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Featured Doctors of the Month



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Dr Victor Koh believes that individualised eye care is the key to good visual outcomes and strives to provide his patients with evidence-based treatment. His keen interest in managing glaucoma, cataracts and ocular trauma has led him to garner several grants to develop novel devices and imaging tools to improve patient care, especially for glaucoma patients.

Screening for Glaucoma

Glaucoma is a major irreversible blinding disease which is estimated to affect up to 100 million people in the world by 2014. [1] In Singapore, the prevalence of glaucoma is between 3 – 5%[2-4] but this number is an under-estimate of the true prevalence due to the “silent” nature of this condition. The classical triad of glaucoma includes a raised cup-disc ratio, visual field defect and raised intraocular pressure (IOP).

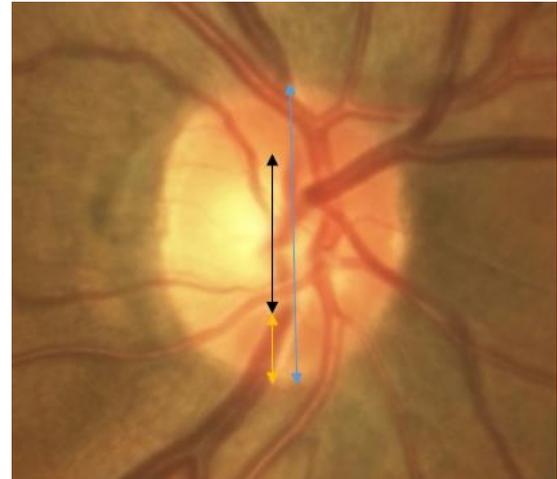
However, most ophthalmologists will agree that raised IOP is simply a risk factor and it is possible to have to glaucoma with normal IOP. The risk factors of primary glaucoma include older age, female gender, family history of glaucoma and hypermetropia.

The less common risk factors of secondary glaucoma include trauma, steroid use, diabetes mellitus and ocular inflammation. This highlights the importance of screening for glaucoma in the community. The challenges include lack of awareness, non-specific early symptoms of the disease and poor accessibility to glaucoma screening. This highlights the importance of screening for glaucoma in the community.

If a fundus photograph can be taken, the optic nerve can be assessed for risk of glaucoma. In general, the cup-disc ratio (CDR) would provide valuable information including:

- increased CDR of >0.5
- asymmetry of CDR >0.2 between the 2 eyes
- thinning of the superior or inferior parts of the neuroretinal rim

Figure 1



Black line: vertical cup height

Blue line: vertical disc height

***The ratio of the length of black-blue line = vertical cup-disc ratio (CDR)**

Yellow line: neuroretinal rim

The optic nerve head has two main components - the neuroretinal rim and the central cup. The neuroretinal rim has a reddish-orange hue and forms the outer ring of the optic disc. The neuroretinal rim is the culmination of the retinal nerve fiber layer exiting the eye. As glaucoma is associated with apoptosis of the ganglion cell, the neuroretinal rim gets thinner as the disease becomes more severe. This results in enlargement of the central cup. The central cup is pale yellowish in colour and allows blood vessels to enter/exit the eye. The optic nerve can be tricky to assess in some situations.

First, in eyes with media opacities or small pupil size, the image quality might be compromised. In these situations, usually the image quality for the rest of the retina would also be affected. Second, the optic nerve might be tilted or torted making the disc margin difficult to determine accurately especially in eyes with high myopia or astigmatism. If possible, the following additional features of glaucoma on the optic nerve head should be identified:

- optic disc haemorrhage (Figure 2)
- wedge defect of the retinal nerve fibre layer arising from the optic nerve head (Figure 3)



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Figure 2

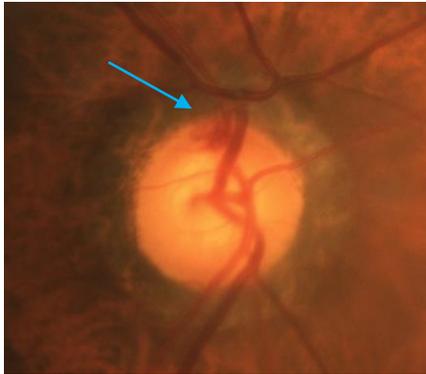
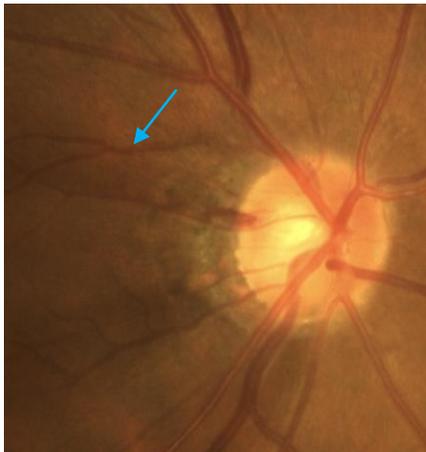


Figure 3



Detection of Eyes at Risk of Developing Angle Closure Glaucoma

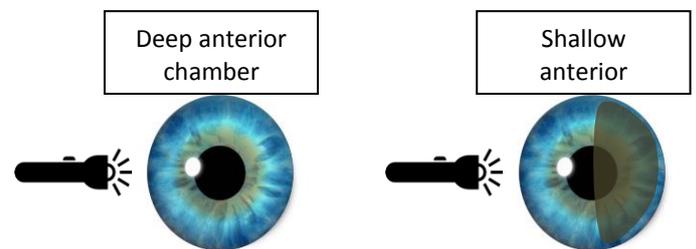
The risk factors for angle closure includes older age, chinese ethnic group, female gender, dense cataracts and high hypermetropia. Angle closure can be classified into two types, symptomatic and asymptomatic. In the former, termed as acute angle closure, the typical symptoms include red and painful unilateral eye, blurred vision and frequently accompanied by frontal headache, nausea and vomiting. The headache is usually refractory to common first line oral analgesic. This is an ocular emergency which requires prompt diagnosis and referral to an ophthalmologist for management. The earlier the acute angle closure attack is broken, the better the long term visual outcomes of the eye.

The latter is more difficult to screen and detect. There might be a first-degree family history of angle closure diagnosis which places an individual at a higher risk by 3-5 times. [5,6] Due to the lack of resources in a primary care setting, detecting eyes with angle closure can be tricky. One could try to perform the "eclipse test" by shining a light temporal to the eye at the limbus (Figure 4).

If the anterior chamber is shallow, the anterior bowing of the iris will cast a shadow on the nasal side of the iris. This test should be repeated for the fellow eye because primary angle closure tends to be bilateral. In eyes with shallow anterior chamber, prophylactic laser iridotomy can be performed to reduce their risk of deterioration.

However, if the IOP is also high or there is already the presence of glaucoma clinically, early treatment is crucial to preserve visual function. In the primary care setting, to measure the IOP, there are several options. First, using the Icare Tonometry which does not need corneal anaesthesia and could even be performed for children. Second, the Tonopen which requires topical anesthetic eyedrops. The measurement of IOP can also act as a screening tool and if the IOP is above 21 mmHg, the patient should also be referred to an ophthalmologist.

Figure 4



The use of automated algorithm for glaucoma detection is becoming a real possibility and these programmes are used as diagnostic support tools for the physicians. They are helpful when used for mass screening as a triage tool and could detect raised CDR on a fundus photo for glaucoma. In addition, more complex "artificial intelligence" systems can also detect eyes with diabetic retinopathy and age-related macular degeneration. However, the use of automated algorithm to screen for eye diseases is still evolving and more studies are required to determine its cost-effectiveness, safety and efficacy in mass screening setting.

References

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Dr Yuen believes strongly in empowering his primary care colleagues, inspired partly by his wife who's a resident physician in Clementi Polyclinic. As the specialist advisor for the National University Polyclinics Specialty Advisory Group, he is actively working on enhancing the capabilities of the NUP Polyclinics to manage ophthalmic cases at the primary care level.

Age Related Macular Degeneration and Diabetic Retinopathy – An Emerging Cause of Visual Loss in Singapore

The top 5 causes of visual loss in Asia as described in a recent epidemiological paper are listed below.

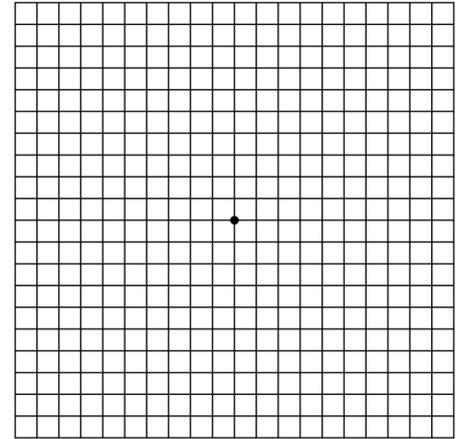
- Uncorrected refractive error (treated with spectacles)
- Cataracts
- Age related macular degeneration (ARMD)
- Glaucoma
- Diabetic retinopathy (DR)

In Singapore, our aging population with its high prevalence of diabetes faces two major challenges in preserving its eyesight; ARMD and DR. The following sections are updates on these two very important diseases.

ARMD Update for Primary Care

Screening

An Amsler chart can be used to screen for macular disease. This includes ARMD and any other macular disease that affects central vision.



Patients are asked to look at the centre of the chart with one eye and alert their doctor if there is any distortion of the lines (metamorphopsia) or a patch of missing lines.

Amsler charts are widely available online and can be easily printed out. Other less stringent ways to test for metamorphopsia would be to ask patient to look for distortion in either eye when they are reading their daily newspaper print.

Systemic Management

Smoking cessation is essential for ARMD patients as smoking is an important risk factor for ARMD.

Eye vitamins

Patients frequently ask about eye vitamins to protect their vision and it's not too unusual for them to ask about the range of vitamins that they can pick off the shelves in our local pharmacies.

Most of the vitamins are inspired from the formulation used in the AREDS vitamins which contain vitamin A,C,E, copper and zinc. In more recent formulations, the vitamin A has been replaced by lutein and zeaxanthin over fears of increased lung cancer risks in smokers given vitamin A supplementation.

The following website provides an excellent FAQ on the AREDS vitamins (<https://nei.nih.gov/areds2/PatientFAQ>).

In the AREDS study, the use of the AREDS vitamins reduces the risk of advanced ARMD by about 25% over 5 years.

However, only patients with intermediate ARMD or advanced AMD benefited from these vitamins. An alternative would be to engage in a diet rich in green, leafy vegetables – a good source of lutein/zeaxanthin (a component of the AREDS vitamins). Importantly, these vitamins have not been shown to show any benefit in preventing the early stages of ARMD.

*Smokers should NOT be given any formulations that contain vitamin A as this increases their risk of lung cancer.



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Diabetic Retinopathy Update for Primary Care

Screening

Diabetic fundus photography remains an important screening measure for our patients. Patients should not wait for their vision to deteriorate before going for screening as even patients with proliferative diabetic retinopathy may remain asymptomatic in the early stages. Needless to say, early detection and treatment goes a long way in preserving their eyesight.

Diabetic fundus photos can be done in all polyclinics/eye departments.

Systemic Management

Aside from HbA1c reduction, the use of fenofibrate in patients with DR has been shown to slow the progression of DR and reduce the need for ocular treatment.

In October 2013, Australia became the first country in the world to add diabetic retinopathy as an indication for fenofibrate. See the attached link below.

<https://www.racgp.org.au/afp/2015/june/the-use-of-fenofibrate-in-the-management-of-patients-with-diabetic-retinopathy-an-evidence-based-review/>

Intravitreal Injections

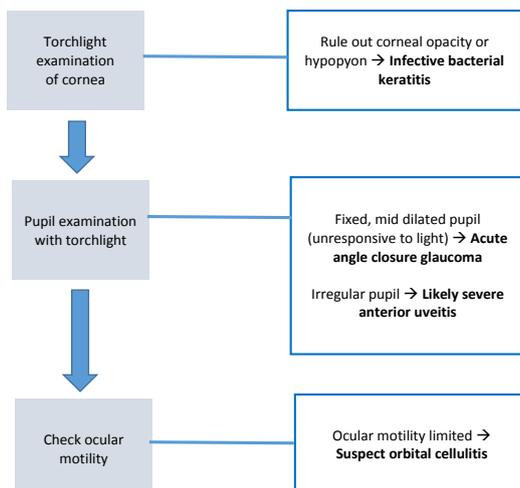
Ocular treatment of ARMD/DR frequently involves the use of intravitreal anti-vascular endothelial growth factors (anti-VEGF) to reduce macular edema and improve/preserve vision. These injections are fast becoming the most frequent procedure done in Ophthalmology clinics nationwide. At the time of writing, we have three available anti-VEGF drugs which can be used for our patients. Unfortunately, most patients require multiple injections to preserve their vision. Fortunately, the injections themselves are reasonably well tolerated by our patients with minimal discomfort due to the excellent local anaesthesia options available.

Approach to Acute Red Eye

*Based on need to rule out etiologies that may cause **early, rapid visual loss** if undiagnosed

**All cases with recent ocular intervention (surgery, intravitreal injections) should be referred stat to Emergency Department

Suggested Protocol



If red flags present → Refer stat to Emergency Department / Ophthalmology

In absence of any red flags, treatment can be instituted with:

1. Topical preservative free lubricants every 2-3 hours
2. Topical antibiotics (Ciprofloxacin, Gentamicin, Chloramphenicol) QDS
3. Review and re-evaluate in 3-4 days

A Volunteering Heart



Dr George Thomas (sixth right), Dr Paul Zhao (fifth right) and Dr Yuen Yew Sen (fourth right) from NUH are among the team of volunteer surgeons for the KK1M project.

One patient stumbles across the operating room, guided by a nurse. Fifteen minutes later, she is smiling ear-to-ear as she can now see clearly for the first time in years. This process was repeated 60 times over two days, in a cataract surgery mission to Sarawak, Malaysia.

In a cross-border partnership between a team from NUH Department of Ophthalmology comprising Dr Paul Zhao, Dr Yuen Yew Sen and Dr George Thomas, and the KK1M project in Malaysia – the aim of the mission was to relieve those with less geographic and financial access to more traditional routes of eye care.

With highly motivated local volunteers, including local ophthalmologists, nurses, operating room technicians and industry representatives, the mission involved bringing equipment for surgery via bus to more remote hospitals without eye care services. Patients who were not able to afford surgery received their surgeries free-of-charge.

Where there was a lack of abundance of technical equipment, the ingenuity, thriftiness of equipment use and the human spirit compensated. Energy levels were high, as was the sense of freedom in the operating room, as everyone was out of their natural hospital ecosystem and yet was working with one aim. New faces, different instrumentation and adapted surgical methods were used for the often very dense cataracts in patients. Despite this, the process of giving was far from one-sided. Where many people received joy from their new vision, the volunteers surely received more in the process; joy in seeing the blind see, smiles in watching a new smile emerge, happiness in watching a patient leave the operating theatre a little happier than when they entered.

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In the News

Do Not Let Glaucoma Hit You Unexpectedly

Mr Chua has been driving a taxi for years and never had many problems on the road. But in 2015, the middle-aged sole breadwinner began experiencing intermittent blurring of vision, especially at night. His busy work schedule, however, kept him occupied and he did not seek help. Instead, he coped reasonably well with the symptoms and life went on as usual. That changed late last year. Mr Chua got into a minor road accident and he was examined at an outpatient ophthalmology clinic. Although his central vision was still good, he was surprised to learn that his eye pressure was almost twice the normal upper limits and his optic nerve is severely damaged. In fact, he has already lost more than 70 per cent of his peripheral visual fields.

The accident was a result of his being unable to see the vehicle next to him cutting into his lane, hence he failed to react quickly enough. Even worse, his constricted visual field means it is no longer safe for him to drive a taxi, and he had to quit his job.

It was as difficult for me to break the bad news to Mr Chua as it was for him to accept this life-changing diagnosis. He had to swallow even more disappointment upon learning that the damage of his optic nerve is permanent. Is it possible to have a disease that is practically free of symptoms in the early stages and yet be irreversible when detected at the later stages? Unfortunately, the answer is “yes” with regards to glaucoma.

Robbing People’s Sight

Glaucoma is known as the silent thief of sight that robs a person of his peripheral vision slowly and stealthily. Elevated eye pressure is the biggest risk factor, though the patient may not exhibit obvious symptoms. Other risk factors include a family history of glaucoma, older age, steroid use, ocular trauma and diabetes mellitus.

Glaucoma is not uncommon, and is estimated to affect more than 100 million people worldwide by 2040. In Singapore, glaucoma is estimated to affect 3 per cent of the population. As glaucoma is an irreversible disease that would only worsen over time, it is important to screen and detect people who are at risk of developing it. When diagnosed early, treatment is effective in preventing blindness and reduced quality of life.

Screening for glaucoma can be simple. You can start with asking yourself if you have risk factors, including being above 60 years old, a family history of glaucoma, diabetes, previous eye injury and the use of steroids. If your answer is yes to some or all these questions, then an eye check would be timely.

This usually includes a visual acuity check, eye pressure measurement and slit lamp examination of the eye.

If the risk of glaucoma is considerable, further in-depth investigations would be required, such as visual field testing and optic nerve imaging. Blindness from glaucoma is preventable.

Screening still plays a key role in identifying eyes at risk of developing glaucoma, while increasingly sophisticated imaging tools are allowing ophthalmologists to accurately detect early glaucoma.

The advances in eye drops, lasers and surgical procedures have also allowed doctors to confidently manage a wide spectrum of glaucoma severity.

For early stage glaucoma, treatment options include eye drops, prophylactic lasers and minimally invasive surgery. If the disease is more advanced, newer surgical implants and lasers are becoming increasingly effective and safe.

Our eyesight can often be taken for granted. We use it every day for almost everything we do the second we wake up till we sleep. Yet, we might be losing it slowly without being aware until it is too late. It is therefore humbling to know that glaucoma is such a debilitating disease despite it being so “silent”. Early detection and treatment remains a key step in preventing blindness from glaucoma. It is important to stop the “thief” in his tracks before he makes away with your precious eyesight forever.

Source : *The Straits Times* (published on 17 April 2018)

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Upcoming CME Events

Date	Topic	Venue
14 July	Common Urogynaecological Conditions for the Family Physicians	NUHS Tower Block Auditorium, Level 1
28 July	Common Paediatric Respiratory Encounters in Practice	NUHS Tower Block Auditorium, Level 1
28 July	Headache Disorders Symposium	NUS LT35, L1, MD6
18 August	7 th Wong Hock Boon Paediatrics Masterclass	NUHS Tower Block Auditorium, Level 1

For more information and registration, you may contact the GP Liaison Centre at gp@nuhs.edu.sg

Registration & lunch will start at 1.00 pm