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KEYWORDS

- Glaucoma • Open angle • Angle closure • Screening • Diagnosis • Management • Referral

KEY POINTS

- Glaucoma is the second leading cause of blindness both in the United States and worldwide and is the world's most common cause of irreversible blindness.
- The disease can be characterized into 2 major subtypes based on the status of the internal drainage system: open angle and angle closure.
- Risk factors for open-angle glaucoma include family history, increased intraocular pressure (IOP), older age (>60), increased cup-to-disc ratio, and thinner central corneas. Risk factors for angle-closure glaucoma include hyperopia (smaller eye), older age, female gender, and Asian ethnicity.
- Angle-closure glaucoma can present acutely with symptoms of pain or decreased vision and nausea or chronically without symptoms, similar to open-angle glaucoma.
- Glaucoma is a clinical diagnosis, based on characteristic optic nerve changes associated with corresponding visual field deficits, regardless of IOP.
- Management of glaucoma includes topical and oral medical therapies, laser modalities, and surgical management, all aimed at lowering IOP.

INTRODUCTION

Glaucoma is an optic neuropathy defined by characteristic optic disc damage and visual field loss for which IOP is a major modifiable risk factor. It is a significant global health problem and the second leading cause of blindness both in the United States and worldwide.^{1,2} Worldwide, glaucoma affects 67 million people, 10% of whom are blind bilaterally.¹ In the United States, more than 2 million Americans are affected, with 120,000 blind as a result, costing approximately \$1.5 billion in expenses.²⁻⁴ Glaucoma is responsible for 11% of the cases of blindness and is the leading cause of blindness in African Americans.^{5,6} With the aging population, the incidence and burden of glaucoma are expected to rise to even more significant levels.

No financial interest in material.

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Prim Care Clin Office Pract 42 (2015) 437–449

<http://dx.doi.org/10.1016/j.pop.2015.05.008>

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Glaucoma is often divided into 2 major subtypes, open angle and angle closure, both of which result in characteristic optic nerve degeneration. Both can be further subdivided into primary or secondary due to some other inciting factors. Secondary glaucoma can result from many other pathologic processes, including but not limited to vasculopathic, malignant, and traumatic.

Open-angle glaucoma is a chronic, insidious process. Patients are often unaware of their disease until vision loss has progressed significantly, known as the “sneak thief of sight.” Early diagnosis remains a challenge given the insidious nature of the onset of this process and, therefore, formal ophthalmologic evaluation of any patient with risk factors is critical for prompt detection.

In contrast, angle-closure glaucoma can be an acute process with more immediate signs and symptoms but may also present insidiously and tends to be a more visually destructive subtype. It accounts for approximately half the cases of glaucoma worldwide and, when acute, is considered an ocular emergency because loss of vision can occur within hours to days.⁷ By 2020, it is estimated that there will be 21 million cases of primary angle-closure glaucoma, with 5.3 million blind bilaterally.⁸

PATHOPHYSIOLOGY OF GLAUCOMA

The optic nerve is the site of degenerative damage in glaucoma (Figs. 1 and 2). The characteristic appearance of glaucomatous optic neuropathy is described as cupping or acquired focal or general loss of neural retinal rim tissue. Various systems to clinically denote the degree of optic nerve damage due to glaucoma have been described, including cup-to-disc ratio and disc damage likelihood scales. The precise inciting mechanism for the cascade of cellular damage resulting in glaucomatous optic neuropathy is not clear and is likely a complex interplay of several factors, including structural susceptibility and vascular. Elevated IOP is an important risk factor for developing glaucomatous optic neuropathy, and, furthermore, the rate at which glaucoma damage progresses is higher at greater levels of IOP.^{9,10}

Normally, the IOP is a balance of aqueous humor production by the ciliary body and aqueous humor drainage through the internal outflow system. A major component of the outflow system is the trabecular meshwork located in an area denoted as the



Fig. 1. Healthy optic nerve right eye. (Courtesy of Wills Eye Hospital Diagnostic Center, Philadelphia, PA; with permission.)

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