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Editorial

Glaucoma: The 'Black hole' of irreversible blindness

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The term “glaucoma” was derived from the Greek word γλαύκωμα (Glaucosis) during the Hippocratic era of 400 BC¹ which essentially meant the greenish pupillary hue in eye which is much different from the normal pupillary color. Until 17th century, the clinical differentiation of poor visual acuity due to cataract or glaucoma was not so well defined. In ancient Indian Medicine, glaucoma has been described as black cataract (in Hindi: 'Kala Motia'), a term which is popular among the Indian rural population even today. The classical description of greenish blue hue in pupillary area narrated in the ancient era corresponds to two main forms of glaucoma. In the first category, also known as acute primary angle closure glaucoma (PACG), pupillary blockage leads to sudden rise of intraocular pressure (IOP) which manifests as severe headache and intense ocular pain, redness, clouding, or haziness of cornea. These symptoms are further compounded with acute and marked diminution or even loss of vision within next few hours. Hence, acute PACG often presents itself as an emergency and warrants immediate therapeutic intervention to save vision. A typical acute PACG is easy to diagnose even by general physicians. Contrary to the PACG, the second form of glaucoma, known as the primary open angle glaucoma (POAG), remains silent for several years until slow and gradual rise in IOP leads to manifest optic nerve damage and peripheral visual fields changes. POAG is invariably diagnosed as an incidental finding in ocular examination or linked with the family history. However, the end stage of open angle glaucoma also leads to cloudy cornea and peculiar blind gate of the patient. Due to this gradual and very slow progression of visual loss, open angle glaucoma is also known as silent killer of vision or the “sneak thief of sight”. Whereas PACG occurs mainly in elderly age group, POAG is a disease of late fourth or fifth decade. In addition to the adult onset primary glaucoma, there can be a congenital variant (known as congenital

glaucoma) due to structural ocular anomalies. Glaucoma may also be the manifestation of a variety of aetiologies such as post-traumatic ocular changes, uveitis, or side effects of topical or systemic administration of steroids in which case it is known as secondary glaucoma. However, it is important to note that vast majority of the cases seen in day-to-day clinical practice are one of the variants of primary glaucoma.

The term glaucoma does not denote disease per se but describes a group of symptoms which is characterized by raised IOP associated with optic nerve damage and subsequent damage or loss of retinal ganglion cells. However, raised IOP is not the only essential feature of all glaucoma or linked with optic nerve damage or visual field changes. In certain cases of ocular hypertension (IOP above 21 mmHg), optic nerve and visual fields remain normal for several years despite persistently raised IOP. Contrary to this situation, a good number of cases, commonly known as low-tension glaucoma, have been found to have definite evidence of optic nerve damage and visual fields changes despite normal IOP. Hence, in addition to raised IOP, several other factors like inadequate blood supply to retinal ganglion cells and optic nerve fibers due to atherosclerosis or advanced age-related connective tissue changes are also thought to play an important role in the progression of glaucoma. This possible vasculogenic theory has led to the genesis of another term “vascular optic neuropathy” to glaucoma.

It is extremely important to understand here that glaucoma is the third largest cause of blindness all over the world following cataract and trachoma which accounts for more than 14% of total blind population.² However, in terms of causes of irreversible blindness, glaucoma is the most leading cause in this group. Global burden of glaucoma in people is expected to be more than 70 million; of these, around 7 million are blind. In consideration to Indian scenario, the prevalence of glaucoma ranges from 0.5 to 1.5% in all age groups and 2.5 to 4.5% in elderly

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population in various parts of the country.^{3,4} The prevalence of PACG has been estimated to be between 1.5 and 5.5% in different parts of the country^{3,4} and the prevalence of POAG varies from 1.5 to 2% among elderly age group.^{4,5} Higher prevalence of PACG has been noted in Indians, South Asians, and Afro-American ethnic populations.⁶ Higher incidence of PACG is also linked with hypermetropic refractive errors.⁷ In contrast to this observation, myopia has been found to have stronger link with POAG.⁷ As mentioned earlier, more than 90% cases of POAG are detected as incidental findings. However, more than 50% of such cases are found to have a very advanced stage of optic nerve damage. Among blindness due to glaucoma of various origins and pattern, PACG contributes more than 42% as compared to 38% in cases of POAG. Sadly, more than 15% of the blinds due to glaucoma are bilateral blinds. It is equally painful to note that more than 20% of glaucoma-induced blinds were never diagnosed as a case of glaucoma until blindness was established in one or both eyes.^{8,9}

Glaucoma may be sporadic but definitely has been found to have a very strong link with the family history.^{3,9} Incidence of POAG increases two to three times in cases of family history of glaucoma among siblings. Though the acceleration of progression of glaucoma has been noticed in 7th to 8th decade of life and more so in cases of hypertension and diabetes mellitus, definite link of these diseases with glaucoma progression has not yet been well established.⁴ However, certain conditions that are linked with restricted ocular blood flow like severe diabetic retinopathy, central retinal vein occlusion, hematopoietic disorders may lead to secondary glaucoma which is commonly known as neovascular glaucoma. Neurodegenerative diseases like Alzheimer's disease and multiple sclerosis are found to have relative thinning of retinal nerve fiber layer and the ganglion cell layer. However, all patients of neurodegenerative diseases do not develop glaucoma.¹⁰ Higher risk and severity of cardiovascular diseases have been linked with the coexisting obstructive sleep apnea syndrome (OSAS). However, OSAS as a risk factor and attributing to the higher incidence of glaucoma or its progression is yet to be established as definitive cause.¹¹

Progression of glaucoma or its blinding complications can effectively be arrested by means of early detection of glaucoma or to identify glaucoma suspect in high risk groups and monitor them in terms of possible manifestations of early signs of glaucoma. Once glaucoma has been detected, its progression can be arrested with the help of anti-glaucoma medications and periodic follow-up. In certain cases, treatment modalities may require augmentation and intervention of pressure lowering laser or surgical procedures.

Early detection and prompt management of glaucoma enables cost effectiveness and better quality of life. Giving stress on the need of periodic eye examination and screening drive is the call of the hour and will have definite impact on early detection of glaucoma and prevention of blindness. Awareness and knowledge of severity of glaucoma and the crucial role of its early detection are very important issues and are pivotal in preventing blinding complications of glaucoma and reducing negative socioeconomic impact on the society due to avoidable blindness. Ophthalmic fraternity and other voluntary organizations have already taken a lead on these

very important issues and positive trends of progressive global campaigning of glaucoma awareness have been witnessed in developed and urban areas of developing countries in the recent past. World Glaucoma Association and the World Glaucoma Patient Association have established a joint initiative to organize "World Glaucoma Day" all over the world on 8th March every year including World Glaucoma Week during corresponding week. On the same line, Glaucoma Research Foundation in US has declared Jan 2016 as a "Glaucoma awareness month" in the United States. Despite such community-based activities, the awareness and knowledge of severity of glaucoma is highly inadequate in developing countries, particularly in rural and suburban areas of Southeast Asia. To overcome such hurdles, and generate adequate awareness and propagate health education, effective support of electronic and print media is very crucial.

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