



Glaucoma Challenges in the Asia Pacific Region

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Epidemiology of Glaucoma in China

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China

Glaucoma is the most common irreversible blinding eye disease in China. However, there are few population-based studies of glaucoma prevalence in China. Epidemiological study of glaucoma has been conducted in Beijing in 1985 and 1996. The objective of the study was to estimate the prevalence of glaucoma and derive an estimate of the number of adults with glaucoma in China.

The location for the study was Shunyi District, which is a farming community northeast of Beijing. A random group of participants was enrolled through cluster sampling of villages. The participants received a basic eye examination and examinations to rule out glaucoma. The primary angle closure glaucoma (PACG) suspects underwent the following examinations. If the anterior chamber was shallow, gonioscopy was performed. If the anterior chamber angle was narrow, dark-room provocative test was performed. If the dark-room provocative test was positive, gonioscopy was performed in the dark room. If the anterior chamber angle was partially or totally closed, a diagnosis of PACG was made.

In this population, the prevalence of glaucoma was 2.07%. The prevalences of PACG, primary open angle glaucoma, and secondary glaucoma were 1.66%, 0.29%, and 0.12%, respectively (Table 1). The prevalence of glaucoma increased with age. Visual function was impaired to some degree in 64.0% of patients with glaucoma. The rate of bilateral blindness among patients with glaucoma was 16.0%, with all patients aged 60 years or older. The rates

Table 1. Prevalence of some types of glaucoma in China.

Glaucoma type	Prevalence
Primary angle closure glaucoma	1.66%
Primary open angle glaucoma	0.29%
Secondary glaucoma	0.12%

of unilateral blindness, bilateral low vision, and unilateral low vision were 17.0%, 23.0%, and 0%, respectively. This study confirms that glaucoma is a serious eye disease leading to blindness according to the prevalence and visual function of patients with glaucoma in China.

Preventing Glaucoma Blindness — the Chinese Perspective

Ge Jian
China

Glaucoma blindness remains one of the major public health challenges in China. Glaucoma, similar to other age-related diseases, will increase rapidly as the

population ages if no effective preventive and treatment actions are taken. However, the development of the eye care system is barely able to meet this enormous need.

There are an estimated 22,000 eye doctors currently practicing in China, with various levels of training and experience. Only an estimated 300 doctors are well-qualified glaucoma specialists. Growing epidemiological evidence suggests that the prevalence of primary open angle glaucoma (POAG) is at least comparable to the prevalence of angle closure.

It is challenging to screen, identify, and subsequently treat all patients with POAG in the community given that this disease is asymptomatic. This approach will require adequate clinical skills of doctors who can use appropriate technology, in combination with effective screening programmes. Therefore, the main focus of a national initiative to combat glaucoma blindness should be human resource development. Further

Is Japanese Glaucoma Different?

Tetsuya Yamamoto
Japan

This presentation showed what Japanese ophthalmologists think of glaucoma from epidemiological and pathogenetic viewpoints. According to the Tajimi Study, a population-based glaucoma survey, normal-tension glaucoma (NTG) is the most prevalent subtype of glaucoma in Japanese people aged 40 years or older, yielding a prevalence of 3.6%. The prevalence of NTG increases rapidly as the population ages, reaching 7.0% among people aged 70 years or older.

There are several intraocular pressure (IOP)-independent or vascular factors that are closely associated with NTG. Several studies have concluded that ocular hypotensive therapy is the treatment of choice for NTG, as well as for high-tension glaucoma. These conflicting findings must be carefully elucidated in the near future.

NTG is the most prevalent subtype of glaucoma in Japan. IOP-independent, probably vascular, factors as well as IOP are associated with the development and progression of NTG in this ethnic group.

training of ophthalmologists should be undertaken to ensure that eye care specialists are able to understand the appropriate basic techniques for glaucoma detection such as intraocular pressure measurement, gonioscopy, and optic disc examination. Health education campaigns will also help to improve the awareness of this condition among Chinese people.

Lessons from the Singapore 5-Fluorouracil Trial

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Singapore*

The purpose of this trial was to determine the effects of a single 5-minute application of intraoperative 5-fluorouracil (5-FU) during glaucoma filtration surgery on intraocular pressure (IOP)-lowering; and field and optic disc progression in an Asian population.

This prospective randomised masked trial of intraoperative 5-FU 50 mg/mL versus placebo in trabeculectomy was performed among 243 Asian patients with primary glaucoma. Trabeculectomy was performed using a standard technique and patients were randomly assigned to intraoperative augmentation with 5-FU under the conjunctiva or placebo. The 2 primary outcomes of the trial were based on the Moorfields 5-FU Study criteria of post-operative IOP and progressive loss of visual fields and optic disc neuroretinal rim.

Three critical levels of IOP were used to define 3 types of 'IOP failure': post-operative IOPs of >14 mm Hg, >17 mm Hg, and >21 mm Hg at 2 consecutive visits (not including day 1). Modified Collaborative Normal-Tension Glaucoma Study criteria were used to determine visual field progression. Loss of optic disc neuroretinal rim was determined only after agreement by 2 masked observers of stereophotographs, comparing the baseline with those taken at each visit.

Intraoperative 5-FU significantly improved the long-term IOP-lowering effect of glaucoma surgery, without any significant increase in complications in this Asian population.

Glaucoma Prevalence in India — Urban Versus Rural

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India*

The purpose of this study was to determine the prevalence of primary glaucoma and the associated risk factors in an urban population compared with a rural population in southern India. Participants aged 40 years or older underwent a complete ophthalmic examination. Glaucoma was diagnosed according to the International Society of Geographical and Epidemiologic Ophthalmology classification. 3850 urban participants and 3924 rural participants were included in the study. The mean age of the urban population was significantly greater than that of the rural population (54.8 years [SD, 10.6 years] versus 53.8 years [SD, 10.6 years]; $p = 0.0001$). There were more people with diabetes and hypertension in the urban population than in the rural population. The mean intraocular pressure (IOP), central corneal thickness, and vertical cup-disc ratio was significantly greater for the urban population.

The prevalence of primary open angle glaucoma (POAG) in the rural population was 1.62% and was significantly different than 3.51% in the urban population ($p=0.0001$). In both populations, POAG was positively associated with age and IOP. The number of people diagnosed to have POAG for the first time and blindness due to POAG was similar in both populations.

The prevalence of primary angle closure glaucoma (PACG) was similar in both populations. The prevalences of primary angle closure (PAC) and PAC suspect were significantly greater in the urban population. In both populations, PACG and PAC were positively associated with age and IOP. In the urban population, there was an association with diabetes and hyperopia. In the rural population, an association was seen with female sex. None of the rural participants with PACG were aware of the disease. In the urban population, 14.7% were aware of the disease (1 patient had had glaucoma surgery and 2 were diagnosed to have POAG). Blindness due to PACG was significantly greater in the urban population than in the rural population. The disease was asymptomatic in both populations.

In conclusion, the prevalence of POAG was greater in the urban population. The prevalence of PACG was similar in both populations. The detection rates were very poor in both populations.

Socioeconomic Considerations for Glaucoma Management in Developing Countries

*Manuel Agulto
The Philippines*

Glaucoma treatment aims to preserve vision and quality of life. The science of glaucoma management identifies the pharmacologic basis of drug choice, dosage, side effects, and improved therapeutic index. The art of glaucoma care involves the ability of patients to comply with a drug regimen to preserve visual acuity and visual field while maintaining quality of life. The socioeconomic limitations in developing countries compound the challenges in the control of glaucoma blindness. A clear grasp of the medical, social, and economic aspects of care will help minimise visual loss in the underserved and undertreated patients of the developing world.

Glaucoma Challenges in Populations with Increasing Myopia

*Wang Tsing-Hong
Taiwan*

The prevalence rate of myopia is rising in Taiwan and the condition is a large public health problem in certain parts of the world, including East Asia. Although myopia progresses at a slower rate in adulthood than during childhood, myopia can still progress after puberty. Axial elongation of the eyeball is the main component that changes in myopic progression.

Adults with myopia are at greater risk for glaucoma. However, the associated ocular complications make the diagnosis and detection of progression of glaucoma difficult. Changes in the anterior segment including flatter corneal curvature, decreased corneal thickness, and endothelial density are noted as the eyeball elongates in myopia. These alterations may affect the accuracy of the measurement of intraocular pressure.

Higher risks for posterior subcapsular cataract, and cortical and nuclear cataract in patients with myopia have been reported in many epidemiological studies. Choriorretinal abnormalities such as retinal detachment, chorioretinal atrophy, and lacquer cracks also increased with the severity of myopia and greater axial length. The reliability of visual field examination for the detection and monitoring of progression of glaucoma is severely compromised under these circumstances. Myopic discs are more likely to have a wide range of size, variable

appearances, and other associated abnormalities. These characteristics markedly restrain the usefulness of imaging systems for optic nerve evaluation in glaucoma practice.

How to detect early glaucoma and monitor its progression in a highly myopic eye remains a serious and difficult issue. It is hoped that new technologies and research will cast more light in the future.

Early Diagnosis — How Do We Find Glaucoma Before It Finds Us?

*Paul Healey
Australia*

Glaucoma is an important cause of preventable blindness. Symptomatic presentation occurs late and is associated with a poor prognosis. The long pre-symptomatic phase of glaucoma makes it amenable to screening. Despite this, diagnosis rates are generally poor. Recent statements in the USA and UK have recommended against screening, in part because of the poor predictive value of tonometry, poor reliability of visual field screening, and mild nature of the vision loss. The aim of this study was to evaluate glaucoma screening and diagnostic algorithms in a well-defined older Australian population.

The study group consisted of 3654 participants of the Blue Mountains Eye Study (BMES), aged 49 years or older, who were examined between 1992 and 1994. Goldmann applanation tonometry could be performed in 99% of participants, optic disc

photographs in 98%, and 76-point supra-threshold visual field testing in 89%. Open angle glaucoma (OAG) diagnosis required matching optic disc and full threshold (Humphrey 30-2) visual field appearance without regard to intraocular pressure (IOP). Subsequently, optic disc stereophotographs were assessed by trained masked non-clinician graders for optic disc signs reported to be associated with glaucoma.

The prevalence of OAG was 3.0% and increased exponentially with age. Age-standardised national projections predicted a 56% increase in the number of people with OAG over 15 years due to the ageing of the population. Sensitivity of current OAG screening methods in the BMES population was 50% with lowest sensitivities in younger participants. Current diagnostic algorithms had a positive predictive value (PPV), also of 50%, with a large proportion of false positives cases receiving glaucoma medications. The PPV of suprathereshold visual field screening and IOP >21 mm Hg for OAG diagnosis was 15%. Multivariate analysis showed that a combination of systemic, ocular, and optic disc signs had the best sensitivity and specificity for OAG detection. A simplified empirical scoring system was devised based on this model. Using a conservative cut-off, the scoring system would screen 4.5% of the population older than 50 years as positive, with a sensitivity of 90% and a positive predictive value of 56%. These are the best diagnostic test results reported for OAG. In conclusion, screening for OAG may be more feasible than previously thought.