



PADEN EYE CARE CENTER
Setting the standard for innovative eye care since 1986

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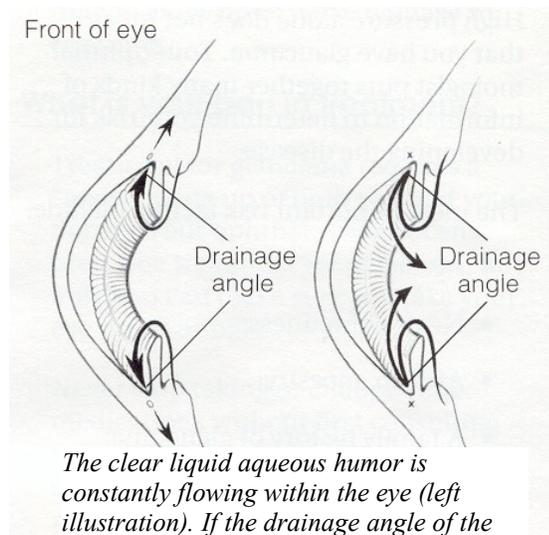
What is Glaucoma?

Glaucoma is a leading cause of blindness in the United States, especially for older people. But loss of sight from glaucoma is usually preventable if you get treatment early enough.

In the past 10 years the diagnosis and treatment of glaucoma has become much better. To really understand the process of glaucoma, you have to understand the disease itself. Glaucoma is a disease of the optic nerve. The optic nerve is the cable containing a huge number of nerve fibers that carry the images we see to the brain.

Many people know that glaucoma has something to do with pressure inside the eye; however just because someone has high eye pressure does not mean they have glaucoma. Glaucoma is progressive damage to the optic nerve with loss of optic nerve fibers. The higher the pressure inside the eye, the greater the chance of damage to the optic nerve but high eye pressure does not always result in damage to the optic nerve. If optic nerve fibers are not damaged over time, then the pressure in the eye is no cause for worry.

When glaucoma causes damage to optic nerve fibers, it can cause blind spots to develop in a patient's vision. Often people don't notice these blind areas until much optic nerve damage has already occurred. If the entire optic nerve is destroyed, the result is blindness.



The clear liquid aqueous humor is constantly flowing within the eye (left illustration). If the drainage angle of the eye is blocked, the fluid cannot flow out of the eye (right illustration).

What Causes Glaucoma?

Clear liquid, called the aqueous humor, flows in and out of the eye. This liquid is not part of the tears on the outer surface of the eye. You can think of the flow of aqueous fluid as a sink with the faucet turned on all the time.

If the “drainpipe” gets clogged, water collects in the sink and pressure builds up. If the drainage area of the eye—called the drainage angle—is blocked, the fluid pressure within the inner eye may increase, which can damage the optic nerve.

What Does Glaucoma do?

Ongoing damage to the optic nerve results in painless, slow, patchy, permanent loss of vision, generally starting with the peripheral vision. The 20/20 central vision is often perfect until very late in the disease

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process. The loss of peripheral vision gets slowly worse until the patient is aware of the dark spots and ultimately may become unable to read or drive. No modern medical magic can restore vision at this point. The entire goal of treating glaucoma is to slow or stop the progress of the damage so that loss of reading and ambulatory vision does not occur during the patient's lifetime.

Who is at Risk for Glaucoma?

Your eye care provider puts together many kinds of information to determine your risk for developing the disease.

The most important risk factors include:

- Age;
- Near-sightedness;
- African ancestry;
- A family history of glaucoma;
- Past injuries to the eyes;
- A history of severe anemia or shock.
- A history of high blood pressure or vascular disease.

Your eye care provider will weigh all of these factors before deciding whether you need treatment for glaucoma, or whether you should be monitored closely as a glaucoma suspect. If you are a glaucoma suspect, your risk of developing glaucoma is higher than normal, and you need to have regular examinations to detect the early signs of damage to the optic nerve.

How do we know who has Glaucoma?

It is important to catch glaucoma fairly early because a damaged optic nerve is more sensitive to further damage. The treatment is more likely to succeed if it is caught before there is significant damage.

The problem with early diagnosis is that, from the patient's point of view, there are no symptoms. Glaucoma doesn't hurt, and the vision appears to be unchanged. From the doctor's point of view, knowing the eye pressure does not rule in or out the diagnosis of glaucoma. Glaucoma is not "high pressure in the eye".

We know that high blood pressure is not a stroke, but high blood pressure is a risk factor for having a stroke.

Similarly, we know that high pressure in the eye is a risk factor for glaucomatous optic nerve damage, but that there are patients with high eye pressures year after year who show no damage to the optic nerve or their vision, while others with eye pressures that are considered low are losing vision.

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The eye pressure does not tell us who has glaucoma. It is the appearance of the optic nerve and the results of testing that tell us which eyes are healthy and which have glaucoma.

How is Glaucoma Diagnosed?

The visual field test (a careful map of the side vision) has long been the “gold standard” for following the progress of advanced glaucoma. The problem with using visual fields for early diagnosis is that, the visual field is typically normal in early glaucoma, while the patient is losing hundreds of thousands of nerve fibers and experiencing early glaucoma damage. Once the visual field finally becomes abnormal, it is fairly reliable at detecting ongoing damage (or documenting stability). The major problem of using visual fields to follow advanced glaucoma is that many patients cannot perform the test in a way that gives reliable information. An unreliable visual field is not reassuring that glaucoma is under control and leaves the doctor no choice except to follow the appearance of the optic nerve.

Historically, the optic nerve was documented with chart notes, drawings, or color photographs. These methods were reliable for detecting gross changes, but even panels of experts in a research setting could not agree on subtle changes. In the past, it was not possible to detect early, subtle changes that would allow treatment decisions to be made when treatment is easiest and most likely to succeed.

Heidelberg Engineering, of Germany, has developed a new method of obtaining scanning laser images (HRT images) of the optic nerve with a depth resolution of one ten thousandth of an inch. Future images are computer analyzed and changes are detected and assigned a probability that the change is accurate, based on the quality of the individual images.

For the first time we can now tell who has early glaucoma and who does not based on an objective, repeatable test. Furthermore, we can detect progression of nerve damage in patients who can't perform a reliable visual field test. If there are changes to the optic nerve, we know we have progression of glaucoma, perhaps ten years before the visual field shows any damage, and if the optic nerve does not change it is very reassuring to the patient (and the doctor).

Both of these tests may not be necessary for every person. You may need to repeat these tests on a regular basis, to determine if glaucoma damage is increasing over time.

What are the different types of glaucoma?

Chronic open-angle glaucoma: This is the most common glaucoma. The “drainpipe,” or drainage angle of the eye, becomes less efficient with time, and pressure within the eye gradually increases.

If this increased pressure results in optic nerve damage, it is known as chronic open-angle glaucoma. Over 90% of adult glaucoma patients have this type of glaucoma.

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Chronic open-angle glaucoma can damage vision so gradually and painlessly that you are not aware of trouble until the optic nerve is already badly damaged.

Angle-closure glaucoma: Sometimes the drainage angle of the eye may become completely blocked. It is as though a sheet of paper floating near a drain suddenly drops over the opening and blocks the flow out of the sink. In the eye, the iris may act like the sheet of paper closing off the drainage angle. When eye pressure builds up rapidly, it is called acute angle-closure glaucoma.

The symptoms include:

- Blurred vision;
- Severe eye pain;
- Headache;
- Rainbow halos around lights;
- Nausea and vomiting.

If you have any of these symptoms call your eye care provider immediately. Unless an eye care provider treats acute angle-closure glaucoma quickly, blindness may result.

A more gradual and painless closing of the angle is called chronic angle-closure glaucoma. It occurs more frequently in people of African and Asian ancestry.

How is Glaucoma Treated?

As a rule, damage caused by glaucoma cannot be reversed. Eye drops, pills, laser and surgical operations are used to prevent or slow further damage from occurring. Because glaucoma can worsen without your being aware of it, your treatment may need to be changed over time.

When change over time is detected, in either the visual field or the HRT images, we know the patient has progressive glaucoma damage. The only proven treatment is to lower the eye pressure, ideally by 30% or more.

Medicines

Lowering the pressure has traditionally been done with eye drops, sometimes in combination with pills. These medications decrease eye pressure, either by slowing the production of aqueous fluid within the eye or by improving the flow leaving the drainage angle.

For these medications to work, you must take them regularly and continuously.

Some eye drops may cause:

- A stinging sensation;
- Red eyes;
- Blurred vision;
- Headaches;

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- Changes in pulse, heartbeat or breathing.
- Impotence
- Fatigue
-

Pills sometimes cause:

- Tingling of fingers and toes;
- Drowsiness;
- Loss of appetite;
- Bowel irregularities;
- Kidney stones;
- Anemia or easy bleeding.

Laser Surgery

Laser surgery treatments may be effective for different types of glaucoma. The laser is usually used in one of two ways. In open-angle glaucoma, the drain itself is treated. In angle-closure glaucoma, the laser creates a hole in the iris (iridotomy) to improve the flow of aqueous fluid to the drain.

Operative Surgery

When operative surgery is needed to control glaucoma, your eye care provider uses miniature instruments to create a new drainage channel for the aqueous fluid to leave the eye. The new channel helps to lower the pressure.

The trabeculectomy, or filtering procedure, is done when nothing else will lower the eye pressure enough. The goal is to surgically create a small, stable “leak” in the eye to allow the eye to drain better and lower the pressure. This usually works well and can eliminate all glaucoma drops. However, short and long term vision threatening complications are possible. These complications are why this surgery is done only after everything else has been tried. We are anxiously awaiting improvements in the surgical care of glaucoma.

What is your part in treatment?

Treatment for glaucoma required a “team” made up of both you and your doctor. Your eye care provider can prescribe treatment for glaucoma, but only you can make sure you take your eye drops or pills.

Never stop taking or change your medications without first consulting your eye care provider. Frequent eye examinations and tests are critical to monitor your eyes for any changes. Remember, it is your vision, and you must do your part to maintain it.

Even though more progress is needed, the majority of patients who, ten years ago would have been blinded by glaucoma, will now enjoy useful vision throughout their lives.