Volume 3, Number 2, 2001

Asian Journal of OPHTHALMOLOGY

Glaucoma Diagnosis in Asia

Mitomycin-C Augmented Viscocanalostomy

Modified Phaco-sandwich Technique

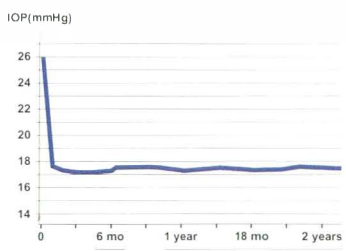
The Swollen Optic Disc

Highlights from the SEAGIG Meeting

Scientific Communications

IOP GOES DOWN...

...AND STAYS DOWN.



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1. Data on file. Hedman K, Alm A. Presented at the ICO, June 1998; Amsterdam, The Netherlands. 2. Watson PG. Ophthalmology. 1998;105:82-87. 3. Bucci M. J Glaucoma. 1999;8:24-30.
4. Data on file. Emmerich K-H. Graefe's Arch Clin Exp Ophthalmol. Accepted for publication. *Indication: Reduction of intraocular pressure in patients with open-angle glaucoma and ocular hypertension. PX 11294.00

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Asian Journal of OPHTHALMOLOGY is a quarterly publication for the practising ophthalmologist. As new technologies and therapeutic interventions are continually being developed, ophthalmology has become a field of rapid change, particularly in the Asia-Pacific region, where disease patterns and health care delivery differ greatly from that seen in the West. Whilst the focus of Asian Journal of OPHTHALMOLOGY is on glaucoma, other topics relevant to the region will not be ignored. Input from ophthalmologists and allied clinicians is welcomed. This will determine the content and direction of Asian Journal of OPHTHALMOLOGY.

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Glaucoma Diagnosis in Asia

The problem of glaucoma in Asia continues to be different from that of other populations that are well described, for instance in Europe and the USA. The problems of glaucoma in Asia are of diagnostic and disease pattern differences. This issue of *Asian Journal of Ophthalmology* includes an article clearly showing the problems of optic nerve head changes and difficulties in diagnosis of the disease from the perspective of a European neuro-ophthalmologist working in the Asian environment. With increasing differences in the types of glaucoma seen in Asia, the normal tension aspect of the disease is becoming more significant with increasing life expectancies.

We are finding that normal tension disease may not be a single entity but is probably a group of entities clinically recognised as normal tension glaucoma. With time and with further research, no doubt we will see the diagnosis of normal tension glaucoma improving and separating into various groups that can be diagnosed by molecular and cellular techniques. The management of this disease, however, will remain difficult and intensive investigation will be required — we will have to address the severity of visual loss and how sight threatening this disease is in individual populations in Asia. More data is certainly needed in terms of the incidence as well as the natural history and mobility of normal tension glaucoma for us to better understand this disease and muster public health resources for the management and future study of glaucoma.

Paul Chew
Editor-in-Chief

Intermediate Term Follow-up of Intraocular Pressure after Mitomycin-C Augmented Viscocanalostomy in Young Asian Patients with Glaucoma

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Purpose: *The goal of glaucoma surgery is to decrease intraocular pressure with minimal complications. Non-penetrating glaucoma surgeries have recently been advocated to decrease possible postoperative complications; however, their intraocular pressure lowering effects are still questionable. Since mitomycin-C has been shown to increase the success rate of glaucoma filtration surgery, we assessed the efficacy and postoperative complications of mitomycin-C augmented viscocanalostomy in young Asian patients with glaucoma.*
Patients and Methods: *Thirty two eyes of 25 young patients (younger than 40 years) who underwent mitomycin-C augmented viscocanalostomy to lower intraocular pressure were enrolled in this study. Best-corrected visual acuity, anterior chamber status, intraocular pressure, and fundus examinations were compared before and after surgery.*
Results: *With a minimal follow-up of 15 months, it was noted that the mean intraocular pressure decreased from 30.2 mm Hg preoperatively to 9.0 mm Hg on the second postoperative day, 9.6 mm Hg after 1 month, 16.6 mm Hg after 6 months, and 17.2 mm Hg at the last follow-up. Complete success rate, defined as an intraocular pressure lower than 21 mm Hg without medication, was 69.6% at the last follow-up. Qualified success, defined as an intraocular pressure lower than 21 mm Hg with or without medication, was 91.3%.*
Conclusion: *Mitomycin-C augmented viscocanalostomy appears to provide reasonable control of intraocular pressure at intermediate term follow-up in young Asian patients with glaucoma.*

Asian J Ophthalmol 2001;3(2):3-5

Introduction

Non-penetrating filtration surgery is an evolving surgical technique for lowering intraocular pressure (IOP) for patients with glaucoma. Epstein[1] and Krasnov[2] were the first to report on this approach. Later, Stegmann introduced a modified non-penetrating filtration surgery 'viscocanalostomy' to treat glaucoma.[3]

Since non-penetrating filtration surgery has the benefits of early postoperative recovery and fewer complications, it gradually gained popularity among ophthalmologists. However, long-term outcomes of non-penetrating filtration surgery are still questionable.[4] Mitomycin-C (MMC), a potent antifibrotic agent, is frequently used as an adjuvant during trabeculectomy. Nevertheless, the exact titration of MMC during trabeculectomy remains a problem since the complications associated with the use of MMC may be severe.[5,6] For the purpose of understanding the additional effects of MMC on viscocanalostomy, we evaluated the outcomes of MMC augmented viscocanalostomy for young glaucoma patients.

Patients and Methods

Between March 1996 and February 1998, 25 patients (32 eyes) younger than 40 years who required glaucoma surgery were enrolled in this study. For the purpose of evaluating the outcomes of the technique in a relatively homogenous group, this study comprised only those patients with a diagnosis of primary open angle glaucoma (POAG) or steroid-induced glaucoma. All patients had elevated IOPs, glaucomatous visual field defects, and optic nerve cupping. None of the patients had previously had argon laser trabeculoplasty. After informed consents were obtained, all operations were performed by one surgeon.

The non-penetrating filtration surgery began with a 7 mm limbus-based conjunctival flap in the upper quadrant. A 5 × 5 × 5 mm triangular scleral flap of 50% depth was dissected into clear cornea. An MMC-soaked gelform (0.04%) was placed above the sclera for 1 minute then copious irrigation under the conjunctiva using a balanced salt solution was done. Under the highest magnification, a second 3 × 3 × 3 mm triangular scleral flap was dissected to a

depth of 90%, creating a deep sclerectomy and leaving a thin layer of scleral tissue over the underlying area. At the level of the scleral spur, Schlemm's canal was deroofed, creating a 3 mm long fenestration in the lumen. A 30 gauge cannula was introduced into the ostia of Schlemm's canal, both left and right, to inject Healon GV. The adjacent Descemet's membrane was then excised along the base, 0.5 mm anterior to Schwalbe's line. The first scleral flap was reflected back in place with one 10-0 nylon suture. The conjunctival flap was sutured in place with 8-0 vicryl running sutures.

Postoperative treatment consisted of topical tobramycin and dexamethasone instilled 4 times a day for 2 weeks. After 2 weeks, chloramphenicol and fluorometholone were instilled 4 times a day for 1 month. Postoperatively, the IOP was recorded at 1, 7, and 14 days, and 1, 3, and 6 months, and then every 3 months thereafter. Anterior chamber depth, presence of hyphaema, choroidal detachment, macular oedema, and bleb appearance were recorded at the follow-up visits.

Results

The demographics of the patients are shown in Table 1. Most of the patients had POAG. Postoperatively, no patients suffered from decreased visual acuity. The decrease in IOP was significant for most patients during the follow-up period (Table 2). Postoperatively, the complications were few and there were no persistent hypotony or anterior chamber reactions noted during the postoperative period (Table 3). At the last follow-up, the number of antiglaucoma medications had decreased from 2.3 ± 0.6 preoperatively to 0.7 ± 0.3 postoperatively ($p < 0.01$; Figure 1). During follow-up, the presence of a filtering bleb was noted in 24 eyes (75%). The complete success rate, defined as an IOP of less than 21 mm Hg without medication was 69.6% at the last follow-up. The qualified success rate, defined as an IOP of less than 21 mm Hg with or without medication was 91.3%.

Table 1. Demographics of the study population (25 patients, 32 eyes).

Gender	
Female	8 (32%)
Male	17 (68%)
Age (years)	35.2 ± 4.8
Follow-up duration (months)	15.4 ± 2.7
Diagnosis	
Open angle glaucoma	30 (94%)
Steroid-induced glaucoma	2 (6%)

Table 2. Intraocular pressure profile before and after mitomycin-C augmented viscocanalostomy.

Visit	Intraocular pressure mean ± SD [mm Hg]
Baseline	30.2 ± 4.3
Postoperative day 1	9.0 ± 4.9
Postoperative week 2	9.6 ± 5.4
Postoperative month 1	13.6 ± 4.9
Postoperative month 3	14.5 ± 5.7
Postoperative month 6	16.6 ± 6.3
Postoperative month 9	16.7 ± 6.8
Postoperative month 15	17.2 ± 5.2

Table 3. Postoperative complications.

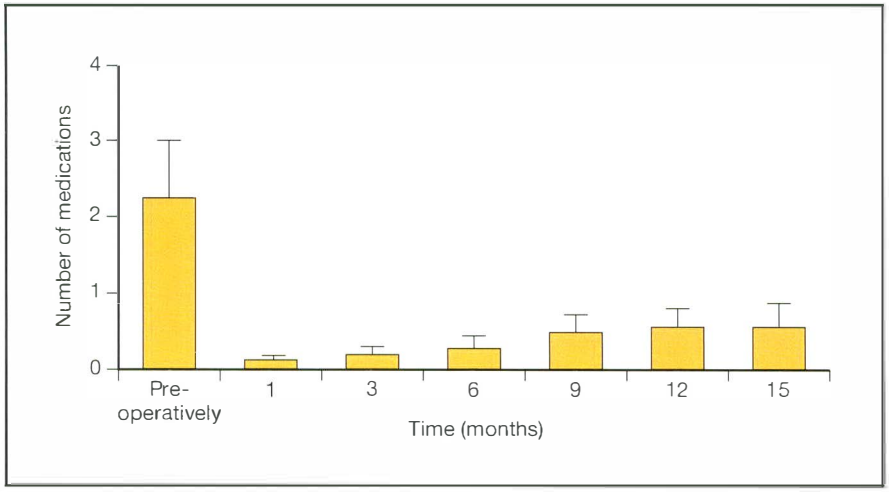
Complication	Number of eyes (%)
Hyphaema	7 (22)
Wound leak	1 (3)
Detachment of Descemet's membrane	1 (3)
Shallow anterior chamber	2 (6)
Encapsulated bleb	1 (3)

Discussion

The goal of glaucoma filtering surgery is to increase aqueous outflow. Trabeculectomy is currently considered the standard filtration procedure for glaucoma because of its relative effectiveness and safety.[7,8] However, trabeculectomy causes some unpredictable early and late postoperative complications such as hyphaema, anterior chamber inflammation, shallow anterior chamber, hypotony, choroidal detachment, and endophthalmitis.[9,10]

Thus, the quest for a low-risk operation for glaucoma has prompted a growing interest in non-penetrating techniques. The non-penetrating procedure was designed to create a drainage outflow pathway without entering the anterior chamber.[11,12] In an experimental model, Mermoud and Vaudaux studied the aqueous dynamics through the remaining thin trabeculo-Descemet's membrane, and found that the outflow resistance was low but sufficient to avoid the immediate postoperative complications often seen after trabeculectomy.[13] In our study, we observed that MMC augmented the non-penetrating procedure of viscocanalostomy and reduced IOP by a mean of 40%. In addition, the use of MMC did not result in increased inflammation in the anterior chamber and there were no

Figure 1. Comparison of antiglaucoma medications before and after surgery.



incidences of a flat anterior chamber postoperatively. Nevertheless, a higher than normal incidence of filtering blebs (75%) can be observed in our series.

Since the follow-up for non-penetrating procedures is limited, maintainance of long-term control of IOP after surgery has also become an important issue.[2] To enhance the filtration of non-penetrating procedures, several methods have been advocated. Kozlov et al.[14] and Fyodorov et al.[15] described the use of a collagen implant placed within the scleral bed. They found the need for postoperative antiglaucoma medication was significantly lower and bleb fibrosis was reduced when the collagen implant was applied.[14,15] Later, Stegmann used a high-viscosity viscoelastic material to create space under the scleral flap during the immediate postoperative period.[3,16] Sourdille et al. used an implant made of reticulated hyaluronic acid to prevent early adhesions under the scleral flap.[17] With these modifications, the success rate of non-penetrating surgery increased.[3,16,17] In addition, Harmard et al.[18] and Dahan and Drusedau[19] found additive effects of intraoperative application of 5-fluorouracil or MMC on the outcome of non-penetrating procedures, however, a higher rate of filtering bleb formation was also noted.

In our study, after the use of MMC, blebs were present in the majority of the patients at last follow-up. However, some patients still needed antiglaucoma medication although the bleb was present. There was no relation between bleb formation and successful filtration; a finding that is in accordance with that of Dahan and Drusedau.[19]

This study indicated that the low complication rate of MMC augmented viscocanalostomy and the comparable filtering effect to that of classical trabeculectomy makes it an attractive alternative to the traditional surgical treatment for open angle glaucoma. However, since the exact mechanism of action of antimetabolites to increase the success of the non-penetrating procedure is unknown, further evaluation on the long-term effects of MMC on viscocanalostomy is mandatory.

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Manual Small Incision Sutureless Modified Phaco-sandwich Technique Using Singh Vectis

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Introduction

The two main objectives of modern cataract surgery are to minimise surgically-induced astigmatism and to achieve rapid visual rehabilitation. Clear corneal or scleral tunnel incisions of the minimum possible size are the key to achieving these objectives.

Today, phacoemulsification has surpassed multiple large incision extra capsular cataract extraction as the method of choice among most surgeons in developed countries. The advantages of phacoemulsification are that it gives excellent post-operative astigmatic control, early visual recovery, and better wound stability, especially in the early postoperative period.

Although phacoemulsification has become the biggest surgical achievement of the present decade, it is still not being practised by the majority of the surgeons in developing countries such as India. Two important reasons for this are that the technique has a prolonged and sometimes traumatic learning curve and, secondly, it requires expensive and complex equipment.

Manual small incision sutureless cataract surgery using various methods is thus a good and effective alternative in this situation. The technique of manual sutureless phaco-surgery offers the following advantages:

- it preserves the integrity of the limbal anatomy thus minimising post-operative astigmatism
- there is early wound stabilisation (after approximately 2 weeks)
- no sutures are used, thus all suture-induced problems are eliminated
- it is safe and easy for mature and hypermature cataracts
- it is cost effective (both initially and for maintenance)
- it is less likely to cause complications such as posterior capsule rupture, dropped nucleus, and bullous keratopathy
- it can even be performed for hard nuclei or incomplete continuous circular capsulorhexis
- it is a good alternative for eye camp surgery.

Surgical Technique

In general, there are 2 methods for performing manual small incision sutureless extracapsular cataract extraction, namely:

- extraction of the nucleus after fragmentation
- extraction of the nucleus as a mass without fragmentation.

In the first method, the incision size is relatively smaller (between 3.5 and 5.5 mm) than in the second, which varies from 6.0 to 8.0 mm. When fragmentation of the nucleus is done, the technique basically involves the 2 stages of fragmentation of the nucleus and extraction of the fragmented pieces of nucleus.

Among the medium incision techniques (5.5 to 8.0 mm) are the techniques of nucleus suction with a Simcoe cannula, as modified by Beirouty et al.,[1] Fry's phaco-sandwich technique,[2] and those based on reducing the size of the nucleus such as the Blumenthal Mini Nuc technique.[3]

Small incision techniques (3.5 to 5.5 mm) include Kansas Bisection and Trisection,[4] Keener's stainless steel loop techniques,[5] Quintana's 3-0 nylon loop technique,[6] and Gutierrez' technique using his specially designed nucleotome.[7]

Personal Opinion

We have tried almost all of the above-mentioned techniques and feel that, in India, where the majority of patients report late for surgery and when the size of the nucleus is relatively large, any technique which involves multiple manipulations for fragmenting the nucleus and later removing the broken fragments, makes the surgery more difficult with an increased chance of trauma to both the uveal and corneal tissue. It further increases the dependence on better quality viscoelastic material, which, unfortunately, increases the cost of surgery for patients, thereby defeating the main purpose of using cost-effective manual non-phacoemulsification procedures.

Modified Phaco-sandwich Technique Using Singh Vectis

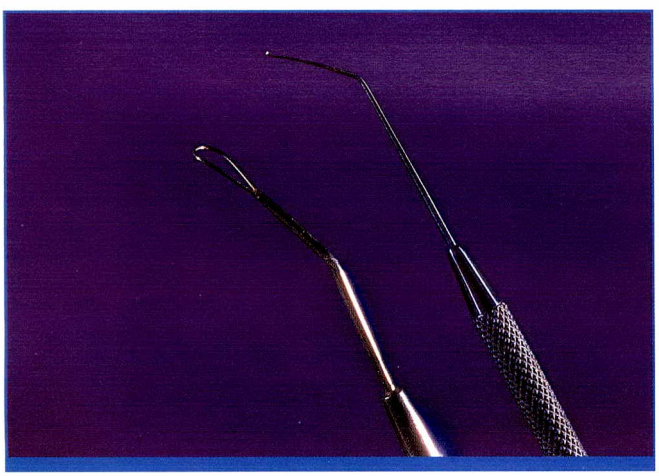
We have used the modified phaco-sandwich technique for the past 3 years

with satisfactory results for more than 500 patients with cataract. In this technique, the nucleus is removed en mass through a 6 to 7 mm scleral tunnel incision using a self-designed lens vectis (Ankur Metal Works, Calcutta, India) and standard Sinsky's hook. The main advantage of this technique is that there is minimum manipulation of the nucleus in the anterior chamber, so chances of possible trauma to both iris and corneal endothelium are minimised. The only disadvantage is that a relatively large incision is required, depending on the size of the nucleus and it is slightly difficult for beginners to dissect a relatively large self-sealing scleral tunnel. Also, since the tunnel length is longer, the shift in postoperative astigmatism is from 1.0 to 1.25 diopters for the majority of patients.

Singh Vectis

We use a lens vectis (Figure 1) that we have modified from Akura's claw vectis.[8] It has an initial loop, the tip of which is slightly curved to give a good grip to the nucleus during extraction. In addition, there are 2 more angulations designed in such a way that, during the bimanual insertion of the vectis and Sinsky hook, there is a minimum chance of touching and damaging iris tissue and the posterior capsule below and corneal endothelium above.

Figure 1. Singh vectis and sinsky hook.



Surgical Technique

After peribulbar block, a fornix-based conjunctival flap is made. All episcleral vessels are cauterised using bipolar cautery. A frown-shaped scleral incision is made using a standard number 15 disposable blade. The width of the tunnel is predetermined by the size of the central nucleus, which is assessed by slit-lamp before surgery; between 6 and 7 mm for the majority of patients. A crescent knife is then used to dissect the scleral pocket. The ends of the frown incision are approximately 3.0 mm from the limbus while the central convexity is approximately 1.5 mm from the limbus. The tunnel is extended by about 2.0 mm into clear corneal tissue. A 3.2 mm angled keratome is then inserted into the scleral pocket and entered into the anterior chamber. While the keratome is entering the anterior chamber, the internal lip of the wound is clearly seen. The anterior chamber is then filled with 2% methylcellulose.

A relatively large circular capsulorhexis (6.0 to 6.5 mm) is then made using the bent tip of a 26 G needle. A can-opener technique may be required for a large nucleus. For patients in whom a central circular capsulorhexis is done, 2 relaxing incisions are vertically made for easy prolapse of the nucleus without undue pressure on the zonules. Then using the Blumenthal hydrodissection cannula, hydro procedures are performed until the hard central nucleus core is isolated.[2] Simultaneously, with the tip of the same cannula, the nucleus is rotated and manually lifted from the superior pole. This simultaneous rotation and lift movement is continued until the nucleus is totally prolapsed in the anterior chamber. This is the most important step in the technique since all manipulations are done in a closed chamber. Viscoelastic is again injected over the prolapsed nucleus to deepen the anterior chamber and a side-port entry is made at 2 o'clock using a V-lance knife.

The scleral tunnel is then enlarged to its full length. Viscoelastic is again injected above as well as below the prolapsed nuclear mass and the posterior capsule with the posterior epinucleus is pushed back as far as possible. Thus, a good cushion of viscoelastic is made both in front and behind the nucleus. Then, with a bimanual technique, the Singh vectis and Sinsky hook are entered simultaneously under clear vision and the nuclear mass is sandwiched between the 2 instruments. With gentle pressure, the nucleus is prolapsed out of the scleral pocket incision.

The epinucleus is then hydro-expressed using the Simcoe cannula with simultaneous gentle pressure at the scleral incision, thus creating a fish mouthing phenomenon. This procedure expresses the epinucleus in a circular manner. Care must be taken not to apply excessive pressure on the wound at this time. The residual cortex is then removed using the Simcoe bi-way cannula. A 6 mm polymethyl methacrylate (PMMA) intraocular lens (IOL) is then inserted after inflating the bag with viscoelastic. The lens is 'dialled' into position using the Sinsky hook and all residual viscoelastic is aspirated out. Irrigating fluid is injected from the side port incision to close the internal lip of the tunnel. The conjunctiva is then replaced over the wound and cauterised at the 2 ends using co-optation forceps.

Exclusion criteria for this technique include:

- hard cataracts (grade V)
- maximum pupillary dilatation less than 6 mm

- relatively shallow anterior chamber
- pre-existing ocular disorders such as uveitis, glaucoma, or subluxation.

Clinical Trial

We studied 300 eyes of 275 patients (62% male, 38% female) with a mean age of 58.5 years (range, 38 to 80 years) who underwent modified phaco-sandwich sutureless surgery from 1 January 1999 to 1 October 2000. All surgeries were performed by the same surgeon using the above-mentioned technique. Nucleus hardness was graded using Emery and Little's classification.[9] Grade distribution was as follows:

- grade 1 — 30 eyes
- grade 2 — 186 eyes
- grade 3 — 76 eyes
- grade 4 — 8 eyes.

Mean follow up was 8 months (range, 2 to 22 months).

The mean incision width was 6.1 mm (range, 6.0 to 8.0 mm). In 10 eyes, the wound was larger than 7.5 mm. Sutures were not required for any patients. The nucleus was bisected in 36 eyes during extraction of the nucleus — in this situation each segment was removed using the same technique. Intraoperatively, 6 eyes had a posterior capsular rent. In 2 eyes, the rent occurred during the insertion of the lens vectis as there was sudden shallowing of the anterior chamber. In the remaining 4 eyes, the rent occurred during the cortical clean up. In 4 eyes, repeated iris prolapse occurred due to premature entry to the wound — in these cases a higher grade of viscoelastic (Healon) was used to prevent iris trauma.

The most common complication was transient striate keratopathy, which was seen in 24% of eyes. This did not persist for longer than the first postoperative week. In 28% of patients, a can-opener capsulectomy was done, either due to a non-dilating pupil or where the capsulorhexis was eccentric. In one patient, iridodialysis occurred due to inadvertent catching of iris tissue with the tip of the Sinsky hook.

A transient rise in intraocular pressure occurred in 4 eyes, which were all controlled with medical therapy. Intraocular lens implantation was not deferred for any patients. Mean surgically-induced astigmatism (the change in the corneal curvature determined by the difference between the pre- and postoperative keratometry) was found to be 1.62 D (range, 1.0 to 2.5 D) at the end of the fourteenth postoperative day. This was calculated using the Jaffe and Clayman vector analysis.[10]

Best corrected visual acuity (BCVA) of 6\12 or better was achieved at the end of the second postoperative week for 92% of patients. For those patients where it was less than the baseline, the cause was not related to the surgical procedure — there was age-related macular degeneration of different grades in 18 eyes, while in the remaining 6 eyes there was optic disc pallor.

We compared these results with a series of phacoemulsification procedures using a 5.25 mm incision (PMMA IOL) and a 3.5 mm incision using a foldable IOL. Statistical analysis showed that the change in astigmatism induced surgically ranged from 1.0 to 2.0 D for more than 80% of patients for whom the manual phaco-sandwich technique was performed, while for those patients in whom the 5.25 mm PMMA IOL was used surgically-induced astigmatism ranged from 0.75 to 1.25 D in an equal percentage of cases. Among patients receiving a foldable IOL, the range was 0.6 to 1.0 D.

Discussion

Both phacoemulsification and manual phaco-sandwich techniques are used at our institution. We consider both the techniques to be equally useful, especially when not using a foldable IOL.

Our experience has shown that, just as in phacoemulsification where adequate pupillary dilatation and good endothelial count with adequate anterior chamber depth are essential prerequisites for achieving successful surgery, so is the case for manual small incision sutureless phaco-sandwich surgery. The final visual outcome has been encouraging with a minimum of vision threatening complications with our technique and we have found that this technique is a good alternative to phacoemulsification surgery. It enjoys all the advantages of modern phacosurgery and also serves as an intermediate step for those surgeons who wish to convert to the phacoemulsification technique.

Recently, we have tried this technique with topical (preservative free) 1% lignocaine alone and with topical plus intracameral (preservative free) 1% lignocaine. The results have been equally encouraging and we now regularly perform this surgery using only topical anaesthesia for cooperative patients with good preoperative conditions.

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The Swollen Optic Disc: Further Observations of a European Neuro-Ophthalmologist in Southeast Asia

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With the increased incidence of brain tumours in SoutheastAsia and the common complaint of headaches among patients attending eye departments, clinicians should be concerned that they may miss such conditions, which tend to present and be diagnosed at a late stage in Asia. The swollen disc of papilloedema is, along with headache, the characteristic manifestation of raised intracranial pressure commonly associated with a brain tumour. It should be reassuring therefore for the examiner to be able to determine whether a suspicious optic disc is within normal limits or not.

Papilloedema

The term papilloedema is now accepted as describing that specific form of optic disc oedema (Figure 1) associated with raised intracranial pressure. Papilloedema is easily diagnosed in its established state when it is bilateral and haemorrhages and/or exudates are evident on the disc itself or at the margins (Figure 2). Visual acuity is normal and field testing may only demonstrate an enlarged blind spot. Peripheral constriction of the visual field is a late finding which may be associated with post-papilloedema optic atrophy.[1]

In the early stages, papilloedema may be difficult to distinguish from variants of normal (pseudopapilloedema) but the latter does not change over a period of observation and, when in doubt, re-examination after 2 to 3 weeks is required. Contrary to traditional teaching, the first areas of the disc to become blurred or elevated are the lower and upper margins rather than the nasal side; in cases of uncertainty these areas should receive special attention.

Not all patients with papilloedema harbour a brain tumour. Raised intracranial pressure can be associated with hydrocephalus, especially in children, or can follow a head injury. It is also found in pseudo tumour cerebri (benign intracranial hypertension; BIH), which generally occurs in young overweight females. Referral to a neurosurgeon is not required until the ophthalmologist has confirmed the diagnosis and carried out a computerised tomography (CT) or magnetic resonance imaging (MRI) scan.

Figure 1. Papilloedema.

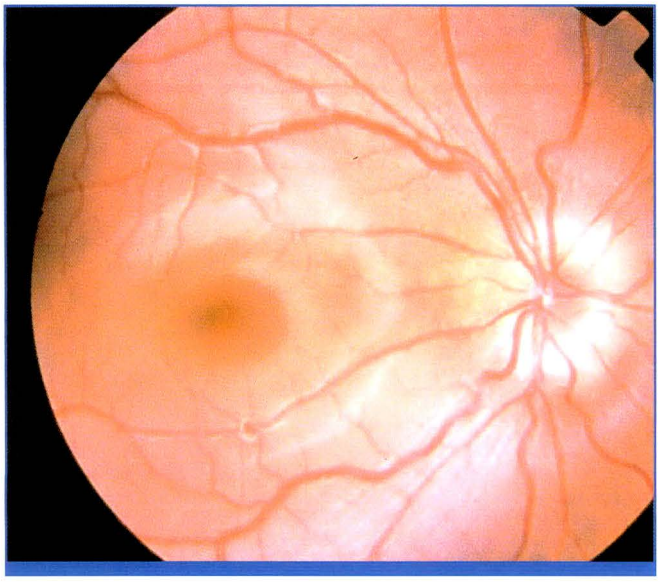


Figure 2. Papilloedema with haemorrhages.

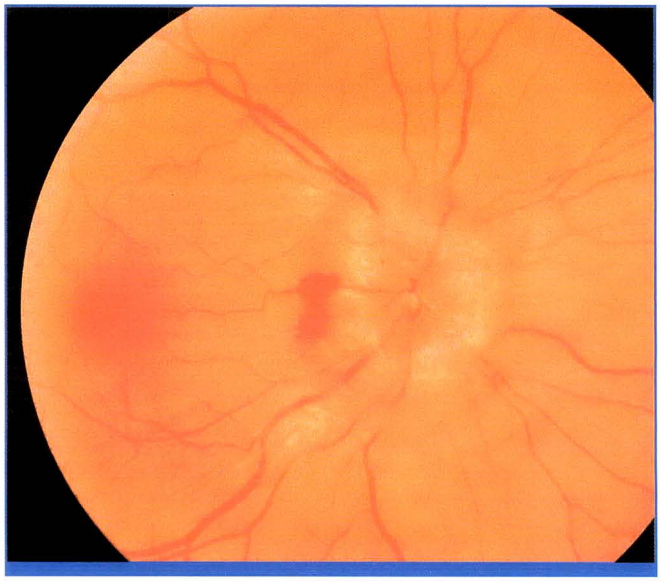
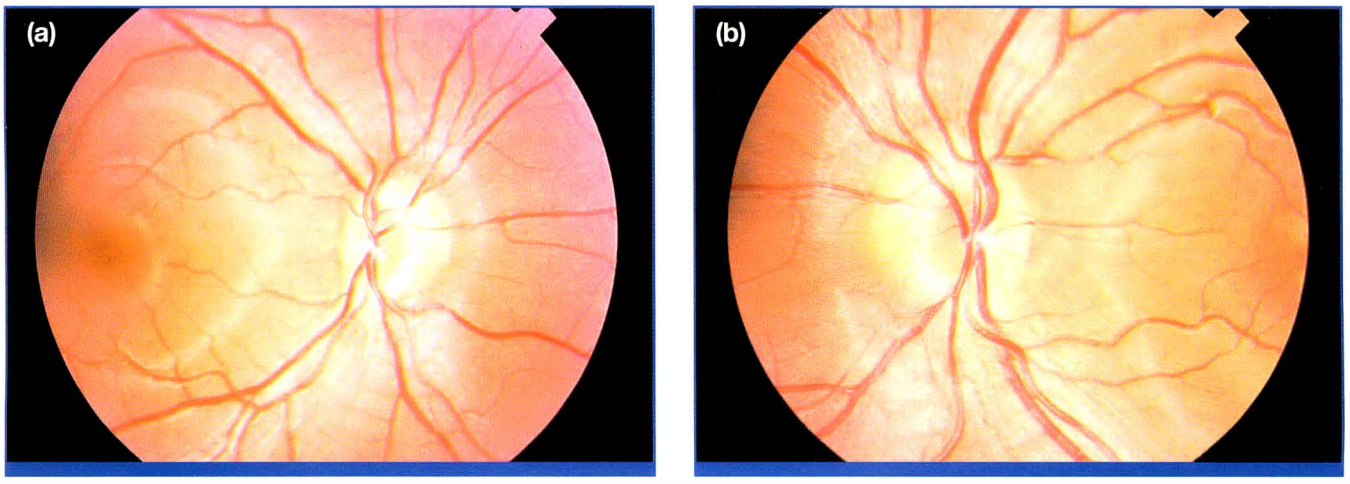


Figure 3. **Pseudo-papilloedema in (a) right and (b) left eyes.**



When papilloedema is present or suspected, other ocular abnormalities should be looked for such as nystagmus, pointing to a lesion in the posterior fossa, and a sixth nerve palsy may be a false localising sign. A homonymous field defect can indicate compression of the suprageniculate or posterior visual pathway by a tumour such as a glioma, meningioma, or an arterio-venous malformation. The headaches of raised intracranial pressure are usually worst in the mornings, centred in the frontal region, and are aggravated by bending down.

Pseudopapilloedema

Pseudopapilloedema, also termed pseudoneuritis or pseudopapillitis, is the commonest cause of a mistaken diagnosis of true papilloedema (Figure 3). Figure 3 shows the discs of a 12-year-old boy who was referred with a diagnosis of papilloedema and brain tumour based on his disc appearances and a mistakenly interpreted brain scan.

Pseudopapilloedema is usually associated with refractive errors of hypermetropia and/or astigmatism or tilted discs, as in this patient. The disc margins are blurred and the disc itself may appear elevated. The cup is often absent but there is no true oedema and the veins are of normal calibre and pulsate normally. It is usually bilateral and symmetrical and does not change over a period of observation. If in doubt, fluorescence angiography (FFA) distinguishes it from papilloedema or optic neuritis (papillitis) by the absence of dye leakage, especially in the late stages of the passage of dye through the retinal vessels.

Other conditions less likely to give rise to a misdiagnosis of papilloedema are opaque nerve fibres (Figure 4), congenital fibrous tissue overlying the disc, and, more importantly, optic nerve head drusen (Figure 5), also termed hyaline bodies of the optic disc where the nerve head is elevated and, as in Figure 5, hyaline deposits may be multiple and extend out beyond the disc margins, and an abnormal branching of the retinal vessels is also commonly present. In this condition the nerve head is usually small — a so called 'crowded disc' and the anomaly is generally bilateral and

Figure 4. **Opaque nerve fibres.**

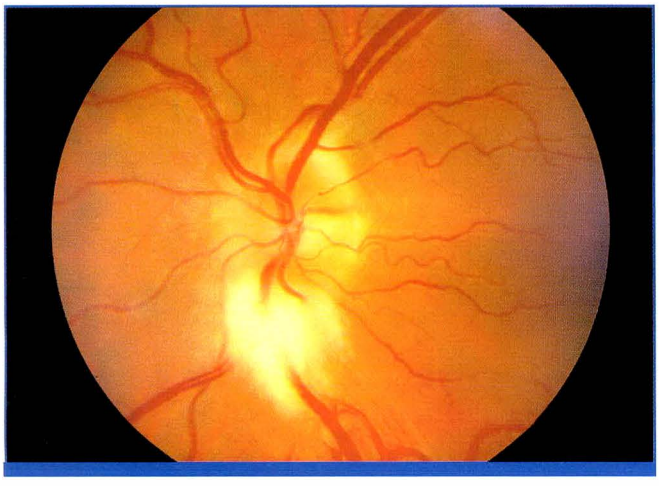


Figure 5. **Optic disc drusen.**

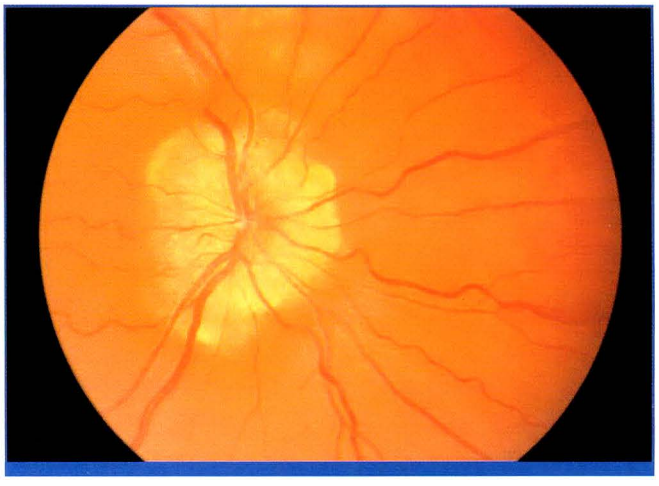
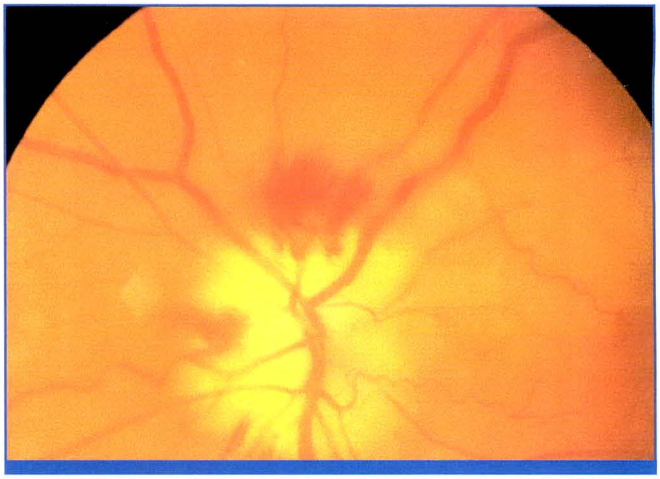


Figure 6. Optic neuritis.

Figure 7. Anterior ischaemic optic neuropathy with haemorrhages.



sometimes familial. However, when the hyaline material is buried within the disc substance, diagnosis will be difficult, especially if a field defect is also present.

Optic Neuritis

Acute inflammation or demyelination of the optic nerve (optic neuritis or papillitis) usually presents in young patients with sudden unilateral loss of central vision, a relative afferent pupil defect, and a swollen hyperaemic disc (Figure 6). In Europe, this is the less common manifestation of optic neuritis (about 35% of cases), or of what is more correctly termed anterior optic neuropathy, as opposed to retrobulbar optic neuropathy (65%). In Southeast Asia, however, a swollen disc (papillitis) is the more common manifestation of optic neuropathy, occurring in two-thirds of patients and multiple sclerosis is a rare cause in this region. Spontaneous recovery is still the expected outcome and corticosteroid treatment is still controversial. According to Walsh and Hoyt, MRI scanning is not required to establish the diagnosis of optic neuritis.[2]

Other Causes of Optic Disc Oedema

Hypertensive Retinopathy and Other Retinal Vascular Diseases

In hypertensive retinopathy, central vein occlusion, and other retinal vascular diseases, the disc may be swollen with haemorrhages and/or exudates. However, the latter are not confined to the immediate disc area as in the conditions described above, and other evidence of vascular disease or abnormality is usually clearly evident in the mid and peripheral fundus.

Anterior Ischaemic Optic Neuropathy

Anterior ischaemic optic neuropathy (AION), both arteritic due to giant cell arteritis and the non-arteritic variety (NAION) usually associated with diabetes, hypertension or arteriosclerosis, present in elderly people with sudden severe visual loss or blindness in 1 eye which may become bilateral if not treated or prevented.

Figure 8. Diabetic papillopathy — note telangiectatic vessels.

Figure 9. Optic disc in a patient with optic nerve sheath meningioma.

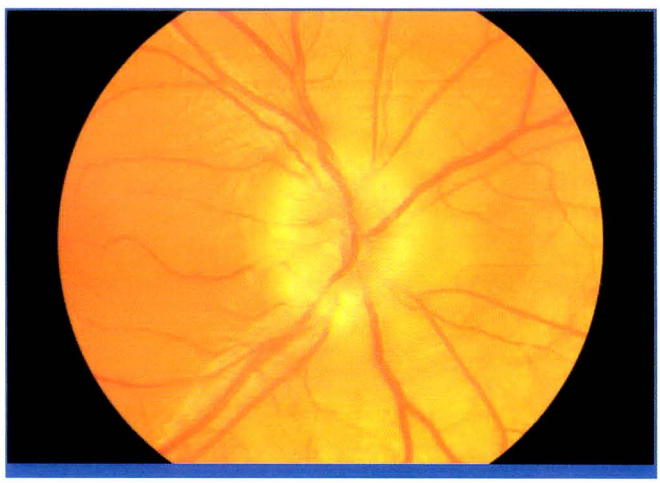
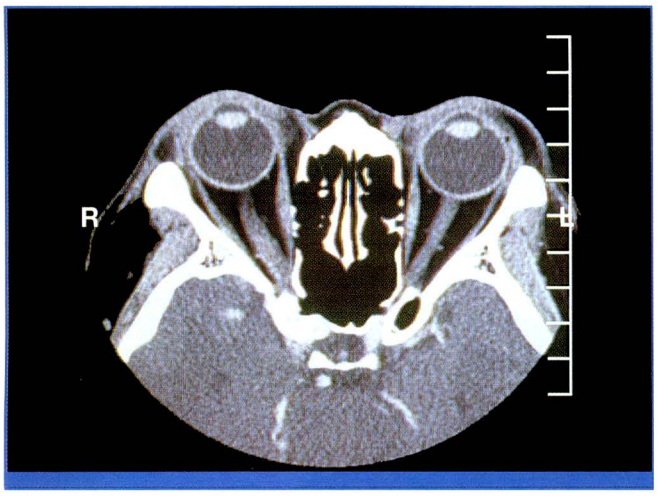


Figure 10. **Computed tomography scan showing right optic nerve sheath meningioma — note thickened nerve.**



In AION, the optic disc is pale and swollen, sometimes with haemorrhages (Figure 7), but in NAION the disc is sometimes hyperaemic at the outset rapidly becoming pale. A pale swollen disc is characteristic of an ischaemic process. The acute and severe visual loss differentiates these conditions from papilloedema due to raised intracranial pressure. Giant cell arteritis is extremely rare in Southeast Asia but a chronic form of NAION is frequently seen, which is usually diagnosed as low tension glaucoma and often progresses following cataract surgery. A CT scan should be performed for such patients in order to exclude a compressive lesion.

Diabetic Papillopathy

Mild hyperaemic swollen discs have been described in young patients with type 1 diabetes where vision is only slightly reduced (usually around 6/9) and spontaneous recovery usually occurs.

A somewhat similar condition, usually unilateral, also occurs here in older patients with type 2 diabetes, where the disc is swollen and hyperaemic with haemorrhages (Figure 8). Again, spontaneous recovery can be expected although this may take weeks or months and no specific treatment is required.

Optic Disc Vasculitis and Optic Nerve Tumours

These are rare causes of unilateral disc swelling. Vasculitis may be associated with changes in the peripheral retinal venous system and requires FFA to establish the exact diagnosis. Optic nerve tumours such as a glioma or meningioma (Figure 9) can also present with optic disc swelling, but as these conditions usually arise within the orbit, other evidence of an orbital lesion such as proptosis or double vision will also be present and a CT scan will readily demonstrate the pathology (Figure10).

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Normal Tension Glaucoma

From the Inaugural Scientific Meeting of the South-East Asian Glaucoma Interest Group (SEAGIG), Bangkok, Thailand, 26-29 November 2000

Introduction to Normal Tension Glaucoma

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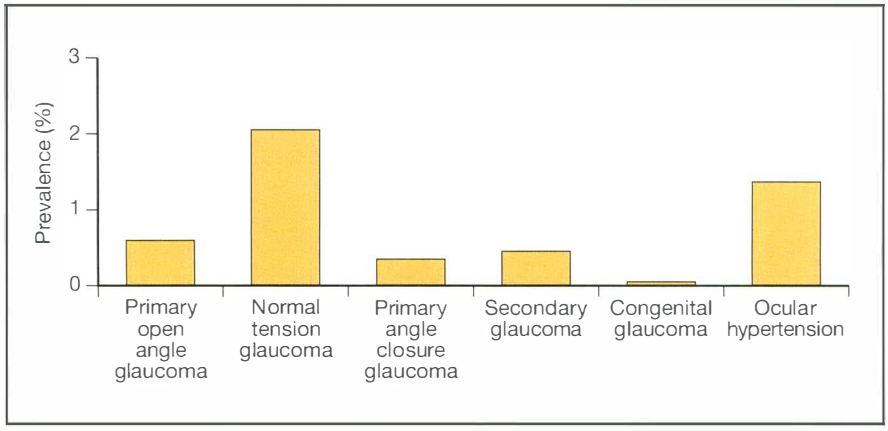
Prevalence

The Nationwide Glaucoma Survey in Japan examined 8924 patients older than 30 years in 7 districts. The most striking finding was the high prevalence of normal tension glaucoma when the cut-off intraocular pressure (IOP) value was set at 21 mm Hg. The incidence of normal tension glaucoma was found to be 3.5-fold that of primary open angle glaucoma, with 2.5% of the screened subjects having normal pressure glaucoma (Figure 1).

Controversy surrounds this unexpected finding due to the relatively low mean IOP (13.36 ± 3.14 mm Hg). At this IOP level, the prevalence of normal tension glaucoma was 2-fold that of primary open angle glaucoma among the Japanese population and the relative hazard odds ratio was substantially higher than that reported in the Baltimore Eye Study[1] when the IOP level increased to 21 mm Hg.

As is the case with any disease, the prevalence of normal tension glaucoma depends on the definition. In particular, definition of the upper limits of normal IOP and how frequently IOP is determined can influence the prevalence of normal tension glaucoma. It is quite clear that the higher the IOP used as a cut-off point between normal tension and primary open angle glaucoma, the higher will be the prevalence of normal tension glaucoma. More frequent measurements of IOP are likely to uncover occasional abnormally high pressures in many patients. The results of several independent population studies suggest that, no matter how the disease is defined, normal tension glaucoma is a fairly common condition.[1-4] However, these studies did not measure diurnal fluctuation of IOP or try to rule out other conditions that may simulate normal tension glaucoma. Unless evidence to the contrary is forthcoming, the studies available to date suggest that normal tension glaucoma is a common condition, with an overall prevalence of up to half that of open angle glaucoma.

Figure 1. **Nationwide glaucoma survey in Japan (1988-1989).**



Clinical practice in Japan reflects this high prevalence of normal tension glaucoma and suggests that a lack of awareness results in a lower detection rate. As an example, of 448 consecutive referrals to the Akasaka Kitazawa Eye Clinic in Japan for glaucoma evaluation during a 6-month period, 280 patients (62.7%) had normal tension glaucoma. This figure does not reflect the prevalence of normal tension glaucoma among the general population. However, a high proportion of normal tension glaucoma among glaucoma referrals indicates that normal tension glaucoma is a problem for general ophthalmologists in Japan and suggests that the prevalence of normal tension glaucoma in Asia is probably higher than was previously thought.

Prognosis

Progression is one of the most important clinical aspects of normal tension glaucoma. Progression can be established by careful examination and evaluation of the optic disc. The usefulness of disc evaluation by conventional means such as ophthalmoscopy is limited for determining progression, while the value of modern sophisticated instruments such as nerve fibre layer analysis remains to be determined. Thus, visual field examination is the preferred method of establishing disease progression. However, there are also problems with visual field examination.

A variety of different methods are used and the phenomenon of long-term fluctuation makes assessment of progression difficult. To determine whether progression

has occurred, a number of fields covering an extended period of time are required. Despite these difficulties, prediction of progression is crucial for the management of normal tension glaucoma.

Review of the literature provides varying degrees of progression in patients with untreated normal tension glaucoma.[5,6] The diverse results may be due to differences in the criteria for progression. When progression is defined as a deterioration of mean deviation of ≥ 3 decibels in a few consecutive fields measured by several programmes of the Humphrey visual field analyser, the probability of progression is estimated to be 32%. On the other hand, when progression is defined according to point by point comparison, the probability of progression is almost 70%.

Study has shown that the majority of patients with normal tension glaucoma progress if left untreated, which has prompted a search for the factor(s) associated with progression. Risk factors identified by Ishida et al. include disk haemorrhage, corrected-pattern standard deviation, age, systolic blood pressure, and pulse rate.[6] It is of interest as to why IOP was not higher among untreated patients in this study. A long-term collaborative study from North America and Europe has shown that a 30% IOP reduction can halt progression of visual field loss in normal tension glaucoma.

Minimum IOP during phasing has been found to be significantly associated with visual field loss in untreated patients with normal tension glaucoma and mean IOP is a significant risk factor in normal tension glaucoma. The association was such that the higher the mean IOP, the more likely progression is to occur.

There are many independent IOP risk factors for normal tension glaucoma, the majority of which may be categorised as vascular factors (Table 1). Some such as disk haemorrhage and peripapillary atrophy are closely associated with progression of normal tension glaucoma. However, it is not yet known how to modify these factors. On the other hand, IOP, which can be clinically manipulated, is not always highlighted as a prognostic factor requiring analysis, probably because the IOP is distributed within a relatively narrow range (10 to 20 mm Hg) in patients with normal tension glaucoma. In addition, the best method for measurement of diurnal IOP without disrupting patients' lifestyles remains to be developed. This would be helpful for determining how, and to what extent, IOP influences the course of normal tension glaucoma.

Table 1. Vascular risk factors for normal tension glaucoma.

Systemic factors	Local factors
Systemic blood pressure	Disk haemorrhage
Haemodynamic crisis	Peripapillary atrophy
Vascular diseases	Retinal and choroidal circulation
Carotid pathology	
Blood coagulation	
Blood viscosity	
Vasospastic syndrome	

The relatively loose association of IOP with visual field progression not only affects the logistics of treatment for normal tension glaucoma, but also means that IOP lowering is the only reliable method of treating glaucoma approved by ophthalmologists, and is likely to remain so for the foreseeable future.

There are a large number of ocular hypotensive medications available for treatment. To improve the efficacy of IOP lowering therapies and to understand the limitations and how a therapeutic regimen should be constructed for each individual patient, the role of IOP and how it interacts with other risk factors needs to be determined.

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Long-term Follow-up: Case Reports

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Glaucoma Research Foundation, Manila, The Philippines

Low tension glaucoma is a diagnostic and therapeutic dilemma. It is a diagnostic dilemma because it is not yet known why this group of undifferentiated open angle glaucomas have this unexplained pathogenetic mechanism of neuropathy. It is clear that advances in screening techniques of the optic nerve and nerve fibre layer

have not clarified the structural damage that occurs in open angle glaucoma, let alone normal or low tension glaucoma.

With the advent of newer therapeutic products, it is now possible to postpone or prolong disease progression. However, the exact process of pathogenetic mechanisms by which patients with low or normal tension glaucoma eventually progress over time remains unclear.

Dr Agulto described the long-term follow up of 3 patients with low tension glaucoma. The first patient was a 65-year-old male with low tension glaucoma for 25 years. At the time of diagnosis, his best corrected visual acuity was 20/20 and cup/disc ratios were almost 1. He was given maximum tolerated medical therapy and his diurnal intraocular pressure (IOP) remained below 15 mm Hg in the right eye. The left eye had a worse cup/disc ratio and more episodes of higher diurnal IOP, although the IOP remained below the statistical normal of 20 mm Hg. However, visual field testing showed progressive damage with the left eye affected to a greater degree.

17 years ago, this patients underwent 45=BA argon laser trabeculoplasty. However, during the next 15 years, slow progressive visual field deterioration was seen on trend analysis. Filtering surgery was advised, although the patient declined on the basis of potential complications.

The second patient was a 74-year old male referred 16 years ago with advanced low tension glaucoma (Table 1). The anterior segment showed early nuclear sclerosis. During the next 5 years, his vision progressively decreased despite maximum tolerated medical therapy and argon laser trabeculoplasty.

Table 1. Status of patient 2 at initial consultation.

	Right eye	Left eye
Best corrected visual acuity	20/300	20/60
Intraocular pressure	17	17

Bilateral trabeculectomy with 5-fluorouracil and suture lysis resulted in single digit IOPs even 3 years later. However, this patient developed posterior subcapsular cataracts necessitating surgery, after which his IOPs slowly increased. Despite efforts to lower the pressure, octopus perimetry showed further visual field loss and at the last follow-up visit the patient had vision determined by finger count in the right eye and 20/200 in the left eye, although his IOP remained at 9 mm Hg in both eyes.

The third patient was a 58-year-old male who presented 15 years ago with blurring of vision and now has severe normal tension glaucoma. Initial examination revealed best corrected visual acuity of 20/25 with moderate myopia and IOP of 15 mm Hg. IOP was maintained at or below this level with topical medication and diurnal IOP showed an almost flat pattern. Laser trabeculoplasty was also performed.

Subsequently, this patient was diagnosed with mild non-insulin dependent diabetes mellitus and 2 episodes of BRVO in the right eye were documented. The diurnal IOP pattern for this patient remained consistently in the low teens.

During the 2 decades of follow-up, these 3 patients received state-of-the-art management for normal tension glaucoma, decreasing IOPs to almost subnormal levels. These approaches to treatment were acceptable to the patients. Young patients with normal tension glaucoma with a potentially long lifespan require a reduction in IOP by 20% to 30% since adequate control of IOP is apparently helpful, even for patients with non-pressure–related factors.

The first patient had probably accepted slow deterioration of vision versus the potential risk of visual loss from glaucoma filtering surgery. The second elderly patient belonged to the group of patients who despite single digit pressure inexorably lose visual field and central vision. The third patient, like the first, has accepted a protracted medical and laser treatment giving him a fairly acceptable stable vision and visual field.

Given the current state of glaucoma pathogenesis involving the apoptotic pathway for ganglion cell death, evidence still favours IOP reduction for practically all glaucoma patients.

Assessment and Prognostic Factors

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In daily clinical practice in Japan, ophthalmologists often see patients with normal tension glaucoma who either develop visual field loss progression or who have little or no progression. However, it is as yet unknown how to predict who will develop progression of visual field loss in normal tension glaucoma.

Dr Sugiyama described a study performed to determine the relative risk ratio of clinical factors in progression of visual field loss in normal tension glaucoma.[1] 70 patients with normal tension glaucoma, not receiving medication were enrolled between 1985 and 1998. The patients' characteristics are shown in Table 1. The definition of progression of visual loss was mean deviation (MD) of deterioration of ≥ 3 decibels (dB) detected twice and point by point comparison — threshold deterioration of ≥ 10 dB at 2 contiguous points or ≥ 5 dB at 3 contiguous points, with one of them being ≥ 10 dB at 2 consecutive visual field examinations. The first time these criteria were detected was defined as the endpoint.

Table 1. Characteristics of patients enrolled in a study to determine the relative risk ratio of clinical factors in progression of normal tension glaucoma (n = 70; mean ± SD; range).

Age (years)	58.2 ± 10.6 (24.0 - 75.0)
Sex (male/female)	21/49
Follow-up (months)	67.3 ± 28.0 (24.0 - 133.0)
Intraocular pressure at phasing (mm Hg)	
Maximum	16.4 ± 2.3 (10.0 - 20.0)
Mean	13.9 ± 2.2 (8.0 - 19.3)
Minimum	11.4 ± 2.4 (6.0 - 16.0)
Range	5.0 ± 1.5 (1.0 - 9.0)
Previous disc haemorrhage	32
No previous disc haemorrhage	38

Table 2. Factors related to visual field progression in normal tension glaucoma by MD comparison and point by point comparison.

Factor	Hazard ratio	95% Confidence interval	p Value
By mean deviation			
Disc haemorrhage			
Negative	1		
Positive	20.3	5.18 - 79.9	0.0001
CPSD (by 1 decibel increase)	1.05	1.02 - 1.08	0.0004
Age (by 1 year increase)	1.11	1.05 - 1.18	0.0009
Systolic blood pressure (by 1 mm Hg increase)	1.03	1.00 - 1.05	0.0331
Pulse rate (by 1 beat per minute decrease)	0.95	0.91 - 0.97	0.0381
By point by point comparison			
Disc haemorrhage			
Negative	1		
Positive	3.28	1.71 - 8.23	0.0008
CPSD (by 1 decibel increase)	1.03	1.00 - 1.05	0.0007
Pulse rate (by 1 beat per minute decrease)	0.98	0.95 - 1.00	0.0479

Abbreviation: CPSD = corrected-pattern standard deviation.

Factors Related to Visual Field Progression

Mean deviation of deterioration and point by point comparison showed that eyes with a previous disc haemorrhage were 20-fold and 3-fold, respectively, more likely to progress (Table 2). The patients were therefore classified into 2 subgroups — those with a previous disc haemorrhage and those without disc haemorrhage. A significant difference was found in the probability of progression between the 2 groups:

- by MD of deterioration — 60% and 11% for patients with and without disc haemorrhage, respectively; $p < 0.0001$
- by point by point comparison — 91% and 51% for patients with and without disc haemorrhage, respectively; $p < 0.0008$.

Further, patients with 2 or more previous disc haemorrhages were 2-fold more likely to progress than those with only 1 previous haemorrhage by both MD deterioration and point by point comparison.

In Summary

Cox model and life table method in 70 eyes of 70 untreated patients with NTG showed that the presence and recurrence of disc haemorrhage increases the risk for progression of visual field loss. Disc haemorrhage may therefore be an indicator for distinguishing patients with NTG who are likely to progress.

Reference

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Abstracts of Asian research published in the international literature

Phacoemulsification in Eyes with White Cataract

A retrospective study of the results of phacoemulsification in eyes with white cataract was performed at Aravind Eye Hospital, Madurai, India. 212 consecutive patients with white cataract — 192 mature (90.6%), 11 intumescent (5.2%), and 9 hypermature (4.2%) — underwent phacoemulsification and continuous curvilinear capsulorhexis. After the nucleus was removed by the divide and conquer or the phaco chop technique, a posterior chamber intraocular lens was implanted. Preoperative and intraoperative findings, as well as postoperative outcomes, were analysed.

The mean phacoemulsification time was 2.03 minutes (range 0 to 5.8 minutes). Best corrected visual acuity of 6/9 or better was attained for 131 patients (61.8%) on the first postoperative day and for 199 patients (93.9%) at 1 month. Postoperative complications included moderate transient striate keratopathy with corneal oedema in 12 eyes (5.7%), and iritis in 2 (0.9%). The intraoperative complications are shown in Table 1.

Phacoemulsification is a safe and effective technique to remove white mature cataract in eyes in a developing country.

Chakrabarti A, Singh S. Phacoemulsification in eyes with white cataract. *J Cataract Refract Surg* 2000;**26**:1041-1047.

The South Asian Cataract Management Study

To determine the clinical outcomes of primary intracapsular cataract surgery with and without implantation of anterior chamber lenses a multicentre randomised clinical trial of 1229 patients aged 40 to 75 years with senile cataract was conducted. The patients were recruited from screening eye camps and outpatient clinics and randomisation was performed after screening for predetermined inclusion and exclusion criteria. Demographics, visual acuity, intraocular pressures, and corneal endothelial cell data were recorded before surgery and at 6 weeks and 12 and 24 months after surgery. Monitoring of the study was secured by a standardised image documentation procedure for all patients using the IMAGEnet digital imaging system. Analysis of corneal endothelial cell images was performed with the Cell Soft software. The main outcome measures were visual acuity and central corneal endothelial cell loss.

The patients were randomised to receive an intraocular lens (IOL; n = 616) or not to receive IOL implantation (n = 613). Surgical complications were reported for 177 patients (14.4%; IOL, 14.8%; no IOL, 14.0%). The most frequent complication observed was vitreous loss, which occurred in 10.3% of eyes (IOL, 11.2%; no IOL, 9.5%). At the final examination, 88% of the operated eyes had a best corrected vision of 6/18 or better (IOL, 88.8%; no IOL, 86.6%). Analysis of corneal endothelial cell data showed a small but significantly greater cell loss 6 weeks after surgery in eyes with IOL implantation compared with those without an IOL, but no overall difference was found between the treatment groups in the long term follow-up.

These findings indicate that there is a rationale for the use of anterior chamber intraocular lenses in primary intracapsular cataract surgery.

Snellingen T, Shrestha JK, Huq F, *et al*. The South Asian cataract management study: complications, vision outcomes, and corneal endothelial cell loss in a randomized multicenter clinical trial comparing intracapsular cataract extraction with and without anterior chamber intraocular lens implantation. *Ophthalmology* 2000;**107**:231-240.

Table 1. Intraoperative complications of phacoemulsification in eyes with white cataract (n = 212).

Complication	Number (%)
Premature entry of the tunnel into the anterior chamber	4 (1.9%)
Incomplete capsulorhexis	60 (28.3%)
Posterior capsular tear	4 (1.9%)
Conversion to a manual non-phacoemulsification technique	4 (1.9%)
Intraoperative miosis	7 (3.3%)
Iris chafing	2 (0.9%)

Efficacy of Latanoprost for Glaucoma in Japan

A study was performed to evaluate the intraocular pressure (IOP) -lowering effect and safety of latanoprost in Japanese patients with primary open angle glaucoma or ocular hypertension. 124 patients with primary open angle glaucoma or ocular hypertension were treated with latanoprost 0.005% once daily for 1 year.

At all follow-up visits there was a significant reduction in IOP compared with the baseline value ($p < 0.001$). After 1 year, the IOP was reduced by 5.4 ± 2.9 mm Hg from a baseline value of 23.5 ± 2.2 mm Hg. No evidence of an upward drift in the IOP was observed during the treatment period. The most frequently reported adverse ocular events were mild conjunctival hyperaemia and iris pigmentation. Very few adverse systemic events were observed.

Latanoprost eye drops showed a marked and stable IOP-lowering effect during the 1-year treatment period. Furthermore, latanoprost was well-tolerated and should

be a valuable contribution to the management of glaucoma.

Suzuki M, Mishima HK, Masuda K, *et al*. Efficacy and safety of latanoprost eye drops for glaucoma treatment: a 1-year study in Japan. *Jpn J Ophthalmol* 2000;**44**:33-38.

Incidence of Retinoblastoma in Singapore

Saw *et al*. described the incidence and survival of Singaporean patients with retinoblastoma from data collected by the Singapore Cancer Registry between 1968 and 1995. The medical records of 46 patients were traced, and information on laterality of the tumour, tumour spread, mode of treatment, and family history of retinoblastoma was obtained. Time trends and survival characteristics are described.

The incidence rate of retinoblastoma was 2.4 per 1 million for children younger than 9 years and 11.1 per 1 million for children younger than 5 years. The incidence of retinoblastoma has been almost uniform over time from 1968 to 1995, except for an apparent increase between 1988 and 1992. The 3-year survival rate for retinoblastoma was 83%. Survival rates were higher in children younger than 2 years because children who present at a younger age often have a tumour diagnosed at an earlier stage. There was no difference in survival rates for sex, race, laterality, family history of retinoblastoma, treatment, or year of diagnosis.

Retinoblastoma is the most common eye cancer in children and may cause blindness or death. The incidence rates of retinoblastoma in Singapore have remained stable during the past 28 years, and the survival rate is higher for younger children. This study will be helpful in monitoring future disease patterns in Asian populations.

Saw SM, Tan N, Lee SB, *et al*. Incidence and survival characteristics of retinoblastoma in Singapore from 1968-1995. *Pediatr Ophthalmol Strabismus* 2000;**37**(2):87-93.

Ocular Lesions Associated with HIV Infection in India

The purpose of this study was to document the ocular disorders seen in patients known to be infected with human immunodeficiency (HIV) virus at a referral eye clinic in India. The first 100 individuals known to be HIV-positive between 1993 and 1998 underwent complete ocular and systemic evaluation.

Most of the patients (76%) were aged 20 to 40 years. Heterosexual exposure to commercial sex workers was the most common risk factor (70%) for HIV infection. Cytomegalovirus (CMV) retinitis (17%) and HIV retinopathy (15%) were the most common HIV-associated ophthalmic lesions. Pulmonary tuberculosis (67%) and oropharyngeal candidiasis (66%) were the most commonly associated systemic infections.

Ocular involvement was most common in children who contracted the disease through perinatal transmission (66.7%) and in homosexual patients (60%). Ocular involvement was comparatively less common in patients who contracted the disease through blood transfusions (33%) or exposure to commercial sex workers (24.3%).

This study shows that the spectrum of ocular lesions associated with HIV infection in India is different from that seen elsewhere in the world. The prevalence of CMV retinitis and HIV retinopathy is lower in India, and there have been no cases of ocular Kaposi's sarcoma. Adnexal infections, albeit rare, were seen in our series. The unavailability and cost of therapy influenced the visual prognosis for these patients.

Biswas J, Madhavan HN, George AE, *et al*. Ocular lesions associated with HIV infection in India: a series of 100 consecutive patients evaluated at a referral center. *Am J Ophthalmol* 2000;**129**:9-15.

CONGRESS CALENDAR

JULY

27-29

World Refractive Surgery Symposium 2001

Orlando, FL, USA

Contact: ISRS World Headquarters, 1180 Springs Centre South Blvd., Suite 116, Altamonte Springs, FL 32714, USA
Tel: (1 407) 786 7446
Fax: (1 407) 786 7447
E-mail: isrshq@isrs.org

AUGUST

10-12

2nd Singapore National Eye Centre & Jules Stein Eye Institute Updates in Ophthalmology

Singapore

Contact: Ms Amy Lim, Organizing Secretariat, Singapore National Eye Centre, 11 Third Hospital Avenue, Singapore 168751
Tel: (65) 322 8374
Fax: (65) 227 7291
E-mail: Amy_Lim@snec.com.sg

19-21

2nd International Conference on Eye Disease

Tel Aviv, Israel

Contact: Kenes, Industry House, 29 Hamered Street, POB 50006, Tel Aviv 61500, Israel
Tel: (972) 351 40014
Fax: (972) 351 75674/5140077
E-mail: conventions@kenes.com

26-30

European Conference on Visual Perception

Kusadasi, Turkey

Contact: Ulker-Tulunay Keeley, 102 Pine Ridge Trail, Madison, Wisconsin 53717, USA
Tel: (1 608) 833 5444
Fax: (1 608) 833 5444
E-mail: UTkeesey@facstaff.wisc.edu

26-31

A Travelling Meeting On Visual And Peripheral Nervous System Disorders

Cuba

Contact: Rosaralis Santiesteban Freixas
E-mail: ediliamt@infomed.sld.cu

27-30

14th World Congress of International Society of Laser Surgery and Medicine

Chennai, Tamil Nadu, India

Contact: Dr B Krishna Rau, President, 14th World Congress of International Society of Laser Surgery and Medicine, Department of Surgery, D2 Ward, Sri Ramachandra Medical College & Research Institute, Porur, Chennai 600 116, India
Tel: (91 44) 476 5856/476 8027-28/852 7776/859 4804
Fax: (91 44) 859 4578, 476 7008
E-mail: krishnar@giasmd01.vsnl.net.in

SEPTEMBER

1-5

19th Congress of the ESCRS

Amsterdam, The Netherlands

Contact: ESCRS, 10 Hagan Court, Lad Lane, Dublin 2, Ireland
Tel: (353 1) 661 8904
Fax: (353 1) 678 5047
E-mail: escrs@agenda-comm.ie

OCTOBER

5-7

11th Annual Conference of Glaucoma Society of India

Indore, Madhya Pradesh, India

Contact: Dr Ramanjit Sihota, President, Glaucoma Society of India, R P Centre for Ophthalmology, All India Institute of Medical Sciences, Ansari Road, New Delhi, India
Tel: (91 731) 528 378
E-mail: rjsihota@hotmail.com/eyesite@satyam.net.in

19-22

Asian-Oceanic Glaucoma Society

Seoul, Korea

Contact: Congress Secretariat, INSESSION International Convention Services, Inc., 7th Floor Wooyoung Venture Tower, 1330-13, Seocho-dong, Seocho-gu, Seoul 137 858, Korea
Tel: (82 2) 3471 8555
Fax: (82 2) 521 8683
E-mail: aogs@insession.co.kr

NOVEMBER

1

Current Concepts in Primary Eye Care

Rochester, MN, USA

Contact: Mayo School of Continuing Medical Education, 200 First Street SW, Rochester, MN 55905, USA
Tel: (1 800) 323 2688 / (1 507) 284 2509
E-mail: cme@mayo.edu

8-10

World Refractive Surgery Symposium: Fall

New Orleans, LA, USA

Contact: ISRS World Headquarters, 1180 Springs Centre South Blvd., Suite 116, Altamonte Springs, FL 32714, USA
Tel: (1 407) 786 7446
Fax: (1 407) 786 7447
E-mail: isrshq@isrs.org

11-14

Annual Meeting of the American Academy of Ophthalmology

New Orleans, LA, USA

Contact: American Academy of Ophthalmology, 655 Beach Street, PO Box 7424, San Francisco, CA 94120-7424, USA
Tel: (1 415) 561 8500 Ext. 304
Fax: (1 415) 561 8576
E-mail: meetings@aao.org

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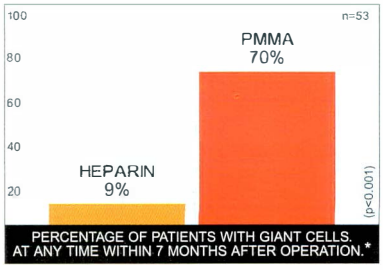

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* Philipson B, Fagerholm P, Calel B, Grunge-Löwenrud A. The three-year results of a randomized double-blind study on heparin surface modified IOL versus an unmodified IOL. Paper presented at the *11th Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) September 1993, Innsbruck, Austria.*

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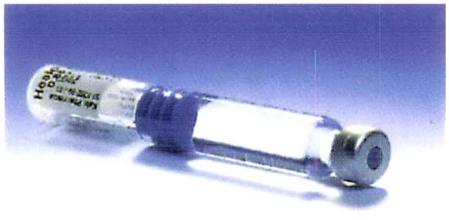

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