

Keith Barton, MD, FRCP, FRCS, FRCOphth

Dr. Barton reflects on the challenges of managing glaucoma in the developing world and on the role of drainage devices in the surgical treatment of this disease.

Based on your work in Ghana, how do you think that glaucoma will be managed in the developing world in the future?

There are huge barriers to the successful prevention of blindness from glaucoma in the developing world: more than 90% of sufferers are undiagnosed, and many who are resist having treatment. Patients commonly present with blindness in one eye, and even then, it is often difficult to convince them that the priority is to treat the fellow eye, which may be at high risk but may still be asymptomatic. More often than not, the patient will expect treatment to restore vision to the blind eye, and the person's trust in the ophthalmologist is based on his or her ability to accomplish that task.

I think there is a great deal to learn from the Aravind Eye Care System in India, which is having a huge impact. There are many differences, however, between sub-Saharan Africa and India. The latter retains a greater proportion of the doctors that it trains than do many African countries, so India has more manpower. That country's per capita gross domestic product is also significantly higher, and its thriving generic pharmaceutical industry makes drugs more affordable. The answers to the problem in sub-Saharan Africa probably lie in both economics and education. While drugs remain unaffordable for many, however, there is a great need for a simple surgical solution.

In your directorial capacity at Moorfields, how do you hope to meet the increasing demand for glaucoma services at a time of budgetary constraints?

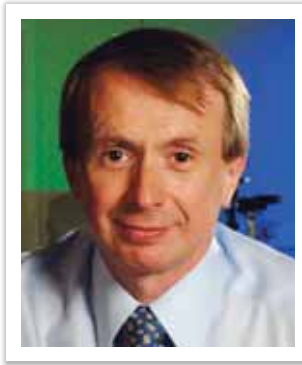
The population at risk of glaucoma is likely to increase by 50% in the next 2 to 3 decades, and the prevalence of glaucoma will probably rise by a greater amount because of the disproportionately higher prevalence among people reaching the top of the age pyramid (ie, there is likely to be a threefold increase in the number of people over 80 years of age). In addition, almost 60% of significant glaucoma in developed countries is undiagnosed. In the

long term, one would expect the proportion of undiagnosed patients to decrease, thereby increasing the number of patients with diagnosed glaucoma requiring health care resources.

In many countries, health care providers are reimbursed for the care they deliver by purchasers or commissioners (insurance, health maintenance organizations, the government, etc.). While providers are under great pressure to deal effectively with ever-rising numbers of patients, purchasers are increasingly involving themselves in the management of patients by way of guidelines, the competitive tendering of contracts for glaucoma management, and the exercise of control over what may be reimbursed in order to slow the escalation in cost resulting from the boom in glaucoma patients.

Community-based eye care providers, both optometrists and private health care chains, are keen to be more actively involved in the ophthalmic care that has tradi-

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FAST FACTS

- Consultant ophthalmologist and glaucoma service director at Moorfields Eye Hospital in London, 1996 to present and 2005 to present, respectively
- Associate professor in the Division of Epidemiology and Genetics at the Institute of Ophthalmology, University College London, 2007 to present
- Trustee and council member (2005-present) as well as research grants committee chairman (2010-present) for the International Glaucoma Association
- Member of the panel of examiners for the Royal College of Ophthalmologists (United Kingdom), 2005 to present
- Heong Long visiting professor, National University Hospital, Singapore, 2011 to 2012
- Founding member of the educational committee of the European Glaucoma Society, 2009 to present

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tionally been managed by hospital-based glaucoma clinics. In line with current UK government policy to transition ophthalmic care out of hospitals and closer to patients' homes, block contracts for care can be awarded to any providers willing to bid for them. Although the current economic climate should favor large providers because of their economies of scale, political initiatives to move care to smaller local providers could leave institutions such as Moorfields vulnerable. We currently examine 73,000 glaucoma patients per year across 15 sites in the London area. The government's policy has prompted me to study the logistics of service delivery beyond political trends and to examine how we provide glaucoma services. Specifically, I am examining how we can see large numbers of patients in the community without increasing costs or compromising their care.

My colleagues and I are currently investigating the separation of data acquisition from clinical decision making. The idea was inspired by the diabetic retinopathy screening service in the United Kingdom, in which patients with diabetes visit the hospital once a year to have only a retinal photograph. A trained individual in a reading center later evaluates the photograph and makes a decision regarding the presence, absence, or severity of diabetic retinopathy and hence the urgency and timing of further examination. Glaucoma is slightly more complicated, because the assessment of the disease's stability is based on a composite picture constructed by the clinician after reviewing the results of several tests. In addition, glaucoma patients are under active treatment and have frequent complaints about their eye drops. Any clinical setup for data acquisition only would need to take all of this into account.

What questions do you hope to answer regarding the pathogenesis and management of uveitic glaucoma?

Uveitic glaucoma is a fascinating subject, because the condition is relatively common, produces huge swings in IOP due to a mixture of mechanisms, affects patients of working and child-bearing age, and poses a high risk of severe visual loss if not treated adequately. The main question that I hope to answer in my own practice is which surgical technique is most appropriate for the individual patient. Designing clinical trials in uveitis is difficult. Surgery for uveitic glaucoma is less common than primary open-angle glaucoma in any individual glaucoma specialist's practice, and the heterogeneity of uveitic glaucoma makes it more difficult to generalize the answers to questions from a surgical trial.

Information on the pathogenesis of the disease is more likely to come from uveitis specialists than myself.

Sufferers of Fuchs heterochromic cyclitis and Posner-Schlossman syndrome, however, tend to spend at least as much time in glaucoma clinics as uveitis clinics, and ultimately, the glaucoma specialist's access to aqueous and to iris and trabecular tissue uniquely positions him or her to examine the pathogenesis of uveitic glaucoma.

Where do you feel that glaucoma drainage devices fit in the treatment algorithm for this disease?

Based on personal experience and clinical trial results, I have a low threshold for using shunts rather than trabeculectomy. Other surgeons share my feelings, although most are on the US side of the Atlantic. I would not argue against those who favor trabeculectomy in many cases, but the procedure clearly has a low chance of success for some patients. In high-risk cases (eg, eyes with more than one failed trabeculectomy or a history of extensive conjunctival surgery such as a scleral buckle), there is a strong argument for implanting an aqueous shunt.

Nevertheless, our dependence on glaucoma devices that are almost 20 years old and differ little from the Molteno implant (Molteno Ophthalmic Limited, Dunedin, New Zealand), which is now more than 40 years old, is a source of shame. Large ophthalmic surgical companies have not invested seriously in the field of glaucoma, but I think that is changing.

What prompted you to run in the Boston Marathon?

I used to run as a student but had allowed this to lapse. In 2000, a colleague, Zdenek Gregor, FRCS, convinced me to run the Dublin Marathon instead of the Great North Run, a half marathon in the North of England, on the pretext that the latter was cold and miserable. I took his advice and completed one of the coldest and wettest runs of my life at over twice the distance. A glutton for punishment, I allowed him to talk me into running the Berlin Marathon the following year in much better weather. At the finish line, he declared that I had qualified for Boston, so the next step was obvious.

My lasting memory of the Boston Marathon, apart from the fact that very little of it actually takes place in Boston, is a newspaper clipping that I received in the mail a month or so after the race in 2002. A kindly bystander, a lady from Wellesley and a former student of the famous school who lives along the course of the race, had seen a photograph in the newspaper in which the runner's race number was legible. His face was half obscured by the elbow of another runner. She thought the clipping ought to be forwarded to the individual involved (me) and contacted the race organizers, who duly forwarded the cutting to me. Thanks to her, I have a photograph of myself in *The New York Times*. □