

Glaucoma treatment

What is glaucoma?

Glaucoma is not a single disease - rather, it is caused by a group of eye conditions that damage the optic nerve. The optic nerve contains approximately one million nerve fibres, and it carries visual information from the eye to the brain. As glaucoma damages these fibres, vision is slowly lost.

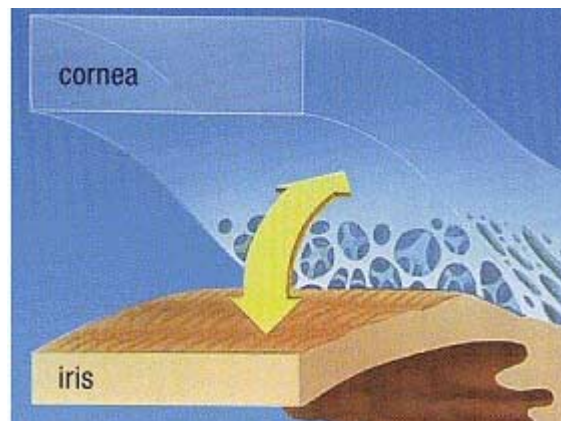
Glaucoma is present in 3% of the population. It is more common with advancing age, and in women, with the prevalence increasing by around 10% per year of age after age 50. Nearly half of those people with glaucoma do not know they have the disease.

In most cases the pressure within the eye is increased, with elevated intraocular pressure being the most important risk factor for developing glaucoma. In these eyes the pressure is too high for the optic nerve cells to tolerate, and they subsequently die. If enough of the cells die, some or all of the vision may be lost.

Broadly speaking there are a three different types of glaucoma;

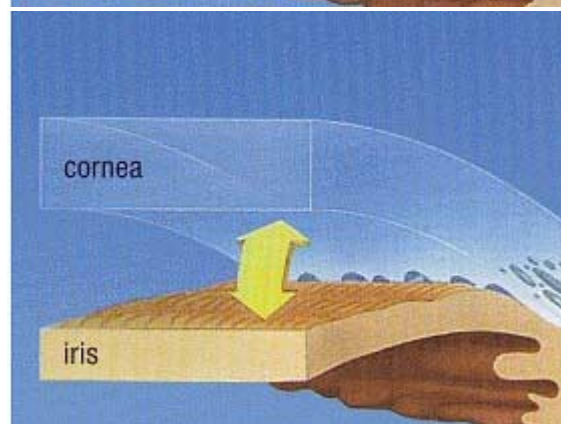
1) Open Angle Glaucoma.

This is the most common form of glaucoma in Western populations and is caused by the trabecular meshwork becoming silted up.



2) Chronic Closed Angle Glaucoma.

This is caused by blocked drainage through a narrow angle between the iris and the cornea with resultant scarring of the trabecular meshwork. It is more common in Asian and Chinese populations.



3) Acute Angle Closure Glaucoma (AACG).

In this condition forward movement of the iris to cover the trabecular meshwork, will result in a sudden and painful increase in the intraocular pressure.

However, glaucoma is not simply a case of "high eye pressure" diagnosed by measuring the pressure in your eye. Ninety percent (90%) of people with elevated pressure (Ocular Hypertension) do not have glaucoma, and up to one third of those with glaucoma have a "normal" eye pressure.

Glaucoma is called the "silent thief of sight" because it develops without obvious symptoms. Therefore, the person with glaucoma is usually unaware they have glaucoma until serious loss of vision has occurred. In fact, half of those suffering damage from glaucoma are unaware they have the disease. As the damage from glaucoma cannot be reversed, early detection, diagnosis, and treatment by your eye doctor (ophthalmologist) is vital to preserve your vision.

Who is at risk of glaucoma?

Everyone should be concerned about glaucoma as it can affect anyone. As a range of conditions cause glaucoma, it is important to have your eyes checked regularly, because early detection and treatment of glaucoma are the only way to prevent visual loss.

Risk Factors:

- over 45 years old
- family history of glaucoma
- high intraocular pressure
- myopic (short-sighted)
- diabetes
- high blood pressure
- race – it is more common in people of black African origin
- migraine or vasospasm (poor circulation)
- previous eye injury
- used steroids (cortisone) for a long period

When should I see my optometrist or ophthalmologist?

Regular examinations are important to protect your eyes from glaucoma.

CESP recommends you have an examination:

- If you have no risk factors and you are between 35 and 50 years old, check every 3 to 5 years. If you have risk factors, check every 2 years.
- If you have no risk factors and you are over 50 years old, check every 2 years. If you have risk factors, check every year.

Those with any risk factors should have their first eye check by the age of 35. For most people an eye check by the age of 40 is recommended.

What are the symptoms of glaucoma?

Most people with primary open angle glaucoma are unaware they have a problem. They don't notice any symptoms until the optic nerve has been damaged and they begin to lose vision. This is why regular examinations with your optometrist or ophthalmologist are so important. One very important point to stress here is that the slow rise in pressure is almost always painless, with the person concerned having no idea that the pressure is above normal.

The first optic nerve fibres to be affected are those that carry the side (peripheral) vision signals, not the central reading vision. If the central fibres were affected first, people would notice symptoms earlier.

Angle-closure glaucoma, although rare, does produce noticeable symptoms. The iris blocks off the drainage angle at the front of the eye, causing a sudden increase in the intraocular pressure. This type of glaucoma is more common in older patients who are long-sighted, and those of Asian background.

Symptoms of acute angle-closure glaucoma include:

- pain in the eye
- severe headache
- nausea and vomiting
- blurred vision
- haloes and rainbows around lights

This type of glaucoma is serious and can rapidly lead to blindness. It is most important that you contact your family doctor or ophthalmologist immediately if you have any of these symptoms.

How is glaucoma diagnosed?

A thorough clinical assessment by your optometrist or ophthalmologist will detect any damage to your eye, or whether you are likely to develop the disease. Early detection is the best way to prevent vision loss.

History

A thorough history is taken to identify any risk factors.

Intraocular pressure (IOP)

A special instrument called a tonometer is used to measure the IOP. A small pressure-sensitive plastic tip is gently placed on the eye after a drop of anaesthetic has been used. In air tonometry, a stream of air is puffed against the eye.



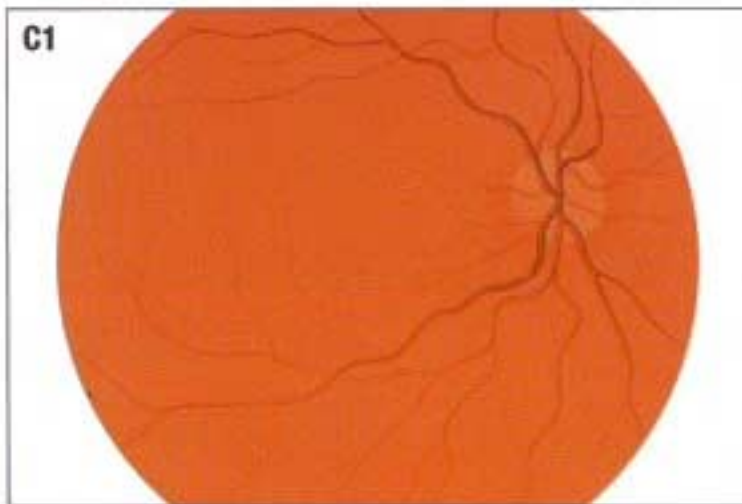
Gonioscopy

A special contact lens is placed on your eye to examine the drainage angle to see if it is blocked.

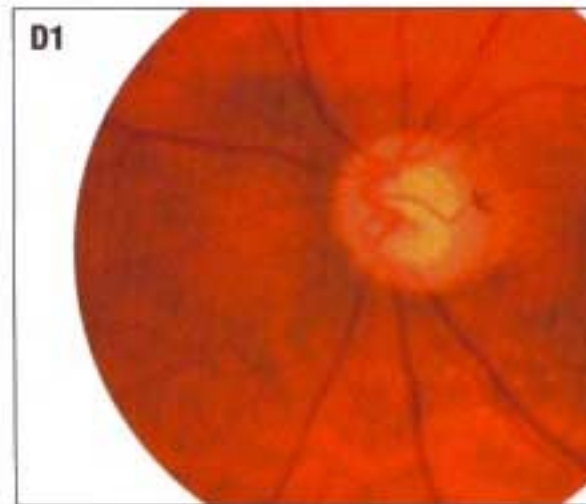
Ophthalmoscopy

After drops have dilated your pupil, the ophthalmologist examines the optic nerve for damage (see below). This is done on the slit-lamp (the special microscope used for the general eye examination) with a lens which gives a stereoscopic, colour view. This technique has largely replaced the hand held ophthalmoscope.

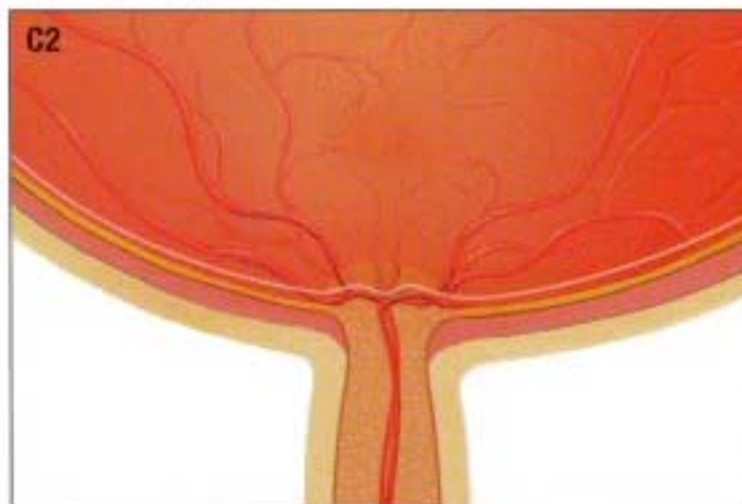
Healthy optic nerve head



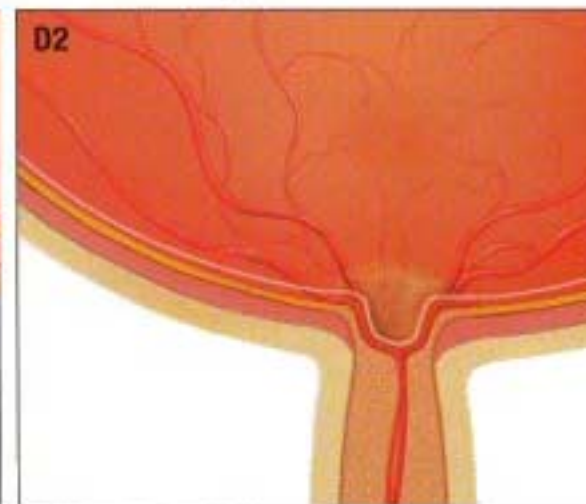
Glaucomatous optic nerve head



Normal cup size



Increased cup size



Visual field testing

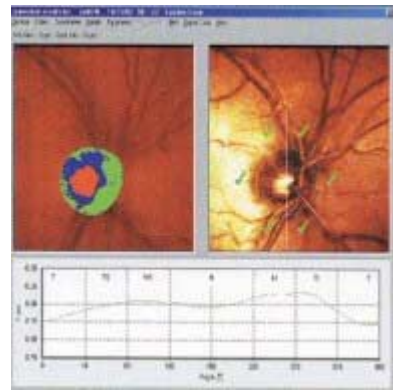
Computerised visual field testing, or perimetry, is an important measure of the extent of damage to your optic nerve. During these tests you will be asked to look into a computer screen and push a button when you see a light flash. A map is then built up of your peripheral vision and the results printed off. If a defect is found in your peripheral vision repeat visual field tests will enable the ophthalmologist to



determine if this field defect is stable or if it is getting larger.

Retinal Topography

Camera-like device takes 3-dimensional colour images of your optic disc using a scanning laser ophthalmoscope. There are no X-rays involved and the painless test only takes a few minutes. These images are used as a baseline, and the appearance of your optic nerve is compared to them at each visit. In this way, early changes, or progression, of glaucoma can be detected. Often the retinal topographer will be able to detect early signs of glaucoma before there is any evidence of visual field loss allowing treatment to be commenced at an earlier stage.



It may not be necessary for you to have all these tests each visit. If glaucoma is suspected, or your glaucoma worsens, more tests may be added or the tests repeated more frequently.

For more information on private Glaucoma Care packages check your local CESP office website.

Eye drops

These are the most common forms of treatment and usually the first type of treatment tried. Drops usually reduce the production or increase the outflow of aqueous humour. It is important to take your drop(s) exactly as prescribed. Since drops can have side effects, your ophthalmologist will prescribe the one best suited to you.

If taking more than one eye drop, try to allow five minutes between each to prevent dilution.

Glaucoma surgery

If despite treatment with eyedrops the IOP remains high and there is evidence of progressive visual field loss glaucoma surgery may be needed to prevent further damage to your vision. This operation is called a trabeculectomy and can be performed alone or it can be combined with a cataract removal.

Before the operation:

Once your specialist has decided that you need a trabeculectomy the surgery is likely to be carried out fairly quickly. It is important to continue taking your normal glaucoma drops during this period.

How is the operation done?

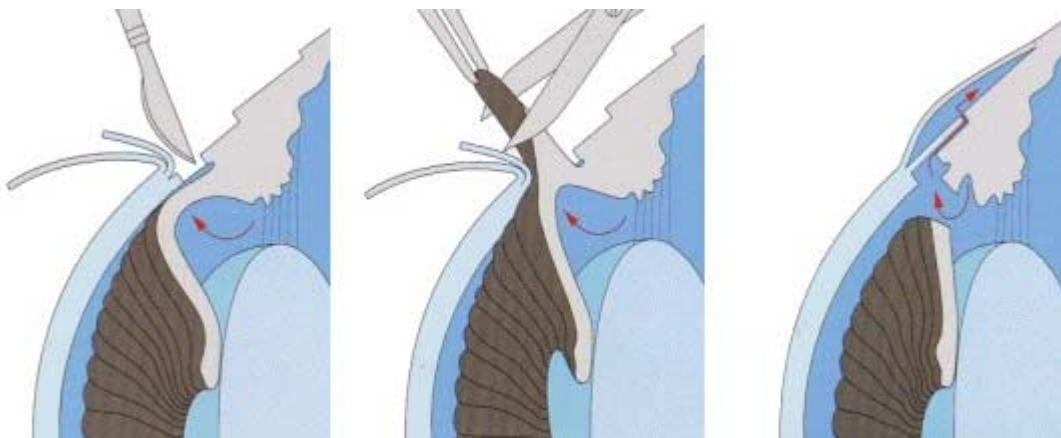
In the anaesthetic room

Like cataract surgery the vast majority of trabeculectomies are carried out under a local anaesthetic. Local anaesthetic is injected around the eye – this stings a little. A pad or small balloon is then placed over the eye for 5-10 minutes. Once the local anaesthetic has taken effect you will not be able to see or feel what is happening, nor will you be able to move the eye or blink. During the operation

you may occasionally see bright or coloured lights and you may be aware of the surgeons hands resting on your forehead and/or face.

In the operating theatre

- you will be lying down and the eye will be cleaned with an iodine solution
- a sterile plastic drape is placed over your eye and then passes above your face like an open tent. A tube blowing fresh air or oxygen will be placed under the drape allowing you to breathe completely normally.
- The operation is performed under a microscope and involves making a special type of small trap door in the sclera (white outer coat of the eye). A small segment of the iris is then removed to prevent it floating up and blocking the trapdoor. The scleral trapdoor is then closed with microscopically fine stitches so that the fluid in the eye may drain slowly out of the eye so reducing the pressure. Your surgeon may use a specialized technique which allows the tension in these small stitches to be adjusted after the surgery or for them to be removed altogether. This means that the drainage of fluid can be improved a simple maneuver carried out in the outpatient clinic.
- Your surgeon may also use a special medicine, applied to the eye for a few minutes by a very small sponge, to slow down or prevent subsequent healing and sealing up of the trapdoor. Useful medicines include 5FU and mitomycin C.
- The trapdoor is then covered by the conjunctiva, the clear tissue on the surface of the sclera, and this is carefully stitched in position.
- The leaking fluid collects underneath the conjunctiva and lifts it very slightly to form what is called a "bleb". This may sometimes look like a small cyst
- At the end of the operation the eye is given a small dose of antibiotic and a medicine to reduce inflammation. The eye is then covered with a shield or pad.



After the operation

Your operation will often be undertaken as an out-patient. In most cases you will need to be seen by your surgeon the following day.

The weeks following surgery are very important and careful management is required during this time to maximize the chances of a successful outcome. You need to be aware, therefore, that there is a required commitment to attending the outpatient clinic regularly during this period.

Dos and Don'ts after the operation:

Do

- use the drops as instructed
- continue with normal light daily activities
- take things easy
- avoid splashing soap, water or anything else into the eye
- wash your hair in the shower with the eye kept shut, or by leaning back at a basin
- be aware that the vision is often very blurred for a number of weeks after the operation. Wearing your old glasses may or may not improve this blurred vision.
- Expect to be off work for 2 weeks

Don't

- carry out strenuous exercise
- rub or press on the eye. This is very important.
- miss any outpatient appointments
- drive unless, or until, you are told it is safe to do so

What are the risks of surgery?

The risks of surgery have to be very carefully balanced against the risk of damage to the vision if the pressure in the eye is not reduced to a satisfactory level.

Hyphaema

This is when a small amount of blood collects in the front chamber of the eye in front of the iris and pupil. This may cause the vision to be blurred, but it usually clears without any specific treatment, within 1-2 weeks. On rare occasions the bleeding may recur and again no action is normally required other than allowing time for the blood to clear naturally.

Excessive drainage

If the fluid in the eye drains too quickly the pressure may become very low, this is known as hypotony and can result in deterioration of the vision. This problem will often resolve with time but occasionally a large "bandage" contact lens or a firm eyepad may be used to slow down drainage of fluid. If these simple methods

are not effective a second operation may be needed to place further stitches in the bleb or trapdoor to slow down fluid drainage.

Very high pressure

This can normally be remedied by reducing the tension in the trap door stitches or by removing them. Your specialist may also gently massage the eye to encourage fluid to pass through the trapdoor into the bleb.

Choroidal Haemorrhage

Bleeding within the layer of blood vessels that nourish the retina is a very rare and unpredictable complication of surgery. If the bleeding is localized the eye may recover but in more severe cases permanent, severe visual loss may occur.

Endophthalmitis (infection inside the eye)

The risk of developing this sight threatening complication in the initial weeks after surgery is approximately 1 in 1500. However, unlike cataract surgery, there is a very small life-long risk of developing endophthalmitis following drainage surgery. This is because the bacteria which normally live on the eyelids and surface of the eye can, very rarely, penetrate the thin walls of the bleb. Should this occur the first signs and symptoms are increasing pain, redness and deteriorating vision. If these occur you should contact your specialist immediately.

Inflammation, excessive healing or scarring of the drainage site.

This is not uncommon and can result in the drainage site closing and the pressure in the eye becoming too high again. To reduce the risk of this happening your surgeon may use special anti-scarring medications during the surgery. This may be supplemented by injections of the same medicine close to the drainage site, given in the clinic.

Complete loss of vision

Complete loss of vision is normally rare. However, it can be a significant risk following surgery in an eye where there is already advanced loss of vision as a result of glaucoma.

Laser treatment

Laser Trabeculoplasty (LTP) is an advanced laser technique used to treat open-angle glaucoma.

Who can have it and how successful is it?

Laser treatment usually reserved for elderly patients who are unable to undergo glaucoma surgery. In some patients it is possible to stop eye drops after laser treatment, however most will need to continue with drops. In these cases the laser is used to reduce the eye pressure when drops alone are insufficient.

The laser delivers a precise burst of light energy to the drainage channels inside the eye. Each burst of laser energy unblocks the tiny holes in the meshwork. Subsequent contraction around the burns further 'pulls' or 'stretches' the microscopic channels, increasing drainage of fluid and decreasing pressure.

How is it done?

The laser treatment is performed in a consulting room admission to the Day Surgery Unit is not required. On arrival you will have drops instilled into your eye to constrict the pupil and reduce the pressure. These take 15 minutes to work and can produce a mild ache around the eye. This usually settles after 30 minutes. The actual laser procedure takes only 5 minutes. Your eye pressure will be taken after 2 hours to ensure there is no elevation which may require more drops or tablets.

The treatment is performed on a laser microscope similar to the slit lamp used for your general examination. Local anaesthetic drops are used and a laser lens is placed on your eye to allow for microscopic focusing of the laser beam. Approximately 30-50 bursts of laser are used which are painless or feel like a 'pin-prick'. Your vision may be blurred for a short time.

After treatment

To reduce any inflammation, anti-inflammatory drops are used 4 times a day for one week in the treated eye. Keep the bottle as it can be used after subsequent treatments. Only one third to one half of the drainage angle is lasered at one session to prevent a pressure spike, so there are usually 2 to 3 sessions per eye. Continue with all your regular glaucoma drops to both eyes unless instructed to cease them.