Community Eye Health JOURNAL

INTERNATIONAL CENTRE FOR EYE HEALTH

VISION 2020

Volume 19 | Issue No.59 | September 2006

What's new in glaucoma treatment?

Glaucomatous optic neuropathy: splinter haemorrhages

R Bourne

EDITORIAL

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Glaucoma treatment: the state of the evidence

Interventions for the treatment of different forms of glaucoma have been tried and tested for many years. The idea that lowering the pressure might be helpful was first proposed more than a hundred years ago. By the 1950s, it was established that raised intraocular pressure (IOP) was glaucoma, and vice versa. However, in the mid 1960s, Fred Hollows and Peter Graham demolished that simple concept by revealing that there were many people in the population with raised IOP but no glaucoma, and people with glaucoma without raised IOP.[1] Nevertheless, IOP remains an important risk factor (and the only one we can modify) for a group of conditions characterised by a progressive atrophy of the optic nerve associated with typical structural and functional abnormalities.

Only quite recently has robust evidence emerged regarding the effectiveness of treatment for open-angle glaucoma (OAG). There is still uncertainty about the best way to manage chronic angle closure. This discussion focuses only on the primary glaucomas in adults, open-angle and acute, and chronic angle closure.

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Community Eye Health JOURNAL

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The journal is produced in collaboration with the World Health Organization

Volume 19 | Issue No. 59 | September 2006

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Printing
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ISSN 0953-6833

Open-angle glaucoma

The first major systematic review was by Rossetti et al. in 1993.[2] Despite finding more than 120 randomised controlled trials (RCTs) of the medical treatment of open-angle glaucoma and ocular hypertension, the authors could not find good evidence that lowering IOP either prevented the development of glaucomatous optic nerve damage, or prevented its progression in established disease. Researchers complained that it would be unethical in a trial to randomly allocate patients with overt disease to a control group with no intervention or placebo; yet they had to confront the ethical reality that the effectiveness of treatment was uncertain.

The ethical challenge was already being met by the collaborative normal tension glaucoma study.[3] Many patients with this form of glaucoma were not routinely receiving treatment. Patients were recruited with OAG whose pressures were never found to be higher than 24 mm Hg. Patients were not randomly allocated to pressure-lowering intervention until they showed definite evidence of progression. About 40 per cent of participants did not progress in five years. This was an important observation on the natural history of the disease. Vision declined in both treated and untreated groups, and it was only after adjusting for the effect of cataract that a beneficial effect of lowering pressure could be demonstrated. Because some eyes deteriorated despite successful lowering of pressure, it was postulated that there existed mechanisms responsible for damage to the optic nerve, independent of pressure.

Ocular hypertension (OHT) was another ethical loophole. Indeed, many patients with OHT were not normally treated, and there was uncertainty about whether lowering pressure would reduce the risk of developing nerve damage. The ocular hypertension treatment study (OHTS) was a multi-centre RCT based in the USA.[4] Patients with raised pressure, but no definite nerve damage, were randomly allocated to treatment or none. Conversion rates were low in five years, but the study was large enough to detect a small treatment effect. It was possible to draw firm conclusions that there was a treatment benefit. The baseline risk of converting was small, about 10 per cent in five years. But treatment reduced this risk by half. The number of patients with OHT needed to treat (NNT) to prevent one from developing optic nerve damage, was about 15 for evidence of structural and/or functional damage, but 42 for functional damage only, i.e. new visual field loss.

The question remained about the effectiveness of lowering pressure in overt disease. The early manifest glaucoma trial (EMGT)[5] was designed to address this. To find 250 patients with early glaucoma, it was necessary to screen more than 60,000 people in southern Sweden. Half of these patients were randomly allocated to treatment and the other half to none. Using a sensitive algorithm for detecting progression in automated threshold perimetry, the trial found a much larger treatment effect, an NNT of 7.

The difference between the treatment effect found in these two studies may reflect differences in the sensitivity of the methods used to detect change, but it can also be explained by differences in the participants. EMGT used a population-based sample identified on the basis of optic nerve head appearance and visual field abnormality, independent of IOP (the mean IOP was 20 mm Hg for the whole trial sample). The OHTS included patients already in clinics with raised pressure but normal optic nerve. They were effectively selected for resistance to the effects of pressure on the optic nerve. OAG is a disease of the optic nerve in which it is vulnerable to the effects of pressure. The higher the pressure, the more likely it is that damage will occur, though the vulnerability of the nerve to pressure is a crucial determinant of disease risk.

A systematic review published in the British Medical Journal[6] in 2005 summarises the evidence for the effectiveness of medical treatment in lowering IOP in OHT, normotensive glaucoma (NTG), and primary open-angle glaucoma (POAG). The lack of evidence highlighted by Rossetti et al. has now been addressed. More detail is needed on the effectiveness of different types of medical, laser and surgical treatments. A completed systematic review on medical versus surgical treatment[7] has found that both treatments are equally effective. This is important evidence for the benefit of surgery where the feasibility of sustained medical therapy is unlikely. Two substantial ongoing Cochrane reviews are examining the evidence for the different medical options and laser trabeculoplasty, both of which are due to be published within the next year.[8,9]

Angle-closure glaucoma

In angle closure and angle-closure glaucoma, there is less evidence of effectiveness of treatments. Useful definitions have been proposed for these conditions, in which anatomical abnormalities of the angle with or without raised IOP are separated from those that cause damage to the optic nerve.[10] Most believe that the structural abnormalities of the anterior segment leading to higher (sometimes very high) pressure are more important than the vulnerability of the optic nerve, because almost every optic nerve will succumb to the effects of prolonged and excessive elevation of IOP in angle closure.

There is no doubt that in acute angle closure there is an urgent need to reduce IOP. There are different ways of doing this. Ideally, this should be done as quickly as possible, while minimising the risk of making the patient feel even worse. Intravenous acetazolamide is often used for rapid action, as well as topical pilocarpine (there is no additional benefit from 'intensive' administration). Osmotic agents such as glycerol or mannitol have fallen out of favour, but evidence regarding the safety and effectiveness of these kinds of interventions is almost entirely

'There is a growing body of good evidence about the effectiveness of glaucoma treatments. An effective service for prevention of glaucoma blindness requires highly developed infrastructure, including fully integrated primary, secondary and tertiary eye care services'

lacking. Trials are needed to evaluate new treatments such as laser iridoplasty and lens extraction, and some are underway.

No one doubts the need to do a peripheral iridotomy (PI) in acute angle closure, both of the affected eye and the contra-lateral one, as a preventive measure. This is not based on trial evidence, but on the observation that if this is not done, the probability of an attack in the second eye is higher than 50 per cent.[11] However, this is not always the solution. Peripheral iridotomy or iridectomy solves pupil block, relative or absolute, if it is contributing to the glaucoma mechanism. It will have no impact if the angle is crowded by a swollen lens, or anterior displacement of the entire iris, lens, and ciliary body as in malignant glaucoma (aqueous misdirection), or acute choroidal effusions or haemorrhage.

The best management of chronic angle closure and chronic angle-closure glaucoma remains uncertain. Imaging the anterior segment using high-frequency ultrasound (UBM) or scanning laser tomography (OCT) will help identify whether pupil block is an important component of the process. Many advocate iridotomy in case it is. We are currently awaiting the results of a trial of the effectiveness of PI as a prophylactic measure to prevent optic nerve damage. However, when pupil block is only marginal in the process, the angle recess may widen after PI, but the pressure is unaffected or may be higher. This is especially the case if high energy is needed to penetrate the iris with the YAG laser and much debris and pigment deposited in an already malfunctioning drainage system. In patients with thick brown irides, some advocate doing a surgical PI. Trials comparing laser and surgical PI showed that laser PI was as good as surgery but not better.

Many of these patients also have an incipient cataract, a larger lens in a smaller eye (hypermetropia is a risk factor), and they will likely need cataract extraction before long. If they have already had a difficult laser PI, the iris will be adherent to the lens and the surgery more difficult, with a higher risk of corneal damage and other complications. Some time ago, clear lens extraction was advocated for chronic narrow-angle glaucoma (CNAG), but no trial was conducted and smaller incision cataract surgery was not so prevalent. Now the question is being asked again. A systematic review in the current edition of CLIB[12] found no RCTs, and although some non-randomised studies suggest a benefit, there is an urgent need for new trials to assess whether primary lens extraction works as well, and is as acceptable to patients, as current management.

Outcomes

Outcomes represent a great challenge in glaucoma since the aim of treatment is preserving sight in the long term. The natural history of the disease is as long as a clinician's career, so it is inevitable that surrogate or proxy measures must be used. IOP has had to suffice for many short-term studies, but those asking the question about preserving sight must measure visual function. Progression, however measured, has become the key parameter, because we seek to reduce visual decay to a rate that is compatible with the patient's sighted lifetime. It should be the primary outcome of any new trial. Harmful effects are of equal importance.

Conclusion

There is a growing body of good evidence about the effectiveness of glaucoma treatments. In terms of VISION 2020, deploying an effective service for prevention of glaucoma blindness requires highly developed infrastructure, including fully integrated primary, secondary and tertiary eye care services. This is an ideal far removed from reality for most poorer countries, and is not in place in many so-called developed countries, including the UK, where people still present too late, with advanced optic nerve damage and a poor prognosis for a sighted lifetime.

Many questions remain about the effectiveness of glaucoma treatment, but the most urgent need for evidence is for the best management of both acute and chronic angle-closure glaucoma. Some studies are underway but more are needed. Laser trabeculoplasty has been shown to be cheap and sometimes effective in trials. The use of the Diode laser, as a means of deferring the need for surgery in poorer countries, needs to be explored. In more affluent countries, a large trial is now needed to explore whether population-based screening for glaucoma can save sight.

References

1 Hollows FC, Graham PA. Intra-ocular pressure, glaucoma, and glaucoma suspects in a defined population. Br J Ophthalmol 1966 Oct;50(10): 570-86.
2 Rossetti L, Marchetti I, Orzalesi N, Scorpiglione N, Torri V, Liberati A. Randomized clinical trials on medical treatment of glaucoma. Are they appropriate to guide clinical practice? Arch Ophthalmol 1993 Jan;111(1): 96-103.
3 The Normal Tension Glaucoma Study Group. Intraocular pressure reduction in normal-tension glaucoma patients. Ophthalmology 1992 Sep;99(9): 1468-70.
4 Kass MA, Heuer DK, Higginbotham EJ, Johnson CA, Keltner JL, Miller JP, et al. The ocular hypertension treatment study: a randomized trial determines that topical ocular hypotensive medication delays or prevents the onset of primary open-angle glaucoma. Arch Ophthalmol 2002 Jun;120(6): 701-13.
5 Heijl A, Leske MC, Bengtsson B, Hyman L, Bengtsson B, Hussein M, Early Manifest Glaucoma Trial Group. Reduction of intraocular pressure and glaucoma progression: results from the early manifest glaucoma trial. Arch Ophthalmol 2002 Oct;120(10): 1268-79.
6 Maier PC, Funk J, Schwarzer G, Antes G, Falck-Ytter YT. Treatment of ocular hypertension and open-angle glaucoma: meta-analysis of randomised controlled trials. BMJ 2005 Jul 16;331(7509): 134-7.
7 Burr J, Azuara-Blanco A, Avenell A. Medical versus surgical interventions for open-angle glaucoma. Cochrane Database of Systematic Reviews 2004; Issue 2. Art. No.: CD004399.pub2. DOI: 10.1002/14651858.CD004399.pub2.
8 Rolim de Moura C, Paranhos A. Laser trabeculoplasty for open-angle glaucoma. Cochrane Database of Systematic Reviews 2002; Issue 4. Art. No.: CD003919. DOI: 10.1002/14651858.CD003919.
9 Vass C, Findl O, Sycha T, Bauer P, Schmetterer L. Medical interventions for primary open-angle glaucoma and ocular hypertension. Cochrane Database of Systematic Reviews 2004; Issue 3. Art. No.: CD003167.pub2. DOI: 10.1002/14651858.CD003167.pub2.
10 Foster PJ, Buhrmann R, Quigley HA, Johnson GJ. The definition and classification of glaucoma in prevalence surveys. Br J Ophthalmol 2002 Feb;86(2): 238-42.
11 Edwards RS. Behaviour of the fellow eye in acute angle-closure glaucoma. Br J Ophthalmol 1982 Sep;66(9): 576-9.
12 Friedman DS,Vedula SS. Lens extraction for chronic angle-closure glaucoma. Cochrane Database of Systematic Reviews 2006; Issue 3. Art. No.: CD005555.pub2. DOI: 10.1002/14651858. CD005555.pub2.

ABSTRACT

The number of people with glaucoma worldwide in 2010 and 2020

Quigley HA, Broman AT

Aim: To estimate the number of people with open-angle (OAG) and angle-closure glaucoma (ACG) in 2010 and 2020. **Methods:** A review of published data with use of prevalence models. Data from population-based studies of age-specific prevalence of OAG and ACG that satisfied standard definitions were used to construct prevalence models for OAG and ACG by age, sex, and ethnicity, weighting data proportional to sample size of each study. Models were combined with UN world population projections for 2010 and 2020 to derive the estimated number with glaucoma. **Results:** There will be 60.5 million people with OAG and ACG in 2010, increasing to 79.6 million by 2020, and of these, 74 per cent will have OAG. Women will comprise 55 per cent of OAG, 70 per cent of ACG, and 59 per cent of all glaucoma in 2010. Asians will represent 47 per cent of those with glaucoma and 87 per cent of those with ACG. Bilateral blindness will be present in 4.5 million people with OAG and 3.9 million people with ACG in 2010, rising to 5.9 and 5.3 million people in 2020, respectively. **Conclusions:** Glaucoma is the second leading cause of blindness worldwide, disproportionately affecting women and Asians.

Printed courtesy of: Br J Ophthalmol. 2006 Mar;90(3): 262-7.

How to assess a patient for glaucoma


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Introduction

Glaucoma affects approximately 65 million people around the world and an expected 7.5 million are blind due to the disease. It is the second most common cause of blindness worldwide.[1] It is estimated that perhaps half the blindness from glaucoma in the world is caused by angle closure.[2] Accordingly, in order to be effective, any case detection has to include methods to detect angle closure.

A clinic examination is different from a screening programme in the community. In the clinic the patient has sought us out and the responsibility is ours to detect and treat any pathology, including glaucoma. Some short cuts that may be satisfactory in screening programmes are not acceptable in a clinic. The best method to detect (and assess) glaucoma is to perform a comprehensive eye examination for all patients who attend the clinic, irrespective of the complaints they present with.[3]

Components of a comprehensive eye examination to assess glaucoma

Five components of the comprehensive eye examination are specifically relevant to assess glaucoma.

1. Slit lamp examination

Specifically in this instance to rule out secondary causes of glaucoma.

2. Intraocular pressure (IOP)

This is preferably measured by applanation tonometry. Tonometry has poor sensitivity and specificity for the detection of glaucoma. Half the patients with primary open-angle glaucoma (POAG) have IOPs below 22 mm Hg at the first measurement. Further, as shown by the ocular hypertension treatment study (OHTS), only 9.5 per cent of patients with IOP above 21 mm Hg develop early glaucoma if left untreated for five years.[4] Intraocular pressure measurement alone is an inefficient tool to detect glaucoma, but, if consistently elevated, IOP does play a role in the diagnosis.

It is important to remember that the Goldmann applanation tonometer may record falsely high IOP if corneal thickness (not corneal oedema) is increased. This message is reiterated by the OHTS finding that in a thick cornea the risk of progression is minimal for patients with ocular hypertension. There is no consensus about which correction formula to use to adjust for corneal thickness; we use Elher's formula, which applies a 5 mm Hg correction for every 70 μ of corneal thickness. Routine central corneal thickness (CCT) measurement is ideal; it should at least be measured in all patients with ocular hypertension and suspected normotensive glaucoma (NTG). As far as management is concerned, IOP is the only known causal factor and the only factor that we can alter therapeutically.

3. Gonioscopy

Gonioscopy is the current gold standard for the diagnosis of angle closure and is mandatory for the diagnosis and management of all glaucomas. POAG is a diagnosis of exclusion, after a careful examination, including gonioscopy, to rule out angle closure and secondary causes. The presence of a single peripheral anterior synechia in an occludable angle (Figure 1) confirms the diagnosis of angle closure.

The ideal technique is dynamic gonioscopy with an indentation-type lens like the 4-mirror Susmann gonioscope. The anterior chamber angle is a dynamic structure and it can change over a period of time due to changes in lens thickness, position, and other factors. It is therefore essential to perform gonioscopy on a routine basis, even in a 'known' case of POAG.

The flashlight and van Herrick tests are sometimes suggested as surrogates for gonioscopy. On its own, the flashlight test is close to useless.[5] The van Herrick test may be of some use in screening programmes, but is of little help in the clinic where gonioscopy is the gold standard.[5]

Figure 1. Gonioscopy showing peripheral anterior synechia

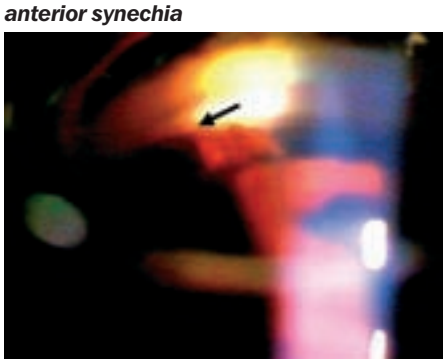

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Figure 2. Optic disc photograph with inferior notch

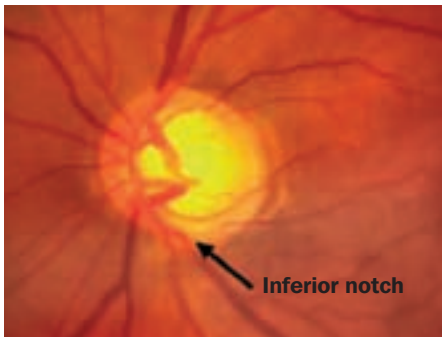

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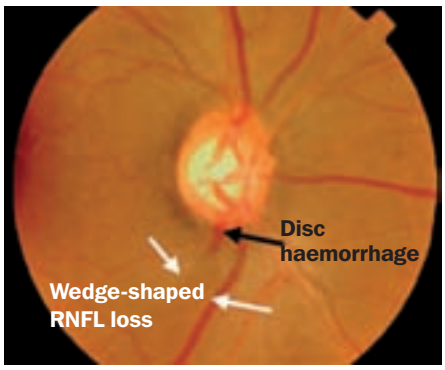
Figure 3. Optic disc photograph with disc haemorrhage



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4. Disc and retinal nerve fibre layer examination

Glaucoma is essentially an optic neuropathy and the key to diagnosis rests on examination of the disc and nerve fibre layer. While stereo disc photography is the gold standard, clinical examination of the disc and retinal nerve fibre layer (RNFL) is best performed by a dilated stereoscopic examination on a slit lamp using a 60, 78 or 90 dioptre lens. The best stereoscopic view is with a contact lens, but logistics prevent its routine use. When there is a doubt, we would still use a contact lens. Unless contra-indicated, the disc, RNFL, and fundus should not ordinarily be assessed with undilated pupils.

The numerous signs that need to be sought during disc assessment are beyond the scope of this article; they include rim thinning or notch, disc haemorrhage, wedge-shaped RNFL, etc. (Figures 2 & 3).

Newer imaging techniques are now available for documentation of the optic disc. These include the Heidelberg retinal tomogram (HRT), scanning laser polarimetry (GDX), and optical coherence tomography (OCT). The Association of International Glaucoma Societies (AIGS) consensus meeting concluded that at present there was insufficient evidence to validate the routine use of these instruments. The meeting also concluded that, in the hands of a specialist, imaging techniques can

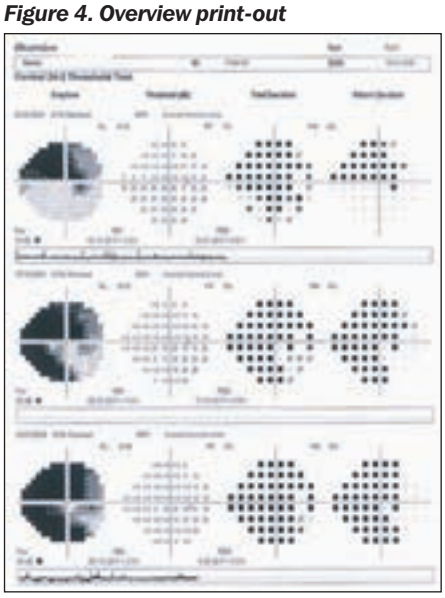
provide valuable information. We concur with these conclusions. We also feel that these instruments have a great potential for follow-up.

5. Perimetry

The goal of glaucoma management is to preserve the patient's visual function and quality of life. The gold standard for the detection of functional glaucomatous damage is automated 'white on white' perimetry. This test is mandatory to document functional damage, its progress and its response to treatment. In areas where primary surgery is necessary, the presence of a confirmed functional defect puts a decision for such intervention on a firm(er) footing.

We first need to obtain baseline fields, both for diagnosis and for comparison on follow-up. The first few fields usually demonstrate a learning curve and cannot be used as a baseline. To determine progression, we currently use the overview programme (Figure 4) and the glaucoma progression analysis (GPA). The GPA provides statistical help to determine progression (Figure 5).

Figure 4. Overview print-out



Frequency Doubling Perimetry (FDP) is a rapid and relatively inexpensive test that can accurately detect established field defects. FDP has a high sensitivity and specificity. It can fulfill the objective of confirming a field defect prior to surgery, but does not have the programmes for follow-up.

The Bjerrum Screen is good enough for documenting a defect, and, if it correlates with the other findings, is enough to go to surgery. The demonstration of a functional defect becomes especially important in the areas where we would go for primary surgery. The Bjerrum Screen, however, is not good for follow-up.

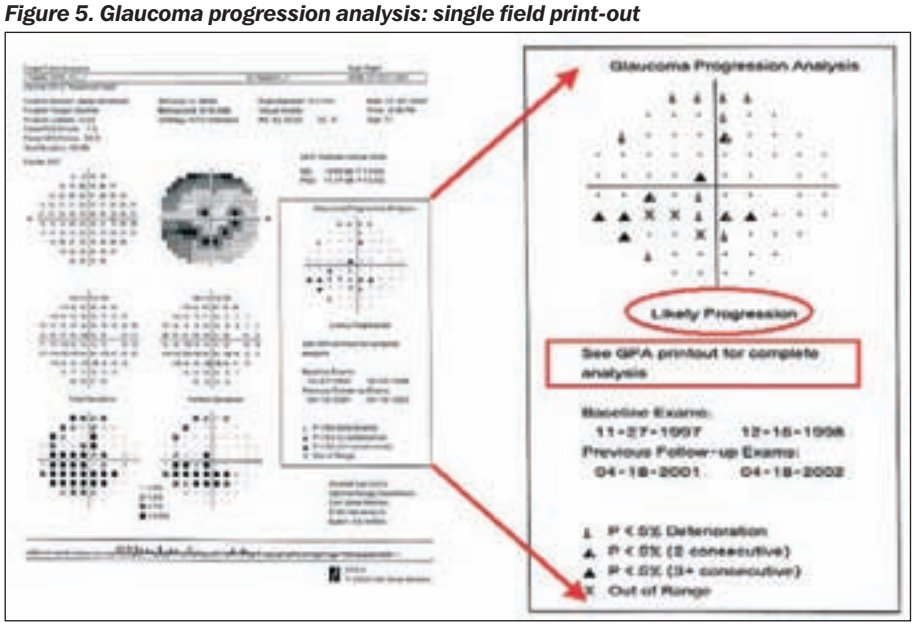
Primary angle-closure glaucoma (PACG)

Tonometry will only detect angle closure in a patient with raised IOP. The structural and functional tests described for POAG (optic disc examination, perimetry) will only detect angle closure that has damaged the disc or visual field. As approximately 75 per cent of subjects with PACG in Asia have optic nerve damage, strategies that detect functional damage in POAG may also be suitable for PACG. However, such tests will not detect eyes without functional damage or eyes at risk for angle closure. Such eyes at risk, and those with early disease, are the ones we need to detect. In these cases, an iridotomy can be curative.

1. Gonioscopy

The ideal way to identify angle closure and eyes at risk is to examine the angle using a gonioscope. The clinical expertise required renders gonioscopy inappropriate for screening; however, it is necessary for clinical practice. The AIGS consensus meeting on angle closure concluded that gonioscopy is mandatory in the clinical situation.

Figure 5. Glaucoma progression analysis: single field print-out



2. Torchlight examination (flashlight test)

In the flashlight test a light is shone from the temporal side onto the cornea, parallel but anterior to the iris. A shadow on the nasal limbus identifies an eye with a shallow anterior chamber, at risk of closure. Considering the sensitivity and specificity of this test, the AIGS consensus meeting concluded it has no role to play in the detection of angle closure.

Figure 6. Van Herrick test showing shallow peripheral anterior chamber

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3. Slit lamp examination (van Herrick test)

The van Herrick test uses a slit beam to compare the depth of the peripheral anterior chamber to the thickness of the cornea. When the depth of the peripheral anterior chamber is less than 1/4th of the corneal thickness, it is considered shallow (Figure 6). The sensitivity and specificity of the test does not meet the recommendations of Prevent Blindness America for screening.

It is also important to remember that the flashlight and van Herrick tests do not detect angle closure but occludable angles, which are only a risk factor for angle closure. This distinction is important because only a minority of occludable angles progress to angle closure. Using the van Herrick test for screening will result in too many false positives.

In summary, the clinical assessment of a patient for glaucoma requires a complete comprehensive examination (including gonioscopy) on all adult patients seen in the clinic, followed by appropriate investigations (visual fields) to document damage and follow up patients with suspected glaucoma as well as confirmed cases.

References

1 Quigley HA. Number of people with glaucoma worldwide. Br J Ophthalmol 1996;80: 389-93.
2 Foster PJ, Johnson GJ. Glaucoma in China: how big is the problem? Br J Ophthalmol 2001;85: 1277-82.
3 Thomas R, Parikh R, Paul P et al. Population-based screening versus case detection. Indian J Ophthalmol 2002;50: 233-7.
4 Kass MA, Heuer DK, Higginbotham EJ, et al. The ocular hypertension treatment study: a randomized trial determines that topical ocular hypotensive medication delays or prevents the onset of primary open-angle glaucoma. Arch Ophthalmol 2002 Jun;120: 701-13.
5 Thomas R, George T, Muliyil J. The Flashlight and van Herrick's Test are poor predictors of occludable angles. Aust N Z J Ophthalmol 1996;24: 251-6.

How to manage a patient with glaucoma in Africa


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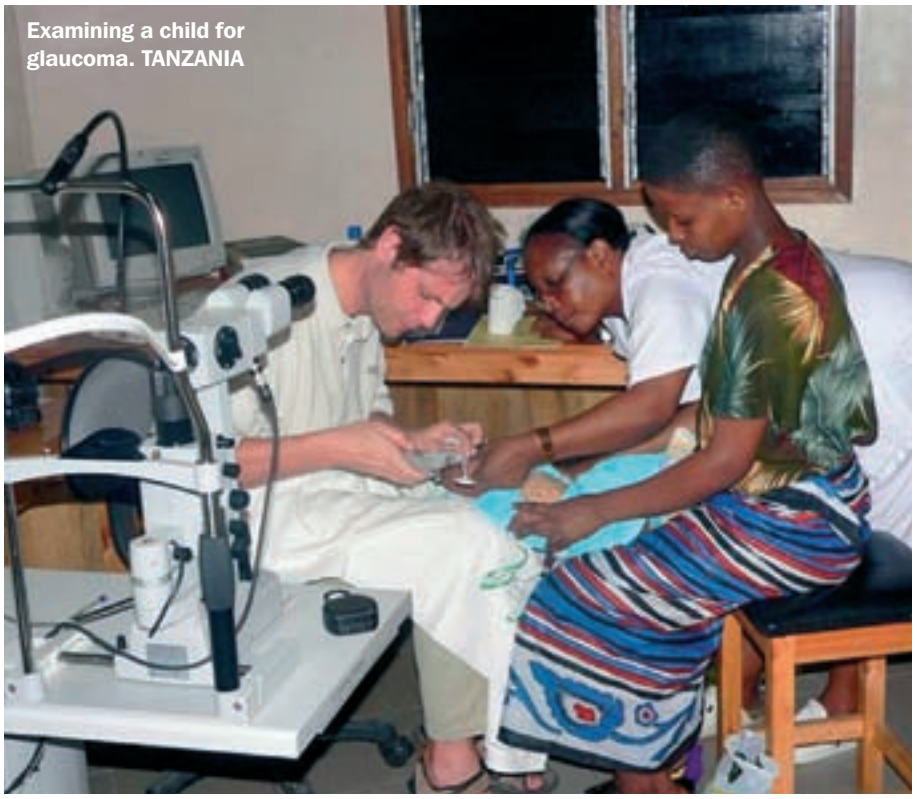
Introduction

How to manage a patient with glaucoma in Africa? The simple answer is: having made the diagnosis by optic disc assessment and intraocular pressure measurements (visual field tests are usually unavailable and unnecessary), perform trabeculectomy surgery using a technique broadly similar to that described by Ian Murdoch in this issue. This article discusses the reasons for this relatively universal management principle. The focus of this article is primary open-angle glaucoma, which affects the large majority of glaucoma patients across the continent. Some brief principles concerning management of other types of glaucoma in Africa are included at the end.

Find the patient

Finding the patient while there is still some useful vision to save is one of the major challenges in the management of glaucoma in Africa. Audits in our hospitals have shown that 29 per cent of glaucoma patients (Dar es Salaam)[1] and 53 per cent of eyes (Kano) present to hospital blind. Seventy per cent of patients had cup/disc ratios of more than 0.8 in their better eye in Dar es Salaam,[1] and 63 per cent of eyes in Kano had cup/disc ratios of more than 0.8. How can we improve on this? Population-based glaucoma screening is not advocated because there is no good screening test and it is impractical. However, there are many active community outreach programmes targeting those with treatable blindness and visual impairment, such as cataract, which can also be used to refer glaucoma patients earlier than they might present themselves to hospital. Outreach workers can be trained in intraocular pressure (IOP) measurement and disc assessment. However, neither are very specific or sensitive screening tests and, as hospitals are able to offer more comprehensive eye care services, even the field assessment of discs and the measuring of IOP may not be necessary. Reduced visual acuity could be used instead. For example, if spectacles can be provided for refractive errors and high-quality cataract surgery for immature cataracts, then all patients with visual acuities less than 6/18 could be referred back to the hospital. Full assessment would then pick up some glaucoma patients earlier than many are currently presenting. Although visual acuity is not thought of as a screening test for glaucoma, it may be the most practical for Africa, where advanced disease does affect visual acuity.


Examining a child for glaucoma. TANZANIA

Richard Bowman

'Surgery is almost always the correct treatment in Africa, where medical therapy throughout the patient's lifespan is impractical'

Address barriers to acceptance of surgery

A number of studies have demonstrated poor uptake of glaucoma surgery in Africa even when it has been provided free.[1,2] This is not surprising. The operation compares poorly with cataract surgery in terms of patient perception; the best that the patient can hope for is retention of current level of vision, and there is indeed a moderate risk of visual deterioration, both acutely (usually transient) and chronically, due to cataract.[2,4] An audit at our hospital (CCBRT Disability Hospital, Dar es Salaam) revealed that some of the barriers to surgery may be related to gender; women were not only less likely to present to the hospital with glaucoma, but also less likely to be referred for surgery once they do present. This requires further investigation.

How can we overcome these barriers?

1. Careful counselling about the reason for surgery, expected outcomes, and the high risk of blindness without surgery. This should be provided preferably by trained full-time counsellors.
2. Programmes with cost-recovery schemes may need to consider charging less for trabeculectomy than for cataract surgery. We currently charge the same for both, but maybe it is unrealistic to expect patients to pay the same fee for an operation offering no chance of better vision as for one offering a high chance of better vision. However, user fees are certainly not the only barrier, since there has been poor uptake of free surgery in Tanzania, as explained above.
3. Pay careful attention to surgical technique to maximise chances of successfully lowering pressure and to minimise the risk of subsequent visual loss (see next section and Ian Murdoch's article).

4 There may be a case for more widespread use of combined cataract and glaucoma surgery in Africa, for patients with glaucoma and immature cataract. This would increase the benefit to the patient (possible improved post-operative visual acuity and less risk of post-operative visual deterioration due to cataract). However, this is more difficult surgery than either cataract or trabeculectomy alone, and is known to have a higher drainage failure rate than trabeculectomy alone. Furthermore, it has not been reported systematically in Africa.

Perform the surgery

Surgery should select techniques based on the assumption that you may not see the patient again after discharge. Surgery is almost always the correct treatment in Africa, where medical therapy throughout the patient's lifespan is impractical. Two studies of patients presenting to hospital with glaucoma have demonstrated that previous drainage surgery is associated with better vision[1] and lower IOPs[1,3] than previous medical therapy.

We advocate techniques similar or identical to those described by Ian Murdoch in this issue, with emphasis on achieving a diffuse posterior bleb and avoiding a post-operative hypotony or anterior chamber shallowing, which have been shown to increase the risk of subsequent visual loss.[4]

Use of anti-scarring treatments in Africa

Patients of African origin are known to be at higher risk of failure of trabeculectomy surgery because of subconjunctival scarring. This has led to widespread use of anti-scarring adjunctive therapy given at time of surgery. Although good results have been described in African and Afro-American patients without these agents, comparative studies tend to suggest a benefit from their use. Mitomycin C (MMC) may result in lower pressures than 5 fluorouracil (5FU), but may also be accompanied by high rates of complications.[5-8] This, together with its higher toxicity and price, and lower pharmacological stability compared to 5FU, have led some to question the suitability of MMC for widespread use in Africa. In conclusion, if anti-scarring agents are available, use them but remember that they will exaggerate the consequences of any error in surgical technique (especially MMC). Extra effort must be made to ensure that the scleral flap and conjunctival flap (especially anteriorly) are securely sutured, and to apply the anti-scarring agent over a wide surface area, in order to try to achieve a diffuse posterior bleb rather than an anterior cystic one.

Manage post-operative complications

Acute complications

Shallow AC

This may be due to leakage of aqueous under the conjunctival flap (Seidel positive), in which case resuturing of the conjunctiva is required. It may also be due to excessive drainage through the fistula (large bleb, Seidel negative). In the latter case, conservative measures may be tried initially (atropine, pad and bandage, short course of diamox), but it may be necessary to resuture the scleral flap if these fail. Both the above causes of shallow AC are associated with hypotony, but if the IOP is high with a shallow AC, then aqueous misdirection syndrome must be considered. Try atropine drops and diamox. If this fails, lens removal and anterior vitrectomy may be necessary.

High IOP

Cut or release (if releasable) posterior scleral sutures and massage behind the posterior edge of the scleral flap to encourage posterior drainage. If this fails, the sclerostomy may be blocked and should be explored and revised if necessary.

Chronic complications

Failure of IOP control

This is usually due to scarring down of the scleral flap and conjunctiva, and the bleb often looks flat. Needle revision of the bleb can be tried. We do this in theatre in the following way: use a micro vitreal blade (MVR blade) to enter the subconjunctival space above the bleb; advance it subconjunctivally into the area of the bleb to dissect any scarring, then penetrate beneath the scleral flap into the AC, and lift the flap as it is withdrawn (the bleb usually appears instantly). Subconjunctival 5FU is then injected above the bleb. If one or two needle revisions fail, repeat trabeculectomy can be performed; this is usually easier to do in a new site if there is room. Repeat trabeculectomy carries a high risk of scarring and failure, and MMC should be used if available.

Cataract

This should be removed using a section placed away from the bleb (i.e. corneal or temporal limbal).

Make every effort to achieve follow-up

A number of studies from Africa report poor long-term follow-up.[4,8] This is one of the reasons why surgical technique has to be even more accurate than in industrialised countries, where good follow-up is the norm (only 7 per cent of patients at Kano had more than two weeks' follow-up). It is important to try to improve this, since late failure of drainage or treatable visual loss from cataract may occur. Counselling about the importance of follow-up is essential and financial incentives such as partial reimbursement of surgical fees or transport costs may be appropriate.

Other types of glaucoma

Normal tension glaucoma (NTG)

The difficulty in Africa is being sure of the diagnosis in the absence of progressive visual field changes. Patients with glaucomatous discs, history of progressive visual deterioration and normal IOPs should usually undergo trabeculectomy which has been shown to be of benefit for NTG.

Angle-closure glaucoma

Uncommon in Africa, except in Asian populations, and therefore commonly missed.

Primary congenital glaucoma

The choice is between goniotomy, trabeculotomy and trabeculectomy, preferably by a sub-specialist.

Rubeotic glaucoma

The eye is usually blind from retinovascular disease and the emphasis should be on keeping the patient comfortable (topical steroids, atropine and cyclophotocoagulation, retrobulbar alcohol or enucleation if necessary).

References

1 Mafwiri M, Bowman RJ, Wood M, Kabiru J. Primary open-angle glaucoma presentation at a tertiary unit in Africa: intraocular pressure levels and visual status. Ophthalmic Epidemiol 2005 Oct;12(5): 299-302.

2 Quigley HA, Buhrmann RR, West SK, Isseme I, Scudder M, Oliva MS. Long-term results of glaucoma surgery among participants in an east African population survey. Br J Ophthalmol 2000;84: 860-864.

3 Verrey JD, Foster A, Wormald R, Akuamoa C. Chronic glaucoma in northern Ghana – a retrospective study of 397 patients. Eye 1990;4: 115-20.

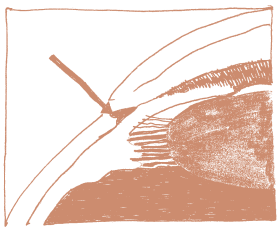
4 Kabiru J, Bowman R, Wood M, Mafwiri M. Audit of trabeculectomy at a tertiary referral hospital in East Africa. J Glaucoma 2005 Dec;14(6): 432-434.

5 Mermoud A, Salmon JF, Murray AD. Trabeculectomy with mitomycin C for refractory glaucoma in blacks. Am J Ophthalmol 1993;116: 72-78.

6 Singh K et al. Trabeculectomy with intra-operative 5-flurouracil vs mitomycin C. Am J Ophthalmol 1997;123: 48-53.

7 Mwanza JC, Kabasele PM. Trabeculectomy with and without mitomycin-C in a black African population. Eur J Ophthalmol 2001 Jul-Sep;11(3): 261-3.

8 Yorston D, Khaw PT. A randomised trial of the effect of intraoperative 5-FU on the outcome of trabeculectomy in East Africa. Br J Ophthalmol 2001;85: 1028-1030.



How to manage a patient with glaucoma in Asia

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Introduction

Glaucoma affects nearly 70 million people worldwide, of which nearly half are in Asia.[1] Although more people are affected by primary open-angle glaucoma (POAG) than by primary angle-closure glaucoma (PACG), the latter is more common in Asians and carries a higher burden of morbidity. An estimated 13.6 million people will suffer from PACG in Asia by 2010, of which nearly 3.5 million will be bilaterally blind.[2] Unlike cataract, visual loss from glaucoma is irreversible. The methods for management of POAG are similar to those described in the other sections of this issue, therefore we will concentrate on PACG in this article.

Traditional definitions of PACG have emphasised the symptomatic aspect of the disease. However, only 25 per cent of PACG is symptomatic, therefore more modern definitions rely on objective evidence of damage to the trabecular meshwork and optic nerve.[3] A diagnosis of glaucoma means that there is damage to the optic nerve as shown by changes in the optic disc and a characteristic visual field defect. One important distinction is that acute angle closure, where there is a sudden rise in intraocular pressure (IOP) causing pain and blurred vision, is not considered as glaucoma.

As management pathways for PACG are different to that of POAG, accurate detection as well as treatment are important when dealing with glaucoma in Asia.

Population burden of glaucoma

PACG is largely asymptomatic. Therefore, there are a large number of patients in the community who have undiagnosed disease. A glaucoma survey in Mongolia showed that 91 per cent of patients were not aware that they had glaucoma,[4] and in a similar survey in Singapore this figure was 21 per cent. This suggests that economic conditions and health service provision are a consideration in the population burden of the disease.

Age and gender are major risk factors for PACG. Angle closure is rare before the age of 40 and more common in females. The main anatomical risk factors are shorter axial length and a shallow anterior chamber depth (ACD). Asian people who present with an acute episode of angle closure have shorter axial lengths compared to those with chronic angle closure, and both these groups have shorter axial lengths than people without angle closure. Although anterior chamber depth is correlated with angle closure in different populations of Asian descent, there is a suggestion that this association differs between different populations.[5]

There is little information about the natural history of the disease. Current understanding indicates that people at risk of disease develop an anatomically narrow angle (or primary angle-closure suspect, PACS) with no other abnormality. Signs of prolonged appositional closure can appear afterwards, where there is raised IOP or peripheral anterior synechiae (PAS); this is termed primary angle closure (PAC). The final stage is angle closure combined with a glaucomatous optic neuropathy (GON) where there is structural damage to the neuroretinal rim of the optic disc and a reproducible visual field defect. This is classified as PACG. Recent data from south India describes the natural history of normal subjects and people with narrow drainage angles who were enrolled from a population survey. Among the people with narrow drainage angles (PACS), 22 per cent (95 per cent CI: 9.8, 34.2) had developed synechial (64 per cent) or appositional angle closure (36 per cent) over a period of five years.[6] Twenty-eight people with established angle closure at baseline were also examined, and 8 out of 28 (28 per cent, 95 per cent CI: 12, 45) had progressed to PACG over five years.[7] In this group, one of nine who had laser peripheral iridotomy (LPI) at baseline had progressed compared to 7 of 19 who refused LPI. Although more information on the natural history and progression of angle closure is needed, in the context of the existing knowledge there is a strong protective effect from peripheral iridectomy.

Primary angle-closure glaucoma is a good candidate for screening; the population undergoes a simple test to detect those at risk or with early disease, who are then subsequently referred for diagnosis and treatment. However, the paucity of data on the natural history of the disease will hamper the understanding of the potential benefits of prophylactic treatment, and we are awaiting results of a randomised controlled trial assessing this strategy.

Treatment

Medical therapy

There is clear evidence that reduction of IOP with medical therapy is effective in preventing the onset of POAG[8] and averting the progression of early POAG.[9] However, the cost of maintaining therapeutic goals to prevent one case is too high for resource-poor countries. In addition, these trials were performed on western populations and the generalisability of the results is limited, especially when considering calculations such as numbers needed to treat. In patients with angle closure and a patent peripheral iridectomy, medical treatment with latanoprost is effective at reducing IOP, even in the presence of synechiae.[10]

Peripheral iridotomy

Laser or surgical peripheral iridotomy (PI) is the mainstay of treatment for angle closure. There is strong evidence to show the protective effect of PI in the fellow eye in a patient presenting with an acute attack, and this is standard practice worldwide. In units where laser treatment is not available, a surgical PI is as effective as laser PI. The emphasis is that patients with an acute attack should not leave the treatment unit without a PI in **both eyes**. The presence of a PI, together with medical and other laser treatments, will often be successful even when early glaucomatous damage has occurred to disc and field. In Asian eyes, PI alone may be insufficient for long-term IOP control following acute angle closure; in one study from Singapore 58 per cent of such eyes required additional methods of management, including trabeculectomy.[11]

In patients who have not suffered symptoms from angle closure, there is no published evidence on the efficacy of prophylactic PI for PACS. However, a longitudinal study from Mongolia showed that when PIs were performed on eyes with PAC or PACG, these eyes were more likely to require further treatment than eyes with the earlier stage of PACS. As a PI can protect a fellow eye from an acute attack, current practice is based on the assumption that it will protect a predisposed individual to a first attack. Therefore, current expert consensus suggests that all eyes with angle closure require a PI to protect them from an acute attack and to eliminate pupil block. This is especially the case in developing countries, where treatment centres can be very far away for the patient.

Laser iridoplasty

Iridoplasty refers to a method where the position of the peripheral iris is altered by applying contraction burns. This pulls the peripheral iris away from the angle structures and can reverse appositional closure. Current expert opinion suggests that if IOP is not promptly controlled by medical means in an acute attack, the patient should be considered for laser iridoplasty. In cases of asymptomatic angle closure due to plateau iris (in which a PI has been performed), iridoplasty can increase the angle width. Limited

capacity restricts the use of this therapy to the populations of developing countries.

Surgery

Surgery can be offered as a single intervention in cases where glaucoma has been diagnosed. It carries more risks than medical and laser treatment; but these are offset by lower long-term costs and the fact that there are no compliance issues, especially important in developing countries. The details of trabeculectomy and management of complications is covered by other articles in this issue.

Lens extraction is an attractive alternative for the treatment of angle closure. This will eliminate pupil block, lens-induced angle closure, and can also have beneficial effects on other mechanisms of angle closure. There is limited information on the long-term success of this form of management. However, lens extraction alone is most effective in the early stages of the disease where there is less than 180 degrees of synechiae and minimal damage to the trabecular meshwork. In the presence of glaucoma and a clinically significant cataract, a combined cataract/glaucoma procedure would be a logical approach for PAC(G). There is presently insufficient evidence to suggest that performing the two surgical procedures separately is better than a single combined operation.[12] In resource-poor settings, where follow-up may be problematic and expensive for the patient, a single procedure may be more appropriate.

Conclusion

Primary angle-closure glaucoma is an important cause of blindness in Asia. Ophthalmic practitioners in Asian countries should focus on accurate detection and prevention of acute attacks and blindness from PACG with appropriate laser and surgical treatment.

References

1 Quigley H. Number of People with Glaucoma worldwide. Br J Ophthalmol. May 1996;80(5): 389-393.
2 Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol. Mar 2006;90(3): 262-267.
3 Foster PJ, Buhrmann R, Quigley HA, Johnson GJ. The definition and classification of glaucoma in prevalence surveys. Br J Ophthalmol. Feb 2002;86(2): 238-242.
4 Foster PJ, Baasanhu J, Alsbirk PH, Munkhbayar D, Uranchimeg D, Johnson GJ. Glaucoma in Mongolia. A population-based survey in Hovsgol province, northern Mongolia. Arch Ophthalmol. Oct 1996;114(10): 1235-1241.
5 Aung T, Nolan WP, Machin D, et al. Anterior chamber depth and the risk of primary angle closure in two East Asian populations. Arch Ophthalmol. Apr 2005;123(4): 527-532.
6 Thomas R, George R, Parikh R, Muliyil J, Jacob A. Five year risk of progression of primary angle-closure suspects to primary angle closure: a population based study. Br J Ophthalmol. Apr 2003;87(4): 450-454.
7 Thomas R, Parikh R, Muliyil J, Kumar RS. Five-year risk of progression of primary angle closure to primary angle-closure glaucoma: a population-based study. Acta Ophthalmol Scand. Oct 2003;81(5): 480-485.
8 Feuer WJ, Parrish RK, Schiffman JC, et al. The Ocular Hypertension Treatment Study: Reproducibility of Cup/Disc Ratio Measurements over time at an Optic Disc Reading Centre. American Journal of Ophthalmology. 2002;133: 19-28.
9 Leske MC, Heijl A, Hussein M, Bengtsson B, Hyman L, Komaroff E. Factors for glaucoma progression and the effect of treatment: the early manifest glaucoma trial. Arch Ophthalmol. Jan 2003;121(1): 48-56.
10 Chew PT, Aung T, Aquino MV, Rojanapongpun P. Intraocular pressure-reducing effects and safety of latanoprost versus timolol in patients with chronic angle-closure glaucoma. Ophthalmology. Mar 2004;111(3): 427-434.
11 Aung T, Ang LP, Chan SP, Chew PT. Acute primary angle closure: long-term intraocular pressure outcome in Asian eyes. Am J Ophthalmol. Jan 2001;131(1): 7-12.
12 Saw SM, Gazzard G, Friedman DS. Interventions for angle-closure glaucoma: an evidence-based update. Ophthalmology. Oct 2003;110(10): 1869-1878; quiz 1878-1869, 1930.

Laser treatment for angle closure

Laser treatment is the cornerstone of management of angle closure, and is generally very effective. However, lasers are powerful surgical tools, which, if used incorrectly, can do considerable harm. The following is intended as a guide for experienced users.

Laser iridotomy

Indications

- in both eyes of patients who suffer an acute episode of angle closure
- patients with asymptomatic narrow angles, established primary angle closure, and those with primary angle closure and early glaucomatous optic neuropathy.

1 Explain the reasons for carrying out the procedure, what it will feel like, and what to expect afterwards.
2 Instil pilocarpine 2% for blue eyes and 4% for brown-eyed patients, and apraclonidine 0.5% (unless contra-indicated) half an hour before, and again five minutes before the procedure.
3 Ensure the laser is set to zero defocus.
4 Anaesthetise the cornea, and insert a Wise or Abrahams lens.
5 If possible, identify an iris crypt (indicating a thin area of iris) in the peripheral iris at, or very close to, 12 o'clock. Take very careful aim on the most peripheral area of iris that can be seen adjacent to the limbal zone. Accurate focussing increases the effectiveness of the laser energy considerably.

Argon

6 Argon laser pre-treatment is very useful in achieving a laser iridotomy in thick, deeply pigmented irises.
7 Set the laser to 50 μm spot, 120 mW, 0.05 s, and apply approximately 30 laser shots to the iris in an overlapping rosette pattern to achieve a 'beaten copper' appearance on the surface of the iris. This helps to avoid large, adherent bubbles when performing the second phase of laser.
8 Set the laser to 50 μm spot, 700 mW, 0.1 s and apply approximately 5 to 10 laser shots to the iris in the same area to form a crater in the stroma. Complete the iridotomy with a few, low-power shots of YAG laser

YAG

9 Multiple lower energy shots (0.6 to 1.2 mJ) are most effective, and prevent the dispersion of pigment that may cause pressure spikes. The use of argon pre-treatment in dark brown irises is important.

Laser iridoplasty

Indications

- for short-term control of intraocular pressure in an acute, symptomatic episode of angle closure (either primary or phacomorphic), prior to definitive management (laser iridotomy or cataract surgery)
- for management of extensive (more than 180 degrees) residual appositional angle closure after laser iridotomy in eyes without peripheral anterior synechiae.

Steps 1, 2 and 4 as above for iridotomy.

5 Set a continuous wave laser (argon, frequency doubled YAG or diode) to 500 μm spot size and 0.5 to 1.0 seconds.
6 Apply laser around 4 or 5 shots of laser per quadrant to the extreme periphery of the iris, taking care not to apply laser to areas of irido-corneal contact.
7 Start with a power of around 100 mW increasing until a brisk contraction of the iris, but without pops or cracks (if so, turn the power down).

Aftercare

Intraocular pressure should be measured at least one hour after treatment. If IOP is high, the protocol used at Moorfields Eye Hospital is:

If IOP above 30 mm Hg

- 250 mg acetazolamide orally stat.
- 125 mg acetazolamide tds for two days.

If IOP above 40 mm Hg

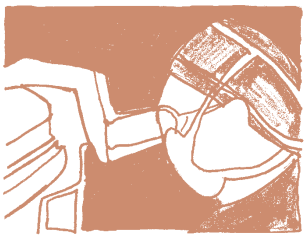
- acetazolamide and topical treatment as appropriate.

A response to therapy **must** be demonstrated before discharge.

All patients then receive prednisolone 1% (Pred Forte) hourly for 24 hours (taking a break through the night), and then four times a day until seen in clinic one week later. All regular medication for glaucoma is continued in both eyes.

Clinic

All patients are seen one week later in clinic and re-gonioscoped. Stop steroids, unless there is evidence of continued inflammation. If the IOP is raised and there is anterior segment inflammation, swap to a topical NSAID.



How I approach trabeculectomy surgery

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The purpose of this article is to describe an approach to the most commonly performed surgical treatment for open-angle glaucoma, trabeculectomy. It is important to recognise that the concept of trabeculectomy surgery can be difficult for patients to comprehend in the first place. Their disease is frequently 'thrust upon them' by doctors; in other words, they are frequently asymptomatic in the eye that the ophthalmologist is most concerned about. The therapy, at best, can only hope to maintain vision. Vision may well deteriorate as a result of the therapy. These concepts are vital in the consideration of any surgical intervention. Preventive therapy is always more difficult to introduce. This also means the surgeon is all the more challenged to produce the safest possible result. A well-rested surgeon and a calm surgical environment is the start, along with a confident surgical technique.

The purpose of trabeculectomy surgery is to create a guarded fistula through which aqueous can drain from the anterior chamber, leading to a steady-state reduced intraocular pressure. If this intervention is appropriate for a patient, drainage surgery has been demonstrated to give long-term intraocular pressure control and visual field preservation. The main complication of this procedure is a failure of drainage due to a scarring response. Other complications include hypotony (low pressure in the eye), infection, and haemorrhage.

This article describes each step and lists points for you as a surgeon to consider. It is based on the assumption that the decision to operate is appropriate. What matters is your results. Follow-up of your surgery is vital so you know how successful your surgery is and can take steps to remedy the deficiencies you identify.

Pre-operative preparation

Rapid reduction of intraocular pressure (IOP) is not good for eyes (decompression retinopathy and suprachoroidal risk). **Any** puncture of the ocular coats rapidly reduces IOP, so high IOPs should be controlled before entry into the eye. This should be controlled medically and, if normal ocular hypotensive agents do not work, a general anaesthetic with some hyperventilation is best at reducing IOP. If not available, then you have to resort to osmotic agents such as glycerol or mannitol, but these have risks.

The operative environment should be optimal: no ocular infection; no infective risk factors (trichiasis, entropion, etc.). If the conjunctiva is inflamed, or there is ocular inflammation (iritis, etc.), pre-operative steroids may be wise (watching for steroid response in IOP). For conjunctiva, this can be topical; for intraocular inflammation, it may need to include systemic cover.

Povidone iodine 5% drops are ideal, unless contraindicated (allergy, availability, etc.). Allow some to enter the lower fornix.

Use some method to remove the eyelashes from your operative field. If a guarded speculum or sticky drape is not available, then a simple piece of plastic can be folded around the lid margin under the speculum.

1 Anaesthesia

General anaesthetic is usually a luxury but may be required for high IOPs and other high-risk cases.

Use whatever local anaesthetic technique you are familiar with to minimise complications and maximise anaesthesia. Retrobulbar, peribulbar and sub-Tenon's have the limitation of making traction sutures more often necessary and making conjunctival closure more tricky, since the eyeball is pushed forward and less likely to return to upgaze. Towards the end of surgery, the posterior conjunctival edge often has less anaesthesia by these techniques and topical amethocaine is not ideal for this. An alternative is to use subconjunctival lignocaine 2% at the operative site. This allows eye movement in downgaze for the main surgery and upgaze for conjunctival closure. In addition, it provides excellent anaesthesia of the conjunctival edge. The disadvantage is that this requires compliance from the patient and there can be some short discomfort during the peripheral iridectomy.

2 Traction suture

A well-placed superior rectus suture is great, but may be prone to subconjunctival haemorrhage, post-operative ptosis, and inadequate placement resulting in conjunctival traction rather than globe traction.

A superior corneal traction suture has merits, but ideally should be released before entry into the eye and may get in the way during suturing of the scleral flap, tending to pull the flap back open.

One South African doctor has suggested running an inferior corneal traction suture underneath the speculum to achieve downgaze. I have tried this with great success.

I personally do not use a traction suture routinely.

3 Conjunctival incision

Fornix-based incisions are now performed by a majority of sub-specialists, mostly on the basis of improved bleb morphology.

The Tenon's attaches about 0.5 mm behind the conjunctiva at the limbus. With your first incision, make a decision to take both Tenon's and conjunctiva at once, or take the two layers in turn. This varies very much from patient to patient.

4 Cytotoxic agent

If you apply a cytotoxic agent, the trend is very much towards large areas more posteriorly, rather than small focal anterior application. Again, this is based on a bleb morphology argument.

Be careful to put the cytotoxic agent only where you want it. Multiple small swabs (counted in and out), large dry swabs soaked in cytotoxic in situ, and subconjunctival injection at completion of surgery are all methods employed by different practitioners.

Remember that beta-radiation is a simple and effective method, very easily applied once you have a probe.

5 Cautery/bipolar

Remember, most bleeding stops of its own accord if a little time is allowed.

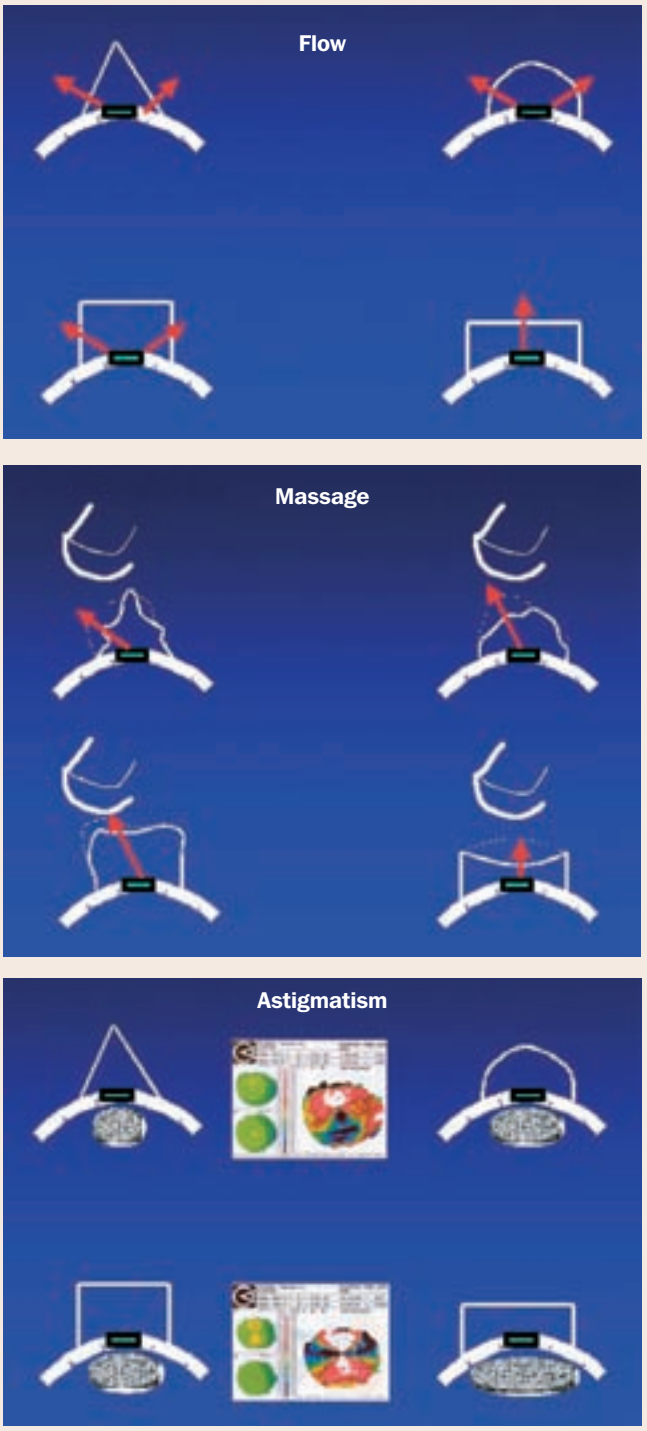
The purpose of this is to prevent bleeding, nothing else. Be careful not to overdo it. Just mark out focal vessels where you are going to, or have, cut; the whole area does not need annihilation!

Perforating veins are better avoided, where possible, by careful planning of the operative site.

6 Scleral flap shape

Triangular, semi-circular, square and oblong are the most frequently used shapes. Figure 1 shows the reason for my own preference of oblong scleral flap, namely flow directed posteriorly through the shortest route and easy massage. The main disadvantage of this shape is that it can result in irregular astigmatism that can take up to two years to resolve.

Figure 1. Shapes of scleral flap



7 Scleral flap dissection

If straight dissection is used, pulling hard on the flap at the base, right where dissection is occurring, helps create the surgical plane more easily.

If a pocket knife is used, take care to keep the plane of dissection parallel; the most frequent error is a wedge-shaped scleral flap.

8 Paracentesis

I recommend an infero-temporally placed paracentesis at this point in the operation, to allow anterior chamber access both at surgery and post-operatively. The infero-temporal position is easier to access at the slit lamp.

9 Sclerostomy

I personally find direct, full-thickness cuts the most rapid and reliable method. The order is illustrated in Figure 2. After cuts 1 and 2, hold the bridge of sclera centrally to enable cuts 3 and 4 to be easily made.

Figure 2. Sclerostomy cuts

If a punch is used, be careful to take the punch to a position 90 degrees to the sclera before punching. This is to ensure a good non-shelved sclerostomy.

10 Peripheral iridectomy

Go peripheral and cut parallel to the limbus. There is a risk of catching the basal artery of the iris; but better that, and waiting for a little bleeding to stop, than a useless hole in the iris nowhere near where it is required!

11 Sutures to sclera

Minimising the period of uncontrolled hypotony is a good thing. Some use pre-placed sutures for this purpose.

Releasable/adjustable sutures are popular in the UK as a method of easy post-operative manipulation to increase flow. Post-operatively, any IOP, except a low IOP, means you are in control. With too low an IOP you can do nothing other than wait and hope, or take the patient back to theatre to correct surgical error.

12 Conjunctival sutures

It is good to secure the conjunctiva back at the limbus with several carefully placed, buried sutures. I routinely use two corner gathering sutures and two central mattress sutures.

13 Subconjunctival injection

Appropriate steroid and antibiotic.

GLOSSARY The optic nerve head in glaucoma

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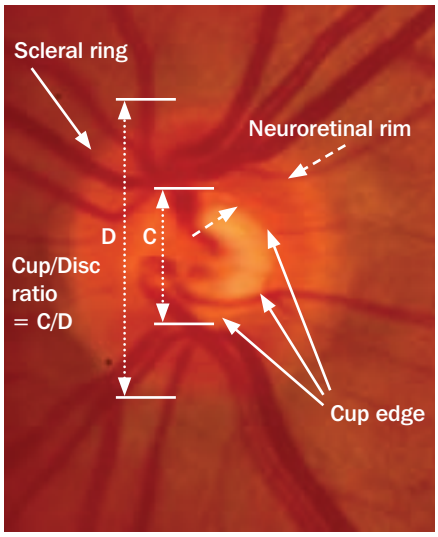
All types of glaucoma involve glaucomatous optic neuropathy. The key to detection and management of glaucoma is understanding how to examine the optic nerve head (ONH). This pictorial glossary addresses the following issues:

- how to examine the ONH
- normal characteristics of the ONH
- characteristics of a glaucomatous ONH
- how to tell if the glaucomatous optic neuropathy is getting worse
- 'pitfalls and pearls'.

How to examine the ONH clinically

The ONH can be examined using a direct ophthalmoscope, an indirect ophthalmoscope, or using a posterior pole lens with a slit lamp. Many types of health professionals can assess the ONH accurately if they have appropriate training. The time available to view the ONH is often short as the examination is uncomfortable for the patient, so it is essential that the examiner has a strategy in mind to answer some key observations. Dilating the pupil facilitates and improves the accuracy of the examination with all instruments. More sophisticated devices such as scanning laser polarimetry, confocal scanning laser ophthalmoscopy, and ocular coherence tomography can also be used to complement the clinical examination of the optic disc and provide quantitative measurements.



R Bourne

Normal optic nerve head

Instrument	Advantages	Disadvantages
Direct ophthalmoscope 	Portable; cheap; magnified view	No stereo view
Indirect ophthalmoscope 	Portable; useful to examine children; may see through media opacity	Limited magnification
Slit lamp + posterior pole lens 	Stereo view; high magnification and illumination	Expensive; heavy

R Bourne

R Bourne

Glaucomatous optic neuropathy: generalised enlargement of cup

Characteristics of the normal ONH

The ONH or optic disc is a round/oval 'plug-hole', down which more than a million nerve fibres descend through a sieve-like sheet known as the **lamina cribrosa**. These fibres are then bundled together behind the eye as the **optic nerve** which continues towards the brain.

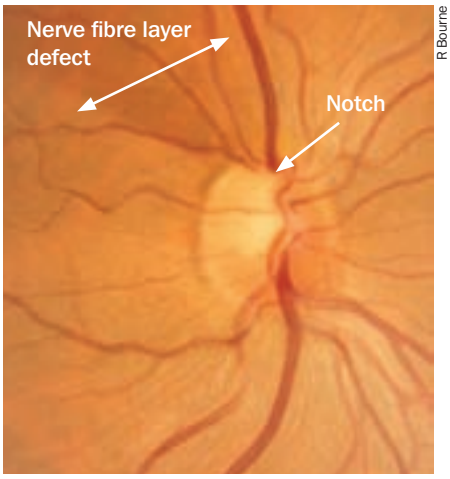
The retinal nerve fibres are spread unevenly across the surface of the retina in a thin layer which has a 'feathery' appearance, best seen immediately above and below the disc. As the nerve fibres converge on the edge of the disc they pour over the **scleral ring** (which marks the edge of the disc) and then down its inner surface. This dense packing of nerve fibres just inside the scleral ring is visualised as the **neuroretinal rim**. The **cup** is the area central to the neuroretinal rim. The cup edge (where it meets the neuroretinal rim) is best seen by the bend in small and medium-sized blood vessels as they descend into the cup. The inferior rim is usually thicker than the superior rim, which is thicker than the nasal rim, and the temporal rim is the thinnest (this is known as the '**ISNT**' rule).

T Ganway-Heath

An example of progression of glaucomatous optic

R Bourne

Glaucomatous optic neuropathy: splinter haemorrhages



R Bourne

Glaucomatous optic neuropathy: focal enlargement of cup (notch) and nerve fibre layer defect

Characteristics of a glaucomatous ONH

- generalised/focal enlargement of the cup
- disc haemorrhage (within 1 disc diameter of ONH)
- thinning of neuroretinal rim (usually at superior & inferior poles)
- asymmetry of cupping between patient's eyes
- loss of nerve fibre layer
- parapapillary atrophy (more common in glaucomatous eyes).

Distinguishing a glaucomatous ONH from a normal ONH

Learn the features of a normal and a glaucomatous ONH (above).

Strategy:

1. Dilate pupils, if possible and safe to do so.
2. Identify disc edge and cup edge thereby identifying rim.
3. Does the rim thickness obey the ISNT rule?
4. Is there a haemorrhage?
5. Estimate vertical cup/disc ratio.
6. Measure size of ONH.*
7. Examine the retinal nerve fibre layer (using green light).*
8. Draw an annotated diagram of the ONH.

*may only be possible with slit lamp and posterior pole lens

Is the glaucomatous optic neuropathy getting worse/ progressing?

The appearance of any of the features of a glaucomatous ONH, or the exacerbation of these features compared to a previous record, is indicative of a progression/worsening of the disease. Disc haemorrhages may be present for two weeks to three months and are an important prognostic sign of progression. An accurate record requires careful observation and a detailed drawing, at the very least. Photographic documentation (preferably stereophotography) is highly recommended. Other imaging devices offer progression analyses, but these are not a surrogate for a detailed clinical examination. Progressive worsening of the visual fields should correlate with structural changes at the ONH.

'Pitfalls and pearls'

The hallmark of glaucomatous optic neuropathy is excavation of the neuroretinal rim.

Advanced glaucomatous ONH can result in a pale optic disc but disc pallor should raise a suspicion of another cause such as optic atrophy.

A colour difference should not be used to distinguish the cup edge; change in direction of the blood vessels is a more reliable indicator.

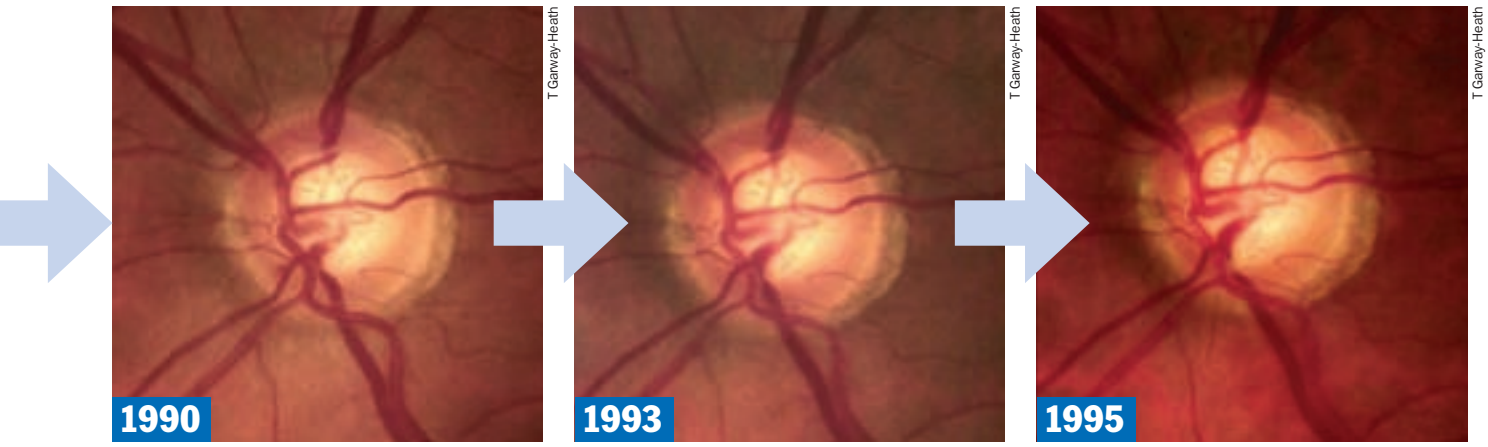
The optic disc abnormality should correlate with the visual field defect. Where this is not the case, further investigations (e.g., CT/MRI scan) may be indicated.

The size of the cup always appears smaller when viewed monoscopically than in stereo.

A measurement of cup/disc ratio (CDR) alone is insufficient and may be misleading as small discs will have smaller cups and hence a smaller CDR.

Further reading

1. Fingeret M, Medeiros FA, Susanna R Jr, Weinreb RN. Five rules to evaluate the optic disc and retinal nerve fibre layer for glaucoma. Optometry. 2005 Nov;76(11): 661-8.
2. Lester M, Garway-Heath D, Lemij H. Optic Nerve Head and Retinal Nerve Fibre Analysis. European Glaucoma Society 2005.



T Garway-Heath

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T Garway-Heath

neuropathy (left eye) over 7 years. Note the progressive thinning of the neuroretinal rim, in particular in the superonasal quadrant

Setting the pace for VISION 2020 in Ghana: the case of Bawku Eye Care Programme

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Introduction

Ghana is a west African country bordered on the south by the Atlantic Ocean, and the north, east, and west by the Republics of Burkina Faso, Togo, and Ivory Coast respectively. It has a population of 20,771,382. Prevalence of blindness is estimated at one per cent. It currently has 52 ophthalmologists and 216 ophthalmic nurses (National Eye Care Secretariat), with nearly half of the ophthalmologists (19) located in the national capital and its environs. The health sector attracted 7.9 per cent of government budget in 2002 and 12.3 per cent in the 2006 budget. Currently there is a comprehensive national health insurance policy being implemented that covers most of the common eye operations done in the country.

Background

Bawku is located in the Upper East Region. Its population is 961,000, and it is the poorest region in Ghana. Its eye care services, however, are among the best. The regional eye care programme is largely a hospital-based programme that started some thirty years ago with the help of the Christoffel Blindenmission. Based at the Bawku Presbyterian Hospital, the programme has grown to become a de facto regional programme with extensive outreach services across the region and beyond, into the neighbouring Northern Region, Burkina Faso and Togo.

The objectives of the programme include:

- provision of quality eye care services that are affordable and readily accessible to patients in the region
- collaboration with stakeholders to develop a comprehensive regional eye care programme which integrates primary eye care services into the existing primary health care delivery system
- collaboration in the training of ophthalmologists, ophthalmic nurses and primary eye care cadres in Ghana and the west African sub-region
- development of a sustainable programme with progressive reduction in dependency on donor funding.

Causes of visual impairment and blindness

The commonest causes of blindness and visual impairment in the region are cataract, glaucoma, and uncorrected refractive errors. With the near absence of trachoma and onchocerciasis, the focus of our interventions is on eliminating visual impairment and blindness from cataract and refractive errors, reducing visual loss from glaucoma, and provision of low vision services.

Figure 1. Ghana administrative map

Eye care delivery performance

Cataract services

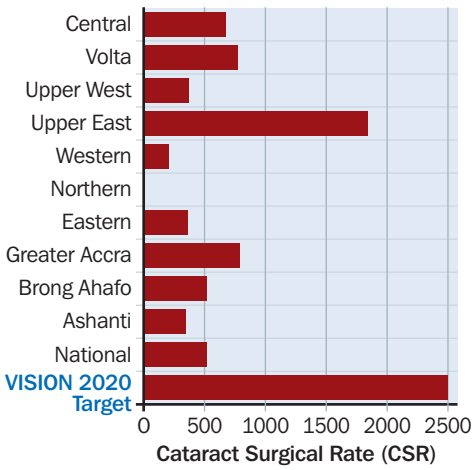
Between 2000 and 2004, 9,933 cataract operations were done under the programme with more than 97 per cent receiving IOL implants. The method of extraction is extracapsular cataract extraction (ECCE). With two ophthalmologists and a cataract surgeon, cataract surgical output has steadily been rising since 2000. Table 1 (below) shows the trend of cataract operations over the last five years.

These figures have been achieved through an extensive network of outreach services including:

- establishment of cataract surgical outreach centres in all district hospitals
- enhanced role of district hospital-based ophthalmic nurses in patient preparation, post-operative management, and referral of complications
- use of community-based rehabilitation workers (CBRs) in case finding and referral to hospitals
- surgical quality assurance through a computer-based continuous outcome-monitoring programme
- client satisfaction evaluation through yearly qualitative surveys
- a cataract surgeon to support the ophthalmologists and nurses to give ocular anaesthetic.

The target in our cataract services is to attain a surgical output above our national VISION 2020 cataract surgical rate (CSR) target of 2,500. Figure 2 shows the CSR of the various regions.

Figure 2. 2004 national cataract surgical rates: performance versus need



Glaucoma

Glaucoma is the second most significant cause of blindness and visual impairment in the region. Primary open-angle glaucoma (POAG) affects 8.5 per cent of people aged 40 years and over in Ghana.[1] Previous hospital-based studies in the Upper East Region show that about 26 per cent of glaucoma patients operated are aged under 40 years and these findings are consistent with our current hospital records.[2] Our strategy for glaucoma intervention includes:

Table 1. Cataract surgical output within the programme

Year	Ghana	Burkina Faso	Total
2000	989	958	1,947
2001	866	728	1,594
2002	1,105	797	1,902
2003	1,294	632	1,926
2004	1,773	791	2,564

- primary trabeculectomy for operable cases with or without anti-metabolites (not commonly done by many surgeons in the country)
- medical management for 'inoperable cases' and those with 'qualified' surgical success
- continuous 'opportunistic screening' for all patients aged 16 years and over
- genetic counselling for identified patients
- advocacy to include glaucoma surgery in the 'minimum benefit package' of the National Health Insurance Scheme in the region.

Bawku Hospital Eye Unit

Part of the success derives from the motivated team work in the programme. GHANA

Childhood blindness

Most causes of childhood blindness in the region are avoidable. Eye health education and vitamin A supplementation are delivered as part of the Expanded Programme on Immunisation (EPI) through inter-sectoral collaboration with the Ghana Health Service, while school eye health programmes are organised in collaboration with the Ghana Education Service.

Surgically avoidable cases of childhood blindness are managed here and, where necessary, referred to the paediatric ophthalmic unit at the Korle-Bu Teaching Hospital in Accra.

Refraction and low vision services

With only one optometrist in the region (in private practice), the bulk of refraction and low vision services are rendered by an ophthalmic nurse/refractionist. Currently, all ophthalmic nurse trainees at the hospital receive tutorials in basic refraction. In this way basic refraction services are expected to become progressively available at the district and community levels.

Human resource management

There are 20 ophthalmic nurses (one per 45,000 population), two ophthalmologists and a cataract surgeon, two refractionists and a cadre of primary eye care (PEC) workers who have been trained and deployed in the various communities under the community-based rehabilitation (CBR) projects. Nurses learn proficient use of the slit lamp and its accessories, indirect ophthalmoscopy, retinoscopy, and use of many basic tools that are considered the privilege of the ophthalmologist in many hospitals in the country. In this way, the nurses can competently handle routine pre-operative and post-operative management of uncomplicated cataract cases. They are also trained to give ocular anaesthetic and do common operations like cicatricial entropion repairs, pterygium excision, evisceration, etc. This enhanced role constitutes a source of pride and motivation, while allowing the doctors time to do the more complex operations and laser treatments.

Recommendations and the way forward

The current CSRs, in Ghana (519) and in most African countries, indicate that we certainly cannot attain the targets set under VISION 2020 unless we undertake fundamental reforms in our view of ophthalmic practice. I suggest the following:

Length of training

Fellowship training under the West African College of Surgeons programme normally takes about six years to complete as a general ophthalmologist. In Ghana, only five ophthalmologists have been trained under the programme over the last twenty or so years, with most spending nearly ten years in residency. While the two-year diploma programme seems too short, the current fellowship programme appears rather too long for the available technology in the sub-region at the moment. Perhaps the east African system of three years is a better compromise and should be encouraged.

Outreach cataract services

These should be an integral part of all the regional programmes. The programmes should be resourced adequately to undertake these and overcome geographical and other related barriers to service uptake. This, from my experience, is a major step towards increasing surgical output.

Utilising available resources

In many hospitals, the work of the ophthalmic nurse is limited to recording visual acuity and assisting the ophthalmologist. Most ophthalmic nurses can be educated to manage all routine post-operative cataract patients, give ocular anaesthetic and do minor operations. In the out-patients department, they can handle many more patients than we currently expect of them. More time would be made available for the ophthalmologist to perform operations. These measures may sound controversial, but the reality is that they are possible and have been implemented successfully elsewhere. What we need is a focused education programme, supervision, and quality-control assurance.

Bawku Hospital Eye Unit

Outreach vehicle preparing to travel to those far from eye care facilities. GHANA

CBR workers and community health nurses

CBR workers and community volunteers can readily be trained to diagnose and refer cataract patients to district hospitals. In addition, primary eye care should be made an integral part of community health training so that this cadre of nurse, available in all districts in Ghana, can play a meaningful role in eye care.

Cataract surgeons

Cataract surgeons are still neither recognised nor accepted in Ghana, despite overwhelming evidence of their importance in many African countries.[3] On the contrary, general medical assistants (one-year post basic nursing) are trained and posted to district hospitals to manage a wide range of medical conditions. My personal experience with cataract surgeons in the Gambia and elsewhere is that they are perfectly up to the task; revisiting this issue is more important now than ever, if we are to realise our stated goal of eliminating all causes of avoidable blindness by the year 2020.

References

1 Ntim Amponsah CT, Amoaku WM, Ofosu-Amaah S, et. al. Prevalence of glaucoma in an African population. Eye 2004;18: 491-497.

2 Verrey JD, Foster A, Wormald R, Akuamoah C. Chronic glaucoma in northern Ghana – a retrospective study of 397 patients. Eye 1990;4: 115-120.

3 Karimurio J. African Programme: Kenya. Comm Eye Health J 2000;13: 49-64.

The social construction of paediatric cataract: how parents make sense of their child's condition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Introduction

Childhood cataract, congenital and traumatic, is the most common treatable cause of childhood blindness, being responsible for 10 to 30 per cent of all childhood blindness. Preventing blindness from childhood cataract requires not only high-quality paediatric surgery, but also an awareness of parents' understanding of the eye problem, and why they might not agree to surgery for their child. Several studies have examined the medical and social aspects of childhood cataract. Foster et al.[1] point out that childhood blindness has huge socio-economic costs, and restoring the sight of one child blind from cataract is considered equivalent to restoring the sight of 10 elderly adults. It is therefore crucial that we understand why parents might not take up the option of surgery.

Objectives of the study

This study was conducted with three objectives. The first objective was to explore the layperson's interpretation of cataract-related blindness. Essentially, we wanted to find out what the parents of children with cataract feel about their child's eye problem.

The second objective was to examine parents' beliefs about paediatric cataract. These beliefs play an important role in explaining health-seeking behaviour. Two specific belief-related questions were cross-tabulated with doctors' recommendations for surgery. The third objective was to determine barriers to paediatric eye care at the institutional level.

Study setting and methods

A 22-item scale of barriers to paediatric eye care was developed, pre-tested, and included in the questionnaire. The questionnaire was administered to 1,070 parents who visited six ORBIS-supported eye hospitals for their children's treatment (Table 1). Of these children, 106 were diagnosed as cataract patients (including congenital, developmental and traumatic cataracts). This study analyses the responses of the 106 parents using qualitative and quantitative techniques.

Table 1. Respondents drawn from six hospitals

Hospital name	Location	Per cent of sample (N=106)
Sri Sankaradeva Nethralaya	Guwahati	26
Sadguru Netra Chiktsyalaya	Chitrakoot	24
Dr Shroff Charity Eye Hospital	Delhi	8
Drashti Nethralaya	Dahod	11
HV Desai Eye hospital	Pune	11
Lions NAB Eye Hospital	Miraj	20

Findings

One of the objectives of the study was to understand how parents make sense of cataract-related blindness, and how they construct and convey the child's problem to the doctor. Several researchers have examined patients' narratives to understand the social construction of health or illness, that is, how they understood and described their own or a family member's illness. Helman[2] makes a distinction between **disease** and **illness**. Disease, according to the researcher, is the doctor's evaluation of a health condition. Illness, by contrast, is the patient's (or care giver's) subjective response to the condition. Agreeing with Helman, we suggest that a parent's response to a child's eye condition would partly explain treatment-seeking behaviour. We therefore asked parents to briefly describe for us the problem the child had. We analysed parents' narratives and found three conceptions of cataract. These are:

The narrative of colour. In this narrative, parents describe the eye problem in terms of the colour of the eye: *whiteness of eye, white spot, white film, pale white spot,* etc. The change in the colour of the eye from black to white is perceived as a shift from 'normal' to 'abnormal' and produces anxiety and fear among them. It is as much the condition of the eye as the parent's response to it that brings the child to the eye hospital.

The narrative of cause. Here, parents describe the problem in terms of factors they believe cause cataract. The main cause for cataract was identified as 'injury' – injury to the eye due to throwing of palm tree leaves, penetration by pencil, friend's fingers, or foreign body, and fire cracker injury. The narratives of such parents tend to be constructed around a specific event and the cause of cataract is attributed to **invasion** by an **external** agency.

The narrative of consequence. Finally, parents describe the problem in terms of effect it has on the child. Phrases such as *not seeing properly, lack of visibility, vision problem, unable to see black board, swelling, watering, rubbing, itching, irritation* and *redness of eye* were commonly used to describe cataract. The first four descriptors refer to the relative absence of faculty or ability (vision) and the rest denote observable changes in appearance of the eye. Lack or loss of vision, and appearance of the eye, are both reasons for parental concern.

This study also examined parents' beliefs about eye surgery, especially with regard to those paediatric cataract patients who are advised to have surgery. We suggest that beliefs are an important cultural determinant of treatment-seeking behaviour. Two belief statements "*the child is young for surgery*" and "*the child's eye is better without surgery*", were cross-tabulated with the time when the doctor advised surgery for the child (during this visit/earlier visit). Sixty-one out of 106 cataract patients were advised to have surgery. Tables 2 and 3 show the results of the cross-tabulation.

Table 2. "The child is too young for surgery"

		During this visit	Earlier visit	Total
Child is too young for surgery	Disagree	17	9	26
	Agree	15	20	35
	Total	32	29	61

According to Yorston,[3] surgery may be delayed for years in adults without affecting the visual outcome. In infants, however, if the congenital cataract is not removed during the first year of life, the vision will never be fully regained after surgery. Table 2 shows that the majority of parents (35) believe the child to be too young for surgery. This implies that parents appear to associate a 'sophisticated' medical intervention (such as surgery) with more advanced age. Specifically, the parents appear to believe that surgery is for adults. But when does the child become an adult and ready for surgery? The data included three age categories: under six years (37 per cent), between six and eleven years (33 per cent) and above eleven years (31 per cent). The 35 respondents who agree with the belief that the child is too young have children spread across the three age categories. This finding is significant because it suggests that the child's readiness for surgery is determined neither by the condition of the eye nor by his/her biological age, but is culturally determined. We conclude that a child's readiness for surgery is a complex decision for the parents and that their decision may be influenced by the gender of the child, the number of children in the family, prior knowledge of eye surgery, and social and peer influence.

Table 3 shows over one-third of parents agreeing with the belief statement that the eye will get better without surgery. This group of parents, one would imagine, would be hard to persuade. Whereas the parents in Table 2 could be persuaded through education, those in this group would require prolonged engagement and demonstration to change their beliefs.

The barriers to paediatric cataract surgery

The main purpose of this study was to determine the barriers preventing parents from accessing eye care facilities at hospitals. The survey questionnaire designed for this purpose included a 22-item scale that measured the respondent's extent of agreement with each item on a 5-point Likert scale (1=complete disagreement, 5=complete agreement). The barrier scale was factor-analysed using the social sciences statistical package, SPSS 13.0.

In simple terms, the factor analysis shows that parents confront three major barriers. In order of importance, these are: access to services, economic difficulties, and beliefs.

The ophthalmologist examines a patient after surgery. INDIA

Pradeep Krishnatray

'Paediatric eye care should aim to provide not only quality clinical care, but also quality interpersonal communication'

Discussion

This study shows that parents fall back on the known and familiar in making sense of cataract. Their discourse about cataract is interspersed with references to notions of colour, cause, and consequence. Cultural beliefs about the 'appropriate' age for surgery and the eye getting better without medical intervention appear to influence access to hospital-based services. It is very likely that the perceived severity of the cataract, and the likely impact it may have, motivates parents to seek hospital-based treatment. Policy makers should design communication interventions to address age-old beliefs. Primary health workers, NGO volunteers, and general physicians should be trained to detect paediatric cataract cases, empathise with the beliefs and fears of parents concerning the problem, and motivate them to visit an appropriate paediatric eye care facility without delay. This study also shows that access to eye care facilities and the cost of treatment are two of the three major barriers to paediatric cataract treatment. Innovative schemes should be designed to address these barriers. Subsidising services and providing travel expenses, or providing patient transportation facilities, may increase uptake of services.

Paediatric eye care should aim to provide not only quality clinical care, but also quality interpersonal communication which allows parents of children with cataract to express their views and feelings about the problem. The larger issues of poverty and education need more attention than they are currently receiving. However, a word of caution would be appropriate here: the findings of this study are related to hospital-based paediatric patients and things could be very different in the outreach setting.

Table 3. "The eye will get better without surgery"

		During this visit	Earlier visit	Total
The eye will get better without surgery	Disagree	16	23	39
	Agree	15	7	22
	Total	31	30	61

Acknowledgments

The authors thank the programme managers at six ORBIS-supported eye hospitals who provided support towards completion of the study.

References

1 Foster A, Gilbert C, Rahi J. Epidemiology of cataract in childhood: a global perspective. J Cataract Refract Surg 1997;23: 601-4.
2 Helman, C. Culture, health and illness. 1984. Oxford: Butterworth-Heinemann.
3 Yorston D. Surgery for Congenital Cataract. Community Eye Health J 2004;17(50): 23-25.

Professional management for eye care

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Introduction

The global initiative VISION 2020: The Right to Sight, estimates that only 25 per cent of existing infrastructure is used for eye care, while the target utilisation is set at 90 per cent. This requires a complete reorganisation. Many providers have the potential to significantly enhance their service by adopting professional management practice and new technologies in clinical services. This article addresses this opportunity from a professional management perspective.

The responsibilities of a hospital administrator could be broadly classified as managing patient care, functional areas, support services, and developmental work. Eye care providers need to focus on four key areas. Strategic management to enhance the efficiency of their organisations requires: human resources management; quality management; marketing; and financial sustainability.

Strategic management

The strategic management process starts with a clear and transparent 'vision' followed by situational analysis. Annual objectives are agreed upon by studying the magnitude of blindness, unmet needs, and organisational capacity. Objectives are translated into 'operational strategies' in the areas of human resources, quality, marketing, and finance. Deviations of actual experience from objectives provide learning experiences which help to fine-tune the strategies.

As part of the strategic planning, organisations should consider vertical integration which brings together the following facilities:

- optical shop
- clinical laboratory
- pharmacy
- canteen.

Together, these components help towards self-sufficiency of the organisation, and convenience of the patients. In the absence of these facilities, business outlets often exploit patients.

Human resources management (HRM)

Today the success of any organisation is centred on its most powerful resource, its staff. We must invest in the workforce which is the real pillar of an organisation. Personnel policy, covering human resource planning to retirement benefits, needs to be redesigned to delight our own people. Only a delighted employee can delight a customer. HRM is the foundation for quality. Successful organisations honour their people by recognising them as 'service partners' or 'internal customers'. Empowerment, continuous training and development are vital parts of HRM.

Managing quality

Consumerism has entered health care. Patients represent a group of consumers who ask relevant questions, and make their own decisions.[1] They look for the right services for the right money, ask questions about treatment options, look for more information, demand convenience, ask for evidence of quality, expect continuity of care, and explore alternative therapies.[2]

Quality means delighting customers. Customer orientation is the underlying principle of quality. Dimensions of quality, like promptness, accuracy, accessibility, and continuity of care, are focal points. Health care quality is broadly classified as 'clinical quality' and 'quality service'.

> 'Providers can enhance their service by adopting professional management practice'

Controlling infection, monitoring complications, length of stay, visual acuity, follow-up rate, and safe medication are a few of the clinical quality measures that need continuous monitoring and improvement. Productivity governed by management systems and standard clinical protocols sharpen the clinical skills.

Maintenance needs to be carried out on a number of levels: routine maintenance, for example cleaning and dusting; preventive maintenance, for example the schedule of planned maintenance actions carried out by in-house maintenance staff to prevent breakdowns or the failure of equipment before it actually occurs; scheduled maintenance through contracts with outside specialist agencies; availability of spare parts for equipment.

Providing quality service means ensuring caring, friendly, customer service. Customers view quality through simple indicators such as smiling faces, the smell of fresh linen, general cleanliness and hygiene.

Marketing

The common citizen does not know where reasonable quality care is available at a reasonable cost. As professionals are reluctant to use marketing as a powerful information tool, many people are misguided by vested interest groups. It is therefore important to understand how best to inform people about the services available, so that they can make sensible judgments when seeking care.

In long-term planning, the emphasis should be on detailed analysis of the environment, particularly consumer behaviour. Most organisations collect no information at all about their consumers. Whatever data they do collect tends to be demographic. Rarely does one see awareness, perception, preference, and usage information. Organisations need to understand how individual patients see, think, feel, and act.[3]

If a hospital is genuinely interested in the welfare of the patients, reliable information and referral facilities should be available. Continuing medical education for general practitioners, and quarterly newsletters, are some of the ways to strengthen the referral system. Referring doctors look for an immediate response, communication about the health condition of the referred patients.

Promotional tools are powerful communication tools; if used without violating advertising and medical ethics, they help to create awareness and demand for services. Providers need to address patients' fear of pain, side-effects, lengthy recovery time, and confusion about the extent of recovery. From registration to follow-up, sales promotions could be widely practiced. Corporate hospitals engage marketing executives to strengthen referrals. Camp organisers should see themselves as sales personnel responsible for promoting camps and building relationships with sponsors.

In eye care it has been shown that outreach programmes and patient counselling are powerful marketing techniques to generate demand.

Community outreach

Outreach programmes are essential in developing countries, as people neither have access to care nor awareness of health problems. Screening camps, community-based rehabilitation, and school screening programmes are some of the common approaches used. Planning, community participation, involvement of ophthalmologists, standardised systems and procedures, patient counselling and review are crucial to outreach programmes. Monitoring and reviewing performance and outcomes is important. The number of

RD Thulasiraj and S Saravanan

A well-managed operating theatre for high-volume cataract surgery at Aravind Eye Hospital. INDIA

camps, number of patients examined, patients advised for surgery and operations completed, should be monitored to know how to improve the service. Free care combined with food and transportation enhances the acceptance rate. Patients need to be transported to the base hospital for operations on the day of the camps. Publicity for the outreach programmes also attracts paying patients to the hospital directly.

Patient counselling

In many organisations, counselling has been one of the key contributors to dramatic growth. Patient counselling is a simple process of educating beneficiaries about the need and importance of eye care. It builds confidence among potential patients. Counsellors assist patients in decision-making by giving detailed information about the operation, pre-operative care, post-operative care, discharge, and follow-up. Counselling enhances patient satisfaction, and those satisfied patients act as catalysts to bring more patients.

A person who has completed his schooling, and who has good communication skills, could be identified as a trainee. In-house training should cover basic anatomy and physiology of the eye, common eye diseases, general surgical procedures, communication, interpersonal skills, and answers to hypothetical questions commonly raised by the public.

Counselling needs to be supplemented by a model of an eye, IOL, and information materials printed in the local language. Counsellors should educate the patients on safe medication and personal hygiene. The outcome is better when the relatives of the patients participate. Patients are made to feel comfortable enough to share their problems, and counsellors are helped to understand the patients' views, and other information about circumstances, which are vital for services planning.

Financial sustainability

Irrespective of the consumer's ability to pay, health care organisations face ever-increasing costs due to rapid advancement in technology, increased expectations of staff, etc. Health care provision is labour-intensive and staff salaries alone constitute a major percentage of the running costs. Blind adoption of western standards increases expenditure but really does not ensure quality. Since the resources generated are fairly limited, emphasis is on control of expenditures so that financial commitments can be met. There are different creative ways to control costs; the exercise[4] summarised in Table 1 shows how the cost of care is directly linked to the volume of work (see Table 1).

As the number of operations increases, the simple logic is that the more operations performed, the more the fixed cost is spread over and the more the cost per operation decreases. Pricing is influenced by location, competition, reputation, economic status, service differentiation, etc., and few hospitals are capable of attracting paying patients. The high cost is due to lighter workloads, or high direct expenses, such as attractive compensation to retain staff in remote areas. Hospitals that conduct camps at the base hospital could not attract paying patients, as people tend to wait for the day of the camp. Service differentiation helps in practicing multi-tier pricing to attract people of different economic backgrounds, and in this way services can be made available at affordable cost.

Table 1. Cost of care linked to the volume of operations

Assuming that 80 percent of the annual total fixed costs of US $40,000 and variable cost per operation of US $14 are incurred in providing cataract surgery, cost per operation for 500 / 1000 / 2000 operations will work out as follows:

Cataract operations	Total fixed cost (US $)	Unit fixed cost (US $)	Unit variable cost (US $)	Total cost (US $)
500	32,000	64	14	78
1000	32,000	32	14	46
2000	32,000	16	14	30

Materials

Of the total cost, materials amount to approximately 40 to 45 per cent of the operating budget. Cost containment in this area usually brings quick results that invariably are well accepted, unlike reduction of personnel costs.

The purpose is to ensure control from acquisition to disposal of materials. Purchase policy, simple inventory techniques like safety stock and re-order level, standardisation of supplies and equipment, and consumption report correlating to the level of activity (e.g., number of lenses issued and number of IOL implants in a month) help control the cost. Providers are responsible for eliminating unnecessary investigations, drugs and therapies, and for ensuring savings in the use of supplies and facilities.

Conclusion

Professional management practices would enhance staff satisfaction, improve quality, patient satisfaction, and public perception of services. This in turn would generate demand which could be met by providing a low-cost service through optimal use of the available limited resources. Ultimately, eye care organisations will become part of VISION 2020 by ensuring long-term sustainability. Are eye care organisations ready to include professionals, formally trained in hospital management, to ensure that administrative functions are effective?

References

1 Kotler P and Clarke RN. Marketing for Health Care Organization, Prentice Hall Inc., New Jersey. 1987. p. 278.
2 Lumsdon K. Baby Boomers Grow Up, Cover Story, Hospital and Health Networks, American Hospital Association, Sharon Hill, Sep 20, 1993, pp. 24-34.
3 Kotler P and Clarke RN. Marketing for Health Care Organization (Op. cit.) p. 258.
4 Thulasiraj RD and Sivakumar AK. Cost Containment in Eye Care, Community Eye Health J 2001 14;37: 6-8.

Reaching out: a strategy to provide primary eye care through the indigenous educational system in Pakistan


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Introduction

In Pakistan, there is a unique and indigenously established system of education called the *madaris*. It is the plural of *madrassa*, which is an Arabic word for a school system. In the context of Pakistan, it refers to an institutional set-up that runs in parallel to the conventional schooling system and is community-based. It is perhaps the oldest and the largest educational system of its kind whereby the students are provided with free religious education. Some institutions offer a combination of religious learning and regular schooling.

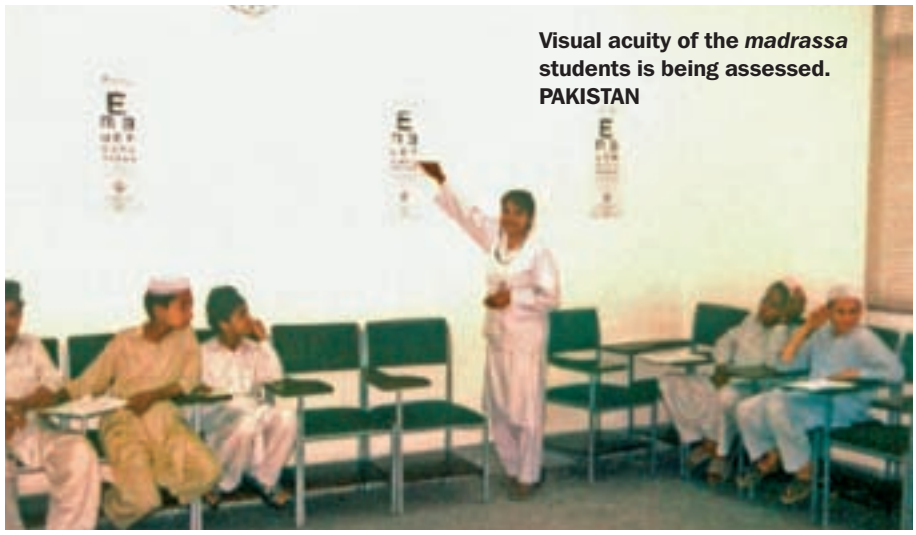
The facilities and the curricula vary from one *madrassa* to another. Since a majority of the students studying here belong to the poor and neglected socio-economic level of society, many offer free accommodation and food to the students in hostels, and most of these provide free education. These institutions are mostly funded by philanthropists; the standard of living of the students, however, is not always satisfactory.

A few *madaris* provide basic health care services to their students, but most are neglected both by the government and the voluntary sectors. It is difficult to find data on the health status of these students.

This article reports a study on these *madaris* that was carried out in 2002 in the district of Peshawar, the capital of the North-West Frontier Province (NWFP) of Pakistan which has a population of 2.5 million. It aimed to determine the prevalence of blindness and low vision among students in the age group of five to 15 years. It offers an agenda for primary eye care and highlights the importance of integrated health care reforms at the national level for this large non-government community education system that caters to an estimated half a million children throughout Pakistan.

Materials and methods

There are 160 *madaris* in the district of Peshawar. When strictly defined and verified, only 48 of them were considered functional as educational institutions. The others were functioning exclusively as mosques. Of these, one *madrassa* refused to entertain the survey and another was closed for summer vacation. The remaining included a population of 3,153 students, who were the subjects included in this study.



Visual acuity of the *madrassa* students is being assessed. PAKISTAN

Syed Majid/PICO

The survey team included 21 members. The lead author, then an MSc student of community ophthalmology at the Pakistan Institute of Community Ophthalmology (PICO), was leader of a team which included 10 trainee refractionists, eight trainee ophthalmic technicians and two female trainee ophthalmic nurses from the Pakistan Centre for Vision Sciences (PCVS). A total of 10 sub-teams were formed for the fieldwork. Each team was assigned a group of *madaris* and were made responsible for assessing visual acuity and screening the children with a vision of less than 6/12 in the better eye. A standard E chart was used for measuring visual acuity. The World Health Organization (WHO) pro forma was used (with minor changes) for recording vision. All the screened children were then brought to the PCVS for detailed examination. Children with refractive errors, i.e. those showing improvement with pinhole, were refracted by the trainee refractionists and were later provided with spectacles. Some children were also referred to the ophthalmologists at the clinical department of the Hayatabad Medical Complex for an expert opinion, to establish the cause of their visual impairment. The clinical examination included direct and indirect ophthalmoscopy and B scan, if indicated.

The cut-off point used in the fieldwork was a visual acuity of less than 6/12 in the better eye. This cut-off point was taken to ensure better service provision for children with refractive errors. However, the results were analysed using the World Health Organization (WHO) definitions of visual impairment: a blind child was defined as one with a visual acuity of less than 3/60 in the better eye, and low vision was defined as a visual acuity of between 6/18 and 3/60 in the better eye.

Results

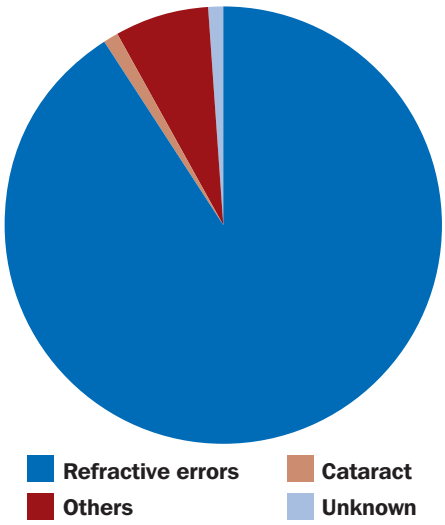
The response rate of this study was 98.5 per cent. Forty-eight children were found absent out of the total 3,153. No child refused examination. The number of males in this study was 3,026 and there were 127 females. The prevalence of blindness was 0.3 per 1,000 children, while that of low vision was 4.5 per cent. Table 1 shows the prevalence of blindness and low vision according to gender. However, it should be noted that the female sample was extremely small.

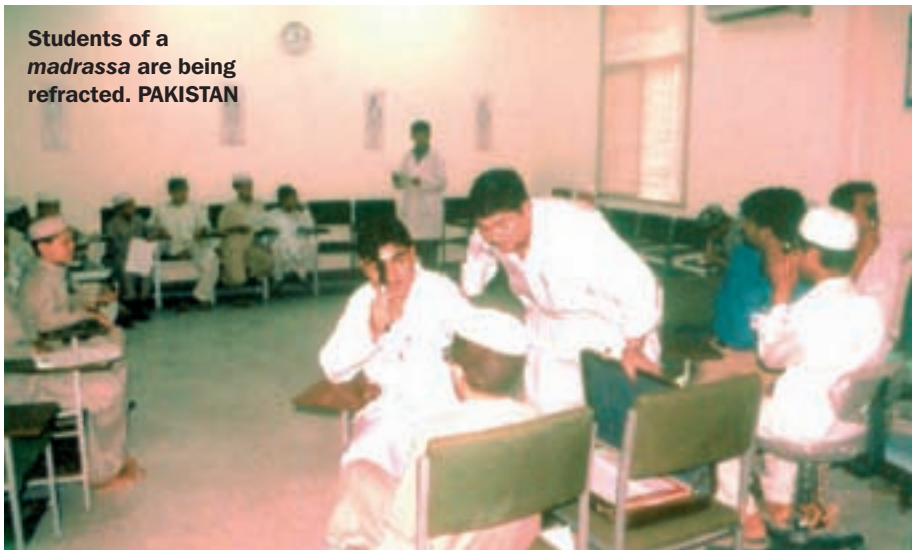
There was only one blind child in this survey, a male with bilateral phthisis bulbi. Refractive errors were the major cause of low vision in this study. Out of the 142 children with low vision, 130 children had uncorrected refractive errors and 10 had

Table 1. Prevalence of blindness and low vision

Category	Males	Females	Total
Blindness	1 (0.3/1,000)	0	1 (0.3/1,000)
Low vision	141 (4.5%)	1 (0.78%)	142 (4.5%)

Figure 1. Causes of low vision





Students of a *madrassa* are being refracted. PAKISTAN

Syed Majid/PICO

causes such as hereditary maculopathies, optic nerve atrophy, amblyopia, etc. In one child the cause of low vision was cataract, and in another child the cause could not be determined (Figure 1).

Discussion

Since the study was the first one focusing on the setting of *madaris*, we did not expect a welcoming attitude from the authorities. We had expected refusals to the screening of children, due to the political circumstances at that time. The government of Pakistan had just started regularising these *madaris* all over the country and the *madaris* authorities had rejected this initiative as unnecessary interference in their institutional matters. Conducting a study at such a critical time could easily have given rise to suspicion in the minds of an already sensitive community. However, we did not find this to be the case.

Almost all the students agreed to participate in the study (98.5 per cent). This possibly reflected the strict disciplinary environment in the *madaris* where students are used to acting promptly when requested by a teacher. Only 4 per cent of the respondents were female. The reasons for this small proportion are obvious. Firstly, there was only one *madrassa* that catered both for males and females, while one was exclusively for females. Secondly, the proportion of girls in comparison to the boys was low in these institutions because the society of the NWFP is predominantly conservative, and girls are not allowed to leave their homes, even for religious education. This gender imbalance would need to be addressed in any strategy to reach this socio-economic group, as we could not call it a truly socially inclusive strategy if girls remain unreached by services.

It was hypothesised for this study that the prevalence of blindness would be higher because these children belonged to a poor socio-economic background. Contrary to that assumption, however, the prevalence of blindness turned out to be 0.3/1,000,[1,2,3] which is low in comparison to the prevalence of childhood blindness in children of the same age group in the general population of a poor country like Pakistan. Interestingly, it is comparable to what we find in the prosperous countries of the world. It is too early to comment further on this, as one finds no data for comparison. Further studies in this area could explain this phenomenon better.

The prevalence of low vision was surprisingly higher, i.e. 4.5 per cent. Although there is no data available for comparison regarding low vision in children, the gravity of the situation becomes apparent if we look at the prevalence of low vision found in the adults of a poor economy; for example, in Ethiopia[4] it was found to be 1.7 per cent.

In this study, uncorrected refractive errors were found to be the major cause of low vision in 91 per cent of the students. In comparison to this, an Indian study in schools for blind children showed that about 19 per cent of children with severe visual impairment improved with spectacles and magnifiers. The higher prevalence of uncorrected refractive errors in children with low vision in this study is not only a measure of the level of awareness, but it also reflects the fact that children, and their guardians, are not seeking help for visual problems, and that *madaris* do not offer primary eye care services or detection of visual problems.

Hereditary disorders, amblyopia, etc. together accounted for 7 per cent of children with low vision. This proportion is quite small in comparison to other studies conducted in schools for blind children in Pakistan[5] and India,[6] where this figure was as high as 47.5 per cent and 34.8 per cent, respectively. In another study conducted in schools for blind children in India,[7] 12.3 per cent of severe visual loss was due to amblyopia, uncorrected aphakia and cataract. Almost all the children with amblyopia had unilateral high refractive errors that were never noticed by them because the other eye was normal and they had never had any eye examination before.

Conclusions

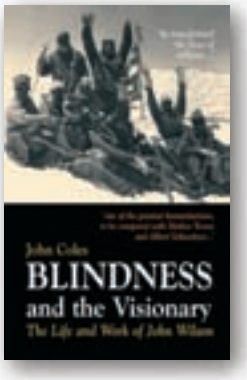
VISION 2020: The Right to Sight aims to eliminate avoidable blindness worldwide. This study reveals a fairly large and neglected segment of the society of Pakistan. It invites the attention of planners and policy makers to develop a strategy to reach a wide range of communities which might not otherwise benefit from eye care services. Inclusion of the children in the *madaris* in the mainstream national strategy may not only serve as a mechanism to achieve the goals set out in VISION 2020, but potentially create opportunities to integrate them into national health care reforms. However, a strategy to reach the girls at home would be needed to complement this effort to reach out to the underserved.

The findings of this study also highlight a strategic link between primary eye care reforms with the questions of social inclusion, resistance to change, and forces of alienation in a conservative society such as that of the NWFP. By focusing on the health care needs of a large segment of physically and socially vulnerable students at the *madaris*, the State would not only fulfill its responsibilities towards these children, but could also encourage acceptability and sustainability in its drive to regulate the *madaris*.

References

1 Gilbert CE. New issues in childhood blindness. Community Eye Health J 2001;14(40): 53-56.
2 Gilbert CE, Foster A. Childhood blindness in the context of VISION 2020: The Right To Sight. Bull WHO 2001;79: 227-232.
3 WHO. Programme for the Prevention of Blindness. Prevention of childhood blindness, 1992, Geneva.
4 Negussie Z and Mabey D. Blindness and low vision in Jimma Zone, Ethiopia: results of population-based study. Ophthalmic Epidemiology 1997;4(1): 19-26.
5 Sethi S, Daud Khan M. Survey of blind schools in North West Frontier Province (An institutional-based study). Pakistan Journal of Ophthalmology 2001 17;3: 90-96.
6 Stella J, Hornby, Shajan Adolph, Vijaya K, et al. Evaluation of children in six blind schools of Andra Pradesh. Indian Journal of Ophthalmology 2000; 48(3): 1.
7 Rahi JS, Sripathi S, Gilbert CE, Foster A. Childhood blindness in India: causes in 1318 blind school students in nine states. Eye 1995;9: 545-50.

Book review



Blindness and the visionary: the life and work of John Wilson

Author: John Coles, published June 2006.

Reviewed by Andrew Elkington, Chairman, The British Council for Prevention of Blindness.

When I was young, my father did not allow me to accept a chemistry set as a present. He was a doctor in general practice and had heard of a twelve-year-old boy losing the sight of both eyes in an explosion at school, caused by the chemicals he was using being mislabeled. That boy was John Wilson. He grew up to be a man who conquered his own disability and transformed the lives of literally millions of people in a similar predicament. This book is a fascinating account of how this was done.

The author has been chairman of Sightsavers International (SSI) for the past five years. Earlier, he had a distinguished career in the diplomatic service, including being Ambassador to Jordan, High Commissioner to Australia, and holding senior posts in Europe and the Foreign Office. All this has equipped him to put Sir John Wilson's life in an interesting perspective.

The reader of the book should, however, take note of what the author writes in the preface. He never met John Wilson. In piecing together the story he tells, he has necessarily relied upon the generosity of the Wilson family, the views of many of Sir John's friends and colleagues, and an enormous amount of archival material. The subject of this biography was a prolific writer and much sought-after speaker, and these activities led to the accumulation of numerous publications. Moreover, for many years, he kept a diary in braille. Later in life he dictated excerpts on tape, taking the opportunity to add comments. All this has allowed the author to marshal a huge amount of factual information and it is fortunate that his background enables him to present this in a manageable form. I rarely found these passages indigestible, and the student of the evolution of the many national societies, both for and of people who are blind, will treasure the myriad details.

Most biographies take a chronological format. This account is different. Whilst the first two chapters follow the traditional pattern, chapters 3 and 4 deal with the themes of John Wilson's work in Africa and Asia. The next two chapters cover the later part of his life in general terms, whilst chapter 7 explores Sir John the man. Finally, there is a section on his legacy, which I found particularly fascinating.

So much for the mechanics of the book. What did I learn? The reader should remember that any reviewer's choice is personal, but for me the following points stood out. First, as an ophthalmologist, it was hurtful and humbling for me to learn that John Wilson was angered that he had not been told the truth about the extent of his eye injuries. He evidently felt that his being allowed to hope that some useful vision might return, when this was obviously not the case, was cruel. Then there was his determination to overcome his disability. He was gifted intellectually and this, combined with hard work, led to his gaining a place at Oxford University. He rowed for his college. All this fits in with his attitude that those who are blind "are normal people who cannot see." His resilience was remarkable. He had "a stamina that compels admiration." Another trait was the way in which he encouraged and supported others. In this connection, readers of the CEHJ will be interested to learn that he strongly backed Professor Barrie Jones's initiative in setting up the International Centre for Eye Health. This book traces Sir John moving from an emphasis on rehabilitation to one on prevention, a concept that the Centre enshrines. It also describes his progressive interest in preventing disability in general. His hearing gradually failed, allegedly because the antibiotics used to treat an attack of amoebic dysentery proved toxic, and this, no doubt, spurred him on to help deaf people, who, it is claimed, outnumber people who are blind.

Lady Wilson plays a pivotal role in this narrative, not only as a devoted wife of 55 years, and the mother of their two children, but also as a professional colleague. She coined the description 'river blindness' for onchocerciasis. She is a historian by training, and with a charm that led to the income of SSI increasing ten-fold when she was in charge of fundraising. Her skill as a photographer greatly helped in this respect.

It is good to have documented the many awards that Sir John received. What gave him most pleasure was becoming an Honorary Doctor of Civil Law of his old university. The Head of his College described him as perhaps the most remarkable of the College's alumni: "A man without sight, with a worldwide vision."

I met Sir John only once. He spoke in the Royal Albert Hall to an audience of over three thousand. We were all riveted. You could have heard a pin drop. At the reception afterwards he was the life and soul of the party, being particularly interested in the views of the young people present. Then I was introduced: a privilege I shall never forget. I did not mention the chemistry set.

Blindness and the visionary: the life and work of John Wilson is published by Royal National Institute for the Blind. It is also available as a CD-ROM for people with sight problems. Price: UK £16.99

Obituary

Jock Anderson FRCS OBE

It is with regret that we report the death of Dr John DC Anderson, better known to his many friends and colleagues as 'Jock', on June 16, 2006.

Jock was born on August 21, 1924, in Lincolnshire, UK, where he spent his early childhood. He later attended Bedford School and went on to work as an electronics engineer during the war years. He then studied medicine at Cambridge University and, while completing his training at the Middlesex Hospital, London, he met his wife, Gwendy.

In 1955, they left for Asia to work, firstly at the Church Mission Society Hospital in Quetta, Pakistan, and, later, the Christian Medical College in Ludhiana, India. Jock was deeply concerned for the enormous number of visually impaired people without access to medical care. He realised a dream when, in 1960, a mobile 'caravan hospital', shipped from the UK, brought ophthalmic and general medical services to many thousands in the Sindh Province of Pakistan. In 1967 Jock moved to Kabul, Afghanistan, where he helped to set up the first eye hospital, trained doctors and nurses, and established eye camps.

Jock joined the newly formed Department of Preventive Ophthalmology (International Centre for Eye Health) at the Institute of Ophthalmology/Moorfields Eye Hospital, London, in 1981. He conducted pioneering research based on surveys in Somali refugee camps, in Zanzibar and Eastern Sudan. During his time at ICEH he was much involved in the teaching programme, and he and Gwendy showed warm and caring hospitality to many overseas students, whose cultural concerns they fully understood after their years in Asia.

Despite spending the last fourteen years of his life in a wheelchair, due to paraplegia caused by a spinal tumour, Jock remained a cheerful, positive and gracious person, sustained by his steadfast faith.

Past and present staff and students at ICEH will remember Jock with much affection and gratitude and we convey our deepest sympathy to Gwendy and their three children and nine grandchildren.

Sue Stevens

John Rifkin

Dr Jock Anderson receives an honorary diploma in Community Eye Health by Her Royal Highness, The Princess Royal, during her visit to the International Centre for Eye Health in 1988. UK

Courses and conferences

The Inaugural World Congress on Refractive Error and Service Development
Theme: Meeting the Challenges of Refractive Errors in the 21st Century. **Date:** 14-16 March, 2007. **Venue:** The International Convention Centre, Durban, South Africa. **Hosted by:** The International Centre for Eyecare Education (ICEE). **Scientific programme:** Sessions include the latest in clinical issues, public health developments and research to address this major cause of visual impairment and blindness and meet the VISION 2020 goal of eliminating avoidable blindness by the year 2020. Latest developments in correcting and treating refractive errors with spectacles, contact lenses and refractive surgery will be discussed as well as programme and community developmental efforts on how to address refractive blindness worldwide.
Information: www.icee.org

Eighth General Assembly of the International Agency for the Prevention of Blindness
Theme: Excellence and Equity in Eye Care. **Date:** July 28-August 2, 2008. **Venue:** Centro de Convenções Rebouças, Sao Paulo, Brazil. Email: **agency@lvpei.org**

International Ophthalmic Nurses Association Annual Conference
Date: 30-31 March 2007. **Venue:** University of Swansea, South Wales, UK. **Information:** Northern Network Events. Email: **iona@glasconf.demon.co.uk**

Bridging Communities and Eye Care Providers to Achieve VISION 2020 in Africa
Date: November 13-17, 2006. **Venue:** Kilimanjaro Centre for Community Ophthalmology, Tanzania. **Objectives:** To meet VISION 2020 goals, developing and implementing better strategies for bridging communities and hospitals will be essential. This course will provide eye care programme managers with the skills necessary to develop, implement, and monitor strategies for increasing utilisation of services by the population in need. **Target audience:** Eye care programme managers (MoH, NGO, service groups), trainers, key decision-makers of national prevention of blindness programmes. **Information and admission procedures:** Genes Mng'anya, KCCO Courses Administrator – Email: **genes@kcco.net**
Course supported by Seva Foundation

Organisational & Financial Management to Achieve VISION 2020 in Africa
Date: November 20-December 1, 2006. **Venue:** Kilimanjaro Centre for Community Ophthalmology, Tanzania. **Course objective:** To provide practical (African-tested) strategies for either developing or strengthening management systems to facilitate increased efficiency, coverage, and satisfaction with eye care services. **Target audience:** The heads and key decision-makers of VISION 2020 planning areas. **Information and admission procedures:** Genes Mng'anya – Email **genes@kcco.net**. Course supported by Fred Hollows Foundation

Short Course in Tropical Ophthalmology
Date: 21-23 November, 2006. **Venue:** International Centre for Eye Health at the London School of Hygiene and Tropical Medicine, 8 Bedford Square, London WC1B 3RE, UK. **Course aims and objectives:** The primary purpose of the course will be to familiarise participants with the main causes of blindness in the world, with emphasis on the tropics. This will be done through review of the clinical presentation and management of the following diseases: trachoma, onchocerciasis, vitamin A deficiency and measles, ophthalmia neonatorum, leprosy, and HIV and the eye. The workshop programme will also introduce participants to the Global VISION 2020 Initiative and its implementation through the VISION 2020: The Right to Sight programme. One of the goals of the Global Initiative is to reduce childhood blindness from its present level of 0.75 per 1,000 children to 0.4 per 1,000 children by the year 2020. The main focus of the VISION 2020: The Right to Sight Global Initiative is to create adequate eye care facilities within communities, particularly in underprivileged areas; to develop human resources so that well-trained eye care workers are available; and to implement specific programmes to control the major causes of blindness. **Target audience:** Ophthalmologists, from the UK and overseas, who wish to gain knowledge on eye diseases found in the tropics. **Information and admission procedures:** Applications for this workshop are available on the London School of Hygiene and Tropical Medicine's website **www.Lshtm.ac.uk/prospectus/short/sto.html** or contact Emma Sydenham – Email: **emma.sydenham@Lshtm.ac.uk**


ICEH

Twenty-six participants from 16 countries attended the annual short course on 'Planning for VISION 2020' run by the International Centre for Eye Health at the London School of Hygiene and Tropical Medicine from 3-7 July, 2006. The participants worked in teams to develop a model for eye care interventions in their selected regions. Those interested in applying for future short courses should email Shortcourses@Lshtm.ac.uk

New resources available

Technology Guidelines for a District Eye Care Programme
This is a new publication from the VISION 2020 Technology Working Group, aimed at all eye care personnel providing services at district level. The document gives guidance on the personnel, equipment, consumables, and supplies needed for an eye care programme serving a population of about 500,000. Estimates are given for the numbers and types of personnel required for the base hospital, the satellite units, and at primary level. Suggested ophthalmic items are drawn from the *Standard List for a VISION 2020 Eye Care Service Unit*, and approximate quantities given.

District programmes will be in various stages of development, so some of the more sophisticated and expensive items are marked 'Essential' or 'If Funds Available'. Some cost estimates are given for budgeting purposes. A section is included on ordering and stock management, with sample forms which can be adapted to local circumstances, and a list of items for simple preventative maintenance of equipment is also included.

The Technology Guidelines for a District Eye Care Programme (plus the *Standard List for a VISION 2020 Eye Care Service Unit*) can be downloaded from **www.v2020.org** or **www.iceh.org.uk** Print copies are available, free of charge for developing countries, from: International Resource Centre, International Centre for Eye Health (address on page 34) Fax: +44 (0)20 7958 8317. Email: **sue.stevens@Lshtm.ac.uk**

Useful resources: glaucoma

The International Glaucoma Association (IGA)
Formed in 1974 at King's College Hospital, London, the IGA is the longest-running and largest patient-based glaucoma association worldwide. Their mission is to help prevent glaucoma blindness throughout the world by providing high-quality patient information material. They believe that the best people to judge what is needed in a particular country are the eye specialists who work there, and they actively seek partners across the world with whom to work.

The IGA produce patient information material in English, German, French, Italian and Spanish, and are working to develop materials in other languages, as and when funding and ophthalmic expertise become available. The materials, at present, are produced in generic form so they are not specific to the medical services in any particular country, but the IGA are pleased to develop specific materials to suit the needs of a specific country.

As a subscriber to the *Community Eye Health Journal* you have already demonstrated your commitment to the prevention of blindness in your area. If your glaucoma service would benefit from patient information support and you would like to examine the possibility of a partnership with the IGA, you are invited to contact the IGA at Tel: 00 44 (0) 1233 648162
Email: **tom@glaucoma-association.com**

Shaarawy T, Flammer J – Editors. Glaucoma therapy – current issues and controversies. Martin Dunitz 2004.
A 328-page comprehensive textbook. Available from ICEH, while very limited stocks last, free of charge to ophthalmologists working in the developing world at tertiary level only. Applications (stating name, work address and job title) should be sent to the Resource Centre at ICEH.

Dhull C, Katenga S, McGavin DDM. The glaucomas. ICEH 1995.
A teaching text and slide set – consisting of a 60-page booklet and 24 colour transparencies. Available from ICEH. UK £20 (UK £15 to developing countries) plus post and packing.

Yorston D. Eye surgery for the prevention of blindness. ICEH 2000.
A video showing two procedures – surgery for upper lid entropion (14 minutes) and trabeculectomy for glaucoma (9 minutes). Available from ICEH. UK £10 plus post and packing.

Stevens SM. Practical ophthalmic procedures. Volume 4. ICEH 2005.
A teaching text and slide set – consisting of a 34-page booklet and 24 colour transparencies covering six procedures. This volume includes detailed instructions for Schiotz and applanation tonometry with a total of 15 illustrations.

Available from ICEH. UK £20 (UK £15 to developing countries) plus post and packing. Free to download from the ICEH website **www.iceh.org.uk/files/tsno10/04/start.htm**

Understanding glaucoma – poster. Anatomical Chart Company, US 2005.
Available from Waterstones. UK £4

Stewart WC. Clinical practice of glaucoma. McGraw-Hill Health Professions Division 1990.
Available form Waterstones. UK £19

Spaeth GL, Eid TM. The glaucomas: concepts and fundamentals. Lippincott Williams & Wilkins 1999.
Available from Waterstones. UK £19

Sherwood MB, Brandt JD, Choplin NT, Schuman JS. Clinical update on glaucoma. AAO 1997.
A CD-ROM containing information on diagnostic tools, the role of anti-metabolites, glaucoma pharmaceuticals, etc.
Contact AAO, stating name, work address and job title.

Zorab AZ, Strauss H, Dondrea CL, Arturo C, Garrett M. Basic clinical science course. Section 10 – Glaucoma. Updated annually.
A 242-page comprehensive paperback with colour plates. Contact AAO, stating name, work address and job title.

Community Eye Health Journal – back issues

Volume 9, Issue 18, 1996
Primary surgical treatment of glaucoma

Volume 9, Issue 19, 1996
Diagnosis and treatment of the glaucomas

Volume 14, Issue 39, 2001
The adult glaucomas

Suppliers' addresses

Waterstones
71-74 North Street, Brighton, East Sussex, BN1 1ZA, UK.
Email: **manager@brighton.waterstones.co.uk**

ICEH
International Resource Centre, International Centre for Eye Health, LSHTM
Keppel Street, London, WC1E 7HT, UK.
Email: **sue.stevens@Lshtm.ac.uk**

AAO
American Academy of Ophthalmology,
655 Beach Street, Box 7424,
San Francisco, CA 94120-7424, USA.
Email: **wovaitt@aao.org**

IGA
International Glaucoma Association,
Woodcote House, 15 Highpoint Business Village, Henwood, Ashford, Kent, TN24 8DH, UK. Email: **info@iga.ork.uk**
www.glaucoma-association.com

Next issue


Margaret Hogweg

The next issue of the *Community Eye Health Journal* will be on the theme **Creating demand for cataract surgery**