

Glaucoma Care in India

Our thoughts on optimizing care for patients.

BY RENGARAJ VENKATESH, MD, AND KRISHNAMURTHY PALANISWAMY, MD

(RV) am a fellowship-trained glaucoma specialist and head of one of the six Aravind Eye Hospitals in southern India. Despite being a glaucoma specialist, cataract remains my primary concern, as is the case for most glaucoma surgeons in India and generally in other developing nations. In India, 30 million individuals are blind from cataract, nearly 90% of whom could have their vision restored. In contrast, there are about 11.2 million people aged 40 years or older in India who are afflicted with glaucoma who will become permanently blind without appropriate therapy. Another 28.1 million people have primary angle-closure glaucoma or are ocular hypertensives and primary angle closure suspects. Every eighth individual or nearly 40 million of the estimated 309 million population aged 40 years or older in India either has glaucoma or is at risk of developing the disease.¹ Numerous population-based studies detailing the prevalence of glaucoma and other eye diseases have been published, and they shed light on the magnitude of glaucoma in India.²⁻⁸

The problem we face is daunting. The rate of undiagnosed glaucoma cases is 90% in contrast to 40% to 60%

in the developed world.²⁻⁸ Most of these patients present either visually disabled or permanently blind from the disease. Glaucoma awareness in both rural and urban communities is poor. Less than one-half of the patients diagnosed with glaucoma via the Aravind Comprehensive Eye Survey had undergone a previous eye examination.⁴ A significant number of patients diagnosed with primary open-angle closure glaucoma prior to examination in the Chennai Glaucoma Study actually had primary angle-closure glaucoma. This discrepancy was possibly due to gonioscopy not being done or done improperly.⁷ This reflects inadequate examination skills among doctors as well as poor standards for ophthalmic residency training.^{9,10} Knowledge and perceptual barriers have resulted in a low follow-up rate in the clinic setting.¹¹

OPPORTUNISTIC SCREENING VERSUS CASE DETECTION

Cataract is easily amenable to detection by mass screening while glaucoma is not. Currently, we perform opportunistic screening in the form of comprehensive eye examinations, which includes tonometry, gonioscopy, optic nerve head examination, and, if necessary, visual field examination. The AECS is the largest eye care provider in the world. It provides affordable and world class health care to the population of Tamil Nadu and Pondicherry in South India, and it consists of five tertiary care hospitals, six secondary care hospitals, six community centers, and 41 vision centers. The average number of patients examined per day at the AECS is a staggering 10,000 patients (Figure 1). We request that all patients presenting to the clinic as well as those with a positive family history and other risk factors for glaucoma undergo a detailed eye examination. Every patient undergoes a comprehensive eye examination, which plays a crucial role in opportunistic glaucoma screening.

TRAINING AT THE AECS

We train one-eighth of all Indian ophthalmologists. Our



Figure 1. A breakdown of the patients treated per day across the many Aravind Eye Care System (AECS) locations.

residency and fellowship programs are some of the best in the country. Our residents are adequately trained in all aspects of glaucoma diagnosis such as applanation tonometry, gonioscopy, optic nerve head analysis, and automated field analysis interpretation. We use modern equipment, including anterior and posterior segment optical coherence tomography. Long-term fellowship programs in the AECS offer outstanding training in glaucoma surgical procedures in addition to glaucoma diagnosis and medical management. The teaching standards in the residency programs in India are not standardized, and many programs do not

meet the specified benchmarks.¹² (See *Call to Action*). As a result, many residents graduate without proper knowledge about glaucoma diagnostic procedures or even how to perform a cataract operation. In order to overcome this knowledge gap, we offer 4-week, short-term training in glaucoma diagnosis and medical and laser treatment, which is being utilized by national and international trainees.

MANAGING GLAUCOMA IN THE DEVELOPING WORLD

Medical management is the mainstay of treatment.

CALL TO ACTION

By Alan L. Robin, MD

Although we physicians might complain about third-party reimbursements, health care regulations, and maintenance of certification, the key issues that we face in the United States and Europe are quite different from those described by Drs. Venkatesh and Palaniswamy. In India, nationwide minimal standards for both medical school and residency training do not exist. It is difficult, therefore, to systematically screen for or treat glaucoma when the quality of medical training is poor.¹ The lack of standardization of residency programs also leaves many ophthalmologists without basic skills such as how to use a slit lamp, how to perform a three-dimensional optic nerve examination or perform gonioscopy,^{2,3} and how to competently operate. The basic business skills that we in the United States rely on (ie, having two or more examination lanes and a technician for efficiency and cost-effectiveness) are not realized in many areas of the less-developed world.

This skill set deficit makes an efficient country-wide surgical reversal of cataract blindness difficult. Because cataract is a first priority, glaucoma detection and diagnosis take second place when compared to the demands for eliminating blindness due to cataract. (We never even consider cataract blindness in our day-to-day activities.)

In less-developed countries, health literacy below the third grade level affects patients' understanding and adherence. Patients are often already severely visually disabled upon presentation for their initial examinations. They make their journeys to clinics on a bus or train, which is tedious and long. They can often travel for a day or more. Distance to the clinic and mode of transportation are often limiting factors for both the initial evaluation and continued care. These patients' disabilities require that someone accompany them to the clinic, often at the sacrifice of a day's wages for all involved.

Medical treatment is an option, but for patients who live in rural regions, pilocarpine and timolol may be the only available medications. For many patients, it is an inconvenience to spend a day just to procure eye drops that are not perceived to improve vision. Generics are often the only medications available. There are differences among various generic brands

of the same product,⁴ and many are inferior to branded products.⁵ The cost and convenience of generic medications, however, often dictates their use. Surgical options such as laser trabeculoplasty are not always available, as the instruments to perform the procedure are not present, and surgeons' skills may be insufficient. In less-developed countries such as India, it is easier to justify cataract surgery compared to glaucoma surgery. Cataract surgery is a one-time expense with a limited number of complications that can profoundly increase patients' quality of life. Glaucoma drainage devices, on the other hand, are expensive. After surgery, patients may still require medical therapy. These costs are hard to justify to a person who might earn less than \$100 per month.

In the United States, phacolytic and phacomorphic glaucomas are extremely rare, yet these forms of the disease are common in India and similar countries and require a strong skill set to tackle them. In order to assist those in developing countries, we, here in the United States, must create better algorithms for glaucoma education, develop screening techniques, and devote more resources to surgical techniques to simplify glaucoma surgery and make it safer in less-developed nations. Improved outcomes are needed with techniques that can be used by less highly trained doctors.

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Figure 2. Trained counselors talk to patients in detail about glaucoma, the importance of compliance, treatment, and follow-up. They also play an important role in family screening for glaucoma.

Many low-cost generic drugs have flooded the market, and their quality control is debatable. Generic drugs are not as potent as the original formulations,¹³ but they are the only hope for many poor patients. Some of the semiurban and rural population do not have access to generic medications. Compliance and long-term adherence to medical therapy is a serious concern, and there are also issues with proper technique for the administration of drugs.¹⁴ Our philosophy at the AECS is that no one should perform a task at a level that someone with less training could perform. To this end, trained counselors talk to patients in detail about the disease, the importance of compliance, treatment, and follow-up (Figure 2). The counselors also play a vital role in family screening for glaucoma, which helps with early-stage detection of the disease.

Although the magnitude of lens-induced glaucoma has decreased, it is not uncommon. We have proven that manual small-incision cataract surgery is a safe and cost-effective technique with minimal complications in patients with phacolytic and phacomorphic glaucoma.^{15,16} Prevalence of cataract and glaucoma increases with age. So many patients in outreach screening camps present with advanced cataract and glaucoma, for whom a trabeculectomy combined with manual small-incision cataract surgery provides a safe and cost-effective technique with the least complications and a short learning curve.¹⁷

Even though trabeculectomy is still the gold standard in India, we need to perform early surgery in patients with advanced glaucomatous damage, because of the poor compliance to treatment and difficulty with long-term follow-up. Managing intractable glaucoma continues to be a challenge, as most of the shunts are expensive. Aurolab, a manufacturing division of Aravind Eye Hospital, has recently

developed a cost-effective tube shunt called the Aurolab Aqueous Drainage Implant. This tube shunt will help glaucoma surgeons deal with failed filters and difficult cases with relative ease.

CONCLUSION

Glaucoma has a high prevalence in India. Poor patient awareness coupled with factors such as compliance issues, inadequate resident training, and cost of medications make glaucoma an extremely dangerous condition with high potential for causing irreversible visual impairment in millions of patients. Strategies to overcome these barriers that would involve ophthalmologists, epidemiologists, and policymakers need to be intelligently and quickly devised. ■

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