

**Dr. Vanita Pathak-Ray FRCS (Ed), FRCOphth (Lon)**  
**Senior Consultant Glaucoma and Cataract Specialist**

**Information on Glaucoma**

Glaucoma is the name for a group of eye conditions in which the nerve which helps us see, including colours and side vision, called the optic nerve is damaged at the point where it leaves the eye ie at the optic nerve head. This damage then leads to very specific type of defects when testing of side vision is done.

Let us understand this complex disease by first understanding the basics. The eye is shaped like a ball – this shape is maintained by the pressure of a fluid produced inside the eye, much like air pressure maintains the shape of a football.

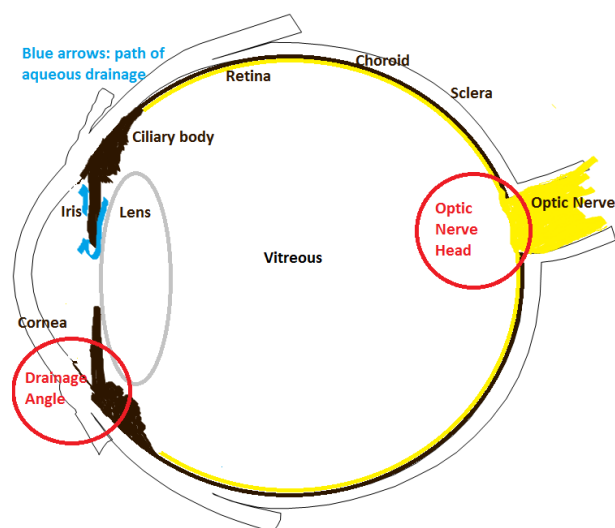


Fig 1A. Schematic of the eye

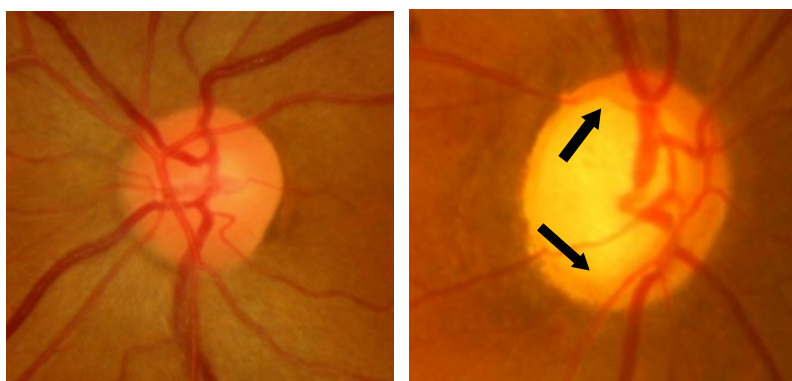


Figure 1 B: Normal disc (left) and Glaucomatous disc (right) with arrows pointing at damaged neuroretinal rims

This fluid called aqueous maintains the eye pressure which is called intra-ocular pressure and is measured by performing tonometry. Figure 2



Figure 2: Tonometry

Aqueous is produced in the eye by a structure called the ciliary body, behind the iris, and it enters the front of the eye via the pupil and is drained away through an area called the drainage angle. Figure 1

This angle, under normal circumstances, is not visible and requires a special lens to view it; this procedure is called gonioscopy. Figure 3

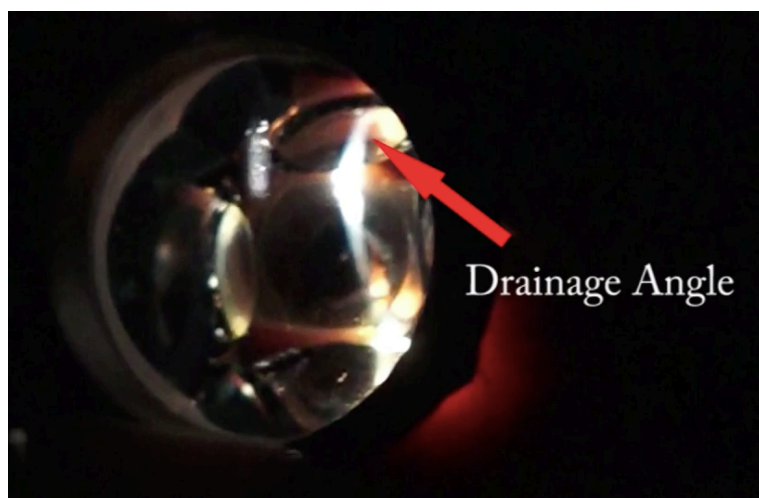


Figure 3: Angle viewing special lens called Gonioscope

These tests are important but the most important test is fundoscopy or ophthalmoscopy, where we examine the back of the eye to check for damage to the nerve that helps us see. Figure 4



Figure 4: Fundoscopy to view the back of the eye

This damage was previously thought to be caused exclusively by eye pressure; however there are various other factors that can lead to glaucomatous damage of the optic nerve head, but eye pressure remains the most important risk factor.

Based on the appearance of the drainage angle, when viewed with gonioscopy, glaucoma is broadly divided into '**open angle**' and '**angle closure**' glaucoma, as seen in Figure 5.

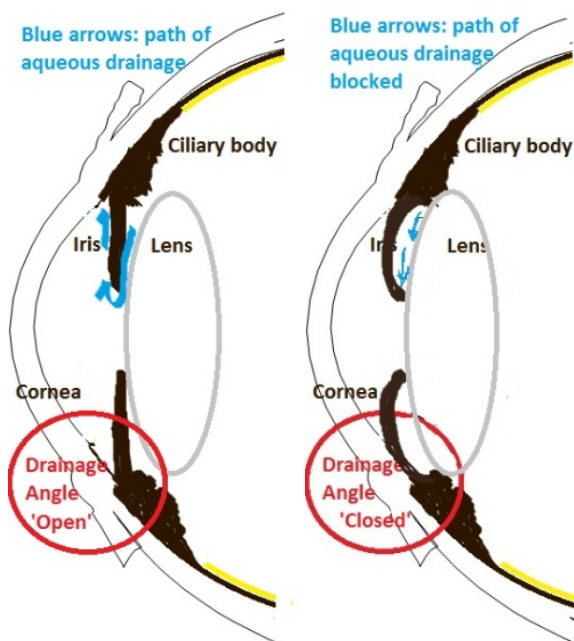


Figure 5: Open (left) and closed (right) drainage angle

### Types of Glaucoma

Based on the drainage angle, these are broadly divided into open angle glaucoma and closed angle glaucoma.

Most glaucomas do not have a known cause, only risk factors and are therefore called primary. **Primary Open angle Glaucoma** or POAG and **Primary angle closure glaucoma** or PACG are '**chronic**' in nature, ie they can take many months or even years to develop. However Angle closure disease has an '**acute**' variety which can lead to loss of vision in hours, if help is not available immediately.

Glaucoma may also be present at or around birth, called **congenital glaucoma**.

Glaucoma that occurs as a result of some disease in the eye or that following any eye operation is called **secondary glaucoma**.

Secondary glaucomas also can be of either type – open or closed.

Glaucoma has frequently been called the 'sneak thief of sight' as in the early stages of the majority of cases there are no symptoms, except in the acute variety when patients may complain of coloured halos and blurred vision specially in the late evenings, preceding pain and loss of vision.

Glaucoma slowly affects side vision (peripheral vision) first. Glaucoma occurs in both eyes, but usually unequally, as a result the better eye keeps 'filling-in' for the eye that is affected more. Due to extreme constriction of side vision tunneling of vision occurs. Figure 6

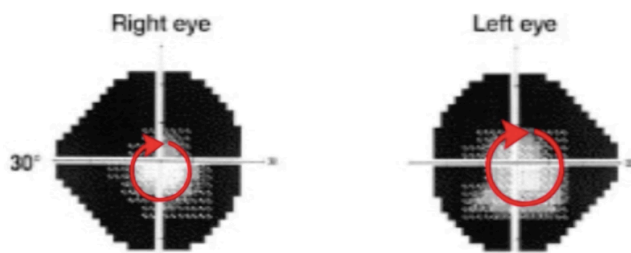


Figure 6: Tunneling of vision on side vision testing

As majority of glaucoma is chronic, patients can tell only after side vision is severely affected and becomes like a tunnel, which occurs in well-established glaucoma. **Central vision continues to remain relatively good till the very last stage.** That is why, early on in the disease, patients fail to realize that they have a problem, and the disease sneaks up on patients, like a thief.

There are a few known risk factors –

- Family history is important. Glaucoma is 10 times more common when there is a family history of the disease; first degree relatives ie parents, siblings and of such individuals should have eyes regularly tested for development of glaucoma.
- Increasing age (above 35-40 years),
- High degree of short-sightedness (myopia)
- Injury to eye
- Usage of any type of steroid medication - eye drops, inhalers, tablets, ointments etc).

In some parts of India, including Telangana, angle closure disease is quite common and will not be detected unless gonioscopy is performed regularly.

Therefore, to summarise, clinical Tests that are specific to glaucoma are

1. Tonometry or measurement of eye pressure
2. Gonioscopy or viewing of the drainage angle under standard dark room conditions and
3. Fundoscopy or viewing of the optic nerve head in 3-D fashion at the slit lamp with a special lens

These are clinical examinations done in sequence. **For fundoscopy and best view of the nerve, the pupil is dilated but only when gonioscopy has ruled out narrow angle or else there is danger of precipitating the acute variety**

If there is a suspicion of glaucoma, then certain investigations are useful - a visual field test or perimetry is done to check for peripheral vision.

Imaging (scans) may also be done, especially when there is suspicion of early disease. Also thickness of the cornea of the front of the eye, where eye pressure is measured, may also be done to precisely estimate the pressure.

Once glaucoma is diagnosed, current treatment of glaucoma is directed towards control of eye pressure. We can do this by means of eye drops (sometimes tablets for short duration), laser and glaucoma surgery.

**For all angle closure disease, laser is done first.** Figure 7 Laser Peripheral Iridotomy helps create a 'hole' in the peripheral part of the coloured portion (iris) of the eye, in order to try and open up the drainage angle. Once this is done it is treated like open angle glaucoma with eye drops.



Figure 7: Laser in angle closure to create a 'hole' in the iris is an outpatient procedure.



**Treatment, once started, has to be taken indefinitely.** As such it has to become a part of one's daily routine. Also lifelong monitoring is required (follow-up at regular intervals, usually 3-6 months). Only your eye doctor will be able to tell if your eye pressure is controlled and therefore it is **vital to attend follow-up appointments** without stoppage of **eye drops as prescribed.**

Operations are undertaken when eye drops fail to control eye pressure. It is usually not done first as it carries a greater risk of complications. Even if surgery is done, lifelong follow-up at regular intervals (3-6 months) is mandatory.

Glaucoma affects the nerve and hence **the ensuing damage is permanent.** Though there is no cure, we can control it and help to prevent any further loss of side vision and subsequent blindness. Let us resolve to beat this invisible disease.

### Conclusion

Glaucoma is the name for a group of eye conditions in which the nerve which helps us see, including colours and side vision, called the optic nerve is irreversibly damaged at the point where it leaves the eye ie at the optic nerve head. This damage then leads to very specific type of defects when testing of side vision is done.

Glaucoma has frequently been called the 'sneak thief of sight' as in the early stages of the majority of cases there are no symptoms, so patients are unable to tell if they have the disease. Only an eye doctor who does specific tests for glaucoma and examines your nerve can tell.

**For this regular eye check-up after the age of 35-40 is recommended and it is well within your right to ask your eye doctor about the health of your nerve.**