In terms of retinal diseases, nutrition matters

China’s efforts in blindness prevention goes abroad

Pediatric glaucoma experts, providing bright future for young eyes

The sound of bagpipes ushered in the guests of honor and the distinguished guests at the opening ceremony held yesterday. The bagpipe players in their charming Scottish kilts stood regally as APAO council members, Hong Kong Ophthalmological Society (HKOS) council members, and council members of the College of Ophthalmology of Hong Kong and other distinguished guests were welcomed to the stage.

This signalled the opening ceremony of the 33rd Asia Pacific Academy of Ophthalmology (APAO) Congress held in conjunction with the 29th Hong Kong Ophthalmological Symposium. The congress welcomed no fewer than 5,000 delegates from over 85 countries.

Most recently, 5 new APAO members have joined the fold, namely, the Iranian Society of Ophthalmology, the Myanmar Ophthalmological Society, the Laos Ophthalmological Society, the Pacific Eyecare Association and the Asia-Pacific Ocular Trauma Society.

According to Congress President of APAO 2018, Dr. Clement Tham, the Hong Kong Ophthalmological Society and the College of Ophthalmology of Hong Kong have come full circle again as excellent hosts and strong supporters of the APAO Congress 1983, 1995, 2008 and now, the 2018 APAO Congress.

He said that the scientific program is what draws delegates to the APAO Congress so he acknowledged Scientific Program Chairperson, Professor Dennis Lam, the 26 members of their International Advisory Board, the six co-chairs, 17 conveners, and 74 coordinators of the Scientific Program Committee. He also thanked the 25 supporting organizations who have organized the symposiums in their invited programs. He also revealed that Kuala Lumpur, Malaysia, has been voted as the hosts of the 2021 APAO Congress.

Cont. on Page 4 >>

Dr. Clement Tham and other VIPs of the Congress looking sharp.
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*Studied over a one-year period.
President of APAO, Dr. Charles McGee said that “Ultimately, 40% of ophthalmologists around the world may find a united voice in APAO”. He said APAO has grown and matured ever since its beginnings in 1960. Dr. McGee also said it was the “enduring qualities of foresight, collegiality, empathy, industry and leadership” that have seen the evolution of APAO. The mission of APAO includes promoting the science and art of ophthalmology amongst different peoples and nations, promoting the prevention activities and restoration of sight through teaching, research and service, fostering cooperation between ophthalmological societies in different countries, as well as to encourage collaboration between all who share APAO’s values. The sharing of research and the preparation of scientific papers also form the core of APAO’s mission.

Having just celebrated their 60th anniversary, a jubilant President of the Hong Kong Ophthalmological Society, Dr. Jeffrey Pong emphasized HKOS’ role in providing educational programs and trainings for its members and to the public. He was pleased to see the coming together of delegates in the symposium sharing new and creative ways of treatments, techniques and technologies. Dr. Pong urged delegates with these poignant words: “let’s not forget what brings us all to ophthalmology and lifelong learning to equip ourselves for better service to our patients. Saving their sights remains the foremost of our priorities.”

Dr. Jimmy Lai, President of the College of Ophthalmologists of Hong Kong shared that expectations are high as there are more than 600 speakers from all over the world this year. “APAO is a platform for us to look for collaborative opportunities and to share knowledge,” he reminded the delegates. “Your strong support is key to our success in this field,” he said.

All delegates were resplendent in the official APAO outfit this year. The men and women council members wore Chinese traditionally inspired shirts and blouses which carried Chinese influenced designs showcasing mandarin collars and traditional knot buttons. Special guest of honour, Secretary for Food and Health for the Government of the Hong Kong Special Administrative Region, Dr. Sophia Chan graciously said she felt like a part of the
team wearing the outfit which added a Chinese New Year touch to the opening ceremony. She shared how government funding for public-private partnership programs have helped alleviate the pressures of long waits and the toll of the heavily subsidized healthcare system in Hong Kong. So far, since September of 2017, 17,000 cataract surgeries have been performed under the public-private program, which has significantly shortened the waiting time for public healthcare lines for cataract surgery from over 6 years to 2 years.

Dr. Chan thanked the private ophthalmology practitioners for their support of this public-private program for this feat. “Glaucoma patients are also subsidized with a full range of topical anti-glaucoma medication, glaucoma laser procedures and surgeries at affordable prices,” she said. Dr. Chan also shared that the Hong Kong Hospital Authority has also provided extra OCT tests to meet the requirements of an expanding glaucoma population. Anti-VEGF injections have also been provided by the government due to the growing number of age related macular degeneration patients.

Chair of APAO 2018 Scientific Program Committee Dr. Dennis Lam remarked that besides having Hong Kong being well-connected to the world of ophthalmology, this year’s event “consolidates the experiences of all the managing of a large congress to become the protocol of organizing APAO congresses”. He said that this new way of doing things has helped to grow APAO. “Alone, we can achieve a little, together we can achieve a lot more,” he said.

At this year’s APAO, new elements include the Wetlab sessions, new abstract awards and the use of the APAO app for speakers’ electronic evaluation as well as Q&A interactions with delegates.

This year’s APAO named awards and lectures were also presented at the opening ceremony. The Jose Rizal International Medal was presented to Dr. Suber Huang from the United States while the De Ocampo Lecture was presented to Dr. Yizhi Liu from China. The Susruta Lecture was given to Dr. Pak-Chin Chow and the Arthur Lim Award was given to Dr. Paisan Ruamviboonsuk.

With the delegates holding an eye-scanning device to their eyes, the opening ceremony was officially declared open. A humorous and touching video showcasing Bangkok, Thailand’s charms as the next APAO hosts was also shown, enticing delegates for more of APAO next year.

Recipients of APAO 2018 Name Lectures and Other Special Awards

Dr. Suber Huang (right), President and CEO of the Retina Center of Ohio receiving the Jose Rizal International Medal for outstanding contributions to ophthalmological developments in the region from Dr. Charles McGee, President of APAO.

Dr. Yizhi Liu (right) receiving the De Ocampo Lecture award for excellent academic achievements in clinical and basic eye research from co-chair of the Scientific Program Committee, Dr. Ningli Wang.

Dr. Pak-Chin Chow (right) receiving the Susruta Lecture award from Dr. Clement Tham, APAO 2018 Congress President.

Dr. Paisan Ruamviboonsuk (right) receiving the Arthur Lim award from Dr. Charles McGee.
Advances in technology and global studies are revealing how examination of the retina can be used in a range of medical diagnoses, according to experts speaking at yesterday’s conference at APAO 2018.

Patients suffering with diabetes in particular could benefit from advances, which include cutting edge artificial intelligence; speakers said in an early morning talk yesterday on medical retina studies and advances.

The use of artificial intelligence in retina examination, helping to move from a rules-based to a learning based technology, will create greater advances in how the retina can be used for medical diagnoses, according to Dr. Paisan Ruamviboonsuk, from Rajavithi Hospital in Thailand, APAO 2018’s Arthur Lim Lecture recipient.

Artificial intelligence has been around since the 1950s and recently surpassed human intelligence in studies, he said. The most recent advances have been a shift from machine learning to what he called “deep learning.”

Deep learning is a subset of artificial intelligence which refers to deep artificial neural networks that allow machines to think and understand the world in the way people do, while retaining the innate advantages they hold over us such as speed, accuracy and lack of bias. It allows them to, for example, recognise sounds and images, more accurately, thus advancing assessment of retinal images.

Dr. Ruamviboonsuk referred to diabetic retinopathy screening studies in Thailand, using deep learning and trained practitioners, that had reaped results in terms of diagnosis and treatment there.

Those studies, which began in 2007 using mobile cameras, and involved training local non-physicians, had received an award for their success and significantly impacted diabetic patients there.

Artificial intelligence is advancing the use of retinal images to predict disease, refractive errors, cardiovascular risk and in cancer biopsies, he told the audience.

“Artificial intelligence is not coming. Artificial intelligence is now,” said Dr. Ruamviboonsuk. “An important question is how we deal with it. There is no easy answer.”

Several other speakers outlined recent studies in links between diabetes and changes in the retina. Dr. Taraprasad Das, vice chairman of the L.V. Prasad Eye Institute in India, talked about studies in India where retina images have been used to detect diabetes.

Dr. Tengku Ain Kamalden, an ophthalmology researcher from the University of Malaya in Kuala Lumpur, discussed research into microRNAs and the increasing importance being attached to them and the detection of diabetes.

MicroRNAs (miRNAs) are small non-coding RNA molecules found in plants, animals and some viruses, that function in RNA silencing and post-transcriptional regulation of gene expression.

Studies into miRNAs on the retina were “exciting” she said and could “mean more than what it seems.”

Their presence could tell us we have a disease, she told the audience, and they could be increasingly important in treatment.

Dr. Hiroko Terasaki, professor of ophthalmology in the department of ophthalmology at Nagoya University in Japan, also discussed the use of technology to measure vascular changes in the retina as a means to diagnose and assess diabetes.

A deep and large scan is required to “catch most advanced vascular change,” he said.

Retina studies have also advanced understanding of diabetic choroidopathy, added Dr. Suk Ho Byeon of Yonsei University in Seoul, South Korea, changing perceptions about retina thinning and the condition.
On the **Edge**

New Treatments for Intraocular Tumors

**by Joanna Lee**

New treatments have been continuously researched upon to treat eye cancers from across the globe, providing means for further explorations on the frontier of managing intraocular tumors in patients.

Dr. Gregorius Luyten from Leiden University Medical Centre, Netherlands, began yesterday’s session on ocular oncology and pathology by updating the audience on the study of the pathology of uveal melanoma (UM), one of the most common malignant primary intraocular tumors. His research looked at the mutations of the BAP1 gene within families. Expounding on multistep carcinogenesis and tumor predisposition syndrome, he shared that 2% to 4% of families had many de novo mutations. Furthermore, it was also found that if more than one melanoma appears in one family, 30% out of those families have BAP1 mutations. They also have high risks of developing malignant mesothelioma, a cutaneous melanoma.

To manage uveal melanoma, Dr. Duangnate Rojaporn from Thailand, gave an overview of the current methods of treating uveal melanoma which includes observation and how to tell between a nevus or melanoma, laser therapy, radiotherapy treatments like brachytherapy, various types of surgery and the current new treatments on trial, namely, targeted therapy and immunotherapy. She also shared earlier on a useful hint on how to identify ocular melanoma using an eight point mnemonic to remember the eight risk factors of ocular melanoma.

Within the spectrum of treatments available, traditional Chinese medicine offers an interesting outlook. Dr. Jinfeng Cao spoke on the various remedies traditionally used for treatment such as artemisinin, ephedrine, gingko biloba, but he particularly noted the rhubarb plant’s compound of aloe emodin and emodin which has emerged in recent studies to have shown positive effects during the observation of tumor cell apoptosis.

So far, there hasn’t been any comprehensive mechanisms of investigation even though zeaxanthin, butein, oridonin and curcumin have been studied in the treatment of UM. He put forth the question if rhubarb could be used to treat melanoma and what the mechanisms could involve. Traditional Chinese medicine, he said, tends to be more multi-targeted compared to western medicine.

Dr. Swathi Kaliki from L. V. Prasad Eye Institute in India, compared how uveal melanoma presents in India and western countries in order to give a perspective of the disease in India compared to other countries. In her data, she has found that Indian patients tend to be younger at age, most in their 40’s when presenting with UM and that they have larger and thicker tumors compared to American patients.

Another mode of treatment explored was in increasing hyaluronic acid and EZH-2 in aggressive retinoblastoma. Dr. Hendrian Soebagjo from Indonesia, shared that hyaluronic acid and EZH-2 indeed have influence upon the aggressivity in retinoblastoma.

In another research related to retinoblastoma, Dr. Chu Wai Kit presented on growth hormone-releasing hormone receptors and how it induces apoptosis specifically in retinoblastoma cells. His research team has found that retinoblastoma expresses high levels of GHRH-R. When retinoblastoma cells were treated with GHRH-R antagonists, they can reduce specifically the apoptosis in retinoblastoma cells as they induce the pathway to the apoptosis of the cancerous cells. Since retinoblastoma is a common type of intraocular cancer in children, they also wanted to make sure that treatment should target only the cancer cells but not the healthy cells. So, they tested the GHRH-R peptides on RPE (retinal pigment epithelium) cells and found no apoptosis on RPE cells.

In the treatment of choroidal metastasis, Dr. Joo Yong Lee, Asan Medical Center, South Korea, shared his findings exploring several means of treatment for this disease that usually ravages women with breast cancer and men with lung cancer. They’ve found that with external beam radiotherapy, there is tumor regression of 85% to 93% of patients with visual stabilisation or improvement in 56% of eyes.

Apart from gamma knife radiosurgery, proton beam irradiation can also be considered as another means to manage choroidal metastasis. This is because proton beam irradiation gives room for a more focused irradiation. Plaque radiotherapy was also brought up as a treatment that gives rise to fewer ocular complications even though it is more invasive, needing hospitalization. He also shared about intravitreal anti-VEGF agents as an effective type of treatment. As cancer patients now have longer survival rates, choroidal metastasis, as Dr. Lee shared, will be more prevalent, thus proper systemic chemotherapy and focal therapy should be used to preserve vision and to prevent enucleation. ☞
Glaucoma is a main cause of irreversible blindness globally. This eye disease is often associated with elevated intraocular pressure (IOP), where damage to the optic nerve can result in the loss of vision.

In the glaucoma symposium, chaired by Prof. Dr. Christopher Leung, Prof. Dr. Ki Ho Park and Prof. Dr. Xiulan Zhang, researchers and doctors in the forefront of glaucoma research gathered to present their latest research results and treatment techniques.

According to Prof. Dr. Lutz Pillunat from the University Eye Hospital of Universitätssklinikum Carl Gustav Carus in Dresden, Germany, the ocular perfusion pressures in glaucoma are correlated to the prevalence of the disease and fluctuate, and are linked to the progression of the disease. In healthy subjects, IOP equals central retinal venous pressure (CRVP). However, in many glaucoma patients, the CRVP was found to be significantly higher compared to controls. Higher CRVP (and lower perfusion pressure) seemed to be linearly correlated to glaucoma damage. At present, ocular profusion pressures in glaucoma patients are calculated wrongly because it is assumed that IOP equals CRVP. Initial results showed that orally applied nitrates reduce an initially increased CRVP.

The discussion on the automatic diagnosis of glaucoma by Prof. Dr. Yu Qiao from the Shenzhen Institute of Advanced Technologies, Chinese Academy of Sciences, followed next. Prof. Yu conducted a research in computer vision, a branch of artificial intelligence. He explained that the aim of computer vision is to develop computer algorithms and systems which can understand images and videos like humans. Currently, he is developing deep models to analyze optical coherence tomography (OCT) images for glaucoma diagnosis, and also integrate visual field (VF), OCT and fundus images for a multiple-modality diagnosis framework for glaucoma, while also making the automatic analysis and deep models interpretable.

Then Dr. Muneeb A. Faq from the All India Institute of Medical Sciences, New Delhi, spoke on the brain as a diagnostic and therapeutic target for glaucoma. He stressed that any effective treatment approach has to address key factors besides IOP. Dr. Muneeb believes that there is a need to investigate and search for a complete mechanism and identify therapeutic targets followed by clinical trials.

Iris surface features as a novel marker for angle-closure glaucoma (ACG) was the next topic presented. Assoc. Prof. Dr. Ching-Yu Cheng from Duke-NUS Medical School, National University of Singapore, shared that Asians are at a higher risk of developing primary angle-closure glaucoma (PACG). The known anatomical risk factors for PACG are thicker iris, greater iris convexity and area, shallow anterior chamber, short axial length and lens vault. For now, predictive models explained that the aim of computer vision is to develop computer algorithms and systems which can understand images and videos like humans. Currently, he is developing deep models to analyze optical coherence tomography (OCT) images for glaucoma diagnosis, and also integrate visual field (VF), OCT and fundus images for a multiple-modality diagnosis framework for glaucoma, while also making the automatic analysis and deep models interpretable.

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VISIT US AT ELLEX EXHIBIT #3G-16-18

*E&OE. © 2018. Ellex Medical. Images courtesy of Paul I Singh, MD (USA)
Say **Goodbye to Floaters** with Ellex’s Reflex Technology

**Vitreous floaters** - although they’re technically benign – doesn’t mean they’re not annoying. Less bothersome versions (which are actually more difficult to treat) appear as tiny dots or strings floating in the patient’s field of vision, while the more troublesome varieties, like large Weiss rings and amorphous clumps can interfere with daily functions and lower quality of life.

Dr. Inder Paul Singh, from The Eye Centers of Racine & Kenosha in Wisconsin, USA, recently helped pioneer the development of new lenses and laser technologies for use in laser vitreolysis, also known as LFR (Laser Floater Removal). He says that floaters can impact visual acuity and quality, which impacts the patient’s life. “Clinically significant symptomatic opacities often compromise visual function, and that ultimately negatively impacts quality of life by precluding participation in routine daily activities.”

Floaters often result from age-related vitreous syneresis or liquefaction, and are also associated with posterior vitreous detachment (PVD). On occasion, they are also a consequence of retinal tear, retinal detachment, vitreous hemorrhage or inflammation.

Because floaters are not as detrimental as other conditions, like a retinal tear (for example), they have often been dismissed – leaving patients to adapt and live with the particle-like annoyances. In any case, because of their impact on the patient, floaters should not be overlooked. In the past, vitrectomy has been hailed as an effective way to remove floaters; however it has been associated with potential risks that could permanently compromise vision – so, it’s hardly an ideal solution. But now with recent advances in YAG laser vitreolysis, patients have an attractive treatment option to reduce or eliminate floaters. When it was first introduced in the 1980s, YAG laser vitreolysis was performed with YAG laser technology designed for use in the anterior segment. This technology provided inadequate vitreous visualization and inefficient laser energy delivery to the back of the eye, which was problematic given that the vast majority of floaters reside in the middle to posterior vitreous.

“Historically, the problem we’ve had with performing YAG vitreolysis was the issue of visualization. We didn’t have a good way of objectively finding these symptomatic floaters because many of them reside in the middle or posterior vitreous. Our traditional YAG lasers were meant for primarily YAG capsulotomies and laser peripheral iridotomy,” explained Dr. Singh.

“To achieve safe and efficacious treatment for these floaters, it’s important to have visualization and the proper illumination,” he continued. “But it’s also important to make sure we’re using technology that maximizes efficiency of energy delivery as well as allowing ourselves to perform multiple shots at one session. We are vaporizing these floaters instead of just breaking them.”

Fortunately, new innovations like Reflex Technology from Ellex (Adelaide, Australia), have addressed those limitations in YAG laser technology, allowing floaters and opacities in the entire vitreous cavity to be treated with greater efficacy and safety than ever before. By providing True Coaxial Illumination (TCI), the illumination tower, the oculars and the laser are all on the same optical pathway, which facilitates visualization of the retina and floaters simultaneously. This provides the surgeon with a better understanding of the floater’s location within the vitreous – and precise spatial context is vital. For example, if both the floater and the retina are in focus at the same time, it is not safe to fire the laser because the floater is too close to the retina. However, if the floater is in focus, but the retina is not, it is safe to fire the laser because the floater is at a safe distance from the retina. The Reflex Technology portfolio of lasers – Ultra Q Reflex and Tango Reflex – allow surgeons to clearly establish the location of the lens, floater and retina in relation to each other through the combination of “off-axis” (slit lamp in the oblique position) and “on-axis” (slit lamp in the coaxial position) illumination. In addition, Reflex Technology is designed to deliver energy more efficiently, which results in a decreased likelihood of adverse events.

The first double-blind study evaluating the effectiveness of YAG laser vitreolysis using Ellex’s Reflex Technology was published in September 2017. The patients – all who had symptomatic Weiss rings – were separated into two groups: one group underwent YAG laser treatment with the Ultra Q Reflex laser (Ellex, Adelaide, Australia), while the second group received sham treatment. After the procedure, all patients were followed for six months. Those in the YAG treatment group reported significantly (P < 0.001) greater improvement in self-reported floater-related visual disturbance (54%), compared with the sham group (9%). Best corrected visual acuity did not change in either group, with 20/25 at both baseline and the six-month evaluation, and no adverse events (i.e. retinal tears or detachment, or increase in intraocular pressure) occurred in the treatment group by month six. These results led the investigators to conclude that “YAG laser vitreolysis subjectively improved Weiss ring-related symptoms and objectively improved the Weiss ring appearance.”

“In just under five years, I have performed more than 3,000 laser vitreolysis procedures, exciting impediments to clear vision and inspiring gratitude in a cohort of patients,” said Dr. Singh. “Three years of personal experience with Reflex Technology has shown me how ‘titratable illumination’ can customize a surgeon’s visual experience during surgery. Because the illumination level provided with Reflex Technology is adjustable, it is possible to precisely titrate the amount of coaxial illumination as needed.”

This article has been supported by an educational grant from Ellex.

**References**

The innovation of technologies such as Titratable Coaxial Illumination™, TCI™, has given birth to a new age of laser vitreolysis (LFR). Today, you can offer your symptomatic floater patients treatment with greater safety and efficacy than ever before. And with advanced screening technologies such as the iTrace™ Wavefront Aberrometer and Corneal Topographer (Tracey Technologies LLC), you can objectively measure the improvement in quality of vision in LFR patients. Speak to Dr. I Paul Singh at APAO 2018 to learn more.

Visit us at Ellex Exhibit #3G-16-18

*E&OE. © 2018. Ellex Medical. Images courtesy of Paul I Singh, MD (USA)
Eat your vegetables. This may reduce your risk of developing age-related macular degeneration (AMD). Studies have shown that foods rich in carotenoids like lutein can help to prevent or slow down the progression of AMD, a leading cause of vision loss. Lutein is a pigment found in dark green leafy vegetables and egg yolks, among others. It protects the macular pigment layer by increasing its density. It is also capable of absorbing the sun’s harmful blue light spectrum. Besides that, it also acts as an antioxidant, neutralizing harmful free radicals.

Presenting on “Protecting the Aging Retina,” Dr. Amy Lo of the Department of Ophthalmology of the LKS Faculty of Medicine, The University of Hong Kong, discussed the many neuroprotective effects of lutein. She highlighted that neuroprotection is important to prevent ischemic optic neuropathies, obstructive arterial and venous retinopathy, carotid occlusive disorders, chronic diabetic retinopathy and glaucoma, among others. All these can cause irreversible loss of retinal neurons, reduction of retinal function, and permanent vision loss. The aim of neuroprotectants is to limit damage from retinal neuronal injury, she said. She added that there have been a number of clinical trials on lutein and its impact on restoring vision and reducing the risk of developing AMD.

In tests conducted by the faculty on a mouse, researchers found that after an ischemic injury, a loss of neurons occurred but after lutein treatment, there were many more neurons seen. “Lutein can restore vision and reduce the risk of AMD,” said Dr. Lo. The retina is highly vascularised, with a high concentration of polyunsaturated fatty acids and is susceptible to oxidative damage. Lutein is capable of reducing the number of apoptotic cells, she added. In addition to all of the above, lutein is also anti-inflammatory and may prevent choroidal neovascularization (CNV). Oral lutein pre-treatment of 10 or 100 mg/kg was found to suppress CNV, inhibit macrophage infiltration, and inhibit inflammation-related molecules. Lutein is also anti-autophagic. The best part is that lutein is recognized as safe by the Council for Responsible Nutrition at up to 20mg/day.

Current treatments for advanced stage using anti-vascular endothelial growth factor (VGEF) are expensive and if the patient has already experienced late stage AMD, this can affect retinal function.

“Current treatments can prevent those people from moving to the advance stage, it would be beneficial to prevent them from losing their vision. All AMD patients are encouraged to undergo tests so we can identify which patients may progress faster to advanced stage. There are 4-5
AMD-associated genes. If they have all the genes, they are at very high risk to advance to the later stage which could be a blinding condition," explained Dr. Ng.

He noted that AMD is a progressive retinal degenerative disease that leads to irreversible blindness and visual impairment in the elderly population. The overall prevalence of AMD in the whole world has been estimated to be 8.7%, and the projection of AMD patients is around 196 million in 2020, increasing to 288 million in 2040. Risk factors for AMD range from cigarette smoking, light exposure, diet, hypertension, and aging to genetic factors.

Comprehensive understanding of the AMD pathological mechanisms is important for the development of new therapies. Dr. Inderjeet Kaur of the Kallam Anji Reddy Molecular Genetics Lab, and Brien Holden Eye Research Centre at L.V. Prasad Eye Institute, India, presented on "Biomarker Identification for Retinal Vascular Diseases by Vitreous Protein Profiling." She said that retinal vascular diseases such as AMD lead to irreversible vision loss if not diagnosed and treated at an earlier stage.

The disease progression is quite variable and unpredictable. The histological changes associated with disease progression are clinically well known but less is known regarding the intraocular biochemical changes associated with these blinding eye diseases, she noted.

A study has shown that there are a number of proteins associated with the progression of retinopathy in the vitreous of patients compared to controls, she said.

Significant elevation and activation of proteins including vascular endothelial growth factor (VEGF), and G-CSF were observed in the vitreous of babies with retinopathy of prematurity (ROP) suggesting an increased inflammation under hypoxic condition. ROP is a neurovascular complication in preterm babies born at less than 33 weeks of gestation, leading to severe visual impairment, but the underlying mechanisms are yet unclear. The study aimed at unraveling the molecular mechanisms underlying the pathogenesis of ROP.

"When these babies are born, normally the blood vessels in the retina are not well-formed. So they are given higher oxygen for their survival. We believe the higher oxygen further suppresses the blood vessel growth. Some of these babies will develop abnormal blood vessels in later life and lose vision because of that. There is no way to predict who will develop problems. Some recover normally. We are trying to find some tests based on the proteins that we see; which will help clinicians to predict who will have problems. The babies can then be given therapies at an earlier stage and vision loss can be prevented," she added.
LEADERSHIP in sweptsource OCT & retina screening

TODAY

Lunch Symposium
Ultimate Source of Value: Topcon’s Posterior Imaging Device for Researchers and Clinicians

Come to S421!
The ocular imaging symposium on device for researchers and clinicians was chaired by Dr. Gemmy Cheung, from Duke-NUS Graduate Medical School, Singapore.

Prof. Dr. Jiang Liu from the Cixi Institute of Biomedical Engineering presented on artificial intelligence (AI)-assisted ocular disease mass screening using fully automatic fundus camera. AI is increasingly important as a mass-screening tool, and using it to screen for diseases such as age-related macular degeneration (AMD), diabetic retinopathy (DR), glaucoma, and pathologic myopia is a step in the right direction in terms of early detection and improving healthcare in the future. The quality of input images significantly affects the outcome of screening systems. Unlike the previous methods that only consider simple low-level features such as hand-crafted geometric and structural features, computational algorithms imitating the working of the human visual system can be employed with the help of AI. Using the proposed algorithm on a large retinal fundus image dataset, the method could achieve higher accuracy than other methods. The methodology is applicable to the image quality assessment and enhancement of other types of medical images as well.

Dr. Carol Cheung from the Chinese University of Hong Kong spoke on clinical benefits of diabetic microvascular disease evaluation using swept source optical coherence tomography angiography (SS-OCTA). She said that retinal microvascular damage in diabetes can be assessed and quantified reliably with optical coherence tomography angiography (OCTA). Quantitative OCTA metrics are correlated with diabetic microvascular complications, such as diabetic retinopathy (DR), diabetic macular edema (DME) and diabetic kidney disease (DKD). Future directions will be focused on evaluating the OCTA metrics to be surrogate markers to detect diseases at an early stage, assess progression risk, and make decisions for treatments.

Dr. Gemmy Cheung presented on OCTA in pachychoroid disorders. Pachychoroid is a relatively new concept. A spectrum of disorders has been described in which characteristic choroidal changes are believed to have important pathogenic implications. Dr. Cheung elaborated on the various disorders, including pachychoroid pigment epitheliopathy (PPE), central serous chorioretinopathy (CSC), pachychoroid neovasculopathy (PNV), polypoidal choroidal vasculopathy (PCV), and focal choroidal vasculopathy (FCV), and focal choroidal excavation (FCE). SS-OCT and SS-OCTA are valuable tools in evaluating the changes within the choroid, choriocapillaris and outer retina in pachychoroid disorders.

In the following Q&A session, Dr. Gemmy Cheung asked Dr. Jiang Liu if the AI-assisted mass screening could be used for systemic conditions such as stroke risk and cardiovascular risk. Dr. Jiang Liu answered that it is possible with big data, but first there must be a large collection of data for the researchers to really identify the association in the large quantity of data, and also further research will be required to make it a reality. In the current ophthalmic screening study, 70,000 eyes were screened to validate it, and government approval is currently being sought for the programme.

Currently, the AI-assisted screening program works only with colour fundus. The research team is currently working with manufacturing companies such as Topcon to develop the clinical protocols for the OCT screening. They are also working with 30-40 ophthalmologists.

Also, there was a question for Dr. Carol Cheung on the six features that can be detected to tell the severity of the disease. She said that the quality of the images is very important. The researchers based the quality of images on the Topcon quality score, where only the minimum of 40% is acceptable.

Moreover, Dr. Gemmy Cheung was asked whether she thought that OCTA can replace conventional OCT completely. She answered that it depends on the conditions in question, and for some conditions, it helps a lot. If you see something in the OCT, you can confirm it using the OCTA. That is good enough to start treatment. However, there should be a good baseline for subsequent comparison. On the subject of clinical trials, we do not have clinical trial level data to support OCTA yet, she said.
MicroPulse offers less invasive glaucoma treatment

MicroPulse lasers may offer a less invasive form of surgery in the treatment of glaucoma, ophthalmologists told a lunchtime audience at the APAO 2018 conference yesterday.

That could mean eye surgeons using surgery at an earlier stage in treatment as the MicroPulse option causes less damage and represents a safer form of treatment than traditional lasers, they said.

MicroPulse lasers work by transmitting short bursts of laser, as opposed to traditional surgical lasers that deliver a continuous burst, Dr. Maria Cecilia Aquino, a glaucoma specialist at National University Hospital in Singapore, told the conference audience.

By providing “short repetitive pulses with rest periods in between” they allow “collateral tissue to rest and cool down,” she said.

This leads to a less destructive surgery as opposed to traditional surgical lasers that deliver high intensity energy for a continuous two seconds.

Tests on MicroPulse lasers showed heat levels of around 35 degrees Celsius, according to Aquino, while conventional lasers under the same conditions heated to as much as 500 degrees Celsius.

The reduced heat leads to less destructive surgery than caused when using traditional lasers, she added.

Other tests had shown MicroPulse lasers to be “very safe and efficient” she said, adding that they are “now being used by a number of eye surgeons worldwide.”

However, there have been some issues with MicroPulse lasers, according to Dr. Aquino.

Trials on an early prototype uncovered difficulties in “sliding the probe,” she said, as it was restricted by its “concave nature.”

The second version was designed to be more convex, allowing easier movement on the eye when moved “in a painting fashion.”

There have also been problems using it on small eyes due to the size of the laser, according to Dr. Aquino. This can be overcome by customizing MicroPulse lasers for certain regions where smaller eyes might be more prevalent.

The next advances in MicroPulse testing will include a randomized study on them, during the second quarter this year, to be conducted in the United Kingdom, United States and Asia.

“We have moved forward and are now trying to apply this treatment in early cases of glaucoma and trying to combine it with cataract surgery,” she said.

Dr. Robert Chang, assistant professor of ophthalmology at Stanford University of Medicine, USA, described this as an “exciting time to be a glaucoma specialist,” because of the progression in treatment.

The usual course of treatment is to begin with something like medicines, and then work up to some kind of “continuous mode laser” surgery as a last resort, he told the audience.

MicroPulse surgery causes “minimal thermal damage” because there is not the build-up of heat associated with traditional lasers, he said, and tests have shown no hypotony issues; meaning what was end stage surgery now can perhaps be moved to an earlier stage.

At the least it provides a new option in treating glaucoma, he added, that could be used to help take people off medication and is minimally invasive. •

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Makoto Aihara, MD, PhD, Professor and Chair, University of Tokyo

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China’s Rapid Progress on Blindness Prevention, Spreading Overseas  
by John Butcher

China has made vast and rapid advances in treating the causes of blindness, Dr. Pak-chin Chow, a specialist in ophthalmology based in Kowloon, told the APAO 2018 conference delegates yesterday.

A combination of government support and non-governmental initiatives have dramatically cut blindness levels, he told a morning session at the Hong Kong event, and Chinese projects are now beginning to be imported overseas.

In many cases “people are going blind because they are ignorant of the fact that it can be cured,” or because they cannot afford medical care, said Dr. Chow, who is vice president of the Hong Kong Medical Association.

In China, in 1997, there were around half a million cataract surgeries, a fraction of the actual cases of cataracts.

Those numbers have now been dramatically altered, according to Dr. Chow, due to the concerted efforts of both the government and non-governmental agencies. Furthermore, Dr. Chow outlined several charities he has been involved with and how they have affected blindness in China, as an example.

Sight First China Action ran from 1999 to 2007, carrying out 5.2 million cataract surgeries in that time, training 62,000 medical personnel and setting up teams in remote areas to reach people less able to see specialists.

The strengths of it were its large scale, government blessings, and strong financial support, he said. Its weaknesses included the finiteness of the project and the lack of stability in medical teams, which tended to come and go. The result of this was, despite the advances made, that there was a lack of follow-up action and local facilities often remained inadequate.

When the project finished there was still a backlog of cataract operations and a “bad situation” despite 800,000 surgeries being done each year.

He, and others, looked for paths to create a more sustainable way to improve cataract treatment and embarked on Project Vision, which involved setting up eye centers across China, each at a cost of one million Hong Kong dollars, and training at least two local doctors to do cataract surgeries in each of those centers.

The project has led to the establishment of 30 eye centers in 10 provinces and resulted in more than 150,000 operations and 140 eye doctors.

Its strengths have been its self-sustainability, according to Dr. Chow, but its weakness is that it has not always been fully under control.

Another cataract charity he has been involved with is the Asian Foundation for the Prevention of Blindness (AFPB).

That involved taking mobile treatment centers, which are basically converted trucks that include a consultation room, waiting area, operation room and recovery room, to parts of China in need to cataract operations.

They are equipped with air conditioning, heating, an emergency generator, and advanced medical equipment, and have been operated in partnership with various organizations including China’s Ministry of Health and Ministry of Education.

From 1995 the project has donated 37 mobile treatment centers, each costing three million Hong Kong dollars, which have conducted more than 950,000 operations. The plan has also trained around 20,000 medical staff.

According to Dr. Chin, the project benefits from its size and having the blessings of the Chinese government, but because the treatment centers come and go, local problems remain unresolved. They are also limited in where they can go by roads, weather and resources.

With the initiative in China proving successful the AFPB decided to move its operations beyond the countries’ borders.
In November a memorandum of understanding was signed with the Cambodian government making the plan official. “If this project is a success we will extend our work to the whole of Cambodia so eradicating cataract blindness from Cambodia,” he said, adding that in the future the project could extend to other countries in need.

To eradicate cataract blindness the causes must first be treated, according to Dr. Chow. Ignorance must be tackled with education, treatment must be made accessible and affordable, resources must be mobilized to remove backlogs in treatment, and an ageing population means more resources will be needed.

To do this requires both governments and non-governmental organizations (NGOs) working in conjunction. Governments have a role in giving their blessings and support to projects, NGOs in initiating projects, philanthropists in providing resources and specialists in bringing expertise.

Ophthalmologists in particular can provide training, carry out surgeries and bring expertise to projects aimed at eradicating cataract blindness, he added.

“Is eradication of cataract blindness an impossible dream? The answer is a big no,” said. Dr. Chow “This is our dream. Let the blind see. So, may our dreams come true soon.”

With the help of China’s Ministry of Foreign Affairs and in collaboration with the Chinese government’s Belt and Road initiative, a plan to create a modern day Silk Route from China to Europe that includes vast infrastructure investment, the mobile treatment center project was extended to Cambodia last year.

A first visit was made in September, after which two treatment centers were donated to Cambodia, along with free medications.

The aim, according to Dr. Chow, is to carry out 10,000 cataract operations in Kampong Cham, Cambodia’s largest region, within 24 months of starting, in order to “eradicate all cataract blindness in that province.”
Presbyopia is long-sightedness caused by loss of elasticity of the lens of the eye, and it usually occurs in middle and old age. In the presbyopia symposium yesterday, chaired by Dr. Robert Ang, Dr. Chak Kwan Cheng, and Dr. Ronald Krueger, the focus of the day was on new and emerging research in the treatment of presbyopia.

The first topic of the symposium was ‘Supracor (Bausch and Lomb Technolas, Munich, Germany) presbyopia LASIK: Should we go monolateral or bilateral?’ Dr. Robert Ang from the Asian Eye Institute in the Philippines said that LASIK for presbyopia is not as invasive as clear lens extraction. There is no lens to remove, and no foreign body such as inlays. Presbyopia treatments are not perfect, and because of that, patients must be able to accept compromises. If their goal in seeking treatment is to improve their near vision, far vision is still very important. Thus, it is essential to ensure that the procedure provides or maintains good far vision bilaterally. Prior to surgery, hyperopes live life with less than 20/20 far vision without glasses and are accustomed to it, and they use reading or progressive glasses all the time.

Meanwhile, myopes are accustomed to 20/20 vision with glasses for distant vision and can see perfect J1 when they remove their glasses. After surgery, hyperopes regress towards hyperopia and improve their vision over time, while myopes regress towards myopia and far vision deteriorates over time. Recommended treatment strategy for hyperopes is bilateral or monolateral Supracor, while for myopes, the treatment strategy is monolateral Supracor only.

The next presentation was by Dr. Ronald Kruger from Cole Eye Institute, Cleveland Clinic, entitled ‘Scleral and intralenticular approaches: Can we safely restore accommodation with lens and scleral modification?’ Intralenticular laser photodisruption (LENSAR, Orlando, Florida, USA) and chemical cleaving of disulfide bonds (Encore Vision, Fort Worth, TX, USA) are up and coming new concepts for restoring the loss of accommodation in lens. Scleral expansion bands (PresVIEW, Refocus Group, Dallas, TX, USA) and scleral translocation with elastic alignment modulation (STEAM by ALeyeGN Technologies LLC) are novel scleral concepts for externally restoring accommodation. The successful refinement of these technologies may change the way we view presbyopia correction in the future.

Dr. Arulmozhi Varman from the Uma Eye Clinic, Chennai, India, gave a presentation on ‘The Unhappy Preslex Patient’. The common complaints are difficulty reading in mesopic conditions, driving at night, glare and halos, starbursts, defective intermediate vision, and decreased contrast. Multifocal intraocular lens (IOLs) use 41% of incoming light for distant vision, and 41% for near vision, while 18% is lost. Compromising optical performance is unavoidable to some extent. The contrast sensitivity in patients with multifocal IOLs (bifocals) is reduced despite high visual acuity and this can affect the quality of vision. In trifocal IOLs, the second order focus enhances near vision and improves contrast by reducing loss of light energy by 5% to 9%. In summary, the unhappy preslex patient suffers from loss of contrast sensitivity, photic phenomenon, IOL decentered with respect to visual axis and pupil, dry eye, aberrated cornea, posterior capsule opacification (PCO), and poor near/intermediate vision.

According to Dr. Klaus Ditzen, all presbylasik procedures are far from being perfect. In comparison, laser blended vision (LBV) seems to be the procedure with the least amount of side effects. Contrast sensitivity in LBV is not reduced because of aspheric ablation profile. Intracorneal procedures probably could have better results.
Furthermore, Dr. Minoru Tomita from Minoru Tomita Eye Clinic in Japan, and Adjunct Clinical Professor of Ophthalmology at Wenzhou Medical College, spoke on clinical outcomes of the modified mono-vision for presbyopia treatment using the Schwind PresbyMAX® profile. The current treatment options for presbyopia include presbylasik, multifocal phakic IOL, multifocal IOL, and corneal inlay. The purpose of the research was to study the clinical outcomes of a combined treatment of Bi-aspheric ablation profile with the non-dominant eye to correct presbyopia and the dominant eye treated with conventional lasik. The study yielded good outcomes at 1 week through 3 months, and showed the value of modified mono-vision using the PresbyMax profile.

Dr. Yu-chi Liu from Duke-NUS Medical School, Singapore presented on lenticules derived from small incision lenticule extraction (SMILE) for presbyopia correction. Dr. Liu explained that lenticule implantation has the potential for the management of presbyopia. The ultimate alteration of corneal refractive power depends on the thickness of the implanted lenticule, depth of implantation, and post-operation corneal wound healing response. The decellularization process increases the potential utilization of allogenic lenticules without changing the efficacy. Clinical trials are currently ongoing.

Dr. John Chang, Director of GHC Refractive Surgery Center, Hong Kong Sanatorium and Hospital, spoke on multifocal IOLs in presbyopia treatment. He said that there is no fixed rule in presbyopia treatment, and it is mix and match for each individual patient, with a balance between symptoms and spectacle independence. It is important to understand the patients’ current visual status, expectations of the surgery, their requirements, and the characteristics of different multifocal IOLs. It is important to choose the right multifocal IOL according to the individual patient’s visual needs and personality.

The final presentation in the symposium was by Dr. Pankaj Gupta, Case Western Reserve University School of Medicine, Cleveland, Ohio, USA. He presented on recognizing and managing ocular surface disorders in the refractive surgery patient. The conditions he covered included Avellino type corneal dystrophy, transforming growth factor beta induced (TGFBI) dystrophy, and ocular surface staining. He also discussed dry eye and LASIK-induced neurotrophic epitheliopathy, Salzmann’s nodular degeneration, herpes simplex virus (HSV) and herpes zoster virus (HZV).

It is hoped that further research and developments in presbyopia treatment will yield new treatments to improve the quality of life of people affected by the associated conditions and symptoms.
Giving Young Eyes a Bright Future

by Joanna Lee

It was a full hall at the “Myopia – Epidemiology, Prevention and Treatment” symposium, perhaps indicative of the “epidemic proportions” of the issue as mentioned by the first speaker, Dr. Ian Morgan. The session began with his findings on the reasons behind the growing issue of short-sightedness among children and youth especially among East Asians. Dr. Morgan postulates that a pathway involving photoreceptors and ON-bipolar cells regulates the release of dopamine. This pathway seemed to play a role in mediating the protective effects of light and may also be involved in the genetic forms of myopia. Somehow, these genetic forms of myopia could be responsive to control through, for instance, spending time outdoors.

The next presenter, Dr. Regan Ashby emphasized that it was estimated that by the year 2020, 2.5 billion of the world’s population would be myopic with two-thirds of the world becoming myopic by 2050. Dr. Regan’s study looked into how we could mimic the biological effects of being outdoors. He asked if retinal dopamine levels can be elevated. With that, they took Levodopa and made it into an aqueous solution to make it more suitable for direct eye treatments.

The results have been shown to abolish experimental myopia in the chicks and mice tested on, even better compared to using atropine. This is due to how when applied directly to the animals’ eye, levodopa restores dopamine levels to those normally seen when we are outdoors. There were also no adverse effects observed. Clinical trials are set for end 2018.

In another development, Dr. Saw Seang Mei advocated for precision medicine and personalised medicine during her session. She first shared on a 15-year cohort study on Singaporean children which began in 1979. The study showed that children with an onset of myopia from an earlier age develop more myopic refraction later on compared with children who have a later onset of myopia. She shared about precision medicine using gene panels to identify genetic burdens of myopia to stratify patients with low risk or high risks of myopia along with suitable treatments.

The diagnosis of myopia is crucial in the treatment of myopia. Dr. Anthony Kua shared an overview of the various clinical imaging methods such as fundus photography, biometry, magnetic resonance imaging (MRI) and optical coherence tomography (OCT). As accuracy of the imaging is vital, Dr. Kua said wider field systems, including “whole eye” systems are needed to help form a better understanding of the eye shape in myopia.

With contagious enthusiasm, Dr. Audrey Chia shared an update on the use of atropine for myopia through her thorough study of the effects of administering atropine on children with myopia. It is effective through low doses, and to consider the use of atropine into the teenage years as studies have shown it to be effective between the ages of 5 to 17 years old. Her study also noted a greater rebound in myopia when atropine treatments have stopped, specifically in children who were given high dosages.

Her presentation also looked at how atropine is not as effective on certain non-Chinese populations, in particular in India and European populations.

Coming from another side of the spectrum, Dr. Helen Swarbrick compared the pros and cons of orthokeratology versus atropine in the control of myopia. Orthokeratology (OK) is a non-invasive method of corneal reshaping for refractive error correction involving specially designed rigid contact lenses. Skilled optometrists are required to put them in. It is a temporary measure to correct myopia. It is used overnight and is mainly for low to moderate myopia. Many studies have shown its efficacy in controlling myopia. Dr. Swarbrick put forth questions on the rebound of myopia in patients on atropine while looking at the rebound of OK patients. Many children reportedly refuse to return to wearing spectacles after going through OK. She also shared about issues like microbial keratitis on OK. When comparing the side effects, her study noted the differences between atropine and OK’s side effects. Atropine’s side effect is drug-related while OK’s side effect arises from optical effects and contact lens related effects.

Dr. Regan Ashby
for PACG are still not perfect. However, current PACG imaging assessment methods are costly. According to Assoc. Prof. Dr. Cheng, iris surface features provide an indication of iris thickness and volume, as well as angle width. In addition, iris crypts and the length of furrow influence the dynamic changes of iris volume. Iris surface features can be assessed in a non-invasive way and are able to provide novel risk factors for ACG.

The following presentation featured Assoc. Prof. Dr. Shamira Perera from Duke-NUS Medical School, Singapore, where he spoke on slow release medications for glaucoma. He shared that depot drugs may improve adherence, and early studies show better tolerability compared to drops. Nonetheless, the side effects may prove to be a challenge and may require a test dose.

Clinical applications of OCT imaging technology in glaucoma diagnosis was another hot topic discussed. Assoc. Prof. Dr. Jin Wook Jeoung from the Seoul National University College of Medicine, South Korea, shared that swept source optical coherence tomography (SS-OCT) provides deeper tissue penetration, with faster scanning speed and wider imaging field compared to spectral domain OCT (SD-OCT). Furthermore, he said that quantitative assessment of the deep optic nerve head structure may provide additional information when evaluating glaucomatous optic nerve head (ONH) change. Trend-based analysis of ganglion cell layer with inner plexiform layer (CGIPL) thickness on OCT may also be useful for assessing glaucoma progression objectively and quantitatively. Moreover, the incorporation of adaptive optics into ophthalmic imaging modalities has enhanced OCT by improving image resolution and quality, particularly in the posterior segment of the eye.

Prof. Dr. Richard Parrish from the University of Miami Miller School of Medicine, talked about new glaucoma medications in the United States. He said that new delivery systems for several existing drugs are currently under investigation in the country. On the other hand, new drugs are difficult and expensive to develop.

Prof. Dr. Nadeem Hafeez Butt from Jinnah Hospital, Lahore, Pakistan spoke on nanotechnology as the future of glaucoma management. Nanotechnology provides precision in the measurement of IOP. It is also possible to have IOP monitoring around the clock, as well as 24-hour control of IOP through a continuous drug delivery system. This will lead to improved results in valvular surgery and the improved prospects of retinal ganglion cell (RGC) regeneration. Prof. Nadeem is optimistic that the future of nanotechnology in glaucoma management is promising.

Participants gained much insight into the trends and developments in glaucoma research at the symposium, and left with renewed interest in the topic.

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Participants gained much insight into the trends and developments in glaucoma research at the symposium, and left with renewed interest in the topic.
I just took a look at the tomography. These values call for caution. I don’t think I would operate.

The biomechanics looks good, though. The cornea is very stable. I don’t see any problem with operating.

Tomography and corneal biomechanics together make the decision easier: surgery could be an option.

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Free talks at the OCULUS booth 3G-15

Role of dynamic corneal imaging in diagnosis of keratoconus and corneal refractive surgery

Vishal Jhanji, MD – 15:30 h

Corneal dynamic and tomographic analysis in pre-refractive screening

Tommy Chan, FRCSEd – 16:00 h

Corneal biomechanics after LVC & CXL

David Kang, MD – 16:20 h
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