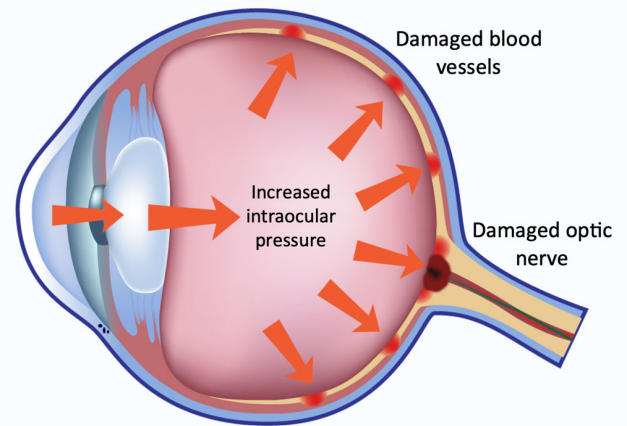


What is Glaucoma?

Glaucoma is a disease of the nerve of the eye (optic nerve). It has been called “The Silent Thief of Sight” because often it will not produce symptoms until it is fairly advanced. Glaucoma is a leading cause of permanent blindness for people over 60 years old. Glaucoma occurs when the pressure inside the eye (intraocular pressure, IOP) is higher than it should be. If left untreated, an elevated IOP can cause damage to the optic nerve resulting in a progressive, irreversible loss of vision. However, early detection and treatment can slow, or even halt the progression of the disease.



What causes Glaucoma?

Most types of glaucoma result from an elevated IOP. The precise cause of the most common type of glaucoma (open-angle glaucoma) is not completely understood. The eye constantly produces **aqueous humor**, the clear fluid that fills the anterior chamber (the space between the cornea and the iris). The fluid drains out of the eye through a complex drainage system in the back of the cornea. As new aqueous flows into your eye, the same amount should drain out. The balance between the production and drainage of aqueous determines the IOP. If the drainage system is not working properly, fluid builds up causing a rise in IOP which can permanently damage the optic nerve. There are other factors and medical conditions that can also cause glaucoma. In these cases, the optic nerves are more sensitive and can develop glaucoma despite having normal intraocular pressures. Other types of glaucoma have different mechanisms (see below).

Types of Glaucoma

Open Angle Glaucoma

Primary open-angle glaucoma (also called chronic open angle glaucoma) is the most common type of glaucoma. In these cases, even though the anterior structures of the eye appear normal, the drainage system is dysfunctional and aqueous fluid builds within the anterior chamber, causing the IOP to become elevated.

Acute Angle Closure

About 10-20% of the population with glaucoma has this type. Angle-closure glaucoma occurs because of an abnormality of the structures in the front of the eye. The space between the iris and the back of the cornea is smaller than normal, leaving a narrower channel for the aqueous to pass through. Eventually the iris can block the drainage channels (trabecular meshwork).

If these channels close gradually, it can cause progressive IOP elevation with few symptoms. This is **chronic angle-closure glaucoma**. If the closure is sudden and complete, it is called acute angle closure. Acute angle closure is a medical emergency and should be treated by an ophthalmologist immediately. If left untreated, severe and permanent loss of vision may occur in a matter of hours or days.

Secondary Glaucoma

This type of glaucoma results from another disease or problem within the eye that results in high IOP, such as: inflammation, trauma, previous surgery, diabetes, tumor, and certain medications. In these cases, both the glaucoma and the underlying problem need to be treated.

Congenital

This is a rare type of glaucoma that is seen in infants and young children. In these cases, surgery is usually required. Usually, the pediatrician detects the problem.

What are the signs and symptoms of glaucoma?

Open-angle glaucoma, the most common type, does not produce any noticeable symptoms in its early stages. You may have glaucoma and not know about it. If you are in any of the high-risk groups mentioned above, you should have regular comprehensive eye examinations starting at age 40. A glaucoma screening that only checks eye pressure is not enough to discover glaucoma.

Angle closure glaucoma can be gradual in which case it will cause few symptoms. But in the case of acute angle closure the IOP rises sharply causing acute symptoms.

Symptoms of **acute angle closure** may include pain in and around the eye, blurred vision and halos, tearing, redness, nausea/vomiting and headache. **This is a medical emergency that needs immediate treatment.**

Secondary glaucoma can cause variable symptoms depending on the disease that is causing it.

How is glaucoma diagnosed?

Because glaucoma does not cause symptoms in its initial stages, the early diagnosis must be made through a comprehensive eye examination that includes the use of specialized instruments and techniques. Any person who is at a high-risk for glaucoma should have an evaluation by an eye doctor as they approach the age of 40, or sooner if any visual symptoms are present.

Who is at risk for glaucoma?

You are at a higher risk of developing glaucoma if you:

- Are over the age of 60
- Have relatives with glaucoma
- Have African, Hispanic, or Asian heritage
- Have high eye pressure
- Are nearsighted
- Have had an eye injury
- Use long term steroid medications
- Have corneas that are thinner than the average
- Have diabetes, migraines or poor circulation.



Clear Vision



Vision with Early Glaucoma



Vision with Advanced Glaucoma

How is Glaucoma treated?

Glaucoma cannot be cured, but it can be successfully treated. The treatment of glaucoma is aimed at lowering the IOP. The following treatments are available for this purpose:

Medications

These are usually given as daily eyedrops. One or more types of eyedrops may be needed. Sometimes eyedrops are enough to control the IOP. They need to be used consistently, like any other medication. Glaucoma drops can have side effects. Most are local symptoms. A type of medication called “beta blockers” can have general side effects in susceptible patients. These include heart (low pulse) and lung (shortness of breath) side effects. Another medication (prostaglandin) can rarely change the iris color. Your eye doctor and your primary care physician need to hear from you if you experience any such side effects. Some medications are contraindicated if there is a known allergy to a component. Most are well tolerated.

Some medications can be inserted into the eye and can slowly release medication to lower the eye pressure. This can be an alternative to using eyedrops on a daily basis.

Laser Surgery

If you have open-angle glaucoma and medications are not enough or are not an option due to medication side effects, a laser procedure can help “open” the drainage channels to increase drainage and lower the IOP. This procedure is called **Laser Trabeculoplasty** and is performed in the office as an outpatient procedure.

If you have angle-closure glaucoma or an angle that is at risk of closing, a different laser procedure can help open the angle and thus increase drainage. This outpatient procedure is called **Laser Iridotomy** and consists of creating a small hole through the iris.

Glaucoma surgery in the operating room

Several major procedures are available to create a drainage system that may lower the IOP in a consistent manner. These procedures are more involved and require careful follow-up.

The successful management of glaucoma is a joint effort between the patient and the doctor. Patients need to take the medications, keep their appointments for testing and visits with the doctor, and constantly communicate with the doctor if new symptoms or questions arise.