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Expanding Human Resources to Prevent Blindness

by Khor Hui Min

From the global perspective, there is a need for common understanding of the eye care team's role, as well as trends and challenges to formulate an action plan for workforce recruitment, retention, training and assessment.

In the session on expanding human resources to prevent blindness worldwide, chaired by Dr. William Astle, Dr. Prashant Garg and Dr. Tharikarn Sujirakul, APAO members who have successfully implemented education programs to expand human resources presented their training models and case studies.

The session started off with a presentation by Dr. Ivo Kocur from the World Health Organization (WHO), Geneva. He spoke about WHO's Universal Eye Health: A Global Action Plan 2014-2019, which is a global roadmap for the development of eye care services through a cadre of trained workers. The Global Action Plan proposed a health system approach, emphasizing on leadership and governance, essential medicines, service delivery, human resources, health financing, and health information system.

"The World Report on Vision states that comprehensive eye care should be integrated into health systems, and there is a necessity to provide universal coverage to marginalized communities. There is also a need for a package of priority interventions," said Dr. Kocur.

The WHO definition of health care team consists of ophthalmologists, optometrists, and allied ophthalmic personnel (AOP). Those who belong to the AOP group are nurses, assistants, technicians, medical technologists, refractionists, orthoptists, photographers, opticians and ocularists.

Then Prof. Dr. William Astle from the University of Calgary, who is also president of the International Joint Commission on Allied Health Personnel in Ophthalmology (IJCAHPO), presented

Cont. on Next Page >>

SnapShot!

SOE President Dr. Jan Tjeerd De Faber (right, in some great red pants) provides the Most Popular Video Award to Dr. John Akkara (left)

START STRONG STAY STRONG

EYLEA®
(aflibercept solution for injection)

Abbreviation of Eylea Product Information:
Presentation; 1 ml. solution for intravitreal injection contains 40 mg aflibercept **Indication:** for treatment of neovascular (wet) age-related macular degeneration (wet AMD), macular edema secondary to central retinal vein occlusion (CRVO), diabetic macular edema (DME), macular edema secondary to branch retinal vein occlusion (BRVO), myopic choroidal neovascularization (myopic CNV). **Dosage and method of administration:** For Neovascular (wet) age-related macular degeneration (wet AMD), the recommended dose for Eylea is 2 mg (equivalent to 50 microliters) intravitreal injection. EYLEA treatment is initiated with one injection per month for three consecutive doses, followed by one injection every 2 months. For Macular edema secondary to central retinal vein occlusion (CRVO), the recommended dose for EYLEA is 2 mg. After the initial injection, treatment is given monthly until visual and anatomic outcomes are stable for three monthly assessments. For Diabetic macular edema (DME), the recommended dose for EYLEA is 2 mg administered by intravitreal injection monthly for the first 5 consecutive doses, followed by one injection every 2 months. Macular edema secondary to branch retinal vein occlusion (BRVO), the recommended dose for Eylea is 2 mg. After the initial injection, treatment is given monthly. For Myopic choroidal neovascularization (myopic CNV), the recommended dose for EYLEA is a single intravitreal injection of 2 mg. Additional doses should be administered only if visual and anatomic outcomes indicate that the disease persists. **Contraindications:** Ocular or periocular infection, Active severe intraocular inflammation, Known hypersensitivity to aflibercept or to any of the excipients. **Special warnings and precautions for use;** Intravitreal injections including those with EYLEA, have been associated with endophthalmitis, Increase in intraocular pressurehave been seen within 60 minutes of an intravitreal injection, Women of childbearing potential should use effective contraception during treatment. **Adverse reactions:** Very common (≥1/10 patients) Conjunctival hemorrhage, Eye pain Selected adverse reactions: Arterial thromboembolic events (ATEs) are adverse events potentially related to systemic VEGF inhibition. There is a theoretical risk of ATEs following intravitreal use of VEGF inhibitors. Immunogenicity-as with all therapeutic proteins, there is a potential for immunogenicity with EYLEA. **Incompatibilities:** EYLEA must not be mixed with other medicinal products

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on current and future workforce resource trends facing Canada.

"For Canada, the perfect ratio is three ophthalmologists for every 100,000 of the population. This ratio is satisfied in the largest cities, but not in the other areas. And for every ophthalmologist, there should be 2-3 AOP. But Canada is in fact experiencing a 60% shortfall," revealed Dr. Astle. "We need 1-2 AOP training programs per province, to increase eye care staff to population ratios."

Furthermore, Dr. Prashant Garg presented on a global model for training and assessing eye care teams. He talked about developing a qualified, skilled mid-level ophthalmic personnel workforce to increase patient access to care and reduce avoidable blindness and visual impairment.

"The team approach is a cost effective and efficient way of making eye care available, accessible and affordable. And training is crucial to achieve this," said Dr. Garg.

"Useful strategies include encouraging training across the health care spectrum, ensuring quality and responsive curricula, as well as developing admission policies to reflect attributes of the assigned roles. Besides that, teaching excellence should be encouraged and supported, and periodic evaluation of training programs is important. Lastly, accreditation is necessary," added Dr. Garg.

Ms. Helen Yan from the He Vision Group of China gave a comprehensive presentation on case studies and a training and assessment model in her home country. She spoke about the first ophthalmic eye care system integrating medical eye care, education and training, industrialization and R&D in China.

"The He Vision Group's work is aligned to the Targeted Poverty Alleviation national strategy by President Xi Jinping launched in 2013, and part of efforts to establish a new model for eye care for the general population by 2020," said Ms. Yan.

"On behalf of China, we are also playing an important role in personnel training, technology, targeted medicine and targeted poverty alleviation for countries in Africa. Currently, we have reached agreements with Rwanda, Kenya, South Africa, Nigeria and Ethiopia," she added.

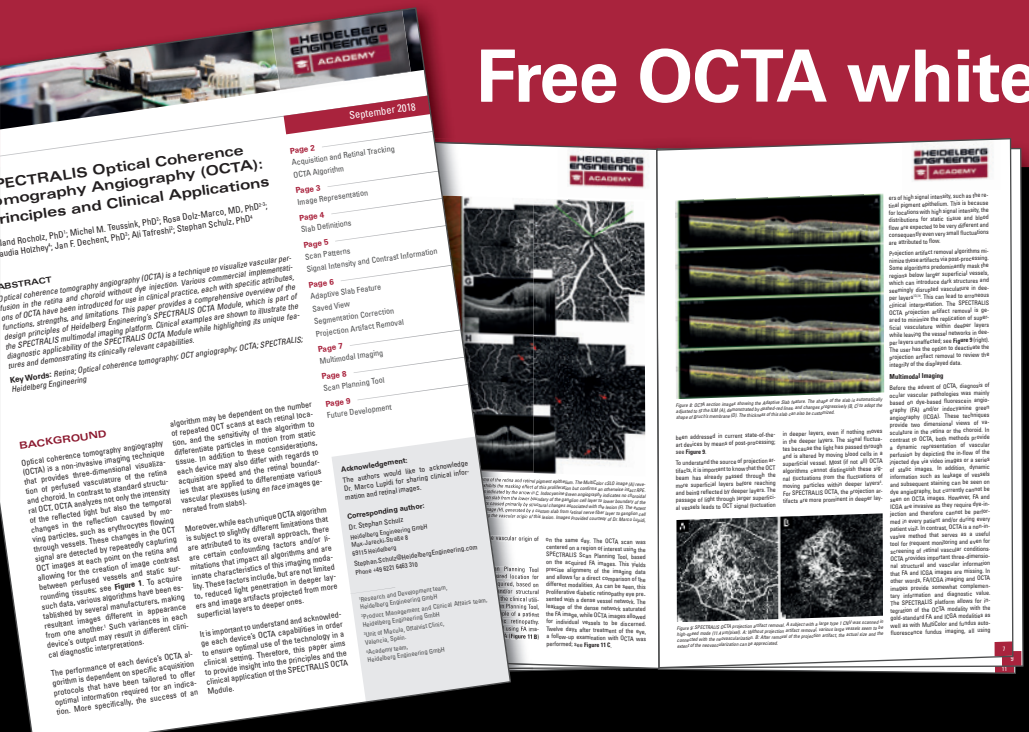
Dr. Jayabaskar Thiyagarajan from the Singapore National Eye Centre (SNEC) also shared case studies and a training and assessment model from SNEC. He talked about the journey of SNEC in developing AOP training programs in Singapore in partnership with IJCAHPO.

Dr. Pawan Baral, regional education manager and optometrist from the Pacific Eye Institute, Suva, Fiji, shared about the high rate of blindness in the Pacific that led the Fred Hollows Foundation NZ to initiate a program to train eye care workers in the region. Today, the foundation works in partnership with the Fiji National University and Ministry of Health in Fiji to achieve this goal.

"The training programs for doctors and nurses currently include a 1-year Postgraduate Diploma in Eye Care for nurses, a 1-year Postgraduate Diploma in Ophthalmology (PGDO) for medical officers, and a 3-year Masters of Medicine in Ophthalmology for PGDO graduates," said Dr. Baral.

The last presentation was by Dr. Karl Golnik, who is the chair of education of the International Council of Ophthalmology (ICO). He spoke on standards and curricular, and processes for certification and accreditation. He emphasized that resources for efficient training need to be developed, while team training must be part of the plan.

The session ended with a short Q&A, where it was highlighted by co-chair Dr. William Astle that government backing and support is a necessity to ensure the success of the training and development programs in the respective countries where they are being run.



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Advances in DME Treatment

Knowing the Area "Under the Curve"

by Joanna Lee

As the prevalence of diabetic retinopathy increases in Asia-Pacific countries, so has the proportion of patients with severe visual loss or blindness. The loss of sight is the complication that patients with diabetes are most concerned about. This is why when clinical results from the VIVID and VISTA studies show a five-letter gain in patients, it offers doctors and patients a way to mitigate this growing threat.

Many would have seen the chart which shows improved visual acuity (VA) over time with treatment. However, Dr. Paisan Ruamviboonsuk, also the Scientific Secretary of Asia-Pacific Vitreo-Retina Society (APVRS), who chaired the session, also introduced how important it is to observe the area under the curve (AUC) which represents the quality of vision that patients are living with over time because it provides key information about the day-to-day visual experiences of patients that cannot be gained from examining individual time points. Thus, an early treatment using aflibercept for DME patients may minimize the duration spent with poor vision, providing meaningful final vision gains.

Taking it further, Assistant Professor in Ophthalmology at the Faculty of Medicine, Chiang Mai University, Dr. Voraporn Chaikitmongkol then brought into focus how studies like VIVID and VISTA have shown rapid and increasing VA gains with early and intensive aflibercept treatment in the first year of the study. At Week 52, these patients who have received aflibercept gained more than 10 letters from the baseline and these improvements could be sustained for three years. However, patients who had received laser treatment with added on aflibercept at week 100 of the study achieved only modest gains in their VA. Dr. Chaikitmongkol also introduced the DRCR.net Protocol T study which compared the efficacy of anti-VEGF agents for visual impairment due to DME.

The DRCR study showed how early intensive treatment in Year 1 makes for a significant reduction in treatment burden thereafter. At week 52, patients treated with aflibercept had also gained more letters than those treated with bevacizumab and ranibizumab. Dr. Chaikitmongkol said emerging data from real world studies like APOLLON also showed good visual gains of approximately 8 letters after 6 months, supporting the efficacy of aflibercept in DME management. Post-hoc analysis of the Protocol T study showed that lower HbA1c, younger age and having no history of PRP are associated with better 2-year visual outcomes.

Another real world study – the randomized, multicenter clinical Protocol V trial had commenced with eagerly awaited results in the next two months. Here, Dr. Neil Bressler, a professor from Johns Hopkins University's School of Medicine, USA, in his crystal clear explanation unpacked and demystified

Dr. Neil Bressler

the study's results, especially bringing the focus back on the AUC. He began with the question, "does it matter which anti-VEGF drug you use?" The answer is: apparently, sometimes it matters, and sometimes it doesn't. To explain, he pointed to the subgroups which could have contributed to the difference in the trial's results. The baseline visual acuity subgroup contributed to a significant difference. And when they looked further into the subgroup, they'd found those who had VA of 20/50 or worse, which was half of the subgroup that had driven the overall results were the ones who had experienced the most superior gain outcomes with aflibercept over 2 years compared with those using other anti-VEGF agents with VA gains averaging at 17 letters. However, for those with VA of 20/30 or 20/40, the results comparing the three anti-VEGF agents weren't as pronounced. Thus aflibercept seems clinically effective for those who have a more severe VA.

Dr. Bressler also shared with further detail how they calculated the area under the curve by taking each subject's area under the curve individually and looking at their change in baseline acuity, plotted out against the x-axis of weeks. The AUC for each subject is calculated by approximating the sum of a series of geometric figures seen on the graph. This gives an insight into how the numbers came to be for the study.

He also mentioned the study showed the subjects' vision remained stable even after six months in both VA gained and actual VA, showing little loss of vision, even if the edema persisted beyond two years. Dr. Bressler concluded his session with "The regiment does lead to a reduced number of infections," adding that those interested could access the slides and studies regarding this topic at DRCR.net.

Bringing SMILEs to myopic patients

by Hazlin Hassan

Some patients with myopia are averse to wearing eyeglasses and contact lenses, just like how millennials are supposedly averse to cooking or baking. Well good news for them as there are more options now, from LASIK to SMILE.

While laser-assisted in-situ keratomileusis (LASIK) is the best-known refractive surgery technique, small incision lenticule extraction (SMILE) is a newer type of laser refractive surgery, which uses a laser to treat myopia.

For a person to see clearly, light rays must travel through their cornea and lens. The cornea and lens refract the light so it lands on the retina. With a refractive error, the shape of your cornea or lens stops light from bending properly. When light is not properly focused on the retina, vision turns blurry.

With SMILE, an ophthalmologist uses a laser to change the shape of the cornea. This improves the way light rays are focused on the retina. SMILE is FDA-approved to treat mild myopia.

SMILE is a less invasive way to treat short-sightedness and astigmatism. Traditional laser treatment involves creating a flap on the cornea, before using a second laser to reshape the cornea. With SMILE, no corneal flap is required.

This minimally invasive technique allows the surface tissue to remain intact, thus significantly preserving the biomechanical strength of the cornea.

SMILE could provide a better procedure compared to LASIK, a refractive surgery symposium on SMILE at the APAO 2019 Congress in Bangkok, heard yesterday.

SMILE results in less inflammation and higher stability of the treatment, said Dr. Rupal Shah, from Center for Sight, India. Her center has treated more than 8,000 eyes in over ten years.


Dr. Rupal Shah

More than 98% of all eyes are within +/- 0.5 Diopters of the intended correction, she said.

Other advantages include that there is no flap to displace, less occurrence of dry eye due to a smaller incision, better patient workflow as there is no need to change beds or laser stations, and is an easier sell for patients who prefer flap-free and blade-free procedures.

"It shows, across several studies, remarkable accuracy, stability and safety, comparable to or superior to femto-LASIK. In the next decade, it is likely to become the technique of choice to treat refractive errors," she concluded.

Advantages of SMILE include better visual and refractive results, better visual quality, safer as it is flapless, lower impact on corneal biomechanics, and anatomical preservation of the anterior corneal stromal layer, said Dr. Xingtao Zhou, Department of Ophthalmology, Eye & ENT Hospital, Fudan University, NHC Laboratory of Myopia, China. His team had conducted 22,000 procedures in refractive surgery last year and less than 200 were LASIK.

He noted that in other refractive surgeries such as LASIK and photorefractive keratectomy (PRK), several refractive results showed a significant decline in spherical equivalent (SE) over about ten years after the surgery, especially for high corrections and young patients.

"Therefore, it is necessary to investigate the stability of SMILE in the longer term," he concluded.

Surgeons must prepare well in order to prevent postoperative complications, cautioned Dr. Ying Li, MD, PhD, Department of Ophthalmology, Peking Union Medical College Hospital, China.

These include careful sterilization, testing of equipment, and preparation of patients.

"Before the surgery, detailed examination is most important, to choose proper patients for the surgery and to exclude contraindications," she said.

After surgery, several examinations including PCT, confocal microscopy, and dry eye measurements should be done. Standard medication to control complications includes antibiotics, hormones, artificial tears and epithelial nutrition.

"In some parts of the world, such as China, SMILE has become the mainstream and benchmark refractive surgery," said Professor Dennis Lam, Chairman and CEO, C-MER International Eye Care Group.

Patients feel more comfortable, surgeons feel safer as there is no risk of flap dislodgement or significant wrinkles and there will be a smaller wound with greater corneal integrity, he added.

However, while SMILE has reduced flap-related complications, it can still have wrinkles, epithelial in-growth and infections, he cautioned. There is less postoperative dry eye but some still have significant dry eye.

The downside to SMILE is that there is no tracking system with cyclotorsion, and centration related to angle kappa affecting astigmatism correction.

There is slower visual recovery, and intracorneal manipulation could have risks of significant complications. Retreatment is also more difficult and the range for refractive correction is more limited, he said.

Doctors Turn **Focus** on Uveitis Treatment

by John Butcher


Dr. Danny Ng


Dr. De-Kuang Hwang

Ophthalmologists concentrated on the latest developments in diagnosing and treating uveitis during a session on the second day of the APAO 2019 Congress, yesterday.

They ran through a range of case studies, demonstrating approaches to the disease, which is often associated with a variety of other ocular problems.

Dr. Thanapong Somkijrungroj, an uveitis and retina specialist at Chulalongkorn University in Bangkok, spoke about diagnosing uveitis and differentiating it from other diseases that share common characteristics with it.

Learning a patient's history is important, alongside a physical examination, to diagnose uveitis, he told the audience, as the condition can present as a manifestation of other systemic infections.

Relevant and reasonable systemic imaging is also helpful in diagnosing uveitis, he said, as well as for planning treatment and conducting follow-ups.

Finally, a holistic approach is important, he added, not just one focused on a specific disease.

Dr. Hyeong Gon Yu, of Seoul National University Hospital, South Korea, spoke about the uses of autofluorescence in posterior uveitis.

Fundus autofluorescence is a non-evasive and easy to perform technique that provides the unique ability to image the pathologies involving the RPE in posterior uveitis, he said.

While autofluorescence (AF) patterns are not particularly distinctive among etiologies, abnormality of FAF can be a prognostic indicator as well as a sensitive biomarker in posterior uveitis, he added.

Dr. Liu Yang, of Peking University First Hospital, presented new findings on uveitis using multimodal imaging, introducing a series of case studies to the audience.

The studies opened up new areas for discussion; she said, around a variety of findings, including the usefulness of OCT with AF, that photoreceptor cell injuries begin at an early stage in the disease, and that there is photoreceptor loss in Vogt–Koyanagi–Harada disease (VKH).

Dr. Rupesh Agrawal, a consultant ophthalmologist at Tan Tock Seng Hospital (TTSH) in Singapore, discussed quantitative imaging in uveitis.

Choroidal vascular indexing is a useful tool for monitoring uveitis activity and progression, he said, while there are other morphometric features in the choroid that it would also be beneficial to characterize and monitor.

There is also the need for a long term longitudinal study and comparison between vitreous haze and other disease biomarkers, he added, to determine its usefulness.

Dr. Danny Ng, assistant professor in the department of ophthalmology and visual sciences at The Chinese University of Hong Kong, spoke about OCT angiography (OCTA) for the management of uveitis.

The prevalence of choroidal neovascularization (CNV) secondary to various forms of uveitis ranges from one to 40% of patients, he told the audience. Fluorescein angiography (FA) is indicated to assess the presence and activity of CNV in uveitic patients, showing early iso- or hypo-fluorescence in the choroidal phase and late leakage.

However, FA diagnosis of CNV in eyes with uveitis is often challenging, he added. Only a small amount of exudation and slight intraretinal haemorrhage is often present, he said. In addition, macular edema and serous retinal detachment can also represent signs of inflammation due to uveitis, making it difficult to accurately assess CNV activity, he added, while RPE defects, scars, and pigmentations with late staining may camouflage the presence of leakage from CNV.

OCTA is an effective way of detecting CNV, he told the audience, especially in subtle cases. It has a number of advantages over alternatives, he said, including being non-invasive, patient-friendly (because it is painless and does not risk causing allergic reactions), and has practical advantages for the physician (repeatability, no need for consent forms and low cost).

Knowing the pitfalls of OCTA interpretation helps to improve the sensitivity and specificity of results, he concluded, and doctors should monitor inflammatory activity and severity post-examination as well as the response to treatment in general.

Dr. De-Kuang Hwang of Tapei Veterans General Hospital, addressed molecular techniques in the diagnosis of uveitis.

Through several case studies he introduced a range of techniques, including loop-mediated isothermal amplification (LAMP), recombinase polymerase amplification (RPA) technique, and comprehensive PCR system.

Current methods are able to detect common pathogens associated with uveitis, he said, but the next generation would be capable of extending this to uncommon pathogens, as well as reducing the cost of diagnosis.


Dr. Thanapong Somkijrungroj


Dr. Hyeong Gon Yu

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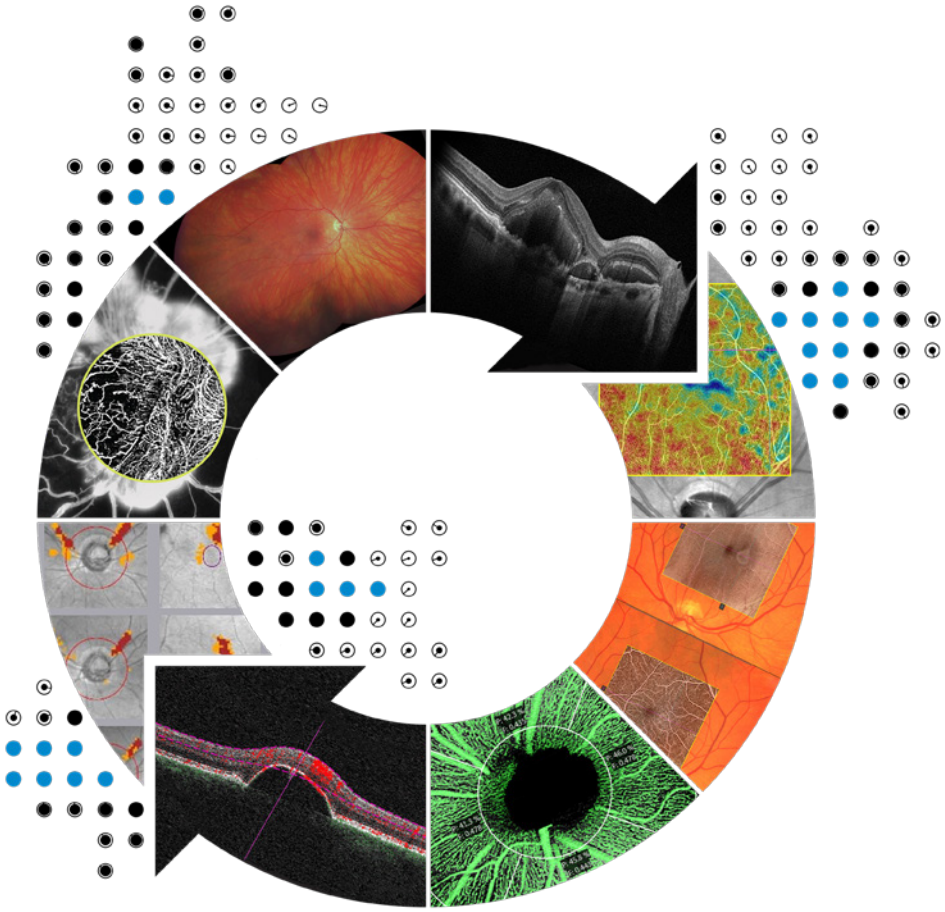

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Tech Big and Small Revolutionizing the Ophthalmology Industry

by John Butcher

Technology is advancing on all levels of the ophthalmology industry, an audience at yesterday's APAO 2019 Congress was told.

From disease detection and medicine delivery, to synthetic eye images, scientists are developing systems that will revolutionize patient care and doctor training.

Deep Learning (DL), a branch of Artificial Intelligence (AI) based on learning data representations as opposed to task specific algorithms, is rapidly developing new systems directed at eye care, said Dr. Naama Hammel, a clinical research scientist at Google AI Healthcare.

There are three rules to developing machine learning, she told the audience; an objective, data, and a model.

The objective refers to a specific task, she said, which the machine will be instructed to resolve, while data given to the machine in order to do that must be fair and representative, and usually abundant too. Finally, you need a model, she added, which is developed using that data.

Developing a system is not a simple task, she said. It requires machine learning expertise, computer power and a considerable investment of time.

While major investment is required, advances have reached the stage where they are now scale-able, she told the audience, as tests have shown one AI system can build or train another. In fact, tests suggest that machine learning models created by other machines are more accurate than human-crafted models, she added.

> **"Developing a system is not a simple task. It requires machine learning expertise, computer power and a considerable investment of time."**
>
> **– Dr. Naama Hammel**

This does not however remove the need for high quality data representative of the task at hand, consistent, and with clear grading guidelines, she continued.

Difficulties arise where gradings are not clear, according to Dr. Hammel. In fields such as diabetic retinopathy, where grading guidelines are clear, it is simpler to create a deep learning model to make diagnoses. When there is a lack of consensus on how to diagnose a disease and guidelines are blurred, creating a model becomes significantly more challenging, she said.

Machines can create other models and machines, she told the audience, but it comes down ultimately to "ground truth" provided by doctors.

If doctors can better "align themselves" behind disease definitions and scales of severity, essentially providing better labels for machines to work from, artificial intelligence in the field of ophthalmology will be able to advance more rapidly than at present, she said.

Dr. Sean Lanchulev, a professor of ophthalmology at New York Eye and Ear Infirmary (NYEE) of Mount Sinai, continued the session introducing the theme of "next generation intelligent therapeutics," which he described as a growing trend.

In the career of a retina specialist they probably look at around 150,000 retinas, he told the audience, but is still unable to distinguish which belong to women and which belong to men. By contrast technology can do so with considerable accuracy, he said, by way of demonstrating the power of machines and their potential to transform the industry.

The next generation of diagnostics may not be a complete replacement of exiting systems, he continued, but could

instead augment what already exists. For example, fundus may be a useful diagnostic tool, but it, plus AI, could be considerably more powerful.

The question regarding therapeutics is how technology can be used to make it smarter, more efficient and more effective, he told the audience.

The pipette, he said, has existed as an eyedrop system for a hundred years, despite major flaws, including commonly overdosing the eye by more than 300%, and missing the eye or applying medication to the wrong part of the eye on many occasions.

Overdosing, underdosing can lead to side effects, he said, while there is also no way to tell if a patient is using the medication as instructed.

Despite these problems there has only been "tiny incremental change" to pipette dispenser designs in the past one hundred years, he said, until now.

He went on to introduce a new delivery system using the latest technology, which has multiple advantages over the traditional pipette system, he said.

Dr. Lanchulev showed video demonstrating the system, which he said a precisely targeted and measured squirt of medication into the center of the eye, thus avoiding overdosing or missing the target. The system is designed to "beat the blink," he added, at 80 milliseconds for delivery.

In addition, it includes smart electronics and mobile connectivity, he continued, allowing the physician to monitor use and better ensure compliance.

"The next generation of diagnostics may not be a complete replacement of exiting systems, but could instead augment what already exists. For example, fundus may be a useful diagnostic tool, but it, plus AI, could be considerably more powerful."

- Dr. Sean Lanchulev

Several trials of the device have already been completed, he told the audience, adding that other technology could potentially be added at a future date, such as a camera.

Dr. Neil Bressler, a professor of ophthalmology at Wilmer Eye Institute, John Hopkins University School of Medicine in Baltimore, returned to the use of AI.

One benefit of AI systems could be the ability to create synthetic eyes, he told the audience.

Increasing concerns among global authorities about the sharing of personal identifiable data, including retina scans, could at some point limit the use of real eyes, he said, making it difficult to train new retina specialists.

Tests have shown synthetic images of eyes, developed by AI systems, indistinguishable from real eyes, he continued, giving them the potential to act as a replacement in the event of tightening restrictions.

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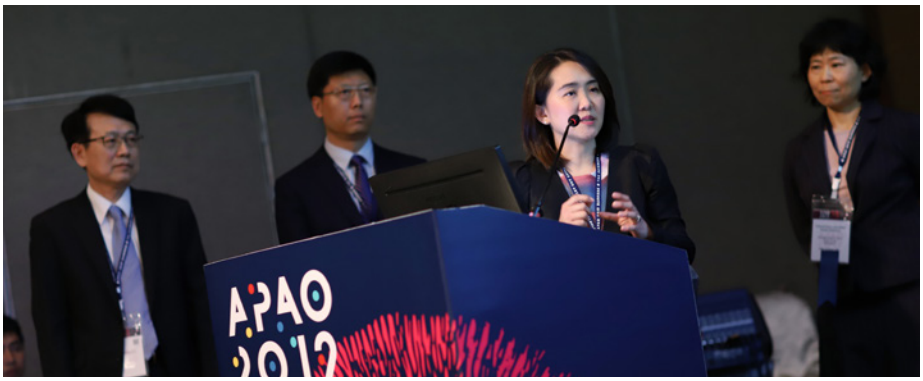

by Hazlin Hassan

Some may think baking is a piece of cake. But some baking ingredients are controversial, with the latest in health fads leaving you questioning the ingredients in your pantry. Brown sugar or artificial sweeteners? Butter or margarine? Coconut, olive or palm oil? These are some of the food items you may be consuming on a daily basis but are mired in controversy.

Similarly, while much has been learned about the role of the vitreoretinal interface in the pathogenesis of vitreoretinal diseases and surgery, there remain controversies about the optimal surgical management of sight-threatening diseases.

Surgeon-scientists presented a compilation of the ophthalmology field's most challenging conditions, including myopic foveoschisis and macular hole, among others, during a retinal surgical symposium at the APAO 2019 Congress in Bangkok, yesterday.

Vitreoretinal surgery in high myopia can be challenging because of higher axial length, posterior staphyloma, thinner and atrophic retina, degenerated vitreous and thinner sclera and abnormal sclera fiber architecture, said Dr. Wen-Hsiang Lee, MD, PhD, Assistant Professor of Clinical Ophthalmology, Vitreoretinal Service, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, USA.

Vitreoretinal conditions commonly encountered in high myopia include macular retinoschisis associated with high myopia, macular hole, epiretinal membrane, and rhegmatogenous retinal detachment, she added.

For thinner and atrophic retina, she advises meticulous vitreous dissection to avoid proliferative vitreoretinopathy (PVR) formation, careful membrane peel to avoid damaging the retina, and scleral buckle to support the vitreous base. "In summary, plan ahead, anticipate potential problems and avoid them," she said.

Dr. Tzyy-Chang Ho, Department of Ophthalmology, National Taiwan University, Taiwan, presented on "Surgical treatment of myopic traction maculopathy/myopic macular hole/ macular hole retinal detachment in highly myopic eyes."

"When we talk about surgical treatment, we need a rational approach," he said.

Some of his advice: a 360 degree inverted flap is not the answer, he said, adding that the internal limiting membrane (ILM) should be preserved if still present. It should also be reconstructed as a single layer. A donut-shaped ILM should however, be removed to release traction.

"Don't wait and don't get desperate," he said.

And then there are the conditions that scientists still know very little about, such as myopia foveoschisis (MFS), where the controversy lies in the treatment, between observation or carrying out surgical intervention. The condition is variable and unpredictable.

In many cases, OCT and vision remain stable for months or years, Dr. Nikolle Tan, Senior consultant, Asia Eye Center Cataract & Retina Specialist, Singapore. In one study, a total of 71% remained stable with an average follow-up of 16 months. Spontaneous resolution was reported, especially after Posterior Vitreous Detachment (PVD).

Another controversy is whether or not to conduct ILM peel in a vitrectomy. In vitrectomies alone, the anatomical success rates were as low as 36%. In vitrectomies using gas without ILM peel, anatomical success rates were 77.8%, while vitrectomies using ILM peel and gas scored highest at between 70 to 100%.

"Vitrectomy with ILM peeling results in better resolution of MFS than non-peeling," she noted.

She outlined several peculiar challenges of vitrectomy, such as long eyes, adherent cortical vitreous, taut terrain and poor contrast. She also touched on the debatable role of gas versus silicone oil in macular hole retinal detachment (MHRD).

To summarize, in some patients, observation is an option for stable cases, she said. The surgical approach for macular hole in combination with retinal detachment is more challenging than surgery for a typical macular hole without retinal detachment.

Air tamponade may provide a comparable rate of macular hole (MH) closure compared with SF6 ophthalmic gas with relatively small diameters, said Dr. Wu Liu, Beijing Tongren Hospital Eye Center, China, when presenting on "Internal limiting membrane peeling and air tamponade for stage III and stage IV idiopathic macular hole (IMH)."

"The take home message is that ILM and air tamponade is still very useful for stage III and stage IV IMH but the initial closure rate may be lower than that with gas tamponade," he said.

For eyes with persistent MH, one can use additional surgery to achieve satisfactory results, and hole closure and visual function improved. Larger diameters are a major risk factor for initial closure, he advised.

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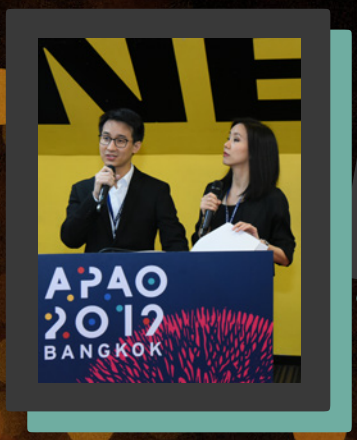
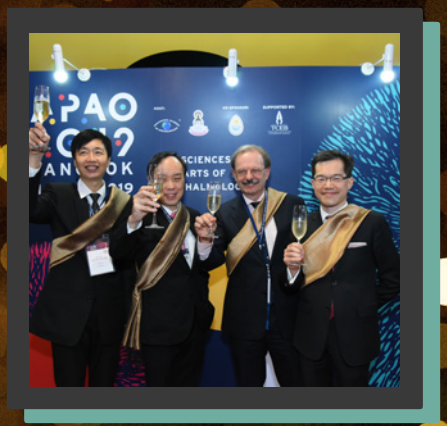




HIGHLIGHTS FROM CULTURAL NIGHT AT APAO 2019 BANGKOK

Collagen Cross-linking: Where are we now?

by Khor Hui Min

Collagen cross-linking (CXL) has become the standard of care for progressive keratoconus (KC) from the first time it was introduced 15 years ago. Since then it has continued to develop, with indications now including secondary ectasia, infectious keratitis and its prophylactic use in refractive procedures.

Dr. Ngamjit Kasetsuwan from Chulalongkorn University, Thailand, spoke on the use of the Dresden protocol, accelerated CXL, and transepithelial CXL. She also discussed corneal haziness, endothelial cell damage/corneal edema, and treatment failure.

Dr. Kavita Rao from Aditya Jyot Eye Hospital in India, talked about choosing cross-linking methods and discussed the efficacy of accelerated cross-linking.

"Acceptable corrected vision and progression of KC are both important factors while planning KC treatment. Accelerated CXL and transepithelial photorefractive keratectomy (TPRK) works well in particular cases. However, customization of CXL treatments is the likely way forward," said Dr. Rao.

Prof. Dr. Mahipal Sachdev, chairman and medical director of Centre for Sight Group of Hospitals, New Delhi, discussed about customizing CXL. He believed that the treatment should be customized because greater energy can be used over the cone, and this can produce better results.

"A tailor-made approach can lead to better refractive and keratometric outcomes. The future is combination therapy," said Dr. Sachdev.

"Localized treatment can help normalization. Computational finite element analysis predicts greater flattening effect with regional increases in elastic modulus, as compared to conventional treatment. Selectively inducing stiffening in the weak zone flattens the cone and improves visual function," he added.

Furthermore, the topic presented was on rituals for perfect cross-linking by Prof. Dr. Rohit Shetty from the Narayana Nethralaya Eye Institute of India, and affiliate associate professor at the Maastricht University, The Netherlands.

"The ritual I propose to practice before cross-linking is to firstly treat local allergy, to reduce inflammation. Next, treat systemic allergy, followed by vitamin deficiencies. After all that, if cross-linking is still required, then it can be performed," explained Prof. Dr. Shetty.

Then Adjunct Assoc. Prof. Dr. Lim Li, Senior Consultant of the Corneal and External Eye Disease Department at the Singapore National Eye Centre (SNEC), talked about laser vision correction combined with cross-linking.

"Long-term studies show that laser vision correction (LVC) combined with cross-linking improves the accuracy of refractive correction and increases the stability of visual outcome. However, the protocols vary (UVA settings/riboflavin concentration/soak time), and long-term studies are required for validation," said Dr. Lim.

Dr. Vishal Jhanji from the University of Pittsburgh School of Medicine, USA, talked about complications in CXL. First of all, complications are rare.

"Complications are not common. They are not severe. Make sure you follow the guidelines. But stopping using the NSAIDs and stop using corticosteroids unless absolutely necessary," said Dr. Jhanji.

"One of the most common complications is delayed re-epithelialization. The risk factors involved are topical corticosteroids and NSAIDs, while associated risk factors include poor ocular surface. Patients with steep corneas might also have problems," he added.

"In the management of the disease, it is a good idea to use preservative-free artificial tear drops, and remove any offending agents. Other considerations are bandage contact lens, autologous serum, and tarsorrhaphy."

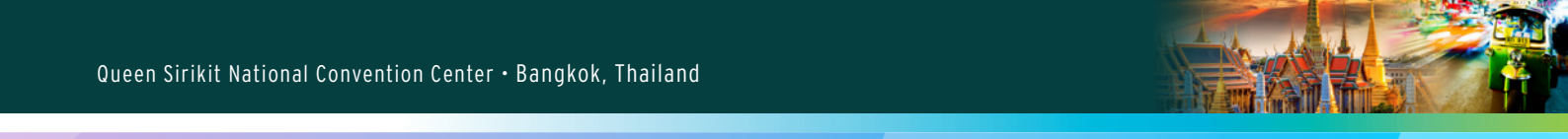
Other complications include corneal infiltrates, inflammatory corneal infiltrates, corneal endothelial decompensation, corneal haze, persistent corneal haze, and intraocular inflammation.

Optimizing vision after CXL was the final presentation, and it was by Dr. Anand Parthasarathy from the Centre for Vision and Eye Surgery, Chennai, India. He spoke about interventions for KC.

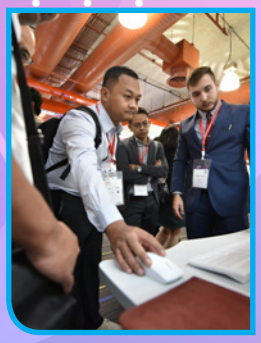
"Post CXL, it is important to explain and emphasize the visual recover after CXL to the patient, given the unpredictability in refractive correction. Most patients may have worsening initially followed by an improvement on follow up, due to epithelial remodelling and stromal changes," said Dr. Parthasarathy.

"Operative factors affecting postoperative visual acuity include epithelium protocols, fluence protocols, type of riboflavin used, complications affecting vision, and previous treatment done for KC," he added.

"Speciality cross-linking, intrastromal corneal ring segments (ICRs), toric phakic lenses (ICLs), and topoguided photorefractive keratectomy (PRK) are successful surgical alternatives in patients with ectasia with an improved uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA). Long-term follow-up indicates a continuity of the effect."



Exhibition Hall and *Poster Gallery* at the APAO 2019 Congress



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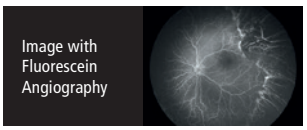

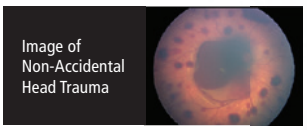

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All Things Inflammatory of the *Anterior Segment*

by Khor Hui Min

In this symposium on Cornea, External Eye Diseases and Eye Bank, various esteemed experts presented on topics touching on essential aspects in anterior segment inflammations that pose diagnostic and clinical challenges.

Dr. Shizuka Koh of Osaka University started off the session with her presentation on the meibomian gland dysfunction (MGD). MGD is a chronic, diffused abnormality of the meibomian glands, commonly categorized by terminal duct obstruction and/or qualitative/quantitative changes in the glandular secretion. It may result in the alteration of the tear film, symptoms of eye irritation, clinically apparent inflammation, and ocular surface disease.

"MGD is the most common cause of evaporative dry eye, which can arise from eyelid inflammation, conjunctival inflammation, corneal damage, microbiological changes, and tear film instability," said Dr. Koh.

"Ocular surface and palpebral conjunctival including eyelid margin inflammation is associated with changes in meibomian gland structure and potential function," she added.

Then Assoc. Prof. Dr. Louis Tong from the Singapore National Eye Centre (SNEC) spoke on inflammation and measurement in dry eye. He discussed measuring inflammation in immune cells (T-cells, innate cells), soluble mediators (cytokines, chemokines, matrix metalloproteinase (MMP), proteases), and lipid mediators (leukotrienes and lysyl oxidase (LOX) enzymes).

Adjunct Prof. Dr. Colin Chan from the University of Canberra, presented on allergic conjunctivitis – beyond topical antihistamines and steroids.

"I just want to emphasize two points. Firstly, you must discuss immunotherapy early, and also discuss steroid sparing agents early. Particularly, in cases of refractory/recurrent allergic conjunctivitis, especially vernal and atopic," said Prof. Dr. Chan.

Dr. Vilavun Puangsricharern, director of the Excellence Centre for Cornea and Limbal Transplant, King Chulalongkorn Memorial Hospital, Thailand,presented on the management of acute Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN).

SJS and TEN are believed to be variations of the same condition, where there is sheet-like skin and mucosal loss. SJS/TEN is a rare, acute, serious and potentially fatal skin reaction.

"The strategy is to protect the integrity of the ocular surface, facilitate healing, and minimize the risk of acute corneal perforation. Also, we must aim to switch off the acute ocular surface inflammatory responses. It is important to minimize and/or prevent symblepharon formation, progressive conjunctival scarring, and chronic ocular surface failure," said Dr. Puangsricharern.

Epithelial transplantation for ocular cicatricial pemphigoid (OCP) was the next topic, presented by Dr. Chie Sotozono from the Kyoto Prefecture University of Medicine, Japan.

"Cultivated oral mucosal epithelial transplantation (COMET) results in better reconstruction of the ocular surface in cases with OCP compared to amniotic membrane transplantation (AMT) alone or LT/KEP. COMET alone with our new Limbal Rigid CL is effective for the improvement of vision in patients with severe ocular surface disease (OSD)," explained Dr. Sotozono.

Furthermore, Prof. Dr. Alvin Young from the Chinese University of Hong Kong discussed updates on the management of peripheral ulcerative keratitis (PUK).

"Remember that there is no magic bullet in the management of PUK. Manage the patient and disease, and don't just treat the signs," said Dr. Young.

Pitfalls in the management of scleritis were the topic presented by Dr. Napaporn Tananuvat from Chiang Mai University, Thailand. She said that surgically induced necrotising sclerokeratitis (SINS) is almost always severe and resistant to treatment.

"The diagnosis of SINS requires comprehensive medical and surgical history, and careful examination. Distinguishing between infection and inflammation is critical. If surgical intervention is required, control of the underlying inflammation with medical treatment is essential," said Dr. Tananuvat.

The final presentation on dry eye disease was by Dr. Srinivas Rao of Darshan Eye Clinic, Chennai and honorary professor of Chinese University of Hong Kong. Dr. Rao emphasized that many factors co-exist and contribute to the disease, so a holistic approach is needed in the treatment.

All in all, the presenters and experts had a fruitful session and discussion.

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1. Hollo G et al. Adv Ther 2014;31:932-944.

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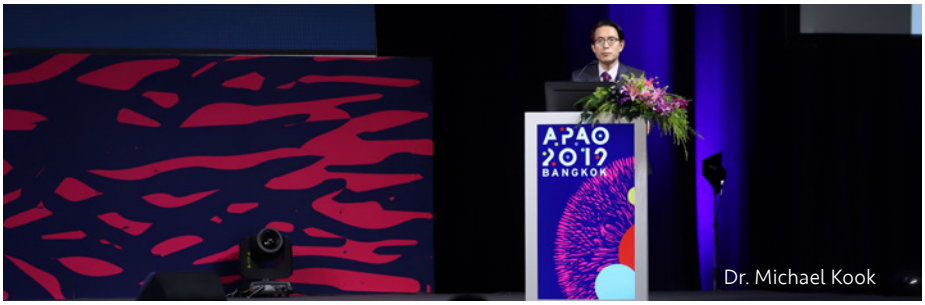

Dr. Michael Kook

by John Butcher

New approaches to glaucoma are likely to result in better tested treatments and fresh ways of tackling the disease, experts in the field revealed at yesterday's session at the APAO 2019 Congress.

In particular 24-hour testing, if expanded, will improve patient care, they said, while increasing awareness of the role ocular blood flow plays in the disease could open as yet untried avenues of research.


Dr. Anastasios Konstas

Dr. Anastasios Konstas, professor of ophthalmology at the 1st and 3rd University department of ophthalmology in Greece, addressed the fundamentals of intraocular pressure (IOP) lowering in glaucoma, which he said could benefit from 24-hour IOP studies.

Although reducing IOP is an effective way of preventing glaucoma progression, there remains limited knowledge of IOP characteristics before and after lowering and of which level is pathological and harmful to the optic nerve, he said.

One particular limiting factor is that a single IOP measurement is often insufficient to determine the success of glaucoma therapy, although in practice clinical decisions are made on a single reading, he said, influencing every step of care for those suffering from glaucoma.

IOP pathology is akin to an iceberg, he told the audience. A single IOP reading, as is common, is like examining just its tip, while daytime IOP monitoring is like seeing some way below the surface. Only 24-hour monitoring is like seeing the entire iceberg, he added.

Published 24-hour studies can help to document the real efficacy of therapy, he said, allowing for a proper comparison of different options in order to establish the best dosing of new therapies.

For a 24-hour disease, like glaucoma, you need an effective therapy that works well day and night, Dr. Konstas said, adding that 24-hour studies had determined that the efficiency of drops differed throughout the day, with some performing better at night and others better earlier in the day.

Better 24-hour IOP control with prostaglandins was a key reason for its adoption and success as a first choice therapy, he said, while in contrast, 24-hour evidence revealed reduced effectiveness of timolol and brimonidine during the night.

Work has been done on obtaining 24-hour evidence of glaucoma treatments, but more remains to be done, he told the audience. He spoke of the need to establish the value of each 24-IOP characteristic, (mean, peak and fluctuation) in predicting glaucoma progression and determining the optimal target IOP that will stabilize function at the various stages of the disease (early, moderate and advanced glaucoma).

"Better understanding of IOP pathology in glaucoma management is a reality," he told the audience, with 24-hour studies helping to reveal the true efficacy of therapies.

There are now effective therapies offering 24-hour IOP control for many patients, but for the majority "individualized twenty-four hour monitoring remains a dream."

Dr. Michael Kook, a professor at the University of Ulsan Asan Medial Center in Seoul, South Korea, argued for greater emphasis on the role of ocular blood flow in the development and progression of glaucoma.

There is what is known as watershed zones between the posterior ciliary arteries, he said. Watershed zones are areas of the body that receive dual blood supply from the most distal branches of the two main arteries and are particularly vulnerable to ischemia because they are the least likely areas to receive sufficient blood.

This is significant because a watershed zone exists in the optic nerve, making it vulnerable to lack of blood flow, he said.

Optical disk hemorrhages and peripapillary atrophy are both risk factors in glaucoma progression, he continued, and could be affected by the watershed zone.

Ocular blood flow is clearly relevant to the progression of glaucoma, according to Dr. Kook, and objective ocular blood flow measurements in the target tissue as well as their cause and effect relationship are currently being uncovered.

The future direction of ocular blood flow study in glaucoma is soon likely to head in the direction of new treatments, he added, and robust evidence validating the impact of it on the disease.

Further, Dr. Prin Rojanapongpun, from the department of ophthalmology at Chulalongkorn University and King Chulalongkorn Memorial Hospital, Thailand, advised using preservative-free eye drops for glaucoma patients.

He presented trials of switching from latanoprost to preservative-free tafluprost eye drops for 339 glaucoma patients that showed reduced corneal staining and conjunctival hyperemia as a result, as well as less itching, tearing and dry eye. As a consequence switching could increase levels of compliance, he said.

Preservatives can cause a range of ocular surface damages as well as deeper structure issues, he told the audience. Most IOP lowering medications contain BAK, he continued, the toxicity of which is well established and raises the risk of poor tolerability and eye damage. Many patients experience symptoms of OSD and other SE with preserved glaucoma medications, he said.

With this in mind, preservative-free medication is theoretically recommended and practically a better option for glaucoma patients, he concluded.

Extending Horizons in the **Management of nAMD and PCV**

Dr. Gemmy Cheung


Professor Tien-Yin Wong

by Joanna Lee

The quest to best manage the effects of neovascular age-related macular degeneration (nAMD) continues with yesterday's APAO 219 Congress session which particularly shed more light as the audience had the opportunity to learn about the latest evidence gained from some major studies. The symposium's chair, Dr. Wichai Prasartritha drew attention to the agenda which was to highlight the importance of proactive treatment regimens such as fixed and the treat and extend (T&E) which are preferable to reactive regimens like the pro re nata (PRN) as they have resulted in better visual outcomes with less loss of vision in real-world studies.

On hand to lay the foundation during the session was ophthalmology professor and medical retina specialist, Dr. Paul Mitchell from University of Sydney, Australia. Treat and extend (T&E) refers to giving patients initial loading doses of anti-VEGF injections until the disease is stable and then the interval between injections would be extended. Dr. Mitchell highlighted several latest trials which had shown excellent VA maintained over three years.

Besides, the View 1 and 2 studies have shown 48% of patients who had received aflibercept 2q8 in Year 1 maintained VA gains in Year 2 with injection intervals of 12 weeks. So, proactive dosing of aflibercept can achieve VA gains in Year 1 that are maintained thereafter with the need for fewer injections. This also shows how T&E may reduce the treatment burden on both patients and caregivers.

The session also gave highlight to the Japanese experience which supports the T&E proactive treatment approach in managing nAMD. Associate Professor Dr. Gemmy Cheung from Singapore National Eye Centre, Singapore looked at the ALTAIR study conducted in Japan which she said pushes the boundaries beyond anything seen earlier. It is the only protocol that starts T&E in Year 1 with results showing comparable visual gains using a 2 and 4 weekly interval adjustment with a gain of 8 to 9 letters (compared to q8). ALTAIR was designed to assess the efficacy of these two types of T&E regimens with aflibercept in nAMD over 2 years. The study also attempted to extend treatment beyond the 12-week interval to a 16-week interval. Results showed 57% of patients reaching the treatment intervals of 12 weeks or beyond at the end of Year 1 while 57% to 60% of patients were maintained with treatment intervals of 12 weeks or beyond at Week 96. Thus, this highlights the suitability of the T&E regimen with extended treatment intervals in Year 1 and beyond.

The use of anti-VEGF also relates to the treatment of PCV. On hand was Professor Tien-Yin Wong, Medical Director of the Singapore National Eye Centre (SNEC) who spoke about the PLANET study. Dr. Wong said the study was "fortuitously designed" in such a way that it could test out the hypothesis if PCV (polypoidal choroidal vasculopathy) is indeed a sub-type of AMD, being very similar to nAMD. Interestingly, the PLANET study's outcome showed more than 94% of patients avoided loss of 15 or more letters over 96 weeks – thus, treatment with aflibercept monotherapy does lead to excellent VA gains over two years, similar to classic AMD trials.

The questions about polyp regression and activity was also addressed in this session. "Is it okay to have polyps if there's no activity?" He shared how the polyps were inactive in more than 80% of the patients at week 96 in the study when treated with aflibercept monotherapy.

Dr. Wong also touched on the role of "rescue PDT" and in particular, when to use rescue PDT for those who had responded optimally during the therapy. He reported that 80% of the patients undergoing the PLANET study required no rescue PDT over 2 years and even among a small number of patients who did require it, rescue PDT did not have any significant improvements to the patients' visions nor did it result in polyp regression. This again gives us indications on the efficacy of aflibercept in the treatment of PCV.

Can we use a T&E regiment to treat PCV as treatment burden continues to be a challenge? Dr. Wong said yes, but at least in the second year of the PLANET study. Diagnose, load on the doses and evaluate the outcome following fluid, symptoms and visual acuity and if needed, on ICGA. He said the T&E could be started from the third loading dose onwards while bearing in mind that if PDT is needed, it would mean the case is a difficult one to treat already from the beginning. With that, it concluded an enlightening update session on managing nAMD and PCV.

See more, Do more with the 3D experience

by Hazlin Hassan

The latest in visualization technology provides eye surgeons an enhanced experience in the operating theater, a surgical retina symposium at the APAO 2019 Congress heard yesterday.

Moderated by Dr. Andrew Chang, from Australia, the session saw experienced surgeons sharing their experiences in using Alcon's comprehensive range of surgical tools, including the NGENUITY 3D Visualization System, and how it changed their practice.

The ULTRAVIT 10K probes provide less traumatic and faster vitreous and membrane removal.

With the ULTRAVIT, which delivers 10,000 cuts per minute (cpm) via dual pneumatic drive technology in 23, 25+, and 27+ gauge series, Dr. Pear Pongsachareonnont, from Thailand, said that traction, which can cause iatrogenic tears and postoperative complications, is reduced.

"One thing I like about this laser [VEKTOR Articulated Laser Probe] is that it has a glowing illumination around the laser probe so it helps to see a bit further than the previous combination laser. And it is flexible and helps reach the very peripheral area," she said.

"The parameters are seen on the screen so you, your resident and your nurses can see what you are doing," she added.

"The Advanced ULTRAVIT's beveled tip provides closer port proximity to the retina allowing more access to tissue planes. It also allows for segmentation and delamination, reducing the dependency on scissors and forceps," said Dr. Srinivas Joshi, MD, Director Research and Community Services, Consultant Vitreoretina, MM Joshi Eye Institute, India.

The Advanced ULTRAVIT beveled tip also enables a longer port open time within Core Mode at maximum cut rates than previous ULTRAVIT probes, he noted.

Overall it provides increased efficiency, and the improved duty cycle provides for more flow for faster vitreous removal versus previous ULTRAVIT probes, he said.

He said he was initially skeptical about the Advanced ULTRAVIT but after using it, he changed his mind.

"I was trying to remove the anterior membranes, and I got so close to the retina. The cutter tip touched the retina but it did not cut the retina. This is where it changed my mind on why this 10k is more efficient," he explained.

"The cutter technology improves flow and the higher cut rate will mean a lot especially when you are going closer to the retina, and especially when it is a detached retina or mobile retina."

Using the Alcon NGENUITY 3D Visualization System also allows surgeons to perform better in macular surgeries, with excellent depth of field and high magnification achieved.

"Macular surgery with NGENUITY is different from conventional surgery. Surgeons are upright, wearing 3D glasses, and conducting surgery by viewing the image on a large flat display rather than looking through the eye pieces of the microscope," said Dr. Zhang Chun, Xiamen Eye Center.

"I perform almost all of my surgeries using NGENUITY. In my experience the benefits of the 3D Visualization is even more obvious for macular surgery," said Dr. Chun.

The brightness and depth of field was not compromised with the high magnification of the 3D visualization system, he added.

"The image resolution was so high with the increased magnification that you can even identify RP damages at the bottom of the macular hole," he said.

In the digital era of vitreoretinal surgery, 3D visualization allows surgeons to obtain a much improved depth of field, said Dr. Kazuaki Kadonosono, from the Department of Ophthalmology and Micro-technology, Yokohama City University Medical School.

Increased depth of field is a feature that allows the use of much greater magnification, enabling significantly better visualization.

Clearly, the high-definition screen of the NGENUITY system continues to provide retinal surgeons unprecedented 3D visualization of the back of the eye with greater depth and detail during surgery than traditional scopes.

The viewing platform of the NGENUITY 3D Visualization System revolutionized vitreoretinal surgery when it was first launched.

Compared to traditional analog microscopes, NGENUITY delivers up to 48% increase in magnification to amplify the view for intricate tasks, up to 5 times better depth of field to maintain focus across an expanded surgical space, and up to 42% percent increase in depth resolution to resolve fine details when managing challenging pathologies.

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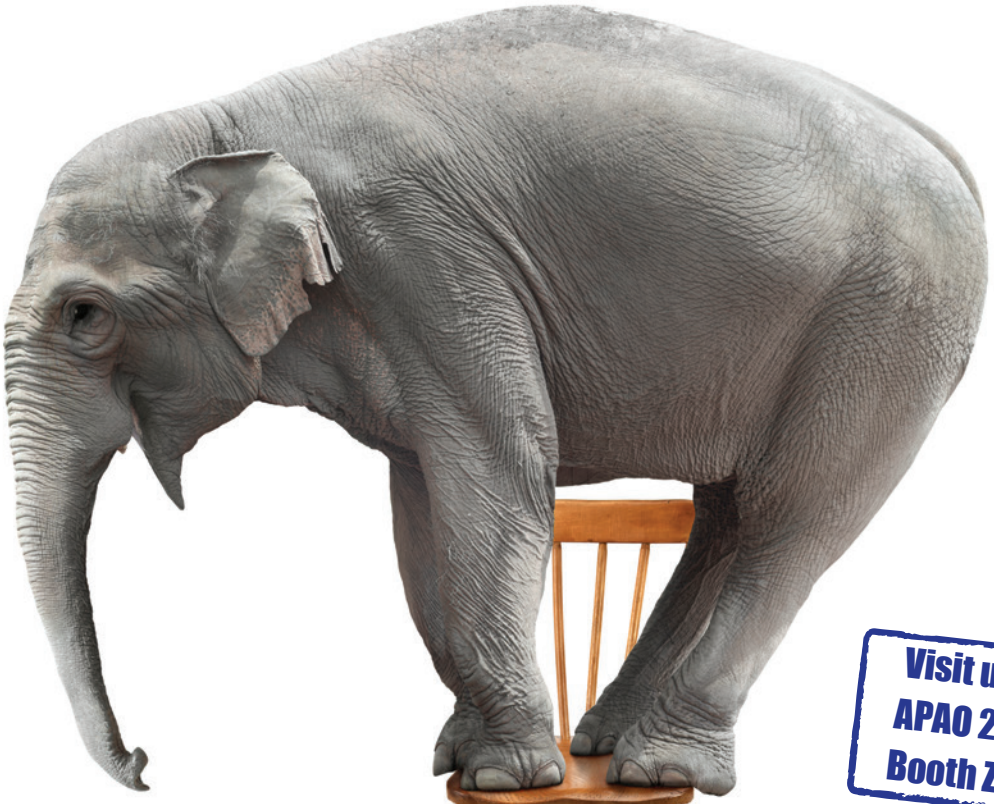

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ALCON SURGICAL VIDEO SYMPOSIUM

8 March 2019 (Friday)

09:30 – 10:30hrs Plenary Hall 2

Moderator: Ronald YEOH, MD
Singapore

Optimizing Outcomes with Innovative Cataract Refractive Suite Technologies

TOPIC	SPEAKER
Managing Challenging Cases with Advanced Phacoemulsification Technology	Haripriya ARAVIND, MD India
FLACS – Benefits of Precision and Pre- treatment	Tim ROBERTS, MD Australia
Optimizing and Verifying Cataract Refractive Outcomes	Prin ROJANAPONGPUN, MD Thailand

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