics will be discussed, together with the concept of "volume" and "flow" symptoms and their relevance to the function and success of dacryocystorhinostomy.

Practical hints for improving the outcome of external DCR will be presented: the size and positioning of the rhinostomy; the "tricks" to aid suturing of mucosal flaps to enhance primary intention healing; the role and rational function of silicone intubation; and practical guidelines for the positioning of Lester Jones bypass tubes.

### Symposium 13 – Glaucoma AOGS-APAO

11 June 2006, Sunday, 1600-1730 Hrs

Room 303-304, Level 3

#### S580

##### NO TEARS PERIMETRY

Ivan Goldberg, Australia

Based on multifocal multichannel visual evoked potential technology, the Accumap™ perimeter tests 58 zones out to 26 degrees from fixation (32 degrees nasally). Near correction is required, pupil dilatation is not, and the test takes about 7 minutes per eye. Other than maintaining fixation, no patient response is required; the test is non-invasive, low "stress" with a minimal learning curve. The major challenge with this technology is the small signal to noise ratio. Adjustment of the cruciate electrode position over theinion, use of multichannels, adjustment of the signal amplitude based on the simultaneously recorded EEG conduction and repeated test runs permit signal enhancement and noise reduction.

Patients whose subjective perimetric tests prove to be unreliable or variable or both, are ideal for this relatively objective approach. In a clinical trial, 100 glaucoma patients with mild to moderate visual field loss were assessed with the Accumap™. The eye with the lesser defect(s) was chosen if both qualified. The defects of 95 of the 100 eyes were detected by the objective perimeter (OP) using the amplitude deviation plot alone. A further two were identified by the asymmetry analysis, yielding an overall sensitivity of 97%.

37 of these patients demonstrated a normal standard automated perimetric (SAP) test in their fellow eye. Of the 22 of these eyes that had an abnormal OP result, 19 also were thought to have a glaucomatous optic disc structure. The OP may therefore be able to detect damage before SAP. Intrasubject variability was about 15% for each eye.

OP proved adept at detecting neurological defects such as hemianopias, quadrantanopias and bitemporal defects from tilted discs. In optic neuritis, all cases showed latency delays, and in acute cases, amplitude reductions were evident. Advances in multifocal electroretinography also offer much promise in this regard.

In conclusion, OP shows promise for the diagnosis of glaucoma. It may also prove useful in detecting progressive damage in diagnosed cases.

### S581

#### COMMERCIALLY AVAILABLE PROSTAGLANDIN-RELATED COMPOUNDS AND PROSTANOID RECEPTORS

Makato Araie, Japan

**Purpose:** To study the involvement of prostanoid FP receptor in the IOP lowering effects of commercially available prostaglandin-related compounds.

**Method:** FPKO and wild-type (WT) mice were bred and acclimated under a 12-hr light-dark cycle. IOP was measured under general anesthesia by a microneedle method. To evaluate the effects of each drug, a single drop (3 micro liter) of each drug solution was applied topically in a masked manner to a randomly chosen eye. IOP reduction was evaluated by the difference in IOP between the treated and untreated control eye in the same mouse.

**Results:** The baseline IOP in WT and FPKO mice was  $15.0 \pm 0.2$  and  $15.0 \pm 0.3$  mm Hg (mean  $\pm$  SEM), respectively, during the day, and  $18.9 \pm 0.4$  and  $19.2 \pm 0.4$  mm Hg, respectively at night. At 3 hrs after instillation, latanoprost (10.9 and 23.2 % on average, daytime and nighttime, respectively), travoprost (15.9 and 26.1%), and bimatoprost (8.8 and 19.8%) significantly reduced IOP in WT mice both during the day and at night. Unoprostone significantly reduced IOP at night (13.7%), and tended to reduce IOP during the day (5.3%). In FPKO mice, latanoprost, travoprost, bimatoprost and unoprostone showed no significant IOP reduction. Bunazosin, a selective alpha-1 blocker, significantly reduced IOP in both WT and FPKO mice (22.1 and 22.2%).

**Conclusion:** As far as the effect of a single application in mice is concerned, the prostanoid FP receptor plays a crucial role in the IOP reducing mechanism of all commercially available prostaglandin-related compounds.

### S582

#### UPDATES ON SELECTIVE LASER TRABECULOPLASTY

Michel Belkin, Israel

Despite good pressure-lowering effects, extended and substantial clinical experience with laser trabeculoplasty, it is used relatively infrequently. Reasons include associated significant tissue disruption with consequent reluctance from re-treatment, lack of full understanding of the mechanism by which IOP is reduced and known complications. Selective Laser Trabeculoplasty (SLT) results in selective absorption of energy by trabecular pigmented cells, sparing adjacent cells and tissues from thermal damage. Morphologic studies demonstrated minimal tissue alteration following

treatment with SLT and comparative studies suggested similar IOP reduction by argon laser trabeculoplasty and SLT. Extensive clinical studies on open angle glaucoma patients show that the response rate after 1 year is from 59% to 96% of patients. The average IOP reduction is from 18% to 40%, lasting in some cases up to 5 years. Observed side effects have been transient and minor. There is preliminary data indicating that SLT is effective in primary angle closure glaucoma as well.

As SLT is efficacious in considerably lowering IOP practically without significant side effects it should be used either as initial treatment of glaucoma or when medical therapy is insufficient.

### S583

#### WHY DYNAMIC GONIOSCOPIC TESTING

Por-Tying Hung, Taiwan

Gonioscopic examination is essential for diagnosis and treatment of glaucoma. Angle-closure glaucoma, requires the most precise detail evaluation for a proper management.

From the advent of goniolens by Salesmann in 1914 until the modern development of gonioscopic image techniques, it is well recognized that the various factors affect the features of irido-trabecular contact and closely related to the judgment and evaluation. Today, we all well known the important evidence as reference is the dynamic changes of the angle picture during gonioscope by the compression of goniolens, or, such as illumination and papillary reaction affect the angle appearances during the UBM examination.

Based on this background the author shall discuss the factors involved in the gonioscopic examinations.

### S584

#### WHO NEEDS A GONIOSCOPY

Ravi Thomas, India

A comprehensive eye examination is necessary for diagnosis of all types of glaucoma. This includes asymptomatic PAC, PACG and eyes at risk for these disorders (PACS). It is important to remember that Gonioscopy is the gold standard examination for the diagnosis of angle closure and that POAG is essentially a verdict of exclusion. With a high prevalence of angle closure in the region we could argue for gonioscopy as a part of the routine evaluation of all patients over the age of 40 years. That is the ideal, but considering the constraints of busy, understaffed clinics, is there a role for surrogates such as the van Herrick test, flashlight test and pupillary ruff abnormalities?

In a "screening" situation, the combined specificity of a positive van Herrick, combined with a raised IOP is almost diagnostic of angle closure. The presence of a pupillary ruff abnormality can

be combined with the above tests to increase the specificity for PACG.

A clinical setting is different. If such tests are positive in a clinic situation, the ideal (gonioscopy) must still be used to confirm the diagnosis. However if these tests are negative, the combined sensitivity is such that the chances of angle closure are remote and perhaps gonioscopy can be avoided. Pupillary ruff abnormality has been reported to have a high sensitivity for PACG; absence of such an abnormality, combined with a negative van Herrick can also be used in a similar manner for PACG.

This guideline is only to address PAC, PACG and PACS. Gonioscopy is still required for glaucoma suspects, raised IOP and for other relevant indications. Use of this guideline for performing gonioscopy may allow us to approach the ideal of a comprehensive examination without too much compromise.

### S585

#### DIAGNOSTIC CHALLENGES OF ASIAN GLAUCOMA

Prin RojanaPongpun, Thailand

It is estimated that 57% of world glaucoma is in Asia. Recent population-based surveys demonstrated that more than 80% of glaucoma were undiagnosed cases. Studies also showed that intraocular pressure (IOP) in Asian is lower than Caucasian. As high as 92% of POAG cases, in certain Asian population, could have IOP of  $\leq 21$  mm Hg. This makes IOP not very helpful in screening new case especially in East Asian population where a so-called normal tension glaucoma is the most dominant form of glaucoma.

As high as 85% of angle closure glaucoma occurs in Asia. Angle closure, a condition that could lead to glaucoma, is treatable and curable if intervention is initiated early enough. Better screening tools are needed to guide us to who are at risk. A better angle assessment tool that may help us differentiate different mechanisms causing angle closure is needed. Integration of information from both screening and assessing angle will guide us in whom treatment will be beneficial and cost-effective.

Although structural changes become the earliest and most important as diagnostic keys in glaucoma, many parameters are adopted from Caucasian database that might not necessary applicable to Asians. Disc parameters are known to be different between races. This certainly poses a need to develop a more Asian customized normative database to be used for such critical analysis. Teaching and training glaucoma diagnosis is an important task. Modules on disc examination as well as angle assessment are necessary. Strategies in implementing and quality assessment of trainees at different levels need to be developed. A real challenge is to make diagnostic tests for glaucoma accessible by majority of Asian population.

### S586

#### PATIENT COMPLIANCE IN GLAUCOMA MANAGEMENT

Ronald Gross, USA

**Purpose:** To discuss the impact of patient compliance in the care process.

**Methods:** Numerous factors are involved in compliance including patient-specific factors, disease-specific factors, and medication-related factors. Assessment of the factors must be individualized. Recently, a method of evaluating patient compliance has been introduced that provides a reminder alarm and also records the time and number of drops delivered over the course of follow-up.

**Results:** Unfortunately, prior to the use of this novel device, there is little data to evaluate patient compliance. Previous data evaluates the use of older medications and may not be pertinent.

**Conclusions:** Compliance is a multifactorial behavior. Hopefully, new instrumentation will allow a better understanding of compliance rates as well as factors available to improve patient compliance.

### S587

#### THE COLORED GLAUCOMA GRAPH — AN ESSENTIAL AID IN THE PROPER CARE OF PATIENTS

George Spaeth, USA

Patients hope that their physicians will help them maintain, restore or even enhance their well-being. Unless physicians also consider the well-being of the person as the desired outcome, such a goal is not likely to be achieved.

Before any treatment can be considered, the physician must first have a good idea what will happen to the patient in the absence of treatment.

The Colored Glaucoma Graph graphically presents the patient's current state of health, the rate of change, and allows determining where the patient is likely to go, providing the essential information that must be known in order to make treatment rational and successful. A valid, reproducible, user-friendly unit for the "Y" axis is the Disc Damage Likelihood Scale, which extends from the earliest stages of glaucoma to the most far advanced.

Units on the "X" axis are years, with a life expectancy which has been calculated for each individual based on age, gender, and essential health and lifestyle characteristics.

The Colored Glaucoma Graph is divided into three sections — Disc Damage Likelihood Scale ("DDLS") stages 0-4 being the green zone in which it is not possible to determine if damage has actually occurred. The yellow zone indicates that damage is already present, though not enough damage that the patient is aware of any change in function or disability. The yellow zone is indicated by DDLS stages 5, 6 and 7. When patients have developed sufficient glaucoma damage that they become disabled in some way

then they are in the red zone, DDLS stages 8-10. A patient in the yellow, asymptomatic damage zone needs treatment which is sufficiently successful and vigorous to prevent them moving into the red, disabled zone. In contrast, when patients are already in the red zone, any further deterioration is associated with the worsening of symptoms and, therefore, treatment is designated to prevent any further damage and which holds the hope of recovery.

**S588**

**EFFECT OF ALPHA-2 AGONIST ON EXPRESSION OF FIBRONECTIN AND SMAD PATHWAY IN SUBCONJUNCTIVAL FIBROBLASTS ACTIVATED BY TGF-BETA**

Gong Je Seong, Korea

After filtering surgery, the wound healing process occurs in normal condition, but the excessive scar formation in the sclerotomy site or bleb may induce the resistance in the aqueous outflow making the intraocular pressure higher, resulting in the surgery failure. The process of the scar formation occurs by infiltration of inflammatory cells, cellular proliferation due to subconjunctival fibroblasts activation, and the formation of excessive extracellular matrix. In the process after filtering surgery, TGF-beta acts as a crucial role. Smad family protein transduces the signaling of TGF-beta between the cellular surface receptor and gene promoter. In this study, we tried to find the signaling process in secretion of the extracellular matrix such as fibronectin after treating the subconjunctival fibroblasts with selective alpha-2 agonist, brimonidine, and TGF-beta, and using it as a guideline in choosing an appropriate antiglaucoma medication.

**Symposium 14 - Uveitis  
Updates on Diagnosis and Therapy**

11 June 2006, Sunday, 1600-1730 Hrs

Room 305, Level 3

**S589**

**CLINICAL FEATURES OF VOGT-KOYANAGI-HARADA DISEASE**

Shigeaki Ohno, Japan

Vogt-Koyanagi-Harada disease (VKH disease) is quite common among the Mongoloid population, but is rare in Caucasian people. Clinical features of VKH disease are usually divided into 3 stages; prodromal stage, ophthalmic stage, and convalescent stage. In the prodromal stage, headache, pain in the deep orbit, vertigo, nausea, and flu-like symptoms suddenly appear.

Several days later, ophthalmic stage follows, and bulbar conjunctival hyperemia, blurred vision, tinnitus, hearing loss,

pleocytosis in CSF, and scalp hypersensitivity occur. Conjunctival hyperemia appears in 80% of the patients in the early stage. VKH disease begins as bilateral posterior intraocular inflammation with exudative retinal detachment in almost all patients. No inflammatory cells are seen in the anterior chamber or in the vitreous in the early stage of the disease. The inflammation gradually progresses to the anterior segment, but it is usually milder than that in the posterior segment.

One or two months later, convalescent stage follows, and acute severe inflammation gradually subsides. In this stage, Sugiura's sign (perilimbal vitiligo), depigmentation of the ocular fundi, skin and hair, and sometimes scimitar sign appear. Angle depigmentation is another important sign which has not been paid much attention.

The mainstay of the treatment is systemic corticosteroids. Large dose or pulse therapy of systemic corticosteroids in the early stage of the disease seems effective not only for the clinical manifestations but also for the immunological improvement.

The exact cause of this disease is still obscure, but molecular genetic mechanisms closely associated with HLA-DRB1\*0405 are one of the important etiological factors.

In this presentation, clinical features of VKH disease will be discussed.

**S590**

**OCULAR TUBERCULOSIS — NEW MIMICKER OF AN OLD DISEASE**

Khalid Tabbara, Saudi Arabia

Tuberculosis is a leading cause of mortality and morbidity worldwide. Recent evidence has suggested that strains of *Mycobacterium tuberculosis* are becoming resistant to available antimicrobial agents. The resurgence of tuberculosis raises the possibility that ophthalmologists may encounter more ocular complications due to tuberculosis.

Tuberculosis affects the anterior and posterior segments of the eye as well as the ocular adnexa. According to the World Health Organization (WHO), it is estimated that one-third of the world's population is infected with *Mycobacterium tuberculosis*. In the United States, the prevalence of tuberculosis has been rising after decades of decline. Although tuberculosis is a subclinical disease in the majority of patients who are immunocompetent, a subset of those who are infected may develop pulmonary or extrapulmonary disease. Prompt diagnosis and early treatment of active tuberculosis is important to prevent severe debilitating disorder that may pose a threat to the patient and the surrounding population.

**S591****CYSTOID MACULAR EDEMA**

Glenn Jaffe, USA

**S592****BEHÇET'S DISEASE – CURRENT AND FUTURE THERAPIES**

Annabelle Okada, Japan

**Purpose:** To summarize current and future therapies for uveitis in Behçet's disease.

**Methods:** MEDLINE search and analysis of literature from the past few years.

**Results:** Large, long term follow-up studies have shown improved visual outcomes for Behçet's disease in recent years when compared to decades ago, presumably due to the more aggressive use of immunosuppressive agents. This commonly entails first-line use of a single immunosuppressive agent, often cyclosporine. For recurrent or refractory disease, additional immunosuppressive drugs or combination low dose corticosteroids are then considered. Although this therapeutic approach has led to improved outcomes overall, severe inflammatory attacks recur in some patients while others become intolerant of various side effects. Already in limited use for ocular Behçet's disease, therapeutic strategies may one day include the routine use of infliximab, interferon- and/or granulocytapheresis. Each of these future therapies has been evaluated in small studies with reportedly positive results that await confirmation in larger scale clinical trials.

**Conclusion:** Behçet's disease remains one of the major challenges for uveitis specialists worldwide. However, recent scientific advances give hope for improved visual outcomes in this potentially blinding disorder.

**S593****SPOTTING THE MASQUERADE**

Muhaya Mohamad, Malaysia

Intraocular inflammation can affect various anatomical segments of the eye. The presence of cells in the eye does not always indicate inflammation and may be due to malignancy. Special features to suggest malignancy include steroid non responsiveness, first episode of uveitis in elderly and presence of constitutional symptoms. The approach to ruling out Masquerade syndromes that mimic intraocular inflammation will be discussed and interesting cases illustrated.

**S594****ROLE OF PCR IN UVEITIS**

Chee Soon Phaik, Singapore

**S595****HLA-B27 UVEITIS**

Lim Wee Kiak, Singapore

**Symposium 15 – Glaucoma  
Glaucoma – Latest Advances**

12 June 2006, Monday, 0830-1000 Hrs

Ballroom 2, Level 2

**S596****ADVANCES IN OPTIC DISC AND RETINAL NERVE FIBER LAYER IMAGING**

Michael Kook, Korea

In this presentation, three of the more promising, easy to use and popular imaging devices are to be discussed. The HRT (Heidelberg Instrument, Heidelberg, Germany) is a confocal scanning laser ophthalmoscope. Studies have reported that HRT measurements are highly reproducible and HRT parameters can discriminate between healthy eyes and eyes with glaucoma. A drawback with this device is that the user must define an ellipse along the rim of the optic nerve. The new HRT 3 software provides an option for alternative analysis without the need for subjective placement of a contour line.

For scanning laser polarimetry, improvement in the custom compensation for the anterior segment increased the sensitivity and specificity of scanning laser polarimetry for differentiating normal eyes from those with glaucoma. Diagnostic performance of GDx-VCC has been found to be similar among the best parameters from various imaging devices. Despite the incorporation of custom compensation for the anterior segment (cornea, lens), VCC measurements sometimes exhibit an atypical retardation pattern (ARP), caused by poor signal to noise ratio. To improve the signal to noise ratio, a new software based on compensation method, called enhanced corneal compensation (ECC), has been recently developed and is undergoing clinical trials prior to its commercial release.

Optical Coherence tomography (OCT) is similar to ultrasound but uses a light source (850 nm) instead of sound. Compared to the original OCT, several improvements have been introduced with OCT3 including better resolution, increased number of A-scans, and a reduced need for pupil dilation.

Although currently limited to research use, ultrahigh resolution (UHR) OCT may provide better resolution of retinal nerve fiber layer and more reproducible measurement of RNFL thickness and retinal structures.

In conclusion, recent advances in glaucoma imaging devices helped us to quantitatively assess RNFL thickness and have been shown to be capable of discriminating eyes with glaucoma from normal eyes with a reasonable sensitivity based on cross-sectional

data. However, none of the available devices provides any strong evidence for detecting progression. More research with the available imaging devices are needed in the aspect of detecting preperimetric glaucoma and/or measurable structural changes based on longitudinal study.

**S597**

**IOP MODULATION FOR GLAUCOMA – A NEW TARGET FOR TREATMENT**

Joseph Caprioli, USA

**Purpose:** To review the evidence that mean intraocular pressure (IOP) and long-term IOP variation are both risk factors for glaucomatous damage and should both be considered in the successful treatment of glaucoma.

**Methods:** The results of several long-term clinical trials in glaucoma are reviewed. These include the EMGTS, AGIS, OHTS, and the CNTGS. In addition, a post hoc study of visual field loss in AGIS was performed to evaluate additional risk factors, including long-term, inter-visit IOP variation.

**Results:** The rates of glaucomatous progression in all clinical trials are related to the level of IOP. In each case, the rates of progression are reduced by treatment to lower IOP. In AGIS, the strongest risk factor for progression was long-term IOP variation. Other significant risk factors were older age and longer follow-up. IOP variation was consistently a much stronger risk factor for progression than was mean IOP.

**Conclusion:** The treatment of primary open-angle glaucoma should be re-evaluated with the knowledge that IOP variation is an important risk factor for progression. IOP treatment should include as a goal, not only reduction of mean IOP, but reduction of long-term IOP variation. This treatment goal can cumulatively be considered “IOP modulation”.

**S598**

**ADVANCES IN TRABECULECTOMY SURGERY – THE MOORFIELDS SAFER SURGERY SYSTEM**

Peng T Khaw, UK

Recent research has suggested that glaucomatous progression can be arrested in the majority of patients over a decade or more if pressure can be controlled in the 10-15 mm Hg range. This can often only be achieved with filtration surgery, and adjunctive agents to prevent scarring which is the most important determinant of long-term intraocular pressure.

However, this often comes at a price including hypotony and all its consequences including flat chambers, cataracts, choroidal effusions and haemorrhage, and in the longer-term cystic uncomfortable blebs, with leakage, blebitis and endophthalmitis and

paradoxically still failure in the long-term due to scarring.

Although we often focus on “ocular endpoints” we are increasingly aware that enhanced surgery comes at a cost to the patient — prolonged periods of poor vision and discomfort, and multiple visits for treatment. We need to continue to strive for a surgical technique that will begin to meet up to the short and long-term results of modern cataract surgery with the individual patient at the heart of the drive for improvement.

In this presentation I will outline the improvements in glaucoma surgery and wound healing modulation which will help us achieve better long-term results with fewer complications, particularly from the patient’s point of view. These improvements have been developed into a “Safer surgery system” for filtration surgery which include:

1. The judicious use of antimetabolites at the time of and after surgery including 5-fluorouracil and mitomycin-c. The scientific basis of these agents will be outlined which helps us to optimise their use
2. The method of applying antimetabolite intraoperatively. Increases in the surface area of application, larger scleral flaps and fornix based incisions has led to a dramatic reduction in cystic blebs and long term complications such as endophthalmitis (20% to 0% over a 5 year follow up period in a high risk group)
3. Intraoperative infusion techniques such as a simple intraoperative infusion to allow accurate titration of outflow to prevent postoperative hypotony and maintain visual acuity in the postoperative period
4. The use of tight suturing techniques with both releasable sutures and the technique of adjustable sutures which allow a gradual safe titration of intraocular pressure.
5. Better methods of applying postoperative anti-scarring agents including the use of a viscoelastics lake and viscodissection.

Detailed videos and handouts on See Safe Surgery System are available from: <http://www.ucl.ac.uk/iao/research/khawlibrary.htm>

**S599**

**NEW POTENTIAL SCREENING MODALITIES FOR ANGLE CLOSURE**

Kenji Kashiwagi, Japan

In many cases, the onset of angle-closure glaucoma (ACG) and primary angle closure (PAC) can be prevented by prophylactic treatment. Once an ACG or acute PAC has occurred, many of the cases present with poor control of intraocular pressure compared with narrow angle eyes that have undergone prophylactic treatment. Thus, it is very important that ACG and PAC be detected through routine health examinations.

The measurement of anterior chamber depth (ACD) is considered to be useful for detecting ACG and PAC. Quantitative and

longitudinal evaluation of anterior ocular configuration is necessary to determine the risk of ACG precisely. Several techniques and instruments were developed to evaluate ACD or angle configuration. Unfortunately, many of them are not suitable to screen risky eye with ACG or PAC in routine health examination, because some of them are expensive and invasive, or require considerable expertise in handling.

We have developed a new non-invasive system called the scanning peripheral anterior chamber depth analyzer (SPAC), which can be operated easily even by non-ophthalmologists and enables quantitative measurement of peripheral ACD. We succeeded to screen subjects at risk of ACG in a public health examination by non-physicians, which indicate that SPAC could be used to detect eyes at risk of ACG.

In this short presentation, I introduce the SPAC system and some results in SPAC projects.

#### S600

##### ANTERIOR SEGMENT OCT — A NEW METHOD FOR ANGLE IMAGING

Paul Chew, Singapore

Anterior segment OCT is a useful method of imaging the angles. The key advantage of anterior segment OCT is that it is done in an upright position. It is non-contact, does not require tremendous operator skills, is very acceptable to the patient, being analogous to auto refraction. This also has further advantage of being a dynamic measurement which allows moment to moment evaluation of the angles, allowing a light-dark evaluation of angles opening and closing. Similarly because of these, questions arise on its role in relation to gonioscopy and UBM as well as the potential uses of it in screening, diagnosis and follow-up.

#### S601

##### ROLE OF LENS EXTRACTION IN ANGLE CLOSURE GLAUCOMA

Dennis Lam, Hong Kong

**Purpose:** To compare the efficacy and safety of early lens extraction by phacoemulsification (Phaco) versus laser peripheral iridotomy (LPI) in the prevention of chronic angle-closure glaucoma (CACG) in patients after acute attack of primary angle-closure (APAC) with a multicentered, prospective randomized controlled trial.

**Methods:** Subjects with successful abortion of APAC by medications were randomized to receive either early Phaco or LPI. Serial measurements including intraocular pressures (IOP), angle status, visual fields and cup-to-disc ratio were monitored up to at least 12 months after the initial intervention. Predictors for CACG conversion were determined statistically using Cox proportional hazard model.

**Results:** Sixty-two eyes of 62 subjects (61 Chinese, 1 Malaysian) were recruited, with 31 eyes in each of the Phaco and LPI arm. The rate of conversion to CACG was 3.2% in the Phaco group and 29.0% in the LPI group ( $p < 0.0001$ ). Treatment by Phaco (hazard ratio [HR] = 0.108, 95% confidence interval [CI] = 0.014-0.857,  $p = 0.035$ ) and time between abortion of acute attack and Phaco or LPI (HR = 0.619, 95% CI = 0.382- 0.951,  $p = 0.050$ ) were associated with a lower hazard ratio of CACG conversion. The mean number of medications required to maintain IOP  $< 21$  mm Hg was significantly higher in the LPI (0.59) than Phaco group (0.03) [ $p = 0.003$ ]. The angle was significantly ( $p = 0.003$ ) wider in Phaco group (mean Schaffer grade increased from 0.28 to 2.10) compared to LPI group (increased from 0.39 to 0.79). The progression in VCDR was initially faster in the Phaco group but was later superseded by the LPI group at 12 months. Complication rates were higher in the Phaco group.

**Conclusion:** Early lens extraction by phacoemulsification was significantly more effective in the prevention of CACG conversion compared to traditional LPI in patients after APAC. These benefits should be interpreted in the light of the potential difficulties and complications encountered with early Phaco. Further studies on optimal timing of the surgery with longer follow-ups are warranted.

#### S602

##### NEW CONCEPTS IN ANGLE CLOSURE GLAUCOMA

Ramanjit Sihota, India

There has been a surge of interest in angle closure glaucoma recently, bringing to light many new facets that help in the diagnosis, prophylaxis, classification, management and prognosis of the disease.

Early diagnosis and prophylaxis of angle closure glaucoma has been made possible by many studies of the biometry, UBM and clinical features that are seen prior to optic nerve head damage in PACG. The presence of a shallow anterior chamber by van Herick's test together with the presence of pupillary ruff atrophy identifies eyes that have already had an attack of angle closure, and justifies the decision to do a laser iridotomy immediately.

Genetics in PACG is being pursued in a number of centers, and Aung Tin has described a possible locus to PACG on chromosome 10.

A new classification of PACG was proposed by the ISGEO for ophthalmic surveys, and attempts are on to expand this for clinical work as well. A classification divides these eyes by the mechanism causing the closure into — pupillary and non-pupillary block PAC, which can be further divided by the clinical presentation e.g. ischemic or nonischemic.

Non-pupillary block mechanisms include a prominent last roll of iris, plateau iris, ciliary body thickening due to a Valsalva manoeuvre etc.

The natural history of PACG and the efficacy of a laser iridotomy have been shown in a few longitudinal studies. The efficacy of various antiglaucoma medications has been studied in PACG, prostaglandins show a slightly decreased efficacy as compared to POAG eyes. Newer surgical approaches to for acute PACG have been suggested, including iridoplasty, paracentesis and phacoemulsification of the lens.

Long-term studies of the various subtypes of PACG have shown a good prognosis for these eyes with both medical and surgical therapy.

### Symposium 16 – Cornea New Advances in Cornea

12 June 2006, Monday, 0830-1000 Hrs  
Room 301-302, Level 3

#### S603 HOST RESPONSES IN FUNGAL KERATITIS

Venkatesh Prajna, India

**Purpose:** The most common cause of corneal blindness is infectious keratitis. Even though bacteria are responsible for more than 90% of the infectious keratitis in the western world, fungi are important aetiological agents in many developing countries. In fact, fungi have replaced bacteria as the most common cause of corneal infections in some of these countries. The visual prognosis after fungal keratitis is known to be poor when compared to bacterial infections. The poor visual results often obtained in these patients, even after treating them with the appropriate, available antifungal agents, clearly emphasizes the need to develop newer therapeutic modalities to combat the fungal infection.

Understanding host response in various stages of this disease is crucial to formulate such a strategy.

**Methods:** Tear samples were collected from proven cases of fungal keratitis to look for the following:

1. Cytokine estimation during the active phase and followed towards healing
2. Matrix metalloproteinase estimation during the intermediate and late phase of the disease
3. Tear proteomics study using MALDI – TOF analysis.

In addition matrix metalloproteinases (MMPs) were estimated in the infected corneal tissue removed at the time of keratoplasty.

**Results:** During the initial stages of the disease, levels of Interleukin (IL)-6 and IL-8 in tear samples were increased significantly when compared with controls ( $p < 0.0009$ ). While IL-6 levels decreased significantly towards healing, IL-8 remained elevated even at the healed stage. Significant increase in the levels of MMP-8 and MMP-9 was observed in fungal keratitis cornea, when compared to the cadaver and keratoconus cornea. Initial study on tear proteomics will be presented.

**Conclusion:** Understanding host responses and formulating an effective strategy to modulate the responses may become an important cornerstone in the management of fungal keratitis.

#### S604 SURGICAL TREATMENT OF MICROBIAL KERATITIS

Hu Fung-Rong, Taiwan

Microbial keratitis is a leading cause of ocular morbidity and blindness worldwide. Over the past few decades, earlier diagnosis, a better understanding of the pathogenesis and the availability of potent antimicrobial drugs have improved the chances for medical control of microbial keratitis. However, virulent and resistant forms of infectious keratitis, fungus and *Acanthamoeba* spp. can still cause keratitis to progress, even with maximal medical therapy. When corneal infection does not respond to appropriate medical treatment, surgical options include conjunctival flap, lamellar keratectomy, phototherapeutic keratectomy, penetrating keratoplasty, evisceration and even enucleation. Among them, lamellar keratectomy offers a good surgical treatment for nontuberculous mycobacterial keratitis that was unresponsive to medical treatment. Flap amputation, another form of lamellar keratectomy, is useful to eradicate post-LASIK nontuberculous mycobacterial keratitis. However, PKP remains the most helpful procedures for extensive infection and impending perforation.

From 1987-2001, 151 patients underwent therapeutic PKP for culture-proven microbial keratitis at National Taiwan University Hospital. Single therapeutic PKP eradicated the infection in 90.2% of patients with bacterial keratitis, 69.2% of patients with fungal keratitis and 86.7% in acanthamoebic keratitis. 68.8% of grafts of bacterial keratitis, 51.3% of fungal keratitis and 78.6% of acanthamoebic keratitis remained clear at 1 year postoperatively. A higher percentage of graft clarity at 1 year postoperatively was achieved when grafts were 8.5 mm or less compared with large grafts. All five patients with secondary endophthalmitis observed at the time of therapeutic PKP experienced a progression of infection despite aggressive surgical treatment and had to be enucleated. In conclusion, surgical treatments play an important role in the management of microbial keratitis. Judicious patient selection before surgery, careful planning of surgical techniques and appropriate follow-up care may all enhance the chance of a successful outcome.

S605

### CORNEAL RECONSTRUCTION USING TISSUE-ENGINEERED EPITHELIAL CELL SHEETS FABRICATED EX VIVO FROM AUTOLOGOUS ORAL MUCOSAL EPITHELIUM

Kohji Nishida, Japan

**Purpose:** Patients with limbal stem cell deficiencies can be treated with allogeneic limbal transplantation, but because of high risk of rejection, recent attempts have been made to fabricate corneal epithelial grafts ex vivo by expansion of autologous limbal stem cells. However, this approach cannot be applied in many cases where bilateral disease produces total stem cell deficiency in both eyes. In this study, we report an alternative replacement strategy for damaged corneal epithelium involving a tissue-engineered epithelial cell sheet comprising only the patient's autologous oral mucosal epithelial cells.

**Methods:** The subjects were 9 patients with bilateral total limbal stem cell deficiencies (ocular cicatricial pemphigoid, Stevens-Johnson syndrome etc). We harvested 3 × 3 mm-specimens of oral mucosal tissue and tissue-engineered epithelial cell sheets were fabricated ex vivo by culturing harvested cells on temperature-responsive cell culture surfaces with mitomycin C-treated 3T3 feeder cells for two weeks. After surgically removing conjunctival fibrovascular tissues from corneal sites, cultured autologous cell sheets harvested using a simple reduced-temperature treatment were transplanted directly to patients' denuded corneal surfaces without sutures.

**Results:** Oral mucosal epithelial cell sheets as well as corneal epithelial cell sheets cultured under these culture conditions highly resemble in vivo corneal epithelium with similar optical transparency. Complete re-epithelialization of patients' corneal surfaces occurred within one week in all four eyes. Corneal transparency was restored and maintained during more than one year. Postoperative visual acuity improved in all eyes except one patient who had suffered from cataract.

**Conclusions:** Tissue-engineered epithelial cell sheets fabricated ex vivo from autologous oral mucosal epithelial cells are effective for reconstructing the corneal surface and restoring vision in patients with bilateral total limbal stem cell deficiencies.

S606

### ADVANCES IN THE USE OF FIBRIN TISSUE GLUE IN OPHTHALMOLOGY

Voon Li Wern, Singapore

**Purpose:** Fibrin glue has been used in a variety of surgical procedures to date as a tissue adhesive as well as a haemostatic agent. In Ophthalmology, there has been renewed interest in the use of fibrin glue for anterior segment procedures, in particular,

pterygium surgery and corneal surgery. This talk gives an overview of the indications for the use of fibrin glue in ophthalmology. It also reveals the results of a pilot study conducted on a cohort of patients with pterygia in Singapore to evaluate the efficacy and safety of fibrin glue in pterygium surgery on Asian Eyes.

**Method:** Pterygium excision and conjunctival autograft with fibrin glue was performed on 25 eyes, with mean follow-up of 6.0 months.

**Results:** Mean surgical time was shorter than conventional surgery (24.7 minutes). The graft remained in-situ in 100%, with early recurrence in 1 (5%) after 4 months. Graft dehiscence occurred in 1 (5%), requiring resuturing. There were no major adverse effects, and no pain.

**Conclusion:** Fibrin glue is effective and safe for pterygium excision and conjunctival graft, with low rate of recurrence and graft dehiscence.

S607

### CLINICAL APPROACH TO A PATIENT WITH AN ITCHY BURNY EYE

Srinivas Rao, Hong Kong

**Purpose:** The ocular surface is a complex structure and normal functioning depends on an integration of many factors — the lid anatomy and function, tears, surface topography, innervation, health of the surface epithelium, allergic diathesis, work profile, and environment among others. However, despite the large number of components constituting the ocular surface and the various different diseases/conditions that can affect these structures, there are no specific symptom complexes for different entities. Thus, problems of the ocular surface tend to manifest as a limited number of symptoms which are not pathognomonic of the underlying condition. Proper management of these symptoms therefore requires that a definitive diagnosis should first be arrived at.

**Methods:** Description of the history taking process, the findings to look for on clinical examination, and the appropriate tests that will have to be performed — in the clinic and in the laboratory will be described. An algorithm will be presented that will allow the clinician to approach such patients in a systematic manner and help perform tailored tests and investigations.

**Results:** The algorithmic approach would help identify the common causes of such symptoms, and also help flag patients with more exotic and/or serious problems.

**Conclusions:** This presentation will help clinicians approach the management of the patient with an itchy, burny eye in a stepwise manner — that helps avoid missing the correct diagnosis. This approach will also help in the rational treatment of this condition, reducing the risk of a shotgun approach to treatment — with its side effects on a compromised ocular surface.

**S608**

**GRAFTS AND GLAUCOMA IMPLANTS**

Veera Ramani, Malaysia

Glaucoma can provoke graft failure and visual loss in corneal graft patients. Glaucoma in post-keratoplasty can be mostly due to angle-closure and corticosteroid induced.

Glaucoma drainage devices enable the surgeons to control the intraocular pressure and this helps to save the patient's sight when all else has failed. However, there are contraindications for this procedure. In some cases, corneal decompensation occurs following the glaucoma implant.

The operative and postoperative complications such as post-operative inflammation, viscoelastic problems, wound leak and their management will be discussed.

**S609**

**ALPHACOR ARTIFICIAL CORNEA TRANSPLANTATION**

**— AN OVERVIEW**

James Pan, Singapore

AlphaCor is a biocompatible, flexible one piece device designed to replace a scarred or diseased cornea in patients who have had multiple failed grafts or those who would be at high risk of failure. These high risk patients have limited treatment options and AlphaCor can provide visual rehabilitation where a donor tissue graft would be expected to fail.

The unique features and characteristics of the AlphaCor are designed to promote retention and optimize patient outcomes. Careful patient selection is crucial to ensure success of the surgery. The implantation of AlphaCor and its postoperative management will be discussed. A brief discussion on the management of common complications will be included.

**S610**

**EVALUATION OF KERATOCONUS USING CORNEAL TOPOGRAPHY**

Lim Li, Singapore

**Purpose:** To evaluate the morphology of keratoconus using corneal topography.

**Methods:** This is a hospital-based observational prospective study conducted at the Singapore National Eye Centre from Sept 2003 to June 2004. One hundred and sixteen patients were enrolled in the study. Of these, 179 eyes were evaluated using the Orbscan II topographer, 130 eyes with clinical keratoconus and 49 eyes with keratoconus suspect. Seventy right eyes from 70 normal subjects were used as controls. Quantitative topographic parameters that were analysed included maximum and minimum keratometry,

astigmatism, anterior and posterior elevation (compared to a best-fit sphere), maximum posterior elevation, 3 mm and 5 mm irregularity and thinnest corneal pachymetry.

**Results:** The mean patients' age was 29.5 years. Fifty-six percent of patients had bilateral keratoconus and 35.3% had keratoconus in one eye and suspect keratoconus in the fellow eye. When compared to the control group, the keratoconus group showed significantly different values in all indices ( $p < 0.001$ ); the keratoconus suspect group showed significantly different values in the following indices ( $p < 0.01$ ): maximum posterior elevation ( $46 \mu\text{m}/26 \mu\text{m}$ ), 3 mm irregularity ( $2.44\text{D}/1.05\text{D}$ ), 5 mm irregularity ( $2.61\text{D}/1.38\text{D}$ ) and thinnest corneal pachymetry ( $504 \mu\text{m}/554 \mu\text{m}$ ). In the keratoconus group, the correlations between maximum keratometry and maximum posterior elevation, thinnest corneal pachymetry, 3 mm and 5 mm irregularity were high ( $r=0.63$ ,  $r=-0.47$ ,  $r=0.56$  and  $r=0.73$  respectively).

**Conclusions:** The Orbscan II system provides useful information in the evaluation of keratoconus morphology and can accurately detect keratoconus suspect cases. It not only aids in the management of keratoconus but is also an important screening tool in refractive surgery.

**S611**

**CURRENT CONCEPTS IN PTERYGIUM PATHOGENESIS**

Minas Coroneo, Australia

**Purpose:** To review and place into context, recent work on pterygium pathogenesis.

**Methods:** We have studied pterygium pathogenesis using ray-tracing techniques, field measurements of ultraviolet insolation in model eyes as well as by developing and using ultraviolet fluorescence photography in children. Standard pathophysiological techniques using pterygium affected whole eyes as well as cell culture of pterygium epithelia have been utilized. In particular, matrix metalloproteinase (MMP) activity has been assayed in cell culture and stained for in whole eyes.

**Results:** Limbal focusing of ultraviolet radiation by an order of magnitude has been confirmed. We have demonstrated preclinical limbal changes that may be caused in insolation in school age children. Pterygium epithelial cells share phenotypic and functional features with limbal epithelial stem cells. In culture, ultraviolet radiation enhances the expression of both inflammatory cytokines (interleukin [IL]-6 and IL-8) membrane-bound growth factors HB-EGF and MMP-1 and -3. This induction is mediated via a specific MAP kinase pathway as inhibitors of ERK significantly inhibit the UV mediated induction of these MMP's.

**Conclusions:** Our data are consistent with anterior segment peripheral light focus induced limbal stem cell transformation. It may now be possible to monitor the effects of early eye protection. Cytokines, growth factors and MMP's are key inducible effector

molecules that may provide a feasible model to explain the active proliferative, invasive, and neovascular features that characterize the pathophysiology of this enigmatic disease. Our findings raise the possibility of medical treatments for this condition. The central role of the limbus in pathogenesis reflects the importance of this structure when considering surgical procedures.

### **Symposium 17 – Retina Pushing the Frontiers**

12 June 2006, Monday, 0830-1000 Hrs

Room 303-304, Level 3

#### **S612**

#### **INTERNATIONAL RETINAL FOUNDATION LECTURE PATHOGENESIS OF GEOGRAPHIC ATROPHY**

Alan Bird, UK

In geographic atrophy there is loss of outer neurosensory retina, retinal pigment epithelium (RPE) and choriocapillaris without preceding retinal detachment. Until recently there was little discussion as to the sequence of events that led to its inception. It now appears that the process is preceded by excessive accumulation of lipofuscin in the RPE, which can now be visualized in vivo by RPE autofluorescence.

The quantity of lipofuscin in the RPE is related to the balance of accumulation, which is the result of metabolic activity that in turn is driven by the need for photoreceptor outer segment renewal, and clearance that may be due to intracellular degradation or extrusion from the cell either inwards or outwards. It has been shown that loss of photoreceptor cells is followed by depression of RPE autofluorescence. An increase of autofluorescence would imply either RPE dysfunction or increased metabolic load.

Both experimental evidence and clinical observations illustrate potential pathogenetic mechanisms of geographic atrophy and explain the association of geographic atrophy with focal increased autofluorescence and increasing lipofuscin if the latter is witness to the inability to recycle phagosomal contents. Whether or not there are any potential therapeutic approaches that can be conceived from these data remains to be considered. If the presence of A2-E or increasing lipofuscin is important to genesis of GA, it would argue against dietary supplementation with Vitamin A. Restriction of dietary vitamin A or slowing down retinoid recycling might be helpful as has been argued for the treatment of Stargardt maculopathy.

#### **S613**

#### **AUTOFLUORESCENCE IMAGING**

Giovanni Staurenghi, Italy

**Purpose:** To document the clinical use of fundus autofluorescence (AF) imaging, mainly derived from lipofuscin accumulated in retinal pigment epithelium (RPE) cells.

**Methods:** Commercial HRA-C and 2 (Heidelberg Engineering) are used to acquire AF images. Images are obtained using fluorescein angiography mode. A short movie of 9-15 images is acquired and then averaged to obtain an AF image. Using HRA2 these steps are done automatically just selecting the mean mode. Moreover the new real time acquisition feature (RT) of Heidelberg Eye explorer software does these steps automatically during the acquisition of the image.

**Results:** A series of different retinal diseases are documented using AF imaging. AF imaging helps in identifying RPE atrophy, accumulation of lipofuscin, and macular oedema in age related macular degeneration. It is also useful in recognizing different phenotype in inherited retinal degeneration. It is useful for the differential diagnosis of macular hole and pseudo-hole. There are also other possible use of AF like the visualization of macular pigment and measurement of photoreceptor pigment.

**Conclusions:** AF imaging is an easy to use non invasive procedure which allows identification of retinal diseases without the use of any invasive test such as fluorescein angiography and indocyanine green angiography.

#### **S614**

#### **OLD AND NEW RISK FACTORS FOR AMD – A REVIEW OF CURRENT KNOWLEDGE**

Paul Mitchell, Australia

**Purpose:** To review current knowledge of the risk factors for age-related macular degeneration (AMD), and to discuss application to modern management of AMD.

**Methods:** The International AMD Study Group has defined the phenotype of AMD as occurring in persons aged over 50 years, and which includes both Late and Early lesions. Of two end-stage, late lesions neovascular AMD accounts for 2/3 of cases in population samples, while atrophic AMD (geographic atrophy) accounts for 1/3 of cases. Early lesions comprise large (soft) drusen (>125 microns diameter), often becoming indistinct or reticular in pattern, and retinal pigmentary changes (both hyper- and hypopigmentation of RPE). Recent literature indicates major advances in understanding of a number of known risk factors, particularly the genetic basis.

**Results:** Confirmed 'systemic' risk factors for development and progression of AMD include a striking, exponential effect of **age** (the major increase in Late AMD prevalence occurs from the

mid- to late-70s, while that for Early lesions appears to be 10-15 years earlier); **genetic susceptibility** (confirmed now as portending a 4-fold higher risk in family or twin studies, mediated by gene abnormalities, such as variants in the Complement Factor H gene), **racial susceptibility**, possibly linked (higher risk in Caucasians), plus **cigarette smoking** (a 3- fold or greater risk now confirmed in multiple cross-sectional (prevalence) and longitudinal (incidence) population-based or case-control studies. Likely/ possible risk factors include **cataract surgery** (a 3-fold higher risk of progression from Early to Late AMD), inflammatory factors (blood markers like C-reactive protein or fibrinogen), **vascular disease** (systolic or other hypertension) and **nutrition** (high dose zinc and antioxidants confirmed protective in AREDS and in recent Rotterdam Study population-based data; dietary fish shown protective influence in many studies). Confirmed local risk signs for progression to Late AMD include presence of large (indistinct) drusen and pigmentary changes, particularly area of the central macula involved, whether one eye already has Late AMD, or whether early signs are bilateral. Application to clinical practice of recent AREDS severity scales will be reviewed.

**Conclusions:** Many confirmed and suspected risk and protective factors are now known for AMD, and ability to quantify risk from ocular signs has improved. With improved knowledge of genetic risk, gene-environment interaction is also likely to be better understood.

**S615**

**RATIONAL AND BENEFIT OF COMBINATION THERAPY IN THE TREATMENT OF NEOVASCULAR AGE-RELATED MACULAR DEGENERATION**

Ursula Schmidt-Erfurth, Austria

**Background:** Neovascular age-related macular degeneration remains a challenge in modern ophthalmology. Although current therapeutic strategies have improved the prognosis substantially, most patients are still losing vision despite treatment. Photodynamic therapy (PDT) using verteporfin is an established treatment option for patients with subfoveal predominantly classic choroidal neovascularization (CNV) or small occult or minimally classic lesions. Novel strategies include the use of adjuvant substances such as steroids or anti-VEGF agents. Combination therapy is discussed using both modalities, verteporfin therapy as well as adjuncts.

**Patients and Methods:** Histology of specimen from treatment of human eyes was studied to evaluate the biologic response following PDT. Indocyanine green angiography (ICGA) was performed to illustrate perfusion changes associated with PDT monotherapy. A short-term and a long-term follow-up of changes within the underlying choriocapillary structures was performed using three-dimensional fluorescein (FA) as well as ICGA. Results of combination therapy with PDT and intravitreal triamcinolone (IVTA) as well

as anti-VEGF substances were documented during clinical trials.

**Results:** PDT monotherapy leads to a transient occlusion of the choriocapillary layer, which often recovers, but may be persistent in 50% of treated eyes following repeated treatments. An increased expression of vascular endothelial growth factor (VEGF) and VEGF receptors was seen by immunostaining in human eyes. Combination with IVTA reduced the number of retreatments necessary and led to a mean improvement in visual acuity of 1.2 lines, avoiding the vision loss often seen with PDT alone. Combination with anti-VEGF agents led to improved outcome regarding vision and retreatment needs in phase I/II trials. Several phase III trials combining PDT and adjunct drug therapy are ongoing. In the VISION trial Macugen offered improved results in lesions with predominantly classic CNV which had received prior or additional PDT. In the FOCUS study a combination of Lucentis with standard PDT led to a positive response in 94% of eyes, vision improvement was seen in 31% with combination therapy in naïve lesions.

**Conclusion:** Combination therapy with PDT and anti-VEGF compounds seems to offer an excellent strategy to potentially improve vision outcome and reduce re-treatment efforts. Results of phase III trials will allow to evaluate this option.

**S616**

**PHOTODYNAMIC THERAPY FOR SUBFOVEAL NON-AGE RELATED MACULAR DEGENERATION CHOROIDAL NEOVASCULARIZATION IN ASIANS**

Adrian Koh, Singapore

**Purpose:** To describe baseline characteristics and short-term visual results of Asian patients with non-age-related macular degeneration (AMD) classic subfoveal choroidal neovascularization and treated with verteporfin photodynamic therapy (PDT).

**Methods:** A prospective consecutive series of 214 eyes presenting with subfoveal choroidal neovascularization not due to AMD were treated with verteporfin photodynamic therapy. Eligibility and exclusion criteria were those used in the Verteporfin in Photodynamic Therapy (VIP) study. All patients had LOGMAR visual acuity measurement, slit lamp biomicroscopy and digital fundus fluorescein angiography. The main treatment outcome was the loss of >15 letters. Adverse ocular and systemic events were also recorded. Fluorescein angiography was repeated at 3 monthly intervals, with re-treatment if there was persistent or increased fluorescein leakage.

**Results:** The main indications for treatment included polypoidal choroidal vasculopathy, pathologic myopia, post-inflammatory, idiopathic, angioid streaks, chronic central serous chorioretinopathy and other unusual etiologies such as macular dystrophy, parafoveal telangiectasia and choroidal hemangioma. The mean age was 45. 1 years (range 8-71). Mean initial visual acuity was 25 letters. Average follow-up period was 16 weeks; average maximal linear

diameter of the lesions was 2400  $\mu\text{m}$ . 75% of patients required re-treatment at 3 months post-PDT. The majority of patients had vision unchanged at 3 months. No patient experienced visual loss. One reported a sudden drop of visual acuity lasting one week. One patient suffered a mild transient photosensitivity rash. No major systemic side effects were reported.

**Conclusion:** In Asian patients, photodynamic therapy seems to be a safe and effective form of treatment of subfoveal choroidal neovascularization from causes other than AMD.

### S617

#### LONG-TERM NATURAL COURSE AND TREATMENT OF MYOPIC CHOROIDAL NEOVASCULARIZATION

Kyoko Ohno-Matsui, Japan

**Purpose:** Choroidal neovascularization (CNV) is a common vision-threatening complication of pathologic myopia. Myopic CNV has recently attracted attention because of newly developed treatments such as photodynamic therapy (PDT). To evaluate the efficacy of new treatments against myopic CNV, we clarified the long-term natural course of myopic CNV, and we have analyzed the visual prognosis after PDT with verteporfin in Japanese patients.

**Methods:** To determine the long-term natural course of myopic CNV, we reviewed the medical records of 25 consecutive patients (27 eyes) with myopic CNV who were followed for at least 10 years after the onset of CNV. To analyze the visual prognosis after PDT, highly myopic patients with subfoveal CNV were prospectively assigned to verteporfin PDT and observed for at least 12 months.

**Results:** In the natural course study, at onset of CNV, the mean age of patients was 46.9 years (range, 26 to 61 years); 19 of 27 eyes (70.4%) had visual acuity (VA) better than 20/200, and six eyes (22.2%) had VA better than 20/40. At 5 and 10 years after CNV onset, VA dropped to 20/200 or less in 24 eyes (88.9%) and in 26 eyes (96.3%), respectively. To evaluate the effectiveness of verteporfin PDT, 16 eyes of 15 consecutive patients were analyzed. Mean age was 60.9 years (range, 41 to 76 years); 13 eyes (81.3%) had VA better than 20/200, and 3 eyes (18.8%) had VA better than 20/40. At 12 months after PDT, VA improved at least 3 lines in 3 eyes (18.8%), remained unchanged in 11 eyes (68.8%), and decreased at least 3 lines in 2 eyes (12.5%). VA dropped to 20/200 or less in 4 eyes (25.0%). PDT treatments required in 12 months were  $1.4 \pm 0.8$ , and 12 eyes (75.0%) showed complete cessation of CNV leakage with only one treatment.

**Conclusions:** Because the natural prognosis of myopic CNV is poor, treatment to prevent further visual loss is necessary. Verteporfin PDT can safely stabilize or improve vision in Japanese patients with myopic CNV. Long-term results are needed before the effectiveness of photodynamic therapy can be confirmed.

### S618

#### FEEDER VESSEL THERAPY FOR CHOROIDAL NEOVASCULARIZATION

Giovanni Staurenghi, Italy

**Purpose:** Feeder vessel (FV) treatment (FVT) of age-related macular degeneration (AMD)-related choroidal neovascularization (CNV) has long been viewed as an attractive clinical approach, particularly when the neovascularization is very near or underlies the fovea. Available clinical evidence strongly suggests that this treatment approach is a successful one that — beyond lesion stabilization — often results in visual improvement. Purpose of this presentation is to give an overview of the possible FVT modalities.

**Methods:** Dynamic indocyanine green angiography is necessary to identify FVs. Different laser approaches are possible. 532 nm laser or 810 nm laser. Moreover a modified fundus camera for ICG angiography could be used to deliver, during dye transit, an 810 nm laser photocoagulation (Dye Enhanced Photocoagulation-DEP). FVT could be also associated to triamcinolone acetonide or to new antiangiogenic drugs.

**Results:** Different FV characteristics are founded. Results of different FVT treatment are analyzed; in particular data coming from studies of DEP, FVT plus injection of triamcinolone acetonide or anti-VEGF.

**Conclusions:** FVT is an economical treatment of choroidal neovascularization which allows a preservation of visual acuity. The data of the combined treatment seems to be very promising in the control of choroidal neovascular lesions.

### S619

#### DO THE OUTCOMES IN CLINICAL PRACTICE MATCH THE PHOTODYNAMIC THERAPY TRIAL DATA?

Paul Beaumont, Australia

This study consists of a consecutive series of patients, 87 subfoveal recurrent choroidal neovascularization (CNV) and 414 subfoveal CNV treated with photodynamic therapy (PDT) in a tertiary referral clinic treated from 2002 to 2005. The mean age was 77 years and 2/3 were female. 38% were predominantly classic 8% minimally classic and 54% occult. The mean lesion size was 1.9 DA and mean initial acuity was 20/80. The outcome at 2 years was significantly better than the TAP Investigation and the VIP study, particularly in the prevention of legal blindness. 11% of the patients in this study had acuity of  $<6/60$  at 2 years compared to 41% in the TAP and 28% in the VIP study. An analysis of the effect of lesion size and initial vision shows that this is explained by the substantially smaller lesion size and the better initial acuity in our patients.

**Symposium 18 – Paediatrics  
Paediatric Ophthalmology – What's  
New?**

12 June 2006, Monday, 0830-1000 Hrs  
Room 305, Level 3

**S620**

**ROP AND INTENSIVE CARE – THE PAST INFORMS  
THE PRESENT**

Frank Billson, Australia

**Aim and Background:** Since 1990s a first epidemic of retinopathy of prematurity (ROP) is occurring in developing world similar to that seen in 1950s in Western countries. By contrast an epidemic of ROP is occurring in Western world since 1970s with neonatal intensive care unit (NICU) and survival of extremely premature babies.

**Methods:** Study of all cases of ROP seen over two years (December 2002 to November 2004) at a tertiary care nursery-NICU is contrasted with data now available from developing countries. All babies less than 1500 grams birth weight (BW) and/or less than 32 weeks gestational age (GA) were screened for ROP in NICU. First screening was at 4-6 weeks of age.

All cases with immature retinal vascularisation were reviewed every 2 weeks till the completion of vascularisation or development of ROP. All babies with any stage of ROP were reviewed weekly till the spontaneous resolution of ROP or the development of threshold disease, necessitating treatment with laser.

**Results:** A total of 1362 babies admitted to the nursery during our study period of 2 years. Two hundred eighty-six of these were babies <32 weeks GA and/ or <1500 grams BW, of which 234 (81.8%) survived. Screening was necessary for 138 babies. Thirty-nine of these 138 (28.3%) developed some stage of ROP (28 boys and 11 girls). The mean GA for babies developing ROP was 27.1 ± 1.73 weeks and the mean BW was 984.3 ± 284.2 grams. ROP was first detected at a mean GA of 34.25 ± 1.9 weeks.

Clinical features of babies with ROP:

Variable	No. of babies (%)
IVH	7 (18.0)
Symptomatic PDA	31 (79.5)
Surfactant therapy	33 (85.0)
Postnatal steroids	13 (33.3)

**Conclusions:** ROP among premature babies differs in developing world from western countries due to NICU remains a challenge where survival is now for sick babies who were earlier unsalvageable. Severe ROP in NICU babies < 28 weeks GA and not in older babies.; threshold disease is more often seen with a concurrent surgical or medical problem, possibly due to severe fluctuations in the vital functions of the infant.

**S621**

**CURRENT STATUS OF IOLS IN CHILDREN**

Monte Del Monte, USA

Children are not just little adults. Therefore unique approaches to diagnosis and treatment of paediatric cataracts are required. This paper will highlight recent advances in prognostic classification of paediatric cataracts, advances in surgical technique, and indications, current technique, and results of intraocular lens implantation in paediatric cataract patients. Clinically useful pearls and research, based on the authors experience with over 500 paediatric cataract patients, will be emphasized to improve the care of your paediatric cataract patients.

**S622**

**INFANTILE RETINAL DYSTROPHIES – GENOTYPES,  
PHENOTYPES AND PROSPECTS FOR THERAPY**

Tony Moore, UK

**Purpose:** To review the advances made in understanding of the molecular genetics of infantile retinal dystrophies, to describe the relationship between genotype and phenotype and describe the different therapeutic approaches that are being considered.

**Methods:** Molecular genetic and phenotypic investigation of a cohort of patients with infantile Retinal dystrophies seen at Moorfields Eye Hospital, London and review of relevant literature.

**Results:** Three main groups of retinal dystrophies present in infancy.

- The cone dysfunction syndromes
- The various forms of congenital stationary night blindness and
- Leber's congenital amaurosis (LCA).

Many of the genes causing these groups of disorders have been identified and the function of the encoded proteins elucidated. This presentation will discuss what is known about the disease phenotype associated with specific mutations and will discuss possible therapeutic approaches. Currently gene therapy appears to be the most promising approach and a human gene therapy trial for one form of LCA is imminent.

**Conclusions:** Advances in the molecular genetics of infantile retinal dystrophies have greatly improved our understanding of disease mechanisms and there is now optimism that novel treatments will soon become available for this group of disorders.

**S623**

**CONGENITAL FIBROSIS OF EXTRAOCULAR MUSCLES**

Zhao Kan Xing, China

## S624

**VISUAL IMPAIRMENT DUE TO BRAIN DAMAGE IN CHILDREN – WHAT CAN BE DONE TO HELP?**

Gordon Dutton, UK

Visual impairment due to damage to the brain in children has multiple manifestations, each requiring identification, measurement and intervention. Vision is required for access to information (near and distance), social interaction and mobility (of upper and lower limbs).

Visual impairment can limit development of these functions, and intervention for each element may be required. Damage can affect:

- Visual input and primary visual processing. This can cause reduced acuity, contrast perception, visual field impairment and perception of movement. (*The facial expression recognition distance, and the functional visual acuities are identified and acted upon. Visual field restriction is compensated for*)
- Dorsal stream function. This causes impaired ability to give attention to (and thus see) components of a crowded visual scene and impaired visual guidance of movement (optic ataxia) of the upper and/or lower limbs. (*De-cluttering of all aspects of the visual world improves both performance and behaviour. Physio- and occupational therapy is indicated for optic ataxia*)
- Ventral stream dysfunction. This causes impaired ability to recognise people and/or objects and text. (*Knowledge and understanding of the child's disordered recognition is required for the provision of optimal education*)
- Impaired accommodation is common but rarely diagnosed, requiring dynamic retinoscopy. Even slight hypermetropia degrades both distance and near vision. (*Bifocal or a separate near spectacle correction may be required*)
- Impaired eye movement can restrict fixation and impair perception of movement. (*Prolonged presentation times for information may be required*).

## S625

**MYOPIA – UPDATES AND INTERVENTIONS**

Dorothy Fan, Hong Kong

**Purpose:** Myopia is one of the commonest ocular abnormalities. Children with moderate to severe myopia are expected to have greater and more rapid myopic progression. They are also more prone to have complications associated with myopia, and a safe and effective treatment to retard progression of the refractive error would be very useful in this cohort. The aim of this study is to evaluate the safety and efficacy of topical 1% atropine eye ointment in retarding myopic progression in children with moderate to severe myopia.

**Methods:** Children (aged 5-10 years) with myopia of -3.00 Diopters (D) or more were treated with 1% atropine ointment once daily for 1 year. Baseline and regular assessments of refractive errors by cycloplegic autorefraction and axial length by ultrasound biometry were done and compared with control subjects.

**Results:** Twenty-three children (mean age:  $7.4 \pm 1.6$  years) were recruited into the atropine group. The initial refractive errors were  $-5.18 \pm 2.05$  D and  $-5.12 \pm 2.33$  D in the atropine and the control groups respectively ( $p = 0.934$ ). Myopic progression was significantly less ( $p=0.005$ ) in the atropine group ( $+0.06 \pm 0.79$  D) than in the control group ( $-1.19 \pm 2.48$  D). Axial length increase was also significantly smaller in the atropine group ( $0.09 \pm 0.19$  mm) than in the control group ( $0.70 \pm 0.63$  mm) ( $p=0.004$ ). No major adverse effects related to treatment were noted.

**Conclusion:** Topical 1% atropine ointment is a safe and effective in retarding myopic progression in moderate to severe myopia. Further large-scale randomized controlled study with longer follow-up seems warranted.

**Symposium 19 – International Ophthalmology Variation in the Patterns of Eye Disease**

12 June 2006, Monday, 1345-1540 Hrs

Room 301-302, Level 3

## S626

**ICO & VISION 2020 LECTURE**
**VISION 2020 – THE PROGRESS**

Gullapalli Rao, India

The most recent figures of blindness prevalence around the world, compiled by the World Health Organization (WHO), show that there has been a marked decrease in rates of blinding diseases in most regions of the world. The reduction has happened due to concerted efforts on the part of governments, non-governmental organizations, and corporate and community level organizations to combat disease, create infrastructure, build human resources and raise awareness of eye health issues. These efforts were catalyzed in 1999 by VISION 2020: The Right to Sight, a joint global initiative of WHO and the International Agency for the Prevention of Blindness (IAPB). In the past six years, VISION 2020 has been able to mobilize activity at the grassroots as well as among national governments. This presentation will detail the achievements of VISION 2020 to date and outline the challenges that remain over the next decade if avoidable blindness is to be eliminated.

**S627**

**TESTABILITY OF PRESCHOOL CHILDREN IN THE MULTIETHNIC PAEDIATRIC EYE DISEASE STUDY**

Rohit Varma, USA

The Multi-Ethnic Pediatric Eye Disease Study (MEPEDS) is a population-based study of eye disease in children aged 6 months to 72 months. Study participants undergo an interview and a clinical examination that includes an assessment of vision using fixation preference testing and the Electronic Visual Acuity tester, refractive error and corneal curvature using the Retinomax refractometer, stereoacuity using the Randot preschool Stereoacuity test and measurement of axial length using partial coherence interferometry. If measurements were obtained in both eyes, children were considered “testable”. Age-, gender-, and ethnic- specific testability rates were calculated. Chi-squared analyses and the trend test were used to determine differences in testability rates between age, gender, and ethnic groups. In general, older children were more likely to be testable compared to younger children. There were no gender or ethnicity related differences in testability rates for any of the examination methods. The tests to evaluate visual acuity, refractive error, stereo acuity, and axial length used in the MEPEDS are useful in obtaining such data in population-based studies in preschool children.

**S628**

**PATTERNS OF EYE DISEASE IN HONG KONG**

Srinivas Rao, Hong Kong

The talk will focus on some of the key ocular problems in Hong Kong — refractive errors and their management, glaucoma, cataract, diabetic retinopathy, age-related macular degeneration and other macular diseases. Information available in the literature, about these conditions in the region, will be presented. Data related to the genetics and epidemiology of these conditions, the clinical presentation and management, and treatment options will be discussed, relating to the work done in these areas at the Chinese University of Hong Kong. Differences in the various aspects of these diseases when compared to the western populations will be highlighted.

**S629**

**CAUSES OF LOW VISION AND BLINDNESS IN TAIWAN**

Cheng Ching-Yu, Taiwan

**Purpose:** To determine the causes and prevalence of visual impairment in Taiwan, particularly in the elderly population.

**Methods:** In the past decade, population-based studies have provided information on the causes and prevalence of low vision

(<6/18 [ $<20/60$ ] best-corrected vision in the better-seeing eye) and blindness (<6/120 [ $<20/400$ ] best-corrected vision in the better-seeing eye) in Taiwan. These include data from a nationwide visual health care screening program for the elderly, the National Registry for Disability, and two cross-sectional population-based eye disease studies — the Peitou Eye Study and the Shihpai Eye Study.

**Results:** In the Shihpai Eye Study, the prevalence of low vision and blindness in the elderly ( $\geq 65$  years of age) was estimated to be 2.9% and 0.6%, respectively. Overall, cataract was the leading cause of low vision in the elderly, accounting for approximately 40% to 50%. Other major causes of low vision were myopic macular degeneration, age-related macular degeneration (AMD), diabetic retinopathy, and glaucoma. Cataract was not recognized as a major cause of blindness. Most of the causes of blindness were irreversible, including AMD, glaucoma, and non-AMD retinal diseases.

**Conclusions:** During the next decades, the rate of low vision caused by cataract will be markedly reduced because of the accessibility and availability of eye care services under the Taiwan National Health Insurance Program. However, with the increasing longevity in Taiwan, the prevalence of visual impairment will increase continuously. Myopic macular degeneration as a cause of visual impairment will become more dominant, owing to the rapid rising prevalence rate of myopia in young cohorts in Taiwan.

**S630**

**SPECTRUM OF EYE CONDITIONS IN 6- & 12-YEAR OLD CHILDREN — SYDNEY CHILDHOOD EYE STUDY**

Paul Mitchell, Australia

**Purpose:** To describe the prevalence and associations with common eye conditions (refractive errors, anisometropia, amblyopia, strabismus), in a sample of younger and older schoolchildren, attending primary and secondary schools in Sydney, Australia.

**Methods:** The Sydney Childhood Eye Study is a population-based survey of a sample of Year 1 and Year 7 schoolchildren resident in the metropolitan area of Sydney, Australia. Of the 2238 eligible Year 1 students, 1765 (78.9%) participated (mean age 6.7 years), while of the 3130 eligible Year 7 students, 2353 (75.1%) participated (mean age 12.7 years). Ethnic groups included European Caucasian (62%) and East Asian (16%) children. The comprehensive eye examination included corrected and un-corrected logMAR visual acuity, cover testing, assessment of ocular movements, tests for stereopsis, color vision, auto- and subjective refraction, ocular biometry, slit lamp examination, optical coherence tomography and mydriatic digital retinal photography.

**Results:** Prevalence rates for myopia and moderate hyperopia were 1.5% and 13.2%, respectively, for the younger group, with corresponding prevalences of 12.8% and 20.9%, respectively, for the

older group. Rates of bilateral and unilateral visual impairment (with best correction) were 0.9% and 2.8% in the 6-year old children (caused by uncorrected astigmatism and amblyopia), while for the 12-year old children, corresponding rates were 1.1% and 5% (80% correctable by refraction); most non-correctable impairment due to amblyopia. Amblyopia was present in 1.8% of the younger and 1.9% of the older group (of whom 60% and 73%, respectively, had been successfully treated). In the younger group, prematurity and low birth weight were about 4- to 5-fold more frequent than in non-amblyopic children, accounting for around one quarter of amblyopia cases. Strabismus was present in 2.8% of the younger and 2.7% of the older group, and was associated with gestational parameters, refractive errors, particularly hyperopia, and amblyopia. Anisometropia, of at least 1 dioptre, was present in 1.6% of the younger group, also had important birth and biometry associations, and was strongly related to amblyopia and strabismus.

**Conclusions:** Data from this study of 2 age groups of school children has defined the prevalence of common childhood eye disorders causing impaired vision.

### S631

#### PREVALENCE RATES OF CATARACT IN SUMATRA, INDONESIA

Rahat Husain, UK

**Purpose:** To describe the prevalence of cataract in adults in rural Sumatra, Indonesia.

**Design:** Population-based cross-sectional study.

**Participants:** A random sample of all adults aged 21 years or more living in three rural villages in central Sumatra was assessed. 919 of 1089 (84.4%) eligible adults participated.

**Methods:** A team of seven Ophthalmologists examined the anterior segment of both eyes using a portable slit-lamp after pupil dilation. Lens opacity was graded according to the Lens Opacities Classification System III (LOCS III). A structured questionnaire was used to collect data on education level and income.

**Main Outcome Measure:** Cataract was defined as either a LOCS III nuclear region score of  $\geq 4.0$ , cortical  $\geq 4.0$  or posterior subcapsular cataract  $\geq 2.0$ , in either eye.

**Results:** 201/919 (21.9%) subjects were found to have cataract. The age-adjusted prevalence rate of cataract (including cataract surgery) was 23.0% (95% CI 20.8 – 25.2). The most common type of cataract for both sexes (adjusted for age) was mixed (13%) followed by nuclear only (5.7%), and cortical only (4%). The prevalence rate of any cataract for adults aged 21-29 was 1.1% increasing to 82.8% for those aged over 60 years. Similar trends with age were noted for nuclear, cortical and PSC cataract. Women had higher prevalence rates than men for all types of cataract except cortical. There was a trend of increasing prevalence of all types of cataract with decreasing education ( $p < 0.001$ ).

**Conclusion:** Cataract prevalence in adults aged 21 years and above in rural Indonesia is amongst the highest reported in South-east Asia. Despite this, there are inadequate resources available to manage this treatable disease. Allocation of resources to tackle the present burden of cataract would likely have large personal, social and economic benefits.

### S632

#### TRENDS AND PATTERNS OF EYE DISEASES IN ASIA

Wong Tien Yin, Singapore

Up to 20 million Asians are estimated to be blind by the World Health Organization (WHO), a figure that is expected to increase as the population ages. In Western populations, the epidemiology of visual impairment and its major causes have been well described. In the past decade, several large population-based studies have provided new information on the prevalence of visual impairment and the major age-related eye diseases in Asia. These include epidemiological studies from India, Taiwan, Mongolia, Singapore and Japan. In particular, the epidemiology of myopia and glaucoma has been well characterized, providing insights not only into the public health implications of these conditions, but also into anatomical changes of the eye with aging. In contrast, there are few well conducted population-based studies on diabetic retinopathy and age-related macular degeneration in Asia, two conditions that are likely to be important causes of blindness in the future. On-going epidemiological studies in Asia will provide information on these conditions.

### S633

#### LOW VISION AND BLINDNESS IN SINGAPORE MIDDLE-AGED AND ELDERLY CHINESE ADULTS – THE TANJONG PAGAR STUDY

Saw Seang-Mei, Singapore

**Purpose:** To determine the prevalence rates and causes of low vision, blindness and patient-assessed deficient visual function among Singapore Chinese adults.

**Design:** Population-based cross-sectional survey.

**Participants:** Singapore Chinese adults aged 40 to 79 years ( $n=1,152$ ).

**Methods:** From an initial sampling frame of Chinese aged 40 to 79 years in the Tanjong Pagar district in Singapore, 2000 subjects were selected using a disproportionate stratified, clustered random sampling method. Of 1,717 eligible subjects, 1,232 were examined (participation rate= 71.8%) and 80 adults who did not have visual acuity (VA) data were excluded from the analysis.

**Main Outcome Measures:** Bilateral low vision was defined as best-corrected VA worse than 6/18 and 3/60 or better, and bilateral blindness as best-corrected VA worse than 3/60 in the

better eye or constriction of visual field to within 10° of fixation in accordance with the World Health Organization (WHO) criteria. Patient-assessed visual function was measured using a modified VF-14 questionnaire.

**Results:** The age and gender adjusted prevalence rates were 1.1% [95% confidence interval (CI) 0.6, 1.8] for bilateral low vision, 0.5% (95% CI 0.2, 1.1) for bilateral blindness and the mean visual function score was 98.6. The rates of bilateral low vision and blindness increased with age; while visual function scores decreased with age, even after adjusting for gender and education. Cataract accounted for 58.8% of bilateral low vision, 20.0% of bilateral blindness, and 52.0% of poor visual function (score < 90). Glaucoma contributed to 60.0% of bilateral blindness.

**Conclusion:** The age and gender-adjusted rates of low vision and blindness were 1.1% and 0.5%, respectively. Glaucoma is a leading cause of blindness in Singapore Chinese adults, in addition to well-recognized causes in the rest of Asia such as cataract.

## Symposium 20 – Retina Cutting Edge

13 June 2006, Tuesday, 0830-1000 Hrs  
Room 301-302, Level 3

### S634

#### THE MANAGEMENT OF PROLIFERATIVE VITREORETINOPATHY

Stanley Chang, USA

**Purpose:** To present an update in techniques for the management of retinal detachment with proliferative vitreoretinopathy (PVR).

**Setting:** Routine vitreous surgery

**Methods:** The characteristics of retinal detachment at risk for the development of PVR include vitreous hemorrhage, large retinal tears, pseudophakia/aphakia, trauma, and cases in whom the retinal tear cannot be identified. The surgical objective should be to relieve the traction completely intraoperatively with vitrectomy, membrane peeling, and an encircling scleral buckle. Perfluorocarbon liquids and panoramic viewing are important adjuncts. Relaxing retinotomies are used when proliferation is intractable, and must be relieved. The role of gases or silicone oil for longer term tamponade is usually necessary.

**Results:** The anatomic outcomes are steadily increasing with 95% of retinas reattached after one or more surgeries. Visual outcomes are influenced by the number of surgeries, anterior segment status and the development of hypotony. Approximately 10-15% of eyes regain visual acuity of 20/40 or better.

**Conclusions:** Advances in surgery for the management of PVR have led to anatomic success rates that are significantly improved. The challenges faced are to find treatments to decrease re-proliferations and rescue retina cellular function that will improve the visual outcome.

**Financial Disclosure:** The author has no financial interest in the material presented.

### S635

#### BRIGHT LIGHT MIGHT OUTFIGHT NIGHT SIGHT

Yasuo Tano, Japan

At the dawn of modern vitreous surgery, our armamentarium was limited only to 17 gauge vitrector sheathed with fiber light sleeve of  $\varnothing$ 2.3 mm. The surgeon had to prepare the worst possible complications such as massive hemorrhage, iatrogenic retinal tear, collapse of the eye and so forth. However, days of nightmare seem to have gone by now with overwhelming advancement and sophistication of instrumentations and techniques over the last 30 years. Among such prominent progresses in surgical environment, remarkable improvement of endoillumination has brought a revolution in modern vitreous surgery. Xenon endoillumination systems have become available which can provide extraordinary bright illumination compared to the conventional illumination system with Halogen or Metal-halide lamp. These systems can provide satisfactory illumination with 25 gauge light pipe, 25 or 27 gauge chandelier illumination, 25 gauge illuminated infusion cannula, and various illuminated forceps and scissors. All of these new instrumentations have drastically changed the surgical capability. Surgeons are able to employ true bimanual techniques under sufficient illumination provided by 25 or 27 gauge sutureless chandelier illuminations. Previously dim 25 gauge light pipe can deliver as bright illumination as 20 gauge illumination. Panoramic viewing is guaranteed throughout a homogeneously illuminated surgical field. Good observation has always been the key to a successful surgery. New techniques and instrumentations will further evolve based on the revolutionarily bright endoillumination systems.

### S636

#### THE NEXT STEPS IN TSV25 SURGERY

Eugene De Juan, USA

Since 1999, when Bausch and Lomb introduced the TSV 25 (25 gauge vitrectomy) system, constant improvements have resulted in nearly half of all vitrectomies in the US being performed with 25 gauge surgery. This minimally invasive approach has been shown to not only speed patient recovery and drastically improve patient comfort but is increasingly being shown to increase safety.

A series of improvements with a new lighter high speed vitrectomy hand piece, more effective light pipes, a variety of intraocular instruments. All major surgical ophthalmology companies have embraced this technology. The indications, results and recent developments will be presented.

## S637

## 25G VS 20G — WHAT IS THE DIFFERENCE?

Tang Shibo, China

**Purpose:** To evaluate the safety and efficacy of 25-gauge transconjunctival sutureless vitrectomy (TVS25G) and compare it with 20-gauge vitrectomy.

**Materials and Methods:** A prospective study was performed. 33 eyes with diseases including macular hole (n=21), idiopathic epiretinal membrane (n=7), vitreous hemorrhage (n=4) and congenital retinoschisis (n=1) were randomly assigned to 25-gauge or 20-gauge group. Surgical time, visual acuity (VA), intraocular pressure (IOP), wound healing, postoperative inflammation, patient's comfort and complications were evaluated. Ultrasound biomicroscopy (UBM) was used to evaluate the healing process of sclerotomies.

**Results:** VA increased in both the 25-gauge group and 20-gauge group (from 0.1 to 0.3) with no significant intergroup difference. Mean surgical time was 25.1 min in 25-gauge group and 40.9 min in 20-gauge group ( $p=0.001$ ). In 20-gauge group, more scleral dehiscence ( $p=0.017$ ) and conjunctival edema ( $p=0.005$ ) were identified by UBM on the 5th postoperative day. This divergence disappeared in the following time. Around the sclerotomies, vitreous incarcerations were observed in 3 eyes in 20-gauge group and 6 eyes in 25-gauge group ( $p>0.05$ ), proliferations were observed in 3 eyes in each group. Inflammation was not evident ( $p=0.046$ ) and patients felt more comfortable ( $p=0.001$ ) in 25-gauge group by the first three postoperative days. IOP elevated in 1 case in 25-gauge group and 4 cases in 20-gauge group postoperatively ( $p>0.05$ ). One eye developed postoperative retinal detachment and macular hole was still open in another case in 20-gauge group. No serious surgical complications were identified in both groups.

**Conclusions:** TVS25G is a safe and efficient option for patients with less surgically complex vitreoretinal diseases. It may hasten postoperative recovery by minimizing surgical trauma, decreasing surgical time, alleviating postoperative inflammation and making people feel more comfortable.

## S638

## NEW VIEWING SYSTEM FOR VITRECTOMY

Horiguchi Masayuki, Japan

**Purpose:** We have developed a new viewing system of the fundus for vitreous surgery, OFFISS. The details of this system and the techniques required for using this system are explained in this presentation.

**Methods:** The system consists of a newly designed field lens (40 dioptre and 120 dioptre) suspended from the operating microscope and a prismatic inverting device. The 40-D lens is placed above the cornea and the illumination from the operating microscope

creates an inverted image of the fundus, which is made erect by an inverter system. The light source of the microscope was 50W halogen lamp, and the light intensity on surface of the retina was 30 mW/cm<sup>2</sup>. No fiberoptics is required, and both hands are free to use two micro-instruments. The intraoperative fluorescein angiogram can be performed with this lens. The 120-D dioptre lens placed above the cornea and a wide-field fiberoptics provide an extremely large angle view of the fundus. This system has been designed so that the surgeon can control the position of the field lens and that of microscope independently, which facilitates the visibility of the fundus during the surgery.

**Results:** We used this system in more than 2000 cases. The 40-D dioptre was successfully used in bimanual membrane removal and haemostasis in proliferative diabetic retinopathy or proliferative vitreoretinopathy, bimanual removal of dropped lens and observation of the fundus during surgery for mature white cataract. Intraoperative fluorescein angiogram detected the vessel abnormalities in some cases with vitreous hemorrhage. The 120-D lens was used for peripheral vitrectomy. In most phakic or aphakic (combined surgery) cases, the ora serrata could be observed without scleral depression. In pseudophakic cases, the visibility of the periphery depended on the size of the IOL, but the vitreous base was visible without depression. This lens minimized the operation time and complication (missed tear etc), because it provides the view of the entire retina. There was no evidence of retinal phototoxicity.

**Conclusion:** OFFISS is very useful in various situations in vitreoretinal surgeries, and we believe that OFFISS will greatly improve vitreous surgery.

## S639

## VISUAL OUTCOMES OF EPIRETINAL MEMBRANE PEELING

Andrew Chang, Australia

**Aims:** Visual outcomes of patients following vitrectomy and peeling of visually significant epiretinal membranes were assessed to determine the influence of specific perioperative factors and surgical complications on final visual acuity and functional vision.

**Methods:** In an unmatched, consecutive surgical series, vitrectomy and membrane peeling were performed on 125 eyes of 123 patients with visually significant macular epiretinal membranes. Patients were followed for 6-36 months. Visual outcome measures included postoperative Logmar visual acuity, change in visual acuity and functional vision tasks evaluated by questionnaire. Perioperative factors including duration of symptoms, preoperative visual acuity, aetiology, membrane type and leakage on fundal fluorescein angiogram were correlated with final visual outcomes.

**Results:** Visual acuity improved by a mean of  $0.31 \pm 0.21$  units (3 lines of vision). In 104 cases (83%), visual acuity improved in patients by 2 lines or more, with 20 cases (16%) having unchanged

acuity and one case (1%) having worse acuity. Ninety-three percent of interviewed cases reported improvement in functional vision, especially reduction of distortion. Cataract was observed in 52 cases (52% of phakic eyes) postoperatively compared to 19 cases (19%) preoperatively. Postoperative visual acuity correlated with preoperative visual acuity. Patients with worse preoperative vision recorded greater visual improvement following surgery. No other perioperative factors were found to have a prognostic value in this study.

**Conclusions:** Epiretinal membrane peeling improves vision in the majority of patients with significant symptoms, even if preoperative visual acuity is not substantially reduced. Surgery improves functional vision including metamorphopsia not measurable by visual acuity, and thus assessment of functional vision should be included in surgical case planning.

**S640**  
**ROLE OF VITRECTOMY IN ADVANCED PROLIFERATIVE DIABETIC RETINOPATHY**

Tarun Sharma, India

Despite laser photocoagulation, many eyes continue to develop complications of proliferative diabetic retinopathy. These are non-clearing vitreous hemorrhage, traction retinal detachment, and combined traction-rhegmatogenous retinal detachment; vitreous surgery is needed to manage these complications. Other indications to perform vitreous surgery include dense premacular hemorrhage, retrohyaloid or anterior hyaloid neovascularization, recurrent bleed with or without retinal detachment after initial vitreous surgery, dense asteroid hyalosis preventing laser photocoagulation, progressive fibrovascular traction involving macular area, fibrous tissue bridging the arcades covering macular area, thickened posterior hyaloid causing tangential traction, and removal of sub-retinal hard exudates from the macular region.

Surgical principals of vitreous surgery in diabetic vitrectomy are removal of media opacity (cataract or vitreous hemorrhage), release of anteroposterior traction, relief of tangential traction, complete hemostasis, fluid gas exchange, gas or silicone oil tamponade, and endolaser photocoagulation. In selected clinical settings, cataract surgery is combined with placement of foldable IOL.

Crucial steps are to understand the surgical anatomy in each case and plan surgical steps. Unlike in proliferative vitreoretinopathy where proliferative tissue could be easily peeled from the surface of the retina, proliferative tissue in diabetics is anchored to retina by several fibrovascular nails. Relief of tangential traction requires membrane dissection using the concept of segmentation or delamination or both. Availability of wide-angle viewing system and combined function instrumentation enhances surgical precision with minimal complications.

**S641**  
**SURGERY FOR RETINOPATHY OF PREMATUREITY — DECISION MAKING AND SURGICAL TECHNIQUE IN STAGE IV & V ROP**

Rajvardhan Azad, India

Surgery in retinopathy of prematurity (ROP) is seen more with awe than benefit. Recent advancement in instrumentation and better understanding of surgical anatomy has made it possible to salvage even stage V ROP cases from going to blindness. In Stage IV ROP lens sparing vitrectomy is beneficial in relieving traction on retina more so in temporal periphery. Surgery in this stage is advocated when traction leads to resultant retinal detachment in infants.

Stage V ROP usually demands extensive surgery as adhesions are too many and too strong and in the extreme periphery. A Pars plana lensectomy is therefore advocated – along with surgical pupilloplasty to have a wider pupillary area to remove traction in the peripheral areas.

Decision making in stage V ROP depends much on configuration on USG. An open funnel usually carries a good prognosis as compared to a closed one. A wider pupilloplasty helps in preventing re-proliferation and closure of funnel, as the tendency to fibroblast formation is more in this age group.

The goal of surgery should be clear to retinal surgeon and parent counselling is essential especially with respect to visual outcome to ensure expectation. Recognizing objects, moving freely within home i.e. actual navigating vision should be the goal if not a very useful vision to the child.

**S642**  
**SURGERY FOR RETINAL VASCULAR DISEASES**

Manish Nagpal, India

The standard management of vein occlusions has been based on laser treatments. For CRVOs if there is ischemia detected on the fluorescein angiography a pan retinal photocoagulation is indicated to prevent neovascularisation and further sequelae of secondary glaucomas. But the chronic macular oedema in ischemic cases usually leads to long term poor visual prognosis especially the cases which present with visual acuity less than 20/200 baseline and an afferent pupillary defect. It is for these cases that the mechanical concept of decompression of the lamina cribrosa is indicated wherein using a MVR blade one makes a stab on the nasal margin of the disc thereby decompressing the lamina and the internal vessels passing between it and also by promoting chorio retinal anastomosis which improves perfusion. For BRVOs there is a concept that the common adventitial sheath narrows the lumen of the vein and artery especially at the junction of an AV crossing. It is believed that due to atherosclerosis and hypertension the

thrombus formation occurs at these junctions. In cases of BRVOs with chronic macular oedema a surgical procedure called sheath decompression surgery is done to relieve the compression on this junction thereby improving the perfusion and eventually reducing the oedema. Both these procedures are not standardized procedures and some trials are going on to study their efficacy and we would be presenting our data on the same.

## **Symposium 21 – Glaucoma Glaucoma Challenges in Asia Pacific**

13 June 2006, Tuesday, 0830-1000 Hrs

Room 303-304, Level 3

**S643**

**SSO GOLD MEDAL**

**EPIDEMIOLOGY STUDY OF GLAUCOMA IN CHINA**

Zhao Jia Liang, China

Glaucoma is the commonest irreversible blinding eye disease in China. However, there are a few population-based study of glaucoma prevalence in China. We conducted the epidemiological studies of glaucoma in Beijing in 1985 and in 1996. The objective of the study was to estimate the prevalence of glaucoma and derive the estimate for the number of adult suffering glaucoma in China. The venue of the Study was Shunyi District, which is a farming community located northeast of Beijing. A random sample was obtained through cluster sampling of villages. The examinees received the basic eye examination and examinations to rule out the glaucoma. The PACG suspects would undergo the following examination. If anterior chamber is shallow, gonioscopy should be performed. If anterior chamber angle is narrow, dark-room provocative test should be performed. If the dark-room test is positive, gonioscopy should be performed in the dark room. If the anterior chamber angle is partially or totally closed, PACG diagnosis is made. In this population, the prevalence of glaucoma was 2.07%. The prevalence of the primary angle closure glaucoma, primary open angle glaucoma and secondary was 1.66%, 0.29% and 0.12% respectively. The prevalence of the variety of glaucoma increased with age. The visual function in 64.0% of glaucoma patients was damaged in some degree. The rate of the bilateral blindness among glaucoma patients was 16.0%. These patients were all 60 years old or above. The rates of unilateral blindness, bilateral low vision and unilateral low vision were 17.0%, 23.0% and 0% respectively. Thus, we can confirm that glaucoma is a serious eye disease leading to blindness according to the prevalence and the visual function of the glaucoma patients.

**S644**

**IS JAPANESE GLAUCOMA DIFFERENT?**

Tetsuya Yamamoto, Japan

The purpose of this presentation is to show what Japanese ophthalmologists think of glaucoma from epidemiological and pathogenetic viewpoints.

**Point 1:** According to the Tajimi Study, a population-based glaucoma survey, normal-tension glaucoma (NTG) is the most prevalent subtype of glaucomas in Japanese aged 40 years or older, yielding a prevalence of 3.6%. The prevalence increases rapidly as population ages, reaching 7% in those aged 70 years or older.

**Point 2:** We have found that several IOP-independent or vascular factors are closely associated with NTG. Several studies have concluded that ocular hypotensive therapy is the treatment of choice for NTG as well as high-tension glaucoma. These conflicting findings must be carefully elucidated in the near future.

**Conclusions:** NTG is the most prevalent subtype of glaucomas in Japanese. IOP-independent, probably vascular, factors as well as IOP are associated with the development and progression of NTG in this ethnic group.

**S645**

**PREVENTING GLAUCOMA BLINDNESS – THE CHINESE PERSPECTIVE**

Ge Jian, China

Glaucoma blindness remains as one of the major public health challenges in China. Glaucoma, similar to other age-related disease condition, will increase rapidly as the population ages if no effective preventive and treatment actions are taken. However, the development of eye care system is hardly able to meet this enormous need. There are an estimated 22,000 eye doctors practising in China with various levels of training and experience. Only roughly 300 of them are estimated to be well-qualified glaucoma specialists in the country. Growing epidemiological evidences suggest the prevalence of primary open-angle glaucoma (POAG) is at least comparable to angle closure. It could be more challenging to screen, identify and subsequently treat the POAG patients in the community given this disease tends to be asymptomatic. This will require adequate clinical skills of the doctors who can use appropriate technology, in combination with effective screening programs. Therefore, the main focus of a national initiative to combat glaucoma blindness should be human resource development. Further training of our ophthalmologists should be attempted in order to make sure they are able to understand the appropriate basic techniques for glaucoma detection, such as intraocular pressure measurement, gonioscopy and optic disc examination. Health education campaigns will also help improve the awareness of the Chinese people.

**S646**

**LESSONS FROM THE SINGAPORE 5-FU TRIAL**

Steve Seah, Singapore

**Purpose:** To determine the effects of a single 5-minute application of intraoperative 5-fluorouracil (5-FU) during glaucoma filtration surgery on intraocular pressure lowering (complications); and field and optic disc progression in an Asian population.

**Methods:** A prospective, randomized, masked trial of intraoperative 5-FU (50 mg/mL) vs. placebo in trabeculectomy was carried out in 243 Asian patients with primary glaucoma. Trabeculectomy was performed using a standard technique and subjects randomly assigned to intraoperative augmentation with 5-FU under the conjunctiva or placebo. The two primary outcomes of the trial were based on the Moorfields 5-FU Study criteria i.e. postoperative intraocular pressure (IOP) and progressive loss of visual fields and optic disc neuroretinal rim. Three critical levels of IOP were used to define three types of 'IOP Failure': postoperative IOP of >14 mm Hg, >17 mm Hg, and >21 mm Hg, on two consecutive visits (ignoring day-1). Modified Collaborative Normal Tension Glaucoma Study criteria were used to determine visual field progression. Loss of optic disc neuroretinal rim was determined only after agreement by 2 masked observers of stereo disc photographs, comparing baseline with each visit.

**Results:** 235 subjects completed over 1 year follow-up. Mean follow-up was 54.0 ± 15.1 months. Failure defined as IOP >14 mm Hg as above occurred in 83/115 in the 5-FU group and 101/120 in the placebo group. The failure rate was significantly lower in 5-FU compared to placebo (RR=0.69, 95% CI: [0.52, 0.93], p=0.014). Similar results were obtained for failure defined as IOP >17 mm Hg: 57 failed in the 5-FU group and 73 in the placebo group (RR= 0.72, 95% CI:[0.51,1.02], p=0.064). Progressive loss of visual fields or disc neuroretinal rim (progression) occurred in 14/111 in the 5-FU group and 21/115 in the placebo group (9 subjects were excluded due to protocol violations). The Cox relative risk regression analysis leads to an estimated RR of 0.67 (95% CI:[0.34,1.31], p=0.239) for the 5-FU group. There were no significant differences in blebitis, endophthalmitis, hypotony, cataract, or other adverse events.

**Conclusion:** Intraoperative 5-FU significantly improves the long-term IOP lowering effect of glaucoma surgery, without any significant increase in complications in an Asian population.

**S647**

**GLAUCOMA PREVALENCE IN INDIA — URBAN VERSUS RURAL**

Lingam Vijaya, India

**Purpose:** To determine the prevalence of primary glaucoma and the associated risk factors in an urban population and compare it

with rural population in southern India.

**Methods:** Subjects aged 40 years or more underwent a complete ophthalmic examination. Glaucoma was diagnosed according to the International Society of Geographical and Epidemiologic Ophthalmology classification.

**Results:** 3850 urban subjects and 3924 rural subjects responded for the study. The mean age for the urban population was significantly more than that of the rural population (54.8 ±10.6 yrs vs. 53.8 ± 10.6 years.0001). There were more diabetics and hypertensives in the urban population than in the rural population. The mean IOP, CCT, VCDR was significantly greater for the urban population.

**Primary Open-angle Glaucoma (POAG):** The POAG prevalence in rural population was 1.62% (95% CI: 1.42–1.82) significantly different (p=0.0001) than 3.51% (95 % CI: 2.9-.1) in the urban population. In both populations, POAG was positively associated with age and IOP. Number of people diagnosed to have POAG for the first time and blindness due to POAG was similar in both populations. **Primary Angle-closure Disease:** The prevalence of primary angle-closure glaucoma (PACG) was similar in both populations. **Primary angle-closure (PAC) and primary angle-closure suspect (PACS)** was significantly more in urban population. In both populations PACG and PAC were positively associated with age and IOP. In the urban population, there was an association with diabetes and hyperopia. In rural population an association was seen with female gender. None of the rural PACG subjects were aware of the disease.

In the urban population 14.7% were aware of the disease (1 subject had glaucoma surgery and 2 were diagnosed to have POAG). Blindness due to PACG was significantly more in urban population than in the rural population. The disease was silent in both populations.

**Conclusions:** Prevalence of POAG was more in the urban population. PACG prevalence was similar. The detections rates were very poor in both populations.

**S648**

**SOCIOECONOMIC CONSIDERATIONS FOR GLAUCOMA MANAGEMENT IN DEVELOPING COUNTRIES**

Manuel Agulto, The Philippines

Glaucoma treatment aims to preserve vision and quality of life. The science of glaucoma management identifies the pharmacologic basis of drug choice, dosage, side effects, and improved therapeutic index. The art of glaucoma care involves the ability of patients to comply with drug regimen to preserve visual acuity and field while maintaining quality of life. The socioeconomic limitations in developing countries compound the challenges in the control of glaucoma blindness. A clear grasp of the medical, social, and economic aspects of care will help minimize visual loss in the underserved and undertreated patients of the developing world.

S649

### GLAUCOMA CHALLENGES IN POPULATIONS WITH INCREASING MYOPIA

Wang Tsing-Hong, Taiwan

The prevalence rate of myopia is rising in Taiwan and it is a large public health problem in certain parts of the world, including East Asia. Though at a slower rate than during childhood, myopia can still progress after the age of puberty, and axial elongation of the eyeball is the main component that changes in myopic progression. Myopic adults have higher prevalent risks of glaucoma; however, the associated ocular complications make the diagnosis and detection of the progression of glaucoma much more difficult. Changes in the anterior segments including flatter corneal curvature, decreased corneal thickness and endothelial density were noted as the eyeball elongates in myopia. These alterations may affect the accuracy of the measurement of intraocular pressure. Higher risks of posterior subcapsular cataract, cortical and nuclear cataract in myopic patients were reported in many epidemiology studies. Chorioretinal abnormalities such as retinal detachment, chorioretinal atrophy and lacquer cracks also increased with severity of myopia and greater axial length. The reliability of visual field examination in the detection and monitoring progression of glaucoma is severely compromised under these circumstances. Myopic discs are more likely to have a wide range of size, variable appearances, and many other associated abnormalities. These characters markedly restrained the usefulness of the imaging system for the optic nerve evaluation in glaucoma practice.

How to detect early glaucoma and monitor its progression in a highly myopic eye remains a serious and difficult issue. We look forward to the upcoming new technologies and researches casting some light in near future.

S650

### EARLY DIAGNOSIS — HOW DO WE FIND GLAUCOMA BEFORE IT FINDS US?

Paul Healey, Australia

**Purpose:** Glaucoma is an important cause of preventable blindness. Symptomatic presentation occurs late and is associated with a poor prognosis. The long pre-symptomatic phase of glaucoma makes it amendable to screening. Despite this, diagnosis rates are generally poor. Recent statements in the US and UK have recommended against screening in part because of the poor predictive value of tonometry, poor reliability of visual field screening and mild nature of the vision loss. The aim of this presentation is to evaluate glaucoma screening and diagnostic algorithms in a well-defined older Australian population.

**Methods:** The study sample consisted of 3654 participants of the Blue Mountains Eye Study, aged 49+ years examined during

1992-4. Goldmann applanation tonometry could be performed in 99%, optic disc photographs in 98% and 76-point suprathreshold visual field testing in 89% of participants. Open-angle glaucoma (OAG) diagnosis required matching optic disc and full threshold (Humphrey 30-2) visual field appearance without regard to intraocular pressure (IOP). Subsequently optic disc stereo-photographs were assessed by trained, masked, non-clinician graders for optic disc signs reported to be associated with glaucoma.

**Results:** The prevalence of OAG was 3.0% and increased exponentially with age. Age-standardized national projections predicted a 56% increase in numbers of people with OAG over 15 years due to the ageing of the population. Sensitivity of current OAG screening methods in the BMES population was 50% with lowest sensitivities in younger participants. Current diagnostic algorithms had a positive predictive value (PPV) also of 50% with a large proportion of false positives receiving glaucoma medications. The PPV of suprathreshold visual field screening and IOP >21 mm Hg for OAG diagnosis was 15%. Multivariate analysis showed that a combination of systemic, ocular and optic disc signs had the best sensitivity and specificity for OAG detection. A simplified empirical scoring system was devised based on this model. Using a conservative cut-off, the scoring system would screen 4.5% of the population aged over 50 positive, with a sensitivity of 90% and a positive predictive value of 56%. These are the best diagnostic test results reported for OAG.

**Conclusions:** Screening for OAG may be more feasible than previously thought.

## Symposium 22 – Paediatrics Challenges in Strabismus Surgery

13 June 2006, Tuesday, 0830-1000 Hrs

Room 305, Level 3

S651

### VERTICAL MUSCLE SURGERY IN THE IMMATURE VISUAL SYSTEM

Frank Billson, Australia

**Introduction:** The immature visual system seen in infancy and early life reflects the plasticity of the developing central nervous system. As visual maturation develops the risk of inducing amblyopia is less but risk of diplopia greater; the other significance of strabismus is to recognise that it is a neurological sign and may indicate underlying progressive pathology.

Vertical muscle dysfunction implies the possibility of vertical and torsional image disparity with smaller fusion tolerance than with horizontal disparity. The implication for vertical muscle surgery is an even greater need for correct assessment of disturbed pattern of movement and surgery that minimises risk to potential fusion.

**Method of Approach:** To discuss illustrative cases and the factors responsible for departure from the normal pattern of movement with surgery to provide rationale of are derived.

**Results:** Illustrative Cases and common Scenarios include:

- In children vertical strabismus is less common than horizontal strabismus though both deviations may be concurrent in A and V syndromes. A and V patterns must be considered in variable strabismus along with factors of accommodation vertical incomitance and other pathology.
- Vertical strabismus may be part of strabismic syndromes requiring consideration of Vertical muscle surgery in some Restrictive and Disinnervation syndromes.

**Discussion:** Particular scenarios and preferred techniques are presented with respect to anatomical factors and differences more commonly present in children.

Oblique Muscles:

- Superior Oblique weakening procedures
- Superior Oblique strengthening procedures
- Inferior Oblique weakening procedures — case for recession
- Inferior Oblique strengthening procedures.

Vertical Recti:

- Superior rectus surgery in DVD not always the answer
- Inferior Rectus surgery and cautions.

Restrictive syndromes:

- These may be primary due to a Browns or secondary to strabismus surgery. Dissinnervation Syndromes surgery on vertical ocular muscle not indicated in the majority of cases, but can be very rewarding in carefully selected cases.

**Conclusion:** Vertical muscle surgery is less frequently done than horizontal muscle surgery but excellent results can be obtained in the immature visual system if the paediatric syndromes are recognised and caution exercised in selection of cases.

S652

**MANAGEMENT OF INFANTILE ESOTROPIA — HOW BEST TO ACHIEVE OPTIMAL ALIGNMENT AND BINOCULAR FUNCTION**

Tony Moore, UK

**Purpose:** To discuss current management of infantile esotropia.

**Methods:** Literature review.

**Conclusions:** Infantile estropia is defined as a large angle esotropia of onset before 6 months of age. It is better regarded as a syndrome or constellation of findings which include esotropia, latent nystagmus, inferior oblique muscle overaction, dissociated vertical deviation and abnormal motion processing. Management options include botulinum toxin and surgery. Surgical alignment by 24 months of age is associated with greater probability of achieving

binocular function and stable long term alignment. Generally the best sensory result that can be achieved is the monofixation syndrome in which there is a small angle esotropia with foveal suppression of the squinting eye but peripheral stereopsis. Although there have been a few anecdotal case reports of high level stereoacuity being achieved following early surgery before 6 months of age such surgery is controversial. There are unfortunately few randomized controlled trials of strabismus surgery and a recent Cochrane review of the management of infantile esotropia concluded that there is insufficient evidence to favor one form of treatment over another. More randomized clinical trials are clearly needed.

S653

**SURGICAL MANAGEMENT OF STRABISMUS ASSOCIATED WITH THYROID EYE DISEASE**

Monte Del Monte, USA

Strabismus is a common and debilitating complication of Thyroid Eye Disease. Because it is caused by a combination of sometimes severe mechanical restrictive and tonic factors, its management is especially difficult. The author has recently reviewed his experience over the past 25 years in treating more than 500 patients with strabismus in Thyroid Eye Disease at the University of Michigan. This paper will summarize the results of this study including the relationship to orbital decompression, types of strabismus and frequency of muscles involved, novel and established surgical approaches, results and complications of surgery (and how to avoid them). The author will emphasize practical clinical pearls learned from this extensive experience in a multidisciplinary Thyroid Disease Center to aid in the optimal strabismus management of these challenging patients.

**Symposium 23 – Refractive Debates & Controversies Part 1**

13 June 2006, Tuesday, 1400-1530 Hrs

Hall 603, Level 6

**(A) SURFACE ABLATION VS LASIK**

Marguerite McDonald, USA vs Lee Hung Ming, Singapore

**(B) MICROKERATOME VS INTRALASE**

Chan Wing Kwong, Singapore vs John Chang, Hong Kong

**(C) PLANOSCAN VS WAVEFRONT**

Wee Tze Lin, Singapore vs Steve Schallhorn, USA

## Symposium 24 – Retina Vitreoretina – State of the Art

13 June 2006, Tuesday, 1400-1530 Hrs  
Room 301-302, Level 3

### S654

#### ARTIFICIAL VISION

Eugene De Juan, USA

Over the past seventeen years we have worked on the concept of developing a functioning retinal prosthesis. The basic concept is to provide a stimulating electrode array that sits on the inner surface of the retina in patients with an outer retinal degeneration. Histologic studies have demonstrated that the inner retina neural cells remain. These cells can be electrically stimulated by short bursts of current. Over the past 3 years we have surgically implanted 6 patients with a 16 electrode device. These patients can identify large targets and in real world conditions improve navigation and other visual tasks. With the use of scanning and other clues the patients can identify large letters. Clinical trials are planned for a new 60 electrode device. An update on the current and planned trials will be given.

### S655

#### OPEN ANGLE GLAUCOMA AFTER VITRECTOMY

Stanley Chang, USA

**Purpose:** To present data and a hypothesis for the late development of open angle glaucoma (OAG) following vitrectomy.

**Design:** A retrospective observational case series.

**Methods:** The records of 453 eyes undergoing vitrectomy were reviewed for postoperative OAG. Eyes with confounding factors were excluded. Sixty-eight eyes of 65 patients that underwent routine vitrectomy were followed for a mean of 56.9 months (range, 7-192 months). For the main outcome measures, patients were classified into three groups: glaucoma suspects, those developing glaucoma postoperatively, and those with preexisting glaucoma.

**Results:** In glaucoma suspects, the mean intraocular pressure (IOP) was significantly higher in the operated eye compared to the fellow eye ( $p=0.0001$ ). In eyes with new onset glaucoma, 23 of 34 (67.6%) eyes developed it in the vitrectomized eye only. In phakic eyes, the time interval between vitrectomy and the development of glaucoma (mean 45.95 months) was significantly longer than eyes that were nonphakic at the time of vitrectomy (mean, 18.39 months) ( $p=0.0115$ ). When the interval between cataract surgery in phakic eyes to the development of glaucoma was compared to the interval from vitrectomy to glaucoma diagnosis in the nonphakic group, the difference was not statistically significant. In eyes with glaucoma preoperatively, the mean number of antiglaucoma medications required to control the IOP was significantly higher in the

vitrectomized eye compared to the fellow eye ( $2.9 \pm 1.2$  vs  $2.0 \pm 1.4$ ,  $p=0.0215$ ,  $n=14$ ).

**Conclusions:** There is an increased risk of OAG following vitrectomy. The presence of the lens may be protective. In established OAG preoperatively, the number of antiglaucoma medications may increase after surgery. Oxidative stress is hypothesized to have a role in the pathogenesis.

### S656

#### VITREO-RETINAL MANAGEMENT IN OOKP SURGERY

Doric Wong, Singapore

Osteo-odonto keratoprosthesis (OOKP) surgery has been successful in restoring vision in eyes with severe anterior segment opacification otherwise not suitable for standard corneal grafting. These eyes can have associated vitreo-retinal pathology. Preoperative direct visualization of the retina is not possible. Imaging, usually with B-scan ultrasonography, is required to evaluate the anatomical integrity of the retina. The postoperative view of the retina is limited to the posterior pole because of the cylindrical optic of the keratoprosthesis. Repair of retinal detachments, either noted before or occurring after OOKP surgery is a challenge because of limited visualization. Vitrectomy for retinal detachment repair in these eyes has required the aid of temporary keratoprotheses and endoscopes. The endoscope will have an important role in these situations for the anatomical assessment of the retina in doubtful situations before OOKP surgery, the management of glaucoma in these eyes, as well a means of visualization in vitreous surgery.

### S657

#### OPTICAL COHERENCE TOMOGRAPHY (OCT3) IMAGING OF THE CONJUNCTIVA AND SCLEROSTOMIES AFTER 25-GAUGE TRANSCONJUNCTIVAL SUTURELESS PARS PLANA VITRECTOMY

Paulo Stanga, UK

**Purpose:** To image the anatomic location of fluid and the timing of 25-gauge sclerostomy closure with optical coherence tomography (OCT3).

**Design:** Uncontrolled, consecutive, interventional study.

**Participants:** Ten patients. Mean age of 72.3 years (range 62-83). All patients completed follow-up. Examinations were scheduled on postoperative days 1 and 8 (average day 9, range 6-15) and one month after that (average day 53, range 37-88).

**Testing:** Patients who underwent 25-Gauge transconjunctival sutureless pars plana vitrectomy surgery also underwent pre- and postoperative optical coherence tomography and biomicroscopy. Clinical records and anterior segment photographs were used to

determine whether sclerostomies appeared closed, open, or widely open. Main Outcome Measures: Fluid immediately above the sclerostomy was classified based on its OCT3 appearance as predominantly subconjunctival (SC-OCT), predominantly sub-Tenon (ST-OCT) or mixed (MX-OCT).

**Results:** The anatomic location of fluid was as follows: SC-OCT (22%), ST-OCT 37%) or MX-OCT (42%) counting over all time points. The proportion of sclerostomies with SC-OCT fluid increases from 4% at the first, to 20% at the second and 47% at the final examination. This is statistically significant (Chi squared = 10.6,  $p = 0.005$ ). The relative proportion of ST-OCT and MX-OCT sclerostomies did not change significantly. Traces of fluid were seen in 63% of sclerostomies at the final examination. Of 37 examinations where the sclerostomy was closed on biomicroscopy, 62% showed a discontinuity in the sclera on OCT3. Of 25 examinations where the sclerostomy appeared open, a discontinuity was visible in all but one. At 13 examinations the sclerostomy was not clinically detectable and imaged on OCT3 in 4 cases.

**Conclusions:** OCT3 shows the evolution of sclerostomies over time after 25-gauge transconjunctival sutureless pars plana vitrectomy. OCT3 demonstrates the postoperative patency of sclerostomies that appear closed on biomicroscopy. OCT3 appears to be a valuable tool for understanding why there seems to be a higher risk of hypotony and endophthalmitis in 25G vitrectomy compared to 20G.

**S658**

**INTRAVITREAL INJECTION OF BEVACIZUMAB (AVASTIN) FOR IRIS NEOVASCULARIZATION ASSOCIATED WITH PROLIFERATIVE DIABETIC RETINOPATHY**

Yusuke Oshima, Japan

**Purpose:** To evaluate the short-term safety and efficacy of intravitreal bevacizumab (Avastin) for iris neovascularization associated with proliferative diabetic retinopathy.

**Methods:** Intravitreal bevacizumab was injected into 14 eyes of 11 patients with iris neovascularization associated with proliferative diabetic retinopathy. The main outcome measures were visual acuity (VA), intraocular pressure (IOP), regression of iris neovascularization by fluorescein angiography before, 1 week, and 1, 2, and 3 months after injection.

**Results:** Regression of iris neovascularization was confirmed in all eyes (100%) 1 week after injection. Repeated injections in five eyes (36%) stabilized the recurrence observed 3 months after the initial injection. The VA remained stable or improved, and the IOP was controlled in 11 eyes (79%) throughout the follow-up period. No inflammation or complications were observed.

**Conclusions:** Intravitreal injection of bevacizumab may be an effective alternative for patients with refractory iris neovascularization by conventional treatments.

**S659**

**ADVANCES IN MACULAR IMAGING**

Alexander Walsh, USA

**Purpose:** Recent advances in computer and digital imaging technologies have enabled the development of novel quantitative analysis techniques that can be applied to ophthalmic diagnostic imaging. Two techniques, 3D-OCT with automated sub-analysis and color fundus image quantification, may enhance our ability to diagnose, monitor and treat complex retinal diseases by providing reproducible and accurate measurements of clinically-relevant disease features.

**Methods:** An investigational Fourier domain OCT device integrated into a nonmydriatic fundus camera (Topcon, Japan) was used to collect 3D-OCT data from normal subjects and patients undergoing conventional OCT. Retinal boundaries outlined by trained reading center graders were used as the gold standard for comparison to results from a conventional OCT device as well as an automated 3D-OCT sub-analysis system called OCTANE. Color images captured with conventional digital fundus cameras were also analyzed with custom software that had been trained on images with similar disease features. Results from this analysis were compared to manual feature identification by reading center graders.

**Results:** 3D-OCT data were collected from 20 eyes of 10 normal subjects and 10 eyes of patients with retinal diseases. Reading center assessments of the normal 3D-OCT scans correlated well with OCTANE retinal thickness measurements ( $p < 0.001$ ) and demonstrated excellent intergrader agreement. On average, the position of the inner and outer retinal boundaries determined by OCTANE deviated less than 10 microns from the reading center standard. Many findings were present on 3D-OCT scans that were not evident with conventional OCT. Using reading center evaluations as the gold standard, results from the quantitative color image analysis software were also assessed. The average sensitivity for detection of included disease features was greater than 95% with excellent specificity.

**Conclusions:** 3D-OCT may detect disease features that are not evident using conventional OCT. OCTANE analysis of 3D-OCT data provides an accurate measure of retinal thickness when compared to a reading center gold standard. The increased speed and segmentation accuracy of 3D-OCT with OCTANE may be useful in the detection of clinically-relevant disease features. In addition, color image analysis methods may enhance the quantification of parameters such as drusen area and microaneurysm counts.

## S660

## TTT IN THE TREATMENT OF EXUDATIVE AGE-RELATED MACULAR DEGENERATION

Dominic McHugh, UK

Transpupillary thermotherapy (TTT) has been employed for the treatment of choroidal neovascularisation (CNV) in the treatment of age-related macular degeneration for a number of years. The basis of the treatment is irradiation of the lesion with a diode laser (near-infrared, 810 nm) using subvisible-thresholds of energy, spot sizes of typically between 1.2 and 3 mm and pulse durations of up to 1 minute.

The author has been performing TTT for the past 7 years, primarily for the treatment of occult lesions, but also of classic membranes. The most recent outcome analysis was of a group of 36 eyes of 33 patients. The eyes had angiographically defined CNV, 11 predominantly classical and 25 predominantly occult. Outcome was assessed with best-corrected LogMAR visual acuity, clinical examination, and fluorescein angiography.

**Results:** Patients were observed for a mean of 28.7 months (range, 18 to 40 months). The mean change in LogMAR visual acuity for predominantly classic membranes was -1.91 (standard deviation [SD] = 4.3) and 5 of 11 (45.5%) eyes had a loss of 3 or more LogMAR lines. Predominantly classic membranes were closed in 9 of 11 eyes and stabilized in 2 of 11 eyes. The mean change in LogMAR visual acuity for predominantly occult membranes was -1.48 (SD=6.3) and 10 of 25 (40%) patients had a loss of 3 lines or more. Predominantly occult CNV was stabilized in 25 of 25 cases, and recurrence developed in 2 of 25 cases; one of the latter developed classic CNV.

**Conclusions:** The medium-term results for patients treated with TTT for both occult and classic CNV show good stability, with little visual loss and few recurrences. These outcomes are broadly similar to those reported in pilot studies elsewhere. The only randomized controlled trial for TTT that has been performed to date is the TTT4CNV trial (Reichel and associates). The results showed that in a subgroup of patients with baseline visual acuity of 20/100 or worse, 22% of treated eyes improved vision by one or more lines compared with none of the eyes in the untreated control group. Furthermore, at 18 months, there was a 2 line benefit in preserving vision in this subgroup when compared to sham treated eyes. Specifically, TTT treated eyes on average lost 2 lines of visual acuity while sham treated eyes lost 4 lines. Both of these findings were statistically significant.

This presentation will summarise the available data on the efficacy of TTT for CNV and attempt to define its role in a time of a wide variety of treatment modalities being assessed, both laser and pharmacological.

## S661

## ANECORTAVE ACETATE (RETAANE) FOR EXUDATIVE AGE-RELATED MACULAR DEGENERATION — SAFETY AND EFFICACY

Brendan Vote, Australia

**Purpose:** To confirm the long term safety of Anecortave Acetate 15 mg Suspension vs. Verteporfin PDT (C-01-99 analysis) as well as to extend the efficacy findings to 2 years.

**Method:** Five-hundred-thirty AMD patients were enrolled and received Anecortave Acetate 15 mg (or sham) every 6 months or PDT (or sham) every 3 months if leakage was noted on angiography.

**Result:** At month 24, no clinically relevant safety issues were observed due to the drug or the posterior juxtasclear depot (PJD) procedure during the entire course of the study. Additionally, two-year data continued to show Anecortave Acetate is clinically equivalent to Verteporfin PDT; 0.07 represented the largest difference (3.5 letters) in logMAR VA over 24 months. Moreover, the mean visual acuity for both treatment groups was found to be clinically stable from month 12 to month 24.

**Conclusion:** With its excellent safety profile, administration outside the eye every 6 months, and multi-factorial mechanism of action, Anecortave Acetate is ideally suited for chronic therapy in the management of patients with exudative AMD.

## S662

## RESULTS OF CONFOCAL SCANNING LASER OPHTHALMOSCOPE INDOCYANINE GREEN ANGIOGRAPHY (CSLO-ICG) GUIDED LASER TREATMENTS FOR EXUDATIVE AGE RELATED MACULAR DEGENERATION

Lim Tock Han, Singapore

**Purpose:** To describe the visual outcomes of various treatment modalities for exudative age related macular degeneration AMD made possible by confocal scanning laser ophthalmoscope indocyanine green angiography (CSLO-ICG) imaging (Heidelberg Retinal Angiography 2, Heidelberg Engineering) including direct thermal laser photocoagulation of Polypoidal Vasculopathy (PCV), feeder vessel treatment (FVT) for choroidal neovascular membrane (CNV) and CSLO-ICG guided treatment for Retinal Angiomatous Proliferation (RAP).

**Method:** Retrospective analysis of three interventional case series was carried out in a tertiary referral centre for exudative AMD. CSLO-ICG guided laser treatment was carried out using a frequency doubled YAG laser (Iridex GLX, Iris Medical).

**Results:** Seventeen eyes of 17 patients with PCV were treated with CSLO-ICG guided thermal laser photocoagulation of the extrafoveal polyps from July 03-Apr 04. Thirteen eyes of 13 patients completed at least 12 months of follow up (13-24 months).

Avoidance of moderate visual loss (MVL) (3 lines) was achieved in 92% and complete resolution of presenting fundus changes achieved in 77%. Three eyes had persistent and/or recurrence of exudative changes due to the occult CNV component of the lesions. In a separate study, 9 eyes of 9 patients were treated with FVT from July 03-July 04 and followed up for 10-20 months. Although avoidance of MVL was achieved in 6 patients, adequate control of the feeder vessel was achieved only in 3 patients while 3 recurred. As for RAP, 13 eyes of 11 patients were found to have RAP over 2 years, from July 03 to June 05. Five eyes were treated with thermal laser ablation guided by CSLO-ICG for stage 1 and 2 extrafoveal RAP. Closure was achieved in 4 of 5 eyes. While 2 eyes lost 2 lines of vision, none suffered MVL.

**Conclusion:** Given the poor natural history of exudative AMD, these treatment modalities based on CSLO-ICG provide alternatives for patients who are not eligible for, or who cannot afford photodynamic therapy and the new anti-VEGF treatments.

## **Symposium 25 – Cataract Debates & Controversies Part 2**

13 June 2006, Tuesday, 1600 – 1730 Hrs

Hall 603, Level 6

### **(A) BIMANUAL PHACO VS CO-AXIAL PHACO**

Jon Goh, Singapore vs Takayuki Akahoshi, Japan

### **(B) CLEAR LENS EXTRACTION - FOR AND AGAINST**

Michael Lawless, Australia vs Doric Wong, Singapore

### **(C) RESTOR VS TECNIS**

Con Moshegov, Australia vs Michael Knorz, Germany

## **Symposium 26 – Retina Practice Pearls from the Vitreo-Retina Experts**

13 June 2006, Tuesday, 1600-1730 Hrs

Room 301-302, Level 3

### **S663**

#### **THE CURRENT TRENDS IN MACULAR HOLE SURGERY**

Sjakon G Tahija, Indonesia

Vitreous surgery for full thickness macular holes was first reported by Kelley and Wendel in 1991. At present, the standard technique comprises a standard three-port core vitrectomy, separation of the posterior hyaloid, tamponade with either SF6 or C3F8 gas, and positioning for a period of 1-2 weeks. A popular adjunct to the

standard surgery is peeling of the inner limiting membrane (ILM). ILM peeling is facilitated by staining either with indocyanine green (ICG) or trypan blue. Some surgeons prefer using triamcinolone to mark any residual vitreous on the macula and to assist in peeling of the ILM. Viscoelastic is useful in protecting the RPE before staining of the ILM. The author will demonstrate some these surgical techniques using videos.

### **S664**

#### **VITREOUS BASE TRIMMING WITH TOPCON OFFISS**

Ong Sze Guan, Singapore

Although it may be difficult, visualizing the vitreous base, the pars plana and pars plicata is critical in order for release of anterior vitreous traction which is a component of many complicated retinal detachments.

Vitreous base trimming is also an important component of successful and complete vitrectomy in routine cases. The direct approach using indentation although useful is imprecise and may be hazardous. A wide angle viewing system using the TOPCON OFFISS can be used effectively to visualize and trim the vitreous base. This is a non contact wide angle viewing system and with a 120 degree lens, provides excellent view of the peripheral retina up to the ora serrata. Successful vitreous base trimming is likely to be associated with less postoperative complications.

### **S665**

#### **VISCODISSECTION REVISITED**

Pearl Tamesis-Villalon, The Philippines

Vitrectomy procedures and instrumentation for the removal of tough preretinal membranes in diseases like Proliferative Diabetic Retinopathy have evolved over the last 30 years, from simple posterior hyaloid detachment with barbed needles to bimanual manipulation with special instruments. Lost in this development is a technique called viscodissection, that appears to have begun in the early '80s with the advent of viscoelastics for cataract surgery. Viscodissection is a practical and effective way to delineate the plane between thick vascularized membrane and retina, in unusually difficult cases of diabetic retinopathy. Although it is not the main surgical technique, it is of great use occasionally, as it can adequately define a space between two surfaces, does not usually cause rupture of the vascular "nails" found connecting retina to membrane, and can minimize formation of retinal breaks. The changes in this technique and the results with its use over the years, are mainly attributed to the appearance in the market of different types of viscoelastics.

S666

### MANAGEMENT OF POLYPOIDAL CHOROIDAL VASCULOPATHY — AN UPDATE

Chan Wai Man, Hong Kong

Polypoidal choroidal vasculopathy (PCV) is considered to be a choroidal vascular disease characterized by branching vascular network and polypoidal structures at the borders of the lesion. Asians and blacks seem to be at greater risk than whites for developing the disease. Manifestations include recurrent hemorrhagic and exudative detachment of the retinal pigment epithelium and neurosensory retina. Photodynamic therapy (PDT) with verteporfin has been demonstrated to be effective and safe for treating active and symptomatic PCV lesions with subfoveal involvement. Stable or improved vision could be achieved up to 95-100 % of eyes in studies of 1 year follow-up. The vision dropped however with time of longer follow-up period. Complications include recurrence or persistence of the disease and development of secondary choroidal neovascularization. The clinical efficacy of other treatment alternatives in PCV such as combined PDT with intravitreal triamcinolone and anti VEGF will also be shared and discussed.

S667

### HYPERTENSION AS A RISK FACTOR FOR DIABETIC RETINOPATHY — NEW CONCEPTS AND CLINICAL SIGNIFICANCE

Wong Tien Yin, Singapore

Hypertension is a common co-morbid condition in patients with diabetes, and has been hypothesized to be a risk factor for the development of diabetic retinopathy. Hypertension impairs retinal vasculature autoregulation, leads to endothelial cell damage, and increases expression of vascular endothelial growth factor. Epidemiological studies and randomized clinical trials have now shown a consistent relationship between elevated blood pressure and risk of diabetic retinopathy. The United Kingdom Prospective Diabetes Study (UKPDS) has provided strong evidence regarding the importance of hypertension in development and progression of retinopathy in type 2 diabetes. In the UKPDS, patients with hypertension randomized to tight blood pressure control had a 37% reduction in the risk of any microvascular disease, a 34% reduction in progression of retinopathy and a 47% reduction in the visual acuity deterioration as compared to patients with less tight blood pressure control. The blood pressure effects were independent of glycemic control, and no threshold blood pressure levels were evident. The UKPDS estimates that every 10 mmHg reduction in systolic blood pressure is associated with a 10% reduction in the risk of diabetic retinopathy. Based on these studies, clinical guidelines now recommend adequate control of blood pressure as a means of preventing visual loss from retinopathy in patients with type 2 diabetes.

S668

### FUNCTIONAL RESULT AND VISUAL OUTCOME IN EARLY VERSUS CONVENTIONAL TREATMENT FOR RETINOPATHY OF PREMATURITY

Sukhuma Warrasak, Thailand

**Purpose:** To assess and compare functional result and visual outcome for early treatment of retinopathy of prematurity (ETROP) versus conventional method in premature infants who were detected or referred to treat ROP at the neonatal intensive care unit.

**Method:** Records of all premature infants diagnosed as ROP were reviewed. Patients were reassessed at one year of age or older.

**Results:** Of 64 ROP patients contacted, 39 returned for follow-up reassessment. The ETROP group comprised of 11 patients (22eyes) and the conventional group had 28 patients (56 eyes). Development of complications from ROP were compared between ETROP and the conventional groups. Esotropia and exotropia of 30-45 prisms occurred in ETROP group in 36.3 % vs 40.7% in the conventional group. High myopia of 5 diopters or more were found exclusively in 27.8% of the conventional group. Retina detachment rate was 17.2% in ETROP and 25.9% in the conventional group. Visual outcome of 20/200 or better was achieved in 72.7% in ETROP compared to 55.6% in the conventional group. None of the patients in the ETROP group lost vision whereas 9.3% in the conventional group did.

**Conclusion:** ETROP offered a better functional and visual outcome than the conventional treatment.

S669

### MANAGEMENT OF DIABETIC RETINOPATHY FOR THE ANTERIOR SEGMENT SURGEON

Caroline Chee, Singapore

**Purpose:** Diabetic retinopathy is a common co-morbidity with anterior segment disease. It is known to progress after anterior segment surgery, limiting the visual outcome. This presentation addresses ways of managing this problem to optimize long-term visual outcomes.

**Discussion:** Blood sugar levels as well as diabetic retinopathy should be well controlled before surgery is performed. Attention should be paid to the timing of surgery. During surgery, measures can be taken to reduce the risk of postoperative progression and to assist in postoperative management. Postoperatively, diabetic retinopathy requires close monitoring and treatment if the need arises. The measures which can be taken at each stage will be discussed.

**Conclusion:** With close attention to the management of diabetic retinopathy in the perioperative period, visual loss from the disease can be minimized. The problem should be looked at as one of diabetic retinopathy where the patient requires anterior segment surgery, rather than one of a surgical case who happens to have diabetic retinopathy.

**S670****ELECTROPHYSIOLOGICAL RESULTS OF SUBRETINAL CHIP IN RABBIT RETINITIS PIGMENTOSA**

Li Xiaoxin, China

**Objective:** In recent years artificial electrical stimulation of the retina is hypothesized to improve visual function of retinitis pigmentosa, even in areas distant from the implant. A clinical trial is going on. Can a small piece of micro-photodiode arrays (chip) improve the visual function? Can it improve the Full-Field VEP and ERG?

**Methods:** A round form-photodiode arrays of 3mm diameter with ca. 90 microelectrodes were implanted into subretinal or choroidal space of 6 retinitis pigmentosa rabbit eyes and 3 normal rabbit eyes. All of right eyes are chip implanted eye and left eyes as control. Focal-ERG (2 weeks after surgery) and Focal-VEP (4 weeks after surgery), Ganz-field ERG and Ganz-field flash-VEP (5 weeks after surgery) were performed.

**Results:** For focal ERG the amplitude of the b-waves increased in 4 RP eyes and 1 normal eye, worse in 1 RP eye, no change in 1 RP eye and 2 normal eyes. For focal-VEP the main amplitude increased in 2 RP eyes and 1 normal eye, no change in 4 RP eyes and 2 normal eye. For Ganz-field Flash VEP the main amplitude increased 2 RP eyes and, decreased in 3 RP eyes. No change in Ganz-field ERG for all RP eyes and normal Eyes between chip-implanted eyes and eyes without chip.

**Conclusion:** We could not find any significant increased amplitude of Ganz-field VEP and Ganz-field ERG after subretinal or choroidal micro-photodiode arrays implantation neither in RP rabbit eyes nor in normal rabbit eyes, but an improvement of amplitude by focal ERG and focal VEP were obtained in some RP eyes and normal eyes.

**S671****AGE-RELATED MACULAR DEGENERATION – CURRENT EVOLVING MANAGEMENT STRATEGY**

Jun S Wong, Malaysia

**Purpose:** To review the evolving treatment strategies in Age Related Macular Degeneration and Choroidal Neovascularisation (AMD/CNV).

**Methods:** A review of published and recent clinical experiences with new modalities of AMD/CNV therapeutics.

**Results:** Newer modalities such as intraocular Anti-VEGF antibodies injections, including Ranibizumab and Bevacizumab, had shown impressive results in the stabilization and/or improvement in vision in patients with AMD/CNV. Clinical cases are also presented to illustrate typical responders with such therapy. An evolving treatment pathway will be proposed.

**Conclusion:** New and currently evolving treatment strategy in AMD/CNV is needed in the optimal management of such patients in light of the availability of novel and efficacious therapeutic modality.