

# Advances in Ophthalmology

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## INTRODUCTION

Ophthalmology in Singapore had its humble beginnings in the 1930s on the first floor of the then Norris Block of the General Hospital at Sepoy Lines off Outram Road<sup>(1)</sup>. Since then, it has flourished, marked by an ophthalmic department in nearly every acute hospital in Singapore. Back in the 1930s, the bulk of patient care centred on the treatment of cataract, glaucoma, trauma and ocular infections. Today, numerous sub-specialties have evolved, in spite of the relatively small anatomical size of the orbit, namely, cornea, glaucoma, vitreo-retina, oculoplastics, paediatric ophthalmology, neuro-ophthalmology, ocular immunology and ocular pathology. To the non-ophthalmologists, perhaps, the most important advances in the past 5 years, have been in the restoration of good vision and prevention of blindness from diabetic retinopathy and glaucoma.

Since the introduction of phaco-emulsification in Singapore in the early 1990s, cataract surgery has evolved into an art, despite it being the most common major ophthalmic surgery. It utilises an ultrasonic probe to emulsify the cataract followed by the implantation of a foldable intra-ocular lens. Compared to extra-capsular cataract extraction, this method reduces the wound size from 12 mm to a mere 4 mm. This has removed the surgically induced astigmatism that was so commonly seen previously. With the use of more accurate machines to measure the correct dioptric power of the intra-ocular lens to be used, it is now possible to have good unaided vision the next day.

Refractive surgery, to correct refractive errors, has also come a long way from the time of radial keratotomies. The use of lasers and recently LASIK (LASER in-situ keratomiluesis) has allowed precise and safe treatment of myopia. It is a combination of lamellar corneal techniques under development for the past 50 years and the extreme precision of the argon-fluoride excimer laser. This has allowed more accurate treatment of patients with myopia of more than -6.00 dioptres. In addition, there is less postoperative patient discomfort and regression of treatment. Improvement in diagnostic tools has enabled more accurate determination of the contours of the cornea and hence, better planning of the surgery. The use of phakic intra-ocular lenses is also being evaluated to correct severe myopia of more than 15 dioptres.

In a recent article on *Registration of new Blindness in Singapore for 1985 - 1995*, Lim<sup>(2)</sup> observed that retinal blindness (57.6%) comprised more than half the causes, followed by congenital and developmental causes (14.7%), optic atrophy (9.3%) and glaucoma (8.6%). Of the retinal causes, age related maculopathy and diabetic retinopathy were predominant. In contrast, in his earlier report in 1975<sup>(3)</sup>, prior to 1969, glaucoma was the leading cause of acquired blindness. Early detection and treatment of glaucoma has led to this significant reduction. Primary open angle glaucoma, traditionally, has been diagnosed on the triad of raised intra-ocular pressures, optic disc cupping and visual field changes (perimetry). The advent of automated computerised perimetry has led to earlier detection of visual field changes that was not possible a decade ago. The use of new generation drugs like alpha<sup>1</sup> adrenergic agonists, alpha<sup>2</sup> adrenergic agonists, topical carbonic anhydrase inhibitors and prostaglandin analogs has allowed ophthalmologists wider options in medical therapy. Similarly, the use of antimetabolites in glaucoma surgery has increased the lifespan of trabeculectomies.

Interestingly, in a recent article in the *Annals*, Sim<sup>(4)</sup> reported that in a population study of 479 elderly Chinese, 97% of newly diagnosed cases were previously undiagnosed. The need for a proper screening programme for glaucoma in the population has to be considered if we are to further reduce its incidence.

Untreated diabetic retinopathy leading to blindness remains the most important cause of preventable blindness in Singapore. Diabetic retinopathy is a microangiopathy with features of microvascular occlusion and leakage. The main factor thought to be responsible for the progression of diabetic retinopathy to a proliferative state is retinal ischaemia. The mainstay of treatment for proliferative diabetic retinopathy is still panretinal laser photocoagulation. The ischaemic retina releases angiogenic factors that lead to new vessels arising from the disc (NVD) or the retina (NVE). These new vessels are usually asymptomatic until vitreous traction on the fibrovascular proliferative tissue causes bleeding. The development of fibrous tissue may also accompany proliferative retinopathy especially along the vascular arcades. Contraction of fibrous tissues can result in avulsion of vessels or tractional retinal detachment leading to blindness.

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With the continuing evolution of surgical techniques and machines, the indication for vitrectomy in diabetic patients has expanded<sup>(5)</sup>. In eyes with severe non-clearing vitreous haemorrhage, where the view is inadequate for laser treatment, early vitrectomy (1-6 months) is recommended, which may be combined with endolaser. Due to the aggressive nature of their proliferative retinopathy, patients with Type 1 IDDM should undergo vitrectomy earlier than Type 2 NIDDM patients. Immediate vitrectomy is indicated in eyes which develop traction retinal detachment involving or threatening the macula or concurrent rhegmatogenous retinal detachment. This has resulted in better visual prognosis in such patients.

With greater awareness of its blinding effects, more has to be done in the screening of diabetic retinopathy. Any diabetic retinopathy screening programme should ensure that the screening method used has a high specificity (> 95%), a high sensitivity (> 80%), and low technical failure (< 5%). All individuals found to have any sight threatening diseases are referred to an ophthalmologist. It is recommended that screening be done at least once annually. Screening modalities now in place include funduscopy by diabetologists

for patients attending hospital diabetic clinics and family physicians, and by photography using a fundus camera with experienced readers evaluating pictures.

Ophthalmology continues to excite all of us because of the intense worldwide interest in eradicating blindness and research into eye diseases such as retinitis pigmentosa that have been untreatable so far. Screening programmes for glaucoma and diabetic retinopathy as well as public education in these eye conditions involving both the primary healthcare providers and the specialists will need to be implemented to further reduce the incidence of blindness from these diseases.

#### REFERENCES

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