

Patient Information Brochure

Glaucoma

Q: How do we see?

A: The visual system is like a digital camera (the eye) connected to a computer (the brain) that makes sense of what the camera detects. The optic nerve is the “cable” that connects the eye to the brain. Nerve fibres carry visual messages from all parts of the retina, which lines the eye and detects light and colour. These nerve fibres come together at the optic disc to form the optic nerve.

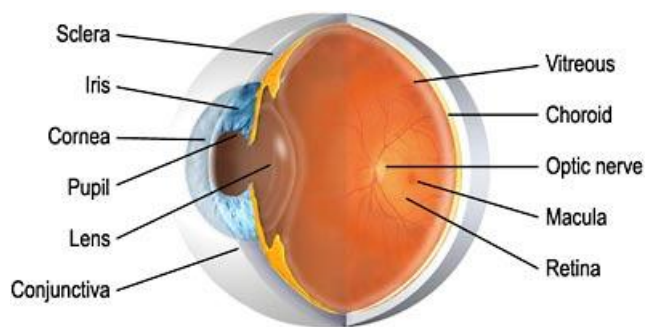


Fig 1 Normal Eye

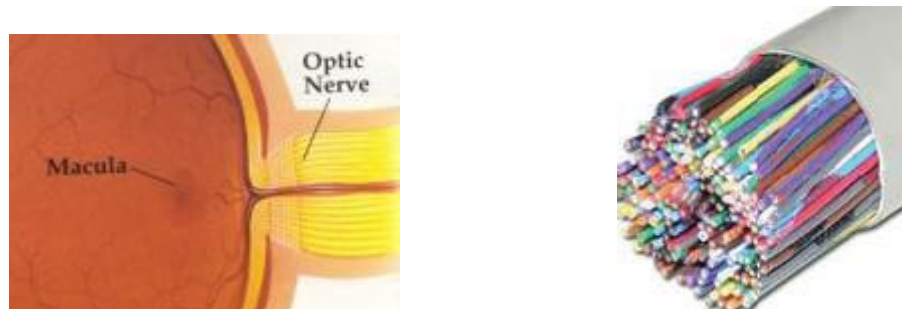


Fig 2 Optic nerve is like telephone cable

Q: What is glaucoma?

A: Glaucoma is a common eye condition (or group of conditions) that can lead to blindness - in fact glaucoma is the second most common cause of blindness around the world. Fortunately if glaucoma is detected early and managed appropriately in nearly every case blindness is preventable. Glaucoma is most often controlled with eye-drops, but laser, tablets and surgery are also used in its treatment.

Glaucoma is a disease of the optic nerve, the “telephone cable” that carries visual information

from the eye, where images are captured, to the brain, the computer that makes sense of what is seen. Most cases of glaucoma proceed very slowly as optic nerve fibres are gradually lost.

Q: What causes glaucoma?

A: Intraocular pressure (IOP) (pressure inside the eye) normally ranges between 10 and 20 mm of Hg. Rise in this intraocular pressure reduces the blood circulation to the optic nerve and damages it. Other causes of reduced blood supply to the optic nerve including age, hypertension (raised blood pressure), diabetes mellitus, hyperlipidemia (raised cholesterol), heart disease, smoking and drinking can contribute to glaucoma.

Q: Who can get glaucoma?

A: Babies, children and young adults can get glaucoma, but these types of glaucoma are rare. Glaucoma becomes much more common as we get older, occurring in 2% of the population over 40 but in as much as 11% of the population over 80. As mentioned above people having other illnesses have a higher risk of developing glaucoma. Glaucoma may also follow on from other eye disease or eye injury. **People with a family history of glaucoma have a higher risk of developing glaucoma.**

Q: What are the types of glaucoma?

A: There are many different types of glaucoma. The two main types of glaucoma are **Primary Open Angle Glaucoma (POAG) and Closed Angle Glaucoma (CAG).**

Q: What is Open angle glaucoma?

A: Most people with glaucoma have forms of POAG. There is most often a family history. There is damage to the drainage system of the eye, leading to increase in IOP, leading to glaucoma.

Q: What is closed angle glaucoma?

A: The second most common type of glaucoma is **Primary Angle Closure Glaucoma (PACG).** There is narrowing of the drainage passage in the eye due to smaller eyeball size (as in people having high plus number) or due to thickening of lens due to cataract. This can develop very slowly, like open angle glaucoma, or can occur suddenly in the case of Acute Angle Closure Glaucoma, where the eye becomes very red and painful and vision is lost in a matter of days if appropriate treatment is not begun.

This form of glaucoma is more common in Indians/ Asians than western people due to relatively smaller eyes.

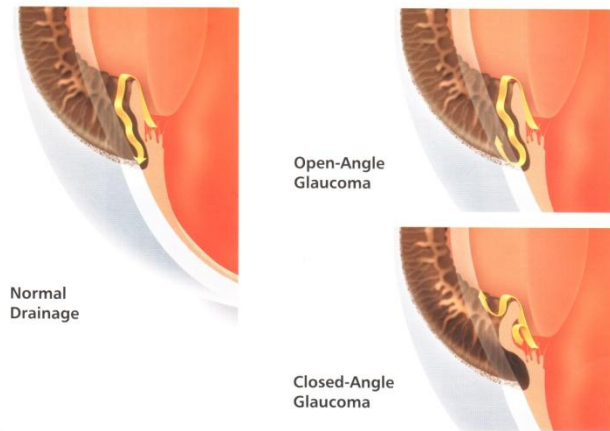


Fig 3 Drainage system of the eye

Q: What will be my complaints if I have glaucoma?

A: Unfortunately the brain does not recognise that patches of vision are missing until the damage from glaucoma is very advanced, so sufferers of glaucoma will only be aware they have a problem very late in the disease. It is for this reason that it is of the utmost importance that we all have regular eye examinations from the age of 45, earlier if we have glaucoma in the family. People go blind because they have glaucoma but haven't realised this, often for many years.

Only in the closed angle type of glaucoma will a person have complaints. Patients will complaint of pain, redness, cloudy vision, coloured rings around lights, severe headache or even vomiting.

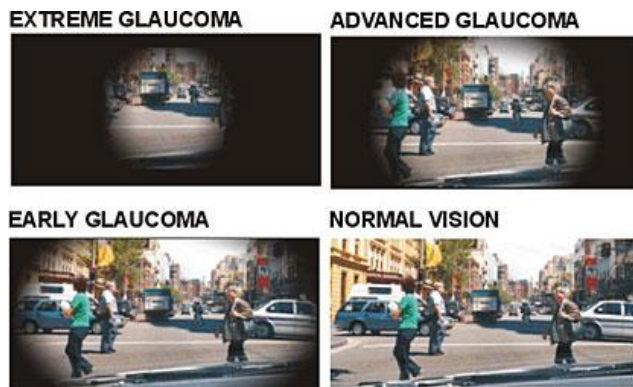


Fig 4 Pattern of vision loss in glaucoma

Q: How will I know if I have glaucoma?

A: *Normally with glaucoma there is no perceived visual disturbance nor eye discomfort to warn that someone has glaucoma.* Glaucoma is detected through routine eye examinations by your ophthalmologist. Glaucoma is often associated with elevated eye pressure, and discovery of this may be how your glaucoma is detected. Glaucoma causes a characteristic type of erosion of the optic disc we call cupping, which can be seen when the back of your eye is examined.

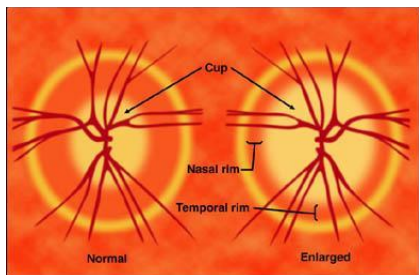


Fig 5A Drawings of a normal disc (left) with a normal sized cup, then a disc with ‘cupping’,enlargement of the cup due to loss of nerve tissue from glaucoma



Fig 5B Photos of cupped discs: in the third disc small disc haemorrhages also typical of glaucoma can be seen

Q: What is visual field testing?

A: Glaucoma causes loss of visual field, patches of one’s vision. This is detected by visual field testing. Monitoring the visual field is particularly important to ensure that glaucoma is controlled and not getting worse – most people with glaucoma will have field tests once a year.

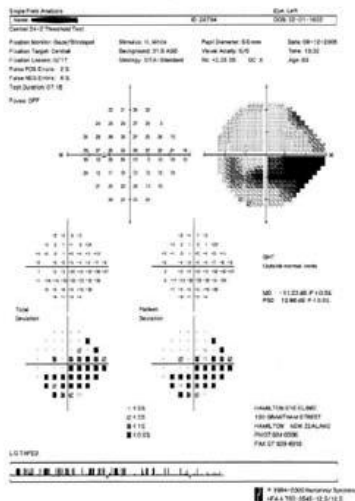


Fig 6 A visual field printout showing typical field loss from glaucoma

Q: How to manage glaucoma?

A: Your ophthalmologist will assess and then usually treat your glaucoma. As well as asking about past eye problems and your general health, and examining your eye, your ophthalmologist will establish your glaucoma diagnosis and a treatment plan doing some or all of the following:

- establish at what level your eye pressures are running
- ensure he has a reliable, repeatable record of your visual fields
- measure your corneal thickness (**pachymetry**)
- record your optic disc appearance with stereo photos

- measure your nerve fibre layer thickness with the OCT

Management of glaucoma is all about detecting that glaucoma is present or not. It can take upto a year to confirm whether a patient has glaucoma or not. Till then a patient is treated as a glaucoma suspect.

This is followed by monitoring the patient to detect whether the disease is controlled, or that more damage is occurring. This is done in several ways. It is important to examine the patient's **optic discs** for further cupping or disc haemorrhages which are indications of progressive glaucoma. For many discs however only big changes can be detected.

Visual field testing is another important way to monitor glaucoma, but field loss occurs relatively late in the disease, and even good subjects will have variable field results depending on how tired they are, and how well they can concentrate on this demanding test.

Q: What is OCT?

A: The **OCT** is a relatively new, very sophisticated machine that can actually measure the thickness of the nerve fibre layer at the back of the eye, down to microns (thousandths of a millimeter). We can compare an individual's OCT result to normal references, and in particular, to the individual's test results from previous years, to see if change has occurred. For the patient the test is simple and painless, rather like having a photograph taken. It is however still a supporting test for visual fields, which is still the gold standard.

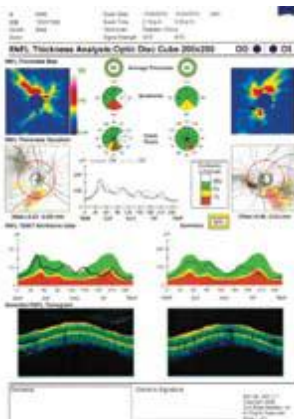


Fig 7 Routine OCT report of a patient with suspected glaucoma

Q: What is the treatment of glaucoma?

A: At present the only way we can **treat** glaucoma is by lowering eye pressure. If we get the eye pressure down to a safe level, in almost all cases of glaucoma we will halt the disease, or at least slow it down so that significant vision impairment does not occur in the patient's lifetime. The level of pressure that is safe is different for each patient, so we set "target pressures" for each individual. (Generally speaking, the lower the eye pressure the better).

1. **Eye drops:** Most glaucoma patients instill **eye drops** to keep their eye pressures at a safe level. A patient may be on one, two or more different glaucoma eye drops. These medications are for lifetime or as instructed by your ophthalmologist.

2. Laser treatment

- a. **Laser trabeculoplasty** is a very safe and generally painless way to treat glaucoma and should be considered for all newly diagnosed cases of glaucoma. Successful laser treatment can keep the eye pressure down for a few years without requiring eye drops. Eventually patients end up applying eye drops. (The laser used is very different from the laser used to allow people to manage without glasses.)
 - b. **Laser peripheral iridectomy** is a safe and painless way of trying to prevent angle closure glaucoma in patients at risk for the same. However it is still a temporary measure as compared to early cataract surgery.
 - c. **Laser iridoplasty** is to treat patients with plateau iris syndrome (a form of narrow angle glaucoma)
3. **Surgery (trabeculectomy)** is also used to treat glaucoma: it is employed when the eye pressure cannot be controlled by drops and laser, and when patients cannot tolerate eye drops (or manage to get them in regularly) or in advanced glaucoma. It is rarely done nowadays.
 4. **Early Cataract Surgery** is recommended in patients with narrow angles or chronic angle closure glaucoma, since it permanently opens up the angle and also reduces the IOP to some extent.
 5. Combined cataract and glaucoma surgery is done in certain cases as required.
 6. End stage Glaucoma where in patient does not much vision and pressure is not controlled with medications, a special form of laser called **Diode Cyclophotocoagulation** is done to keep eye pressures down. Also **Anterior Retinal Cryopexy (ARC)** may be required under local anaesthesia for *neovascular glaucomas* (glaucomas caused due to diabetes/vein occlusions).
 7. Repeated injections in the eye may be required before laser or ARC can be done to prevent neovascular glaucoma.
 8. Enucleation (removal of the eyeball) may be rarely required in painful blind eyes due to glaucoma.

Blood pressure, diabetes and lipid (cholesterol) control, regular exercise, avoiding smoking and tobacco and improving overall health also helps control glaucoma.

Q: What is the course of glaucoma?

A: Having glaucoma means that you must have a life-long association with your ophthalmologist. The disease can be controlled but not cured, and it is essential that patients are seen regularly (for most this is six monthly). Typically glaucoma is well controlled for a number of years but then at a follow-up visit it is found that control has been lost, for instance that the

visual field is worse, and that a change in treatment is necessary. It is the ophthalmologist's, and the patient's responsibility to make sure that patients do not become "lost to follow-up".