

The Eye Institute–Bausch & Lomb Research Prize:

Advanced Specialist Trainees or Clinical Fellows

COMPETITIVE CATEGORY

High-Speed ICG Angiography-guided Laser Treatment for Polypoidal Choroidal Vasculopathy: Case Series

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Objective: To report the treatment outcome of polypoidal choroidal vasculopathy (PCV) using high-speed (HS) ICG angiogram (HRA II) guided laser treatment.

Methods: Consecutive interventional case series diagnosed as PCV using HRA II FFA/ICG video-angiography at a tertiary referral centre for exudative age-related macular degeneration (AMD).

Results: 123 eyes with occult choroidal neovascularisation (CNV) (MPS classification) were referred to the AMD Clinic at Tan Tock Seng Hospital over 12 months (July 2003 to June 2004). 24% of these cases demonstrated PCV on HS ICG. Patients with PCV had a mean age of 65.9 years, were predominantly Chinese (93%) males (1.6:1). Fifteen patients underwent laser therapy to PCV and completed 2 years of follow-up. 53.3% of eyes demonstrated visual improvement (>2 Snellen lines) with 93.3% demonstrated visual stabilisation (<2 Snellen lines change in VA). 86.7% of patients demonstrated angiographic resolution of PCV, whilst 66.7% of patients demonstrated clinical resolution of presenting fundal features.

Conclusion: Confocal scanning ICG angiography provides excellent imaging of PCV, allowing identification of feeder vessel as well as accurate localisation of PCVs. Minimum 2-year follow-up suggests this treatment option is safe and efficacious.

Paradoxical Vascular Proliferation of Choroidal Neovascular Membrane Following Intravitreal Bevacizumab Injection – A Case Report

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Objective: To report a case of paradoxical progression of choroidal neovascularisation (CNV) following intravitreal bevacizumab injection given for a patient with occult CNV due to neovascular age-related macular degeneration.

Methods: Progression of CNV following intravitreal bevacizumab injection was demonstrated using confocal scanning laser ophthalmoscope indocyanine-green angiography.

Results: Despite the expansion of CNV into the subretinal space and some leakage demonstrated by fluorescein

angiography, there was a decrease, rather than increase, of the macular thickness as measured by optical coherence tomography which was correlated to improved visual acuity.

Conclusion: This case illustrates that disjunction of anti-proliferative and anti-exudative properties of an anti-VEGF agent can occur.

Bilateral Dense Cataracts and Anterior Uveitis as a Forme Fruste of Retinal Detachments in a Young Patient with Atopic Dermatitis

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Objective: To present the first reported case of bilateral retinal detachments in a young teenage boy with atopic dermatitis who presented with dense white cataracts and severe anterior chamber inflammation, so as to alert clinicians to the association between the 2 conditions.

Methods: Retrospective case report.

Results: We present the first reported case of bilateral retinal detachments in a teenage boy with atopic dermatitis who presented with dense white cataracts and severe anterior chamber inflammation. This 16-year-old boy presented with a 3-week history of bilateral blurring of vision, worse in the right eye. Examination showed visual acuity of hand movement in both eyes with white cataracts and abundant anterior chamber activity. Intraocular pressures were 0 and 12 mm Hg in the right and left eyes respectively. A right relative afferent pupillary defect was present. B-scan ultrasonography showed a right inferior retinal detachment. Physical examination showed atopic eczema in the neck and flexural regions of all 4 limbs. He underwent left phacoemulsification and retinal re-attachment surgery with intraoperative findings of a small supero-nasal retinal tear, and a very shallow retinal detachment temporally with fibrotic reaction. One week later he underwent a similar operation for the right eye, this time with poor view of the retina, but with intraoperative findings of a shallow inferior retinal detachment involving the macula. He recovered well postoperatively with resolution of uveitis bilaterally, and achieving best corrected visual acuities of 6/9 and 6/120 in the left and right eyes respectively.

Conclusion: Retinal detachments in patients with atopic dermatitis can masquerade as panuveitis and dense cataracts that can progress very quickly. Hence, one must be aware of this association and be able to recognise it early. A high index of suspicion is required when examining such patients.

Comparing Clinical Accuracy and Efficiency of Automated Visual Acuity Assessment System with Manual Visual Acuity Assessment

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Objective: To evaluate the clinical accuracy and efficiency of Automated Visual Acuity Assessment System (AVAAS) compared against Manual Visual Acuity (MVA) assessment. AVAAS is an innovative and newly developed system using Visual Basic which is linked to Microsoft Access database. It is based on Landolt-C optotypes (Flash MX with anti-aliasing) of 8 different orientations, and using a formulated algorithm, built in to determine the progress of the assessment.

Methods: Fifty volunteers (100 eyes) participated in this prospective study and were assessed by both MVA and AVAAS. Their best corrected visual acuity (BCVA) and the time taken to complete assessment of both eyes were recorded. A second assessment was subsequently performed based on the first recorded BCVA. Their BCVA and timing were again recorded. Fixing the level of significance at 5%, all analyses were performed with Stata 9.0.

Results: The level of agreement between AVAAS and MVA for the initial assessment was 86%. For the second assessment, it was 85%. The average time taken to complete initial MVA and AVAAS were 107.3 sec and 115.7 sec, respectively. The difference in timing was found to be non-significant ($P = 0.10$). However, there was significant difference between the timing for the second assessment (MVA: 64.3 sec, AVAAS: 81.9 sec; $P < 0.01$; $n = 40$).

Conclusion: The level of agreement was high. The time taken to perform AVAAS was comparable to that of MVA and the difference was clinically insignificant. The AVAAS is clinically proven to be an accurate and efficient system for visual acuity assessment.

Infective Keratitis in Singapore: Risk Factors and Clinical and Microbiological Review 2004 to 2006

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Objective: To identify risk factors and to define clinical and microbiological characteristics of infective keratitis in an urban setting.

Methods: A retrospective analysis of cases of presumed infective keratitis who presented at a tertiary eye centre, Tan Tock Seng Hospital, Singapore, over a 20-month period. 130 cases of presumed infective keratitis were included. The clinical records of all cases with cornea microbiology requests were reviewed with respect to clinical features, risk factors, microbiology, management and outcomes.

Results: The majority of patients had at least one of the risk factors associated with infective keratitis including contact lens use (63.1%), previous ocular surgery (10.8%), ocular trauma (10.0%), and corticosteroid use (1.5%). Cornea scraping results were obtained for 109 of these patients and 80.7% of these were positive. Bacteria and fungi were isolated in these cases, the most common being gram-negative organisms. 50.0% of the infections involved gram-negative bacteria, and 12.5% were polymicrobial. The most common isolate identified were *Pseudomonas aeruginosa* (48.9%), coagulase negative *Staphylococcus* (27.3%), followed by *Staphylococcus aureus* (4.5%). Fungi were isolated in 2.3%.

Conclusion: Contact lens wear remains the most important risk factor, compared to other developed countries, where other risk factors were more prominent. Good contact lens education is needed to reduce the incidence of infective keratitis. Antimicrobial therapy should always include coverage against *Pseudomonas aeruginosa* as it is a common offending organism.

The Effect of Preoperative Counselling on Fear Caused by Visual Sensations During Phacoemulsification – A Randomised Controlled Trial

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Objective: To determine whether preoperative counselling on the potential intraoperative visual perceptions during cataract surgery helps reduce the fear experienced by patients during the surgery.

Methods: Patients undergoing phacoemulsification under topical anaesthesia were randomised to those who received additional counselling and those not counselled. Patients were interviewed postoperatively on their intraoperative experiences.

Results: Of 851 patients, 558 (65.6%) received preoperative counselling while 293 (34.4%) were not counselled. A lower proportion of the group which received additional preoperative counselling were frightened compared to the group not counselled for perception of light (7/558 [1.3%] vs. 13/293 [4.4%], $P = 0.007$), colours ($P = 0.001$), movement ($P = 0.020$), flashes ($P = 0.072$) and instruments ($P = 0.599$). The mean fear score was significantly lower in the counselled group compared to the non-counselled group for light perception (0.03 vs. 0.12, $P = 0.002$), colours, ($P = 0.001$) movement ($P = 0.005$), and flashes ($P = 0.035$). Analysing separately by gender, the above findings were true of males whereas no significant association between fear and preoperative counselling was found for female patients. Preoperative counselling was a significant factor affecting fear after accounting for age, gender, operated eye and duration of surgery (multivariate odds ratio 4.3, 95% confidence interval 1.6-11.6, $P = 0.003$). More patients in the counselled group

reported increased satisfaction as a direct result of their intraoperative visual sensations (433/558 [77.6%] vs. 141/293 [48.1%], $P < 0.001$).

Conclusion: Preoperative counselling on possible visual sensations during cataract surgery significantly reduces both the proportion of patients frightened and the mean fear score compared to patients not counselled. Patients counselled experienced greater satisfaction from their intraoperative visual experiences.

CSLO-ICG Angiography-guided Photodynamic Therapy with Verteporfin for Treatment of Subfoveal Choroidal Neovascularisation

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Objective: To evaluate the effect of superior imaging of choroidal neovascularisation (CNV) afforded by cSLO-ICGA on verteporfin photodynamic therapy (PDT) treatment outcomes.

Methods: A retrospective interventional case series of all patients undergoing cSLO-ICGA-guided PDT over an 18-month period (Mar 2004 to Aug 2005). Eligibility criteria followed recommendations of the Verteporfin Roundtable Participants (2000 and 2001), except that: 1) lesion delineation was guided by cSLO-ICGA, and 2) all CNV subtypes were included.

Results: Of the 19 eyes eligible, predominantly classic CNV was found in 10 eyes (52.6%), minimally classic CNV in 7 eyes (36.8%) and purely occult CNV in 2 eyes (10.5%). Cause of CNV was age-related macular degeneration (AMD) in 14 eyes (73.7%), pathological myopia in 4 eyes (21.1%) and traumatic choroidal rupture in 1 eye (5.3%). Median pre-treatment logMAR visual acuity (VA) was 0.62 (mean, 0.73; SD, 0.42; range, 0.10 to 1.60), while median VA at 1 year was 0.50 (mean, 0.67; SD, 0.48; range, 0.10 to 1.60). Six eyes (31.6%) gained >3 lines, 10 eyes (52.6%) were stable (within +/- 3 lines of baseline), and 3 eyes (15.8%) lost >6 lines of VA. Complete resolution of central retinal thickening (on OCT) occurred in 9 eyes (52.9%), with partial resolution in a further 7 (41.2%).

One eye (5.9%) showed no improvement. Lesion greatest linear dimension (GLD) was reduced by 64.6% ($P = 0.048$, Wilcoxon signed-ranks test) when compared to that obtained by fluorescein angiography alone.

Conclusion: Our study showed that 84.2% of eyes undergoing cSLO-ICGA-guided PDT avoided VA loss of >3 lines at 12 months. This compares well with results from flash-fluorescein-angiography-guided PDT.

NON-COMPETITIVE CATEGORY

The Many “Faces” of Vitreo-Macular Traction

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Objective: To illustrate that vitreo-macular traction (VMT) may present with diverse fundoscopic appearances leading to common mis-diagnosis.

Methods: A retrospective, descriptive case series.

Results: Five patients who were seen at our tertiary referral centre had been diagnosed with various macular conditions. There were 3 male and 2 female patients. Their ages ranged between 53 and 64 years. One patient was diagnosed with lamellar macular hole and observed. Another patient with Stage 2 macular hole presented with monocular triplopia, and underwent combined cataract surgery and vitrectomy. One diabetic was diagnosed with clinically significant macular oedema and underwent grid laser photocoagulation. One patient had bicycle spoke wheel appearance of foveal retinoschisis and 1 patient appeared to have retinitis with silvery border. Both these patients were observed. Optical coherence tomography (OCT) revealed VMT in all cases.

Conclusion: VMT may be misdiagnosed or missed in various macular disorders by virtue of its varied appearance. OCT is a useful clinical tool to investigate macular lesions, and to illustrate VMT, which may warrant surgical management. Therefore, it should be suspected and excluded through clinical examination or OCT.

The Eye Institute–Allergan Research Prize:

Basic Specialist Trainees

COMPETITIVE CATEGORY

Intra-arterial Fibrinolysis for Acute Central Retinal Artery Occlusion: A Systemic Review

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Objective: The natural course of central retinal artery occlusion often leaves the affected eye legally blind. Commonly used conventional regimens have been ineffective in reversing

visual loss. Administration of a thrombolytic agent directly into the ophthalmic artery has shown promising results. The aim of this study was to review data on the efficacy of local intra-arterial fibrinolysis (LIF).

Methods: We systematically reviewed studies published after year 2000 on LIF with directed emphasis on treatment criteria and visual outcomes. After correction for data duplication, the

results of LIF in 44 patients with complete data are reported.

Results: All published studies identified were small, retrospective and non-randomised. Mean interval to LIF was 18.7 hours (SD, 37.2; range, 4 to 240). 43.2% of patients had an improvement of 2 Snellen lines or more with 25% achieving 6/15 or better and 34.1% attaining 6/60 or better 48 hours post-intervention. Treatment instituted within 6 hours from symptom onset resulted in a mean improvement of 5.4 lines compared to 2 lines in patients treated beyond 6 hours. When presenting acuity was light perception or worse, only 1 in 10 eyes attained a 2-line improvement even with intervention within 10 hours. Complications were seen in 5 patients (11.4%) and included intracerebral haemorrhage (1), ischaemic cerebrovascular accident (2), transient ischaemic attack (1) and vitreous haemorrhage (1).

Conclusion: Retrospective studies show potential benefits of LIF but with notable systemic adverse events. The studies had methodological limitations and in the absence of RCTs, there was insufficient evidence to establish the efficacy of LIF.

Safety and Efficacy of Combined Phacoemulsification and Trabeculectomy with Mitomycin C Instillation in Asian Patients

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Objective: To evaluate the safety and efficacy of combined cataract extraction and trabeculectomy procedures augmented with mitomycin C.

Methods: 137 eyes of 129 patients who underwent a combined cataract extraction with trabeculectomy and mitomycin C between January 2005 and December 2005 with 6 months of follow-up were identified from the Eye Institute (TEI) operations database. Intraocular pressure (IOP) measurement by Goldmann Applanation Tonometry (GAT) preoperatively and postoperatively at 1, 3, 6 and 12 months were recorded. Other measures included best-corrected visual acuity (BCVA) and use of anti-glaucoma medications postoperatively. Complete success was defined as targeted IOP of <20 mm Hg, 18 mm Hg and 15 mm Hg for targets of high-teens, mid-teens and low-teens respectively without the use of adjuvant anti-glaucoma medications or repeated surgical intervention for IOP control. Qualified success was defined as IOP <20, 18 and 15 mm Hg for targets of high-teens, mid-teens and low-teens respectively with the use of adjuvant anti-glaucoma medications. The Kaplan-Meier survival analysis was used to evaluate survival of trabeculectomies.

Results: Patient demographics were as follows: 55% males, 45% females, 83% Chinese, 8% Malays, 5% Indians and 4% others. The mean age was 70.63 years (range, 32 to 92) and the mean follow-up period was 11.21 months (range, 6 to 18). Types of glaucoma: POAG [n = 91 (66.42%)], CACG [n = 40 (29.20%)], AACG [n = 1 (0.73%)], SOAG [n = 6 (4.38%)] and Others [n = 2 (1.46%)]. The mean IOP at preoperative 19.1 mm

Hg, postoperative 3 months 10.71 mm Hg, postoperative 6 months 11.51 mm Hg, postoperative 12 months 11.62 mm Hg. The mean BCVA preoperative 6/15 compared with postoperative 3 months 6/12, postoperative 6 months 6/12, postoperative 12 months 6/12. Complete success rates were 81% for IOP <20, 75% for IOP <18 and 60% for IOP <15. The cumulative proportion of patients who required medication at 1 year to maintain IOP <20 mm Hg is 91%, IOP <18 mm Hg is 80% and IOP <15 mm Hg is 63%. There were no cases of blebitis or endophthalmitis.

Conclusions: The combined cataract extraction and trabeculectomy with mitomycin C at TEI is and efficacious. All patients had a modest improvement of BCVA after the procedure. 113 eyes (92%) met the criteria for complete success while 24 eyes (18%) required needling with 5FU.

Infective Keratitis in Singapore: Corneal Culture Results and Treatment Outcome in a Tertiary Hospital over a 20-month Period

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Objective: To compare outcomes in patients with culture-positive infective keratitis versus culture-negative keratitis in Tan Tock Seng Hospital, Singapore.

Methods: A retrospective analysis of 112 cases of presumed infective keratitis seen at Tan Tock Seng Hospital, Singapore over a 20-month period. The diagnosis of infective keratitis was based on clinical findings of corneal infiltrate of at least 1 mm in size with overlying epithelial defect and associated anterior chamber cells of 1+ or more. Corneal culture results were analysed and the initial and final Logmar best-corrected visual acuity (BCVA) in both groups were compared.

Results: Ninety-one cases (81.3%) were culture-positive while 21 (18.8%) were culture-negative. Forty-nine (43.8%) were gram-negative bacilli, 34 (30.4%) were gram-positive bacteria, 2 (1.8%) were fungal and 6 (5.4%) showed mixed growth. In the culture-positive group, the median initial BCVA was 0.30 while the median initial BCVA for the culture-negative cohort was 0.50 ($P < 0.001$). The median final BCVA was 0.20 for the culture-positive group while the median final BCVA for the culture-negative group was 0.10 ($P < 0.001$).

Conclusion: Patients with culture-negative corneal ulcers have a better visual outcome. This may be attributed to cases of smaller ulcer size with lower microbial load and the possibility of misdiagnosing marginal keratitis as infective keratitis.

RSAF Photorefractive Keratectomy (PRK) Experience in 2006

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Objective: To validate the effectiveness of photorefractive

keratectomy (PRK) as a treatment option providing predictable, accurate and precise results for the correction of myopia amongst RSAF pilot trainees.

Methods: Potential pilot trainees who had successfully completed advanced ground school training were selected for the RSAF PRK programme. The RSAF PRK programme ensures that PRK is conducted with stringent control of the patient, surgeon, refractive laser suite, and post PRK haze prevention factors. The pre- and post-treatment visual parameters of the selected candidates were compared.

Results: Based on the refractive results obtained with the RSAF PRK treatment protocol and haze prevention regime, PRK is a good treatment option providing predictable and reliable results for the correction of myopia amongst potential air force pilot trainees and hence can be used to increase the talent pool from which RSAF can pick to train as pilots.

Conclusion: PRK is a viable option for RSAF candidates keen on pursuing a career as a pilot. Advances to surface ablation therapy such as LASEK and EpiLASIK may lead to an even better refractive outcome compared to PRK.

NON-COMPETITIVE CATEGORY

Ocular Tuberculosis: Spectrum of Presentations, Diagnosis and Management in an Endemic Developed Country

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Objective: To describe the spectrum of tuberculous ocular inflammation; its diagnosis and treatment and their dilemmas.

Methods: Retrospective case series. Thirty patients with tuberculous ocular inflammation between April 2000 and March 2007 from a single institution were included.

Results: The 30 patients were predominantly male (60%) and Chinese (56.7%). The ages at presentation ranged from 26 to 72 years, with a mean age of 45.7 years and a median age of 46 years. Twenty patients had unilateral involvement while 10 patients had bilateral involvement. The most common presentations were anterior uveitis (36.7%) and panuveitis (33.3%). Diagnosis of tuberculous ocular disease was made based on several methods in combination: 11 patients had a history of tuberculosis or previous exposure to tuberculosis, 6 out of 21 chest X-rays showed old pulmonary tuberculosis changes, and 17 out of 19 Mantoux tests were positive. However, only 2 out of 9 aqueous/vitreous taps were PCR positive for *Mycobacterium tuberculosis*, and 2 out of 3 patients had serum TB T-spot test done which were positive. All 30 patients were treated with steroids: 29 patients with topical steroids, 10 required oral steroids, 9 required both topical and oral steroids, and 4 had intravenous pulse methylprednisolone. Two patients required further immunosuppression with methotrexate and 3 with azathioprine.

Conclusion: In this case series, the elusive diagnosis of ocular tuberculosis was clinched based on the combination of medical history and positive investigation tests. Along with systemic anti-tuberculosis antibiotics, steroids remain the mainstay of treatment with systemic immunosuppressants in selected cases.

The Eye Institute–Hoya Research Prize:

Students or Paramedical Staff

COMPETITIVE CATEGORY

Health-related Quality of Life and Utility Values Associated with Diabetic Retinopathy in Singapore Patients

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Objective: To determine the health-related quality of life and utility values associated with diabetic retinopathy in Singapore patients.

Methods: Patients (n = 245) with diabetic retinopathy seen in an ophthalmology specialist clinic in Singapore were interviewed using a standardised questionnaire in a cross-sectional study. Utility values were calculated using the time

trade-off, standard gamble for death and standard gamble for blindness techniques. Health-related quality of life was evaluated using the EuroQoL 5D (EQ-5D) and the EuroQoL visual analog scale (EQ-VAS).

Results: The mean utility values for time trade-off, standard gamble for death and standard gamble for blindness were 0.85 (95% CI, 0.83 to 0.87), 0.81 (95% CI, 0.78 to 0.84) and 0.87 (95% CI, 0.84 to 0.90) respectively. Lower utility values were associated with males ($P = 0.018$, $P < 0.001$, $P = 0.013$ respectively), decreased best-corrected visual acuity ($P = 0.464$, $P = 0.666$, $P = 0.132$ respectively), presence of clinically significant macular oedema ($P = 0.024$, $P = 0.380$, $P = 0.003$ respectively) and decreased current health state score on the EQ-VAS ($P = 0.020$, $P = 0.444$, $P = 0.812$ respectively).

Conclusion: Diabetic retinopathy is associated with a substantial lowering of the quality of life in Singapore patients.

Risk Factors for Poor Visual Outcome One Year after Laser Photocoagulation for Diabetic Retinopathy

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Objective: To determine the prevalence and risk factors for poor visual outcome 1 year after laser photocoagulation for diabetic retinopathy.

Methods: A review of 171 patients undergoing focal, grid or pan-retinal photocoagulation (PRP) for diabetic retinopathy to identify risk factors for poor visual outcome (visual acuity [VA] 6/60 or worse) 1 year later.

Results: The mean age of the 171 patients was 59.1 years (range, 34 to 84). Among all patients who underwent PRP, 13.3% had poor visual outcome. Overall risk factors were: non-Chinese (30% vs 7.9% Chinese, $P=0.02$) and new vessels at disc (NVD) pre-laser (36.4% vs. 9.7% without NVD, $P=$

0.035). In the subgroup with non-proliferative diabetic retinopathy, poor visual outcome (13%) was more common in Malays (42.9% vs 8.5% non-Malays, $P=0.039$). In the subgroup with proliferative diabetic retinopathy, 13.8% had poor visual outcome, which was more common in Indians (66.7% vs. 7.7% non-Indians, $P=0.042$) and NVD pre-laser (36.4% vs. 0%, $P=0.014$). Among patients who underwent focal laser alone, 13% had poor visual outcome. Increased macular thickness and associated vitreous haemorrhage (VH) were causes of poor final VA 1 year after undergoing focal laser (352 microns in eyes with poor VA vs 260 microns in eyes with good VA, $P=0.033$; 50.0% in eyes with VH vs 7.3% without VH, $P=0.048$).

Conclusion: Patients with diabetic retinopathy had poor visual outcomes in 13.3% after PRP and 13% after focal/grid laser photocoagulation. Risk factors for poor outcome after PRP included non-Chinese race and presence of NVD prior to laser.

NON-COMPETITIVE CATEGORY

Awareness of the Relationship Between Smoking and Age-related Macular Degeneration Amongst Optometry Students in Singapore

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Objective: To assess the optometry students' behaviour, knowledge and attitudes towards smoking. The perceptions of their future role as optometrists in smoking interventions for their patients were also evaluated.

Methods: A standardised 11-item questionnaire was sent to all students ($n=141$) in the 2006 optometry course offered by Singapore Polytechnic. In general, the students' behaviours and attitudes towards smoking, and barriers regarding intervention on tobacco-using patients were assessed. The data

collected were statistically analysed using Strata version 9.0.

Results: A total of 147 subjects were approached for the study, of which 141 students (29.1% males and 70.9% females) with a mean age of 17.93 years (range, 16 to 23) participated in the survey. More (60.5%) Yr-3 students recognised the association of blindness to smoking, than the Yr-2 (38.8%) and Yr-1 (22.2%) students ($P=0.001$). Significantly more Yr-3 students (71.1%) also stated that smoking is associated with age-related macular degeneration (AMD), when compared to the Yr-1 (31.5%) and Yr-2 (28.6%) students ($P<0.0001$). Majority of students (85.5%) would advise tobacco-using patients to quit. More than half (59.7%) of the 141 students who were interviewed denoted that they are interested in attending courses on opportunistic smoking cessation counseling for the benefit of their patients.

Conclusion: Optometry students in Singapore are generally aware of the harmful effects of smoking. It is both crucial and essential to educate optometry students on tobacco-related ocular diseases to update and increase the awareness among them to better serve the community.

The Eye Institute–Novartis Research Prize:

Non-Trainee Doctors (House Officers, Medical Officers, Service Registrars or Research Fellows) or TEI Research Collaborators

COMPETITIVE CATEGORY

Secondary Eccentric Full-thickness Macular Holes Following Macular Surgery

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Objective: To describe 3 cases of eccentric full-thickness macular holes following macular surgery.

Methods: An observational case series of 3 eyes with eccentric full-thickness macular holes following pars plana vitrectomy for idiopathic macular hole, myopic macular hole with retinal detachment and epiretinal membrane. Internal limiting membrane peeling was performed in the 2 eyes with macular holes.

Results: The eccentric macular holes developed 8 weeks to 17 months postoperatively. Two of the 3 eyes developed a single eccentric hole located temporal to the fovea, while the eye with myopic macular hole developed 4 eccentric holes on the temporal quadrant and enlargement of the original myopic macular hole. Optical coherence tomography (OCT) confirmed the full thickness nature of the eccentric holes with no associated retinal detachment. No treatment was given to the eccentric holes. The visual acuity remained stable in all eyes and no detrimental sequelae arose during the follow-up period ranging from 12 weeks to 15 months.

Conclusion: Single or multiple eccentric macular holes can develop after pars plana vitrectomy and remain stable with no detrimental sequelae without treatment.

Use of Fibrin Glue in Pterygium Surgery: An Evidence-based Analysis

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Objective: To perform an evidence-based analysis on the efficacy of fibrin glue for securing the conjunctival autograft in pterygium surgery.

Methods: A systematic search of the electronic database MEDLINE was performed to identify all English language articles pertaining to the use of fibrin glue in pterygium surgery. The contents of each article were abstracted and the findings were corroborated.

Results: Six relevant articles comprising 3 randomised clinical

trials (RCTs) and 3 case series were identified. The 3 RCTs compared different brands of fibrin glue with different types of sutures (Beriplast P® vs 10-0 Nylon®, Quixil® vs 8-0 Vicryl® and Tisseel Duo Quick® vs 7-0 Vicryl®). The total number of patients varied from 22 to 65 and the mean follow-up time ranged from 3 weeks to 6 months in the RCTs. The transplant success rate was 100% in both study groups in all 3 RCTs. All 3 RCTs showed a statistically significant reduction in the average operating time and 2 showed fewer postoperative symptoms using fibrin glue compared to sutures. In the largest case series, which was non-randomised, the recurrence rate was 5.3% with fibrin glue and 13.5% with suture ($P=0.31$). No side effect of fibrin glue was reported.

Conclusion: Current available evidence in published literature suggests that the use of fibrin glue in pterygium surgery is as efficacious as sutures in anchoring the conjunctival autograft and it reduces the operating time and postoperative pain compared to using sutures.

Visual Quality of Life in Adult Survivors of Stevens Johnson Syndrome and Toxic Epidermal Necrolysis

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Objective: To investigate the impact of long-term ocular sequelae of Stevens Johnson Syndrome (SJS) and toxic epidermal necrolysis (TENS) on visual quality of life using the VFQ-25 questionnaire.

Methods: A cross-sectional descriptive study. The VFQ-25 questionnaire was administered via interview to a cohort of patients previously treated for ocular complications of SJS or TENS. Patients further underwent a comprehensive ophthalmic review for long-term sequelae of SJS or TENS. Data from the VFQ-25 scores were compared against a published reference group via *t*-test. Correlations between ophthalmic review findings and VFQ-25 scores were investigated via Spearman's rank correlation coefficient.

Results: When compared to the reference group, the mean VFQ-25 general vision subscale score was found to be lower (72 ± 18 vs. reference groups score 83 ± 15). However, this relationship did not reach statistical significance ($P=0.103$). Various other subscale scores and the VFQ-25 composite score were also found to be similarly lower than the reference group. The clinical parameters investigated – including Schirmer's test, self-reported symptoms of dry eyes, and slit lamp examination for corneal scarring – were not found to have a statistically significant correlation with the VFQ-25 scores.

Conclusion: A poorer visual quality of life for adult survivors of SJS and TENS is suggested. Larger studies are needed to confirm this finding, and to elucidate the possible causes of this poorer visual quality of life.

The Influence of Patient Characteristics on the Rate of Posterior Capsule Rupture During Routine Cataract Surgery

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Objective: To investigate if patient characteristics are risk factors for posterior capsule rupture (PCR) during routine cataract surgery.

Methods: Data of all eyes that underwent routine cataract surgery from January 2000 to September 2005 at The Eye Institute, National Healthcare Group, Singapore were retrospectively analysed. Complicated cataracts associated with trauma and inflammation, as well as subluxated cataracts were excluded from analysis. The data were analysed using chi-square and ANOVA tests as well as logistic regression.

Results: The mean age of the 31,527 consecutive cases included in the study was 67.6 years. There were 26,087 (82.7%) Chinese, 2606 (8.3%) Malays, 2001 (6.3%) Indians, and 833 (2.6%) of other races. There were 17,266 (54.8%) females and 14,261 (45.2%) males. 485 cases sustained PCR, giving an overall incidence of 1.5%. By univariate chi-square analysis, increased age ($P = 0.001$) and higher number of systemic co-morbidities ($P < 0.001$) were associated with higher PCR rates. However, PCR rate was not associated with gender and race. By multivariate logistic regression, after adjusting for all other factors, both increase in age ($P = 0.02$) and increase in number of systemic co-morbidities ($P < 0.001$, B coefficient = 0.566) remained as significant risk factors for PCR. The risk of sustaining PCR increased by 2% (95% CI, 0.1% to 3%) with every 1 year increase in age of patient and by 17% (95% CI, 10% to 25%) with every additional systemic co-morbidity.

Conclusion: Increased age and the number of systemic co-morbidities of a patient, but not gender and race, increases the risk of PCR during routine cataract surgery.

Rapid Development and Subsequent Spontaneous Partial Resolution of Diabetic Retinopathy in a Newly-diagnosed Diabetic Following Initiation of Rapid Glycaemic Control

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Objective: To report an unusual case of rapid development of diabetic retinopathy following rapid initiation of glycaemic control in a newly-diagnosed diabetic with subsequent partial spontaneous resolution of the retinopathy.

Methods: Observational case report.

Results: A 29-year-old Chinese woman admitted for a leg ulcer was found to have previously undiagnosed diabetes mellitus. Baseline eye examination showed unaided visual acuity of 6/6 and normal ocular fundi with no evidence of retinopathy bilaterally. She was started on subcutaneous insulin injections, and rapid glycaemic control was achieved with glycosylated haemoglobin (HbA1c) levels dropping from 14.5% at baseline to 6.9% within 2 months. Four months after commencement of treatment, the HbA1c level had dropped further to 5.9%, and she complained of sudden onset of blurred vision in the right eye. The vision in the right eye was 6/12 partial unaided and 6/7.5 partial best corrected. Funduscopy revealed bilateral moderate non-proliferative diabetic retinopathy (NPDR) with multiple cotton-wool spots (CWS) around the vascular arcades and posterior pole in both eyes. In particular, there was one CWS over the papillo-macular bundle in the right eye. Fluorescein angiography revealed multiple microaneurysms with mild diffuse leakage. The CWS gradually resolved and 4 months later, funduscopy revealed only mild NPDR with no CWS bilaterally and right unaided visual acuity was 6/6 partial.

Conclusion: Diabetic retinopathy can develop rapidly following initiation of glycaemic control in newly-diagnosed diabetics and this case emphasises the importance of close ocular monitoring in newly-diagnosed diabetics receiving treatment.

Awareness of Haemoglobin A1c and its Relationship With Diabetic Retinopathy Among Adult Diabetic Patients Attending a Tertiary Ophthalmic Centre

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Objective: To investigate the awareness of haemoglobin A1c (HbA1c) and its relationship with diabetic retinopathy among adult diabetic patients attending a tertiary ophthalmic centre.

Methods: Prospective survey of 507 randomly selected adult diabetic patients.

Results: The mean age of the participants was 62.1 years (range, 23 to 88). 50.9% were males and 49.1% females. The mean duration of diabetes was 7.8 years (range, 2 months to 45 years). During the previous 1 year, 99.6% had consulted an eye doctor and 97.6% a family physician/specialist for eye screening and diabetes follow-up respectively. 43.4% were aware that they had diabetic retinopathy. 15.9% were familiar with the specific term HbA1c as they had done the test previously. An additional 58.5% were aware of a test which monitors blood glucose levels over a 3-month period. 32.5% knew the ideal

value of HbA1c while 41.8% were aware that HbA1c level indicates the risk of developing diabetic retinopathy. 67.3% were willing to have their HbA1c tested at their next physician visit and 69.4% were keen to learn more about HbA1c.

Conclusions: Nearly three quarters of diabetic patients surveyed at our eye centre were aware of the specific term HbA1c or the test itself. However, the majority of them were not aware that they had diabetic retinopathy and that HbA1c level can indicate the risk of developing diabetic retinopathy. More education is needed make diabetic patients understand HbA1c and their diagnosis of diabetic retinopathy to help control diabetic retinopathy development and progression.

Outcome of Glaucoma Filtration Bleb Needling With 5-Fluorouracil After Trabeculectomy

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Objective: To evaluate the outcome and safety of bleb needling after trabeculectomy for glaucoma patients.

Methods: Review of outcomes of glaucoma filtration bleb needling with 5-fluorouracil in all patients who underwent trabeculectomy over a 1-year period.

Results: Of the 21 subjects, there were 13 males (62%) and 8 females (38%). The mean age was 67 years. The target intraocular pressure (IOP) was achieved after one treatment in 67% of subjects, and in 91% and 100% after 2 and 3 treatments respectively. For the first needling procedure, the mean pre-procedure IOP was 22 mm Hg; this decreased to a mean of 12 mm Hg after needling. The mean drop in pressure after the first needling procedure was 10 mm Hg (range, 2-21), while the mean IOP dropped from 25 to 15 mm Hg (range, 1-19) and 18 to 10 mm Hg for the second and third needling procedures respectively. The mean drop in IOP after the first procedure for subjects below 65 years was 10.4 mm Hg, while for those 65 years and older it was 9.6 mm Hg. Male subjects had a mean drop in IOP of 11 mm Hg, while for female subjects it was 8 mm Hg.

Conclusion: Needling of the filtration bleb successfully lowers IOP by a mean of 10 mm Hg. The target IOP was achieved after 1 procedure in 67% of subjects, while 23% and 10% needed a second and third needling respectively.

Health-related Quality of Life Associated with Age-related Macular Degeneration Using Utility Values and EQ-5D Health Status Questionnaire

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Objective: To ascertain the health-related quality of life

(HRQoL) associated with age-related macular degeneration (AMD) in Singapore.

Methods: Two hundred and twenty randomly selected ophthalmology outpatients diagnosed with AMD were interviewed using a standardised questionnaire. Utility values were calculated using the time trade-off (TTO) and standard gamble (for death and blindness) techniques. The EuroQol 5D (EQ-5D) health status questionnaire was used to assess HRQoL.

Results: The mean age was 66.8 years (range, 55 to 89) with a male predominance (63%). There were 88% Chinese, 8% Malays and 4% Indians. Wet AMD was present in 18.6% of patients while 81.3% had dry AMD. The mean utility values were 0.86 for TTO, 0.90 for standard gamble (death) and 0.94 for standard gamble (blindness). Chinese reported significantly higher utility values compared to non-Chinese for TTO (0.87 versus 0.78; $P = 0.02$) and standard gamble (death) (0.92 versus 0.80; $P = 0.04$). Impaired visual acuity (6/12 or worse) was associated with significantly lower utility values for standard gamble (blindness) using multivariate analysis ($P = 0.03$). A significant proportion of patients had problems with mobility (14%) and usual daily activities (8.5%). Fourteen per cent of patients also reported some form of anxiety or depression.

Conclusion: AMD and impaired vision are associated with a decrease in HRQoL as measured by the utility values and EQ-5D, with some differences among the races. A significant proportion of AMD patients also have anxiety or depression, and problems with mobility and usual daily activities.

Epidemiology of Postoperative Endophthalmitis in Two Asian Populations

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Objective: To compare the clinical features and outcomes of postoperative endophthalmitis between 2 Asian populations.

Methods: The epidemiological data of patients who developed endophthalmitis after cataract surgery in India (Aravind Eye Hospital, Pondicherry) were compared with those in Singapore (Tan Tock Seng Hospital).

Results: The rate of postoperative endophthalmitis was higher in India compared to Singapore, 77 of 45410 cases, 0.17% vs. 21 of 29541 cases, 0.07%. The majority of cases developed early in both populations: 69 of 77 (89.6%) in India vs. 19 of 21 (90.5%) in Singapore. Of these, 100% presented within 3 days in Singapore while only 49.4% sought treatment in India within the same duration. There were more males (0.09%) compared to females (0.04%) in both Singaporean [multivariate odds ratio (OR), 2.51 ($P = 0.063$)] and Indian subjects (63.6% vs 36.4%). The rate of endophthalmitis was higher in the left eye compared to the right (0.09% vs. 0.04%) [multivariate OR 0.35 ($P = 0.045$)]. Positive cultures from vitreous taps were obtained from 48.7% in India and 47.6% in Singapore. Coagulase-negative *Staphylococcus* (CNS) was the most

common organism in both groups (10.5% India vs. 14.3% Singapore). Final visual acuity (VA) better than 6/12 was achieved in 33.3% of Singapore patients and 7.8% of Indian patients.

Conclusion: There is a higher incidence of postoperative endophthalmitis in India. In both populations, more males were affected and CNS was the most common organism cultured. Most patients had VA worse than 6/12.

Utility Values and Myopia in Teenage School Students Attending a Tertiary Eye Care Centre

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Objective: To determine the utility values of myopic teenage students in a tertiary eye care centre.

Methods: Demographic data and utility values of 499 subjects aged 12 to 19 years seen at the Aravind Eye Hospital, Pondicherry, India, over a 6-month period were analysed. Time trade-off (TTO – the number of years of life patient is willing to sacrifice) and standard gamble for blindness (SGB – the risk of blindness patient is willing to accept) were calculated.

Results: The mean age of the 499 subjects was 13.9 years (SD ± 1.2 ; range, 12 to 19). In the right eye, there were 343 subjects (68.7%) with low, 143 (28.7%) with moderate and 13 (2.6%) with high myopia respectively. The mean TTO was 0.94 (SD ± 0.08 ; range, 0.06 to 1.00) and the mean standard gamble (SG) was 0.85 (SD ± 0.27 ; range, 0 to 1.00). Both the TTO and SG correlated significantly with the spherical equivalent ($P = 0.049$ and $P < 0.001$ respectively). Low myopes had a higher SG than moderate or high myopes ($P = 0.019$ and $P = 0.042$ respectively). The TTO was significantly higher for those in school compared to college students (0.94 vs. 0.86, $P < 0.001$) but the difference in SG was not significant. TTO and SG did not vary significantly with gender, type of school or family income.

Conclusion: Utility values were generally high among myopic teenagers; but were significantly lower amongst high myopes, indicating a poorer quality of life.

NON-COMPETITIVE CATEGORY

Posterior Capsule Rupture During Routine Cataract Surgery

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Objective: To investigate the short-term outcome in eyes which sustained posterior capsule rupture (PCR) during routine cataract surgery.

Methods: As part of a clinical audit programme, all eyes which had PCR during routine cataract surgery were coded and entered into a database. The casenotes of these patients who were operated on from January 2004 to September 2005 were retrospectively reviewed. Complicated cataracts such as traumatic and subluxated cataracts were excluded.

Results: Out of 1525 cataract surgeries performed by phacoemulsification or extracapsular extraction, 27 (1.8%) were complicated by PCR. Two cases were excluded from analysis due to incomplete data. Among the remaining 25 eyes, 13 (52%) achieved a best-corrected visual acuity (BCVA) of 6/12 or better between 6 weeks to 3 months postoperatively. Seven eyes with a postoperative BCVA worse than 6/12 had significant preexisting ocular pathology which contributed to the poor vision. Upon the exclusion of these 7 cases, a good visual outcome was attained in 72.2% of patients. Of the remaining 5 eyes with a poor visual outcome, 3 eyes had bullous keratopathy, 1 eye had a vitreous haemorrhage and 1 case was of an indeterminate cause. The presence of coexisting ocular pathology was a significant risk factor of poor visual outcome ($P = 0.01$).

Conclusion: The majority of eyes that had routine cataract surgery complicated by PCR had good BCVA in the early postoperative period.

An Unusual Case of Bilateral Enucleation – A Case Report

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Objective: To report a case of unusual bilateral enucleation following attack by a wild bear.

Methods: An observational case report.

Results: This is a case report of a 40-year-old male who was attacked by a bear in the jungle as he was collecting firewood. He was referred to our hospital with severe bleeding from wound, facial disfiguration and fracture of orbits. Examination revealed an enucleated globe within the injured tissues of the face and orbit. Urgent CT scan revealed that both the globes were missing. The patient underwent emergency surgery. Bear attacks are extremely rare. Such animal attacks are usually associated with extensive tissue loss and may require staged plastic reconstruction. The chance of salvaging the injured eye is extremely remote. They are usually complicated by secondary infections.

Conclusion: Animal injuries are very infrequently encountered in this part of the world. Extensive tissue loss makes treatment challenging and is often associated with poor visual prognosis.

Spitting Cobra Venom-related Eye Injury

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Objective: To report a case of spitting cobra venom-related eye injury.

Methods: Observational case report.

Results: A 23-year-old man presented with complaints of ocular redness and pain after a cobra spit venom into his left eye while he was gathering fallen tree branches. He immediately

washed his eye for about 10 minutes after the injury. On presentation 20 minutes later, his best-corrected visual acuity (BCVA) was 6/12 in the left eye. Examination revealed conjunctival hyperaemia and corneal punctate epithelial erosions (PEEs) in the inferior interpalpebral area. The right eye was normal. He was treated with topical antibiotic and preservative free artificial lubricant. The PEEs resolved partially the next day and cleared within a week with improvement of his BCVA to 6/6.

Conclusion: Venom from a spitting cobra can cause severe keratoconjunctivitis that can resolve completely with medical treatment.

The Eye Institute–Alcon Research Prize:

Specialist Doctors (Associate Consultants, Consultants or Visiting Consultants)

COMPETITIVE CATEGORY

A Placebo-controlled, Double-blind, Randomised Clinical Trial on the Effect of Supplemental Intracameral Lignocaine on the Visual Sensations and Resultant Fear Experienced by Patients During Cataract Surgery Under Topical Anaesthesia

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Objective: To determine whether supplemental intracameral lignocaine reduces the visual sensations and the resultant fear experienced by patients during cataract surgery under topical anaesthesia.

Methods: 506 cataract patients who underwent routine phacoemulsification under topical anaesthesia were randomised to receive a supplemental 0.5 mL intracameral injection of either 1% lignocaine or balanced salt solution (BSS). The injected fluid was left in the anterior chamber for 1 minute prior to capsulorhexis. The patients were then interviewed postoperatively by a trained interviewer using a standardised questionnaire about their visual experience and their reaction to it. The surgeons, patients and interviewer were masked to the randomisation.

Results: There was no statistically significant difference in the demographics between the lignocaine (277 patients, 54.7%) and BSS (229 patients, 45.3%) groups. 500 patients (98.8%) experienced at least light perception during the surgery. There was no statistically significant difference in the proportion of patients who experienced various types of visual sensations

intraoperatively between the 2 groups. The intraoperative visual experience was frightening in 6.5% of patients in the lignocaine group and 4.8% in the BSS group ($P = 0.448$). On a visual analogue scale of 1 to 10, the mean grade of fear in the lignocaine group was 2.7 compared to 4.6 in the BSS group ($P = 0.032$).

Conclusion: Intracameral lignocaine at the concentration, volume and duration used in this study did not reduce the visual sensations experienced by patients during phacoemulsification compared to BSS. However, patients given intracameral lignocaine were less fearful of their visual experience compared to those given BSS.

Vision Restoration Therapy for Post-geniculate Visual Loss in Patients with Strokes

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Objective: Visual field defects arising from post-geniculate lesions in the brain are considered by many clinicians untreatable because the well organised visual pathways of the brain are regarded as hard-wired and hence loss of visual function deemed irreversible. However, recent studies in humans have indicated that vision restoration therapy increases the size of intact visual field even many years after brain damage.

Methods: Case review of 8 patients who had retro-chiasmal visual loss who started vision restoration therapy between September 2005 and March 2006. Three had visual field defects from strokes; the remaining 5 had surgery related or AVM haemorrhage related lesions. There were 7 males and 1 female. Age ranged from 20 to 66 years (mean, 46.9; median, 50). Three had visual field defects from strokes; the remaining 5 had surgery related or AVM haemorrhage related lesions. All patients successfully completed 6 months of twice daily visual rehabilitative therapy for 6 days every week. At the end of the

period of therapy, their visual field size were analysed based on the number of stimuli detected on a High Resolution Perimetry (HRP) screen before and after each month of therapy. Fixation control was assessed by the degree of fixation loss.

Results: The average percentage stimulus detection change was tracked for all patients after each module of therapy. This showed a progressive increase as therapy progressed: 2.48% (first month), 4.96% (second month), 6.78% (third month), 11.45% (fourth month), 14.90% (fifth month) and 18.62% (sixth month). The patients were also questioned on their subjective improvement in their daily lives. Three patients did not show an increase of stimuli detection of more than 15%.

Conclusion: Vision restoration therapy may be a useful form of visual rehabilitation for patients with post-geniculate visual field loss although our early results do not show a uniform improvement in all patients. The physiologic basis of this improvement may lie in the process of neuro-plasticity which causes an increase of receptive field sizes of neurons near the lesion area and strengthening of long-range horizontal connections in V1 which usually exhibit sub-threshold activity.

The Use of Perfluorocarbon Liquid as Postoperative Endotamponade in Proliferative Vitreoretinopathy and Posterior Segment Complications of Ocular Trauma

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Objective: To evaluate the use of perfluorocarbon liquid (PFCL) as endotamponade in posterior segment complications of severe ocular trauma, and retinal detachments associated

with proliferative vitreoretinopathy (RD/PVR).

Methods: This retrospective case-record review focused on disease severity, previous vitreoretinal surgeries, pre and postoperative vision, operative details, duration of PFCL endotamponade and postoperative complications.

Results: 61 eyes of 60 patients had vitrectomy with PFCL endotamponade for ocular trauma (24 eyes), and RD/PVR (37 eyes). In trauma eyes, disregarding 2 eyes in which PFCL was left in-situ for 92 and 49 days, mean duration of PFCL endotamponade was 14 days for the remaining 21 eyes (range, 7 to 28 days). Anatomical success with initial PFCL-endotamponade surgery was 33.3%, and 58.3% with further surgeries. Vision improved in 48%, stabilised in 43% and 2 patients eventually underwent enucleations. In eyes with RD/PVR, PFCL was left in-situ for a mean of 16.7days (range 7-46 days). Successful reattachment after initial PFCL-endotamponade surgery was 51.4%, and 64.9% with additional surgeries. Vision improved, remained stable and deteriorated in 38%, 32% and 22% of eyes respectively, the 3 remaining eyes were eventually enucleated. Complications seen included raised intraocular pressure (IOP) (6.5%), anterior chamber dispersion (17.7%), cataract formation (11.8%), keratopathy (9.7%), anterior segment inflammation (9.7%), and posterior segment membrane re-proliferation (19.4%).

Conclusion: PFCL is a viable alternative as postoperative endotamponade in complicated vitreoretinal conditions like severe ocular trauma and PVR, with specific long-term retinal stabilisation requirements. No severe or long-lasting toxicity associated with prolonged use of PFCL endotamponade was seen in this study.

NON-COMPETITIVE CATEGORY

Comparison of Gonioscopy, Visante and Slit-lamp Anterior Segment Optical Coherence Tomography in Detecting Angle Closure

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Objective: To compare the diagnostic performance of 2 anterior-segment optical coherence tomography (OCT) devices in detecting angle closure using gonioscopy as the reference standard.

Methods: This is a prospective, cross-sectional observational study. This hospital-based study included 99 subjects above 40 years of age. Visante-OCT (Carl-Zeiss Meditec, Dublin, USA) and Slit-Lamp-OCT (Heidelberg Engineering, Heidelberg, Germany) imaging were performed on the same day by a single-masked operator. Gonioscopy was performed

by a single examiner masked to OCT findings, and the anterior chamber angle (ACA) was graded as closed if the posterior trabecular meshwork could not be seen in that particular quadrant. OCT images were assessed by 2 examiners with glaucoma subspecialty training working together, and a closed ACA was defined by any contact between the iris and angle wall anterior to the scleral spur.

Results: The ACA status could be assessed in all 4 quadrants of 83 (84%) eyes. A closed ACA in at least one quadrant of the eye was observed in 30 eyes with gonioscopy, 55 eyes with Visante-OCT and 46 eyes with SL-OCT ($P=0.012$, McNemar test). Considering gonioscopy as the reference standard exam, Visante-OCT imaging identified 29/30 (97%) of the eyes with 1 closed ACA on gonioscopy, while SL-OCT imaging detected 27 (90%) of these eyes ($P=0.500$, McNemar test)

Conclusion: Visante-OCT detected more closed ACAs than Slit-Lamp-OCT imaging. The visible light used to facilitate the positioning of the Slit-Lamp-OCT scanning-beam may have accounted for this difference. Both OCT devices detected most of the eyes showing a closed ACA on gonioscopy, however, both devices detected more eyes with closed ACA when compared to gonioscopy.