

Glaucoma in the Kingdom of Saudi Arabia

This growing population requires more glaucoma subspecialists and tertiary care centers.

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Dr. Edward's and coworkers' perspectives on the eye care delivery system and the prevalence and treatment of glaucoma in the Kingdom of Saudi Arabia are appreciated and informative. They help us better understand the importance of glaucoma and the need for glaucoma specialists in the Middle East. The authors' observations also point out the many differences between health systems in the East and West.

The prevalence of congenital and angle-closure glaucoma in the Kingdom are different from that found in the United States. Less than 3% of the Kingdom's population and more than 14% of the US population are over 65 years of age.¹ These age distributions might explain the difference in the prevalence of various glaucomas and other comorbid conditions between the two countries.

There are far too few glaucoma specialists in the Kingdom, considering that the population of that country is comparable to that of the state of New York. According to the American Glaucoma Society's website, 96 glaucoma specialists serve the 8.5 million residents of New York City.

In the Kingdom, medications and care are universally available, whereas in the US, where health care is not universal, many individuals struggle to afford copayments.

Many prevalence studies have been performed in the United States, including but not limited to the Framingham Eye Study, Projecto Ver, the Baltimore Eye Survey, the Los Angeles Latino Eye Study, and the Beaver Dam Eye Survey. It may be important for clinicians in the Kingdom to better understand the prevalence of various eye diseases, including glaucoma, and to know the percentages of individuals with glaucoma who are unaware of their disease process and who go blind in at least one eye.

A better understanding of the Kingdom's age distribution, demographic differences, population density, number of practicing ophthalmologists and glaucoma specialists, and the types of glaucoma will enable eye care providers to better evaluate various delivery systems' strengths and weaknesses in the future. The authors' affiliations with both the Johns Hopkins Wilmer system and the King Khaled Eye Specialist Hospital demonstrate a positive synergy of two global powers.

—Alan L. Robin, MD, section editor

The Kingdom of Saudi Arabia has a population of 19.8 million citizens and approximately 9.3 million employed expatriates. Although the average life expectancy here has been rising rapidly, only 2.73% of the population is over 65 years of age.²

The epidemiological data on glaucoma in the Kingdom are sparse. The prevalence of the disease using population-based studies remains unknown. One study that evaluated the presenting cause for vision loss estimated that 5.2% of patients with visual complaints had glaucoma.³ Hospital-based studies and observations suggest that the distribution of various subtypes of glaucoma differs from that of the West. Primary angle-closure glaucoma is fairly common and, in the hospital setting,

may equal or surpass the number of cases of open-angle glaucoma.⁴ Pseudoexfoliation is fairly common in the region and accounts for a significant number of patients within the hospital system.⁵ The incidence is probably similar to that in North Africa.⁶

Primary congenital glaucoma and other glaucomas secondary to genetic diseases contribute significantly to the burden of disease in the Kingdom. Most primary congenital glaucoma results from an autosomal recessive mutation in the *CYP11B1* gene. Based on the congenital glaucoma registry at the King Khaled Eye Specialist Hospital, 80 to 90 new cases of the disease are seen every year. The number of glaucoma care providers outside the hospital is increasing, suggesting that

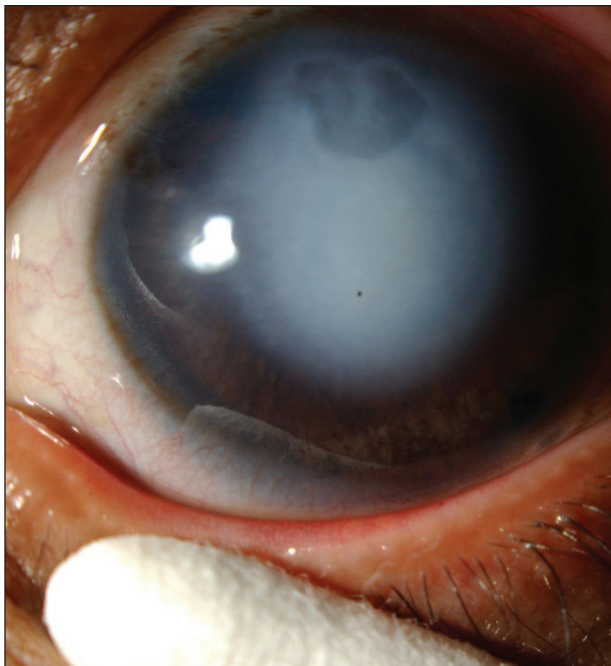


Figure 1. An unusual variant of a patient with primary congenital glaucoma with congenital corneal opacity and iris defects that resemble Peters anomaly.

the volume of primary congenital glaucoma cases is rising as the population grows. The phenotype of primary congenital glaucoma tends to be severe, with many features of anterior segment dysgenesis (Figures 1 and 2).⁵ Many patients require multiple surgical interventions for adequate IOP control. Clinical observations suggest that the Saudi community is becoming more conscious of glaucoma, because patients are presenting earlier, and more glaucoma suspects are being seen compared to 1 or 2 decades ago.

TRAINING PROGRAMS

Ophthalmology residency training is fairly similar to programs in the United States. Over 4 years, trainees rotate through the glaucoma service in the second and fourth years of residency. Residents are exposed to various complex forms of glaucoma, receive sufficient training in laser and surgical procedures, and participate in various levels of the decision-making process. Most residents will participate in a fellowship. Similar to the United States' accreditation process, the Kingdom has a commission that oversees the quality of training and the certification process. The King Khaled Eye Specialist Hospital transitioned to a 2-year glaucoma fellowship in 2009 that includes intense exposure to the medical and surgical treatment of simple and complex glaucoma, regular evaluations, and a research project requirement.

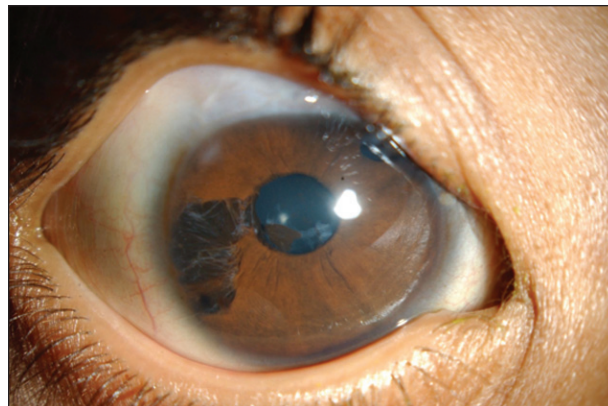


Figure 2. A patient with primary congenital glaucoma with patchy iris atrophy suggestive of anterior segment dysgenesis after filtration surgery.

The final evaluation includes a written and an oral examination.

Approximately 40 fellowship-trained Saudi glaucoma specialists provide glaucoma care within the governmental health system and in private practices. Larger numbers of subspecialists will need to be trained to treat the rapidly growing population in the Kingdom.

MODELS OF CARE

There is a two-tiered system for medical care in the Kingdom. Universal health care is provided to Saudi Arabian citizens and some expatriates through the Ministry of Health and various hospital systems run by governmental organizations. The system of care within the governmental hospital is similar to that of the Veterans Affairs Hospitals and university hospitals in the United States except that Saudi citizens have universal coverage in the government hospitals. There is also a thriving private practice sector providing ophthalmic and subspecialty glaucoma care to both Saudi citizens and the expatriate population.

Tertiary glaucoma care is limited to the King Khaled Eye Specialist Hospital (Figure 3) and some of the major university, governmental, military, National Guard, and Security Forces hospitals. As a result, the tertiary centers are overcrowded. The Ministry of Health in Saudi Arabia has approved funding for the construction of additional tertiary care eye hospitals in different regions of the Kingdom. These centers will provide more regional tertiary ophthalmic care.

Within the Ministry of Health, all glaucoma medications are provided free of cost. Hospitals, like the King Khaled Eye Specialist Hospital, have access to most of the latest glaucoma medications available on the market. The US FDA and the European and Australian



Figure 3. The King Khaled Eye Specialist Hospital in Riyadh.

regulatory bodies are looked to as a reference when considering new drugs to be added to the formulary. After new drugs are identified, the Saudi FDA and the Ministry of Health fix the pricing for the medications. Both international brand names and several local generic topical glaucoma medications are available. Fixed combinations are prescribed for many patients. The insurance industry is slowly emerging as a player in the private practice sector; its role in public hospitals is undetermined.

At the King Khaled Eye Specialist Hospital and major university hospitals, most modern glaucoma surgical devices are available. The approval of surgical devices is the province of the Saudi FDA and typically requires previous European CE Mark approval and/or US FDA approval for use in Saudi Arabia. The private hospitals also offer many modern surgical treatments for glaucoma.

The dry climate leads to ocular surface issues that appear to cause increased sensitivity to/reduced tolerance of glaucoma medications, and a high incidence of infection makes endoscopic cyclophotocoagulation an attractive option for patients who require combined glaucoma and cataract surgery. Finding a treatment for pediatric glaucomas that is low risk and provides long-term IOP control is challenging. Due to the complication of corneal clouding, procedures such as deep sclerectomy are generally preferred.

CONTINUING MEDICAL EDUCATION

Glaucoma-related continuing medical education is provided locally at major university hospitals on a regular basis. The Saudi Ophthalmology Society hosts an annual 4-day meeting. Well-known international speakers participate in the conference, and glaucoma is a major topic.

The glaucoma specialists at the major hospitals and universities actively participate in international glaucoma meetings and publish articles relevant to glaucoma care in the Kingdom in the peer-reviewed literature.

The Saudi Ophthalmology Society includes glaucoma specialists who are a part of the World Glaucoma Association.⁷ Their activities include keeping members up to date on the field of glaucoma, improving patients' care and public awareness in the Kingdom through health fairs and awareness programs, organizing glaucoma sessions for the annual meeting, and assisting glaucoma researchers in Saudi Arabia.

The glaucoma specialists in the Kingdom organize many activities during World Glaucoma Week, including educating citizens about glaucoma through public media and organizing screening campaigns at the malls in the larger cities. ■

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1. United States Census Bureau. State and County Quick Facts. <http://quickfacts.census.gov/qfd/states/00000.html>. Accessed November 4, 2014.
2. Health Statistics Annual Book. <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/1433.pdf>. Accessed September 5, 2014.
3. Al-Shaali FF, Bakrman MA, Ibrahim AM, Aljoudi AS. Prevalence and causes of visual impairment among Saudi adults attending primary health care centers in northern Saudi Arabia. *Ann Saudi Med*. 2011;31(5):473-480.
4. Al Obeidan SA, Dewedar A, Osman EA, Mousa A. The profile of glaucoma in a tertiary ophthalmic university center in Riyadh, Saudi Arabia. *Saudi J Ophthalmol*. 2011;25(4):373-379.
5. Olawoye OO, Pasquale LR, Ritch R. Exfoliation syndrome in sub-Saharan Africa. *Int Ophthalmol*. 2014;34(5):1165-1173.
6. Alanazi FF, Song JC, Mousa A, et al. Primary and secondary congenital glaucoma: baseline features from a registry at King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia. *Am J Ophthalmol*. 2013;155(5):882-889.
7. Saudi Glaucoma Group. World Glaucoma Association. <http://www.worldglaucoma.org/Directory/index.php?socid=%7BB32E099B-3587-489F-A49A-F26AE2FB6DB97D>. Accessed September 5, 2014.