THE PREVALENCE OF GLAUCOMA IN OUR SOCIETY: THE CAUSES, EFFECTS AND REMEDIES.

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ABSTRACT

Glaucoma is a relentless degenerative eye condition of complex origin. It accounts for irreversible blindness and impaired vision in hundreds of thousands of people, interrupting their capacity to flourish and thereby causing huge economic loss to them. Glaucoma is relatively common, especially in older adults and can cause damage to the optic nerve if left untreated. The glaucomas are a group of optic neuropathies characterized by progressive degeneration of retinal ganglion cells. These are central nervous system neurons that have their cell bodies in the inner retina and axons in the optic nerve. Glaucoma can be slowed down to enhance life-long useful vision if and only if it is diagnosed in its early stage and effective treatment is sustained. In addition, evaluation of the optic nerve by direct ophthalmoscopy may identify suspicious signs of optic nerve damage that should also prompt referral to an eye care specialist. Compliance is vital for best results and to prevent undesirable side effects- this means following the doctor's instructions carefully. It is recommended that primary care physicians should consider referring patients with a family history of the disease for a complete ophthalmologic examination.

Key Words: Glaucoma, Causes, Symptoms, Risk Factors, Treatment, Prevention

INTRODUCTION

Glaucoma is a serious eye condition that can cause blindness. It damages the optic nerve, which carries information from your eyes to the visual center in your brain. This damage can result in permanent vision loss. Globally, glaucoma is the most common optic neuropathy, the second common cause of blindness, and the most common cause of preventable visual disability (Quigley and Broman, 2010). Glaucoma includes a spectrum of progressive optic neuropathies characterized by pathological degeneration of nonmyelinated retinal ganglion cells, with structural damage at the level of optic nerve head. The common pathway in the pathogenesis of glaucoma is triggering of accelerated apoptosis of the retinal ganglion cells. As a consequence of neuronal death within the central visual pathway, clinical signs of glaucoma start appearing. These signs include retinal nerve fiber layer defects, thinning of the neuroretinal rim, and excavation of the optic nerve head, commonly called cupping of the optic disc. These structural

changes lead to functional defects in the form of irreversible visual field loss (Yucel and Zhang, 2000).

In the currently published literature on glaucoma, intraocular pressure (IOP) is not considered to be a part of the definition of glaucoma; however, it is the most easily modifiable risk factor to decrease the risk of disease onset and progression. IOP reduction by medical, laser, and surgical treatments remain the only clinically proven treatment of glaucoma (Leske, Heijl, Hussein, 2003) However, Collaborative Normal Tension Glaucoma study has exemplified that lowering of IOP alone is not entirely effective for all patients of glaucoma (Collaborative Normal-Tension Glaucoma Study Group, 2000). In some patients, sufficient IOP reduction to slow down or arrest the disease process may be either difficult or full of adverse effects of treatment.

According to the World Health Organization estimates of 2002, the number of people blinded by glaucoma was 4.4 million (12.3% of the blind people worldwide). The majority of those with glaucoma remain undetected, and estimates of people afflicted by glaucoma and related blindness are made on the basis of data from epidemiological studies. From these studies, it has been understood that glaucoma affects all populations, but there is a disparity in distribution. This disparity is either because of a higher prevalence and racial predilection or because of a large population in these regions resulting in a larger absolute number of persons with glaucoma. Glaucoma is an optic neuropathy with characteristic optic disc changes and visual field defect. It is the second most common cause of blindness and the leading cause of irreversible blindness worldwide. The type of glaucoma also varies from region to region. Primary open angle glaucoma (POAG) is the most common type of glaucoma in Africa. The Baltimore eye study by Tielsch, Sommer and Katz (2004) found the prevalence of POAG in people of African descent to be four times greater than in Caucasians. Ntim-Amposah (2000) reported a POAG prevalence of 8.5% among adults aged 40 years and older in Ghana. Observations among West African ancestrally-related populations in the Caribbean also show a very high prevalence of POAG. Although studies confirm that POAG is the predominant form of glaucoma in Africans, there are other forms of glaucoma in West Africa.
In order to properly characterize the different types of glaucoma and to ensure appropriate management, it is important to perform routine gonioscopy and critically examine all patients.

CAUSES OF GLAUCOMA

Glaucoma is the result of damage to the optic nerve. As this nerve gradually deteriorates, blind spots develop in the visual field. For reasons that doctors don't fully understand, this nerve damage is usually related to increased pressure in the eye. Elevated eye pressure is due to a buildup of a fluid (aqueous humor) that flows throughout the inside of your eye (World Health Organization, 2012). This internal fluid normally drains out through a tissue called the trabecular meshwork at the angle where the iris and cornea meet. When fluid is overproduced or the drainage system doesn't work properly, the fluid can't flow out at its normal rate and eye pressure increases. Glaucoma tends to run in families. In some people, scientists have identified genes related to high eye pressure and optic nerve damage. Types of glaucoma include:

Open-angle glaucoma
Open-angle glaucoma is the most common form of the disease (Weinreb and Khaw, 2004). The drainage angle formed by the cornea and iris remains open, but the trabecular meshwork is partially blocked. This causes pressure in the eye to gradually increase. This pressure damages the optic nerve. It happens so slowly that you may lose vision before you're even aware of a problem.

Angle-closure glaucoma
Angle-closure glaucoma, also called closed-angle glaucoma, occurs when the iris bulges forward to narrow or block the drainage angle formed by the cornea and iris. As a result, fluid can't circulate through the eye and pressure increases. Some people have narrow drainage angles, putting them at increased risk of angle-closure glaucoma.
Angle-closure glaucoma may occur suddenly (acute angle-closure glaucoma) or gradually (chronic angle-closure glaucoma). Acute angle-closure glaucoma is a medical emergency.

Normal-tension glaucoma
In normal-tension glaucoma, your optic nerve becomes damaged even though your eye pressure is within the normal range. No one knows the exact reason for this. You may have a sensitive optic nerve, or you may have less blood being supplied to your optic nerve. This limited blood flow could be caused by atherosclerosis, the buildup of fatty deposits (plaque) in the arteries or other conditions that impair circulation.

Glaucoma in children
It's possible for infants and children to have glaucoma. It may be present from birth or develop in the first few years of life. The optic nerve damage may be caused by drainage blockages or an underlying medical condition (Nongpiur, Ku, Aung, 2011).

Pigmentary glaucoma
In pigmentary glaucoma, pigment granules from your iris build up in the drainage channels, slowing or blocking fluid exiting your eye. Activities such as jogging sometimes stir up the pigment granules, depositing them on the trabecular meshwork and causing intermittent pressure elevations.

SYMPTOMS OF GLAUCOMA
The signs and symptoms of glaucoma vary depending on the type and stage of the eye condition (Quigley and Broman, 2010). For example:

Open-angle glaucoma symptoms are:
- Patchy blind spots in your side (peripheral) or central vision, frequently in both eyes
- Tunnel vision in the advanced stages

Acute angle-closure glaucoma symptoms are:
- Severe headache
- Eye pain
- Nausea and vomiting
- Blurred vision

- Halos around lights
- Eye redness

If left untreated, glaucoma will eventually cause blindness. Even with treatment, about 15 percent of people with glaucoma become blind in at least one eye within 20 years.

Risk factors

The intraocular pressure from glaucoma can build up and destroy sight without causing obvious symptoms. The awareness and early detection of glaucoma are extremely important because this disease can usually be successfully treated when diagnosed early. While everyone is at risk for glaucoma, certain people are at a much higher risk and need to be checked more frequently by their eye doctor. The major risk factors for glaucoma include the following:

- Age over 45 years
- Family history of glaucoma
- Black racial ancestry
- Having certain medical conditions, such as diabetes, heart disease, high blood pressure and sickle cell anemia
- History of elevated intraocular pressure
- Decrease in corneal thickness and rigidity
- Nearsightedness (high degree of myopia), which is the inability to see distant objects clearly
- History of injury to the eye
- Use of cortisone (steroids), either in the eye or systemically (orally or injected)
- Farsightedness (hyperopia), which is seeing distant objects better than close ones (Farsighted people may have narrow drainage angles, which predispose them to acute sudden attacks of angle-closure glaucoma).

TREATMENT OF GLAUCOMA

Slowing disease progression and preservation of quality of life are the main goals for glaucoma treatment. The decrease in quality of life associated with glaucoma may occur earlier than previously thought, underscoring the importance of early diagnosis and treatment (McKean-Cowdin, Wang and Wu, 2008). There are several types of glaucoma treatment, including medicated eye drops, micro-surgery, laser treatments and other eye surgery. It's important to realize that glaucoma treatments may prevent additional vision loss, but they will not restore vision already lost to the disease.

Glaucoma medications

The use of topical medication (prescription eye drops) is the most common treatment for early glaucoma. The purpose of glaucoma eye drops is to reduce IOP to prevent vision loss. The same medications used to treat glaucoma also are used to treat high eye pressure (without optic nerve damage or vision loss) to prevent the onset of glaucoma. There are several categories and many brands of glaucoma eye drops. The eye doctor prescribes the medication(s) that he or she feels will be most effective for ones individual needs. In some cases, more than one type of eye drop may be required and prescribed. Examples of eyedrops include:

- prostaglandin analogues
- carbonic anhydrase inhibitors
- cholinergic agents
- beta blockers

Side effects of eyedrops can include stinging, redness, eyelash growth, change in eye colour and occasionally retinal detachments and difficulty breathing. If eye drops are not effective enough, the doctor may prescribe an oral carbonic anhydrase inhibitor.

Glaucoma typically is a chronic condition meaning it is possible one may need to use eye drops every day for the rest of one's life to prevent vision loss from glaucoma. In some cases, your eye doctor may also prescribe oral medicine (pills) to reduce your risk of vision loss. For the individuals' safety and well-being, it's important to take daily glaucoma medication(s) as directed. Being careless and failing to comply with glaucoma treatment regimens eye doctors prescribe is one of the main causes of blindness from glaucoma. If you find that the eye drops you are using for glaucoma are uncomfortable or inconvenient, never discontinue them without first consulting your eye doctor about a possible alternative therapy.

Glaucoma surgery

In some cases, glaucoma surgery may be a better option than medication for the control of glaucoma and prevention of vision loss. There are a number of types of glaucoma surgery, including:

Minimally-invasive glaucoma surgery (MIGS)

In recent years, a number of micro-surgical procedures called minimally-invasive glaucoma surgery (MIGS) have been developed to reduce or eliminate the need for glaucoma medications. MIGS procedures require only tiny incisions and cause less trauma to the eye than conventional glaucoma surgery. The goal is the same with MIGS and conventional glaucoma surgery: to increase outflow of aqueous humor from the eye to lower IOP and decrease the risk of optic nerve damage and vision loss.

Trabecular and shunt glaucoma surgery

These surgeries are more invasive than MIGS procedures, but often are more effective in lowering IOP and reducing the need for glaucoma medications. The goal of these procedures is to create new exit channels for the aqueous humor to significantly reduce IOP.

Laser glaucoma surgery

The most commonly used laser glaucoma surgery is called selective laser trabeculoplasty (SLT). The SLT procedure has been used worldwide for more than 25 years and can be used as a primary treatment for open-angle glaucoma or if medications are ineffective or cause unacceptable side effects for this type of glaucoma. According to Glaucoma Research Foundation , SLT can lower IOP by about 30 percent when used as initial therapy for open-angle glaucoma, but it may take one to three months for results to appear, and the effect typically lasts only one to five years. The laser surgery can be repeated, but results from a subsequent procedure may not be as effective.

PREVENTION OF GLAUCOMA

These self-care steps can help detect glaucoma in its early stages, which is important in preventing vision loss or slowing its progress.

- **Get regular dilated eye examinations.** Regular comprehensive eye exams can help detect glaucoma in its early stages, before significant damage occurs. As a general rule, the American Academy of Ophthalmology recommends having a comprehensive eye exam every five to 10 years if you're under 40 years old; every two to four years if you're 40 to 54 years old; every one to three years if you're 55 to 64 years old; and every one to two years if you're older than 65. If you're at risk of glaucoma, you'll need more frequent screening. Ask your doctor to recommend the right screening schedule for you.
- **Know your family's eye health history.** Glaucoma tends to run in families. If you're at increased risk, you may need more frequent screening.
- **Exercise safely.** Regular, moderate exercise may help prevent glaucoma by reducing eye pressure. Talk with your doctor about an appropriate exercise program.
- **Take prescribed eyedrops regularly.** Glaucoma eyedrops can significantly reduce the risk that high eye pressure will progress to glaucoma. To be effective, eyedrops prescribed by your doctor need to be used regularly even if you have no symptoms.
- **Wear eye protection.** Serious eye injuries can lead to glaucoma. Wear eye protection when using power tools or playing high-speed racket sports in enclosed courts.

Conclusion

Glaucoma is a leading cause of blindness. Early diagnosis and treatment can prevent vision loss from the disease. Primary care physicians can play an important role in the diagnosis of glaucoma by referring patients with suspicious optic nerve head findings for complete ophthalmologic examination. They can improve treatment outcomes by reinforcing the importance of medication adherence and persistence and by recognizing adverse reactions from glaucoma medications and surgeries.

Recommendations

1. Primary care physicians should consider referring patients with a family history of the disease for a complete ophthalmologic examination.
2. Individuals at risk of glaucoma should learn to practice preventive measures to avoid coming down with the disease.

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