

Understanding glaucoma



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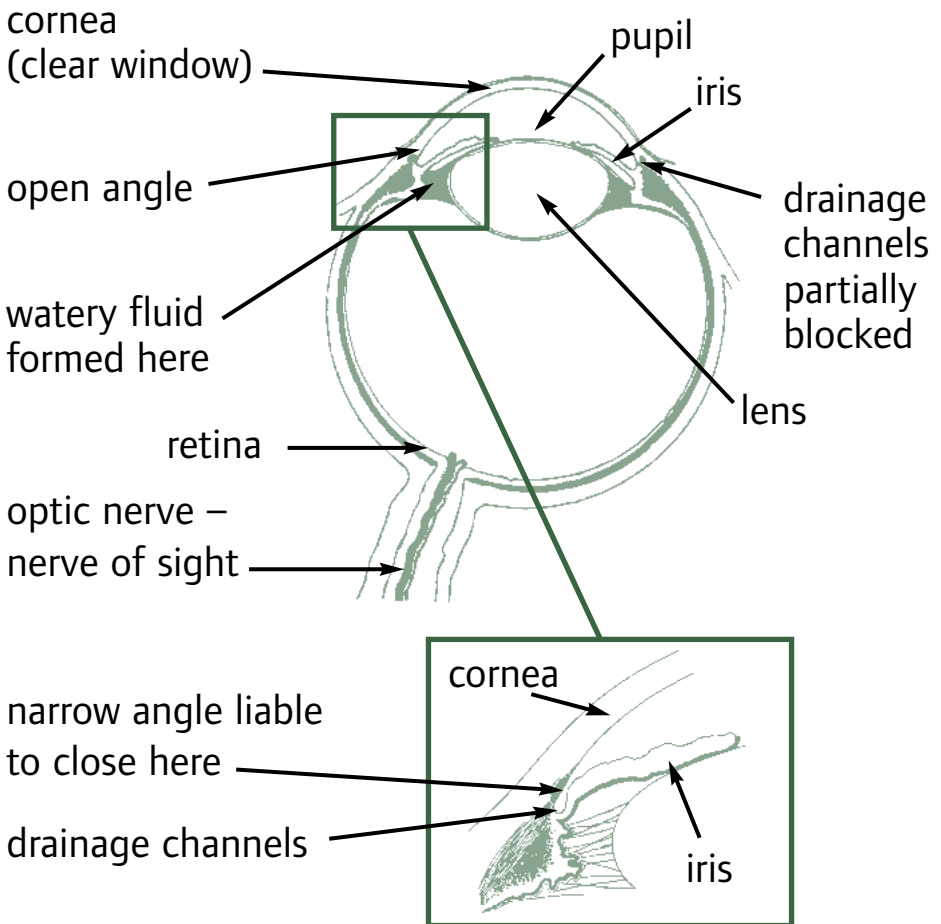
About glaucoma

Glaucoma is the name given to a group of eye conditions which cause optic nerve damage and can affect your vision. Glaucoma damages the optic nerve at the point where it leaves your eye.

How your eye works

When you look at something, light passes through the front of your eye and is focused by the lens onto your retina. The retina is a delicate tissue that is sensitive to light and it converts the light into electrical signals. A delicate network of nerves delivers these signals from the different parts of the retina to the optic nerve and then onto the brain. Your brain interprets these signals to “see” the world around us. The point at which the nerves leave the eye is called the optic disc.

Cross section of right eye from above showing "open angle" in chronic glaucoma



Inset – enlarged view showing how acute glaucoma is caused by a closure of a narrow angle.

Causes

Glaucoma damage may be caused by raised eye pressure or a weakness in the optic nerve. Or you may have an eye pressure within normal limits but the damage occurs because there is a weakness in the optic nerve. In most cases, high pressure and weakness in the optic nerve are both involved to a varying extent. (Eye pressure is **not** connected to your blood pressure).

Your eye needs a certain amount of pressure to keep the eyeball in shape so that it works properly. However, if the optic nerve comes under too much pressure then it can be damaged. The amount of damage there is depends on how high the pressure is and how long it lasts, and whether there is a poor blood supply or other weakness of the optic nerve. A really high eye pressure can damage the optic nerve immediately. A lower level of pressure can cause damage more slowly, and then you would gradually lose your sight if it is not treated.

How eye pressure can rise

A layer of cells behind the iris (the coloured part of the eye) produce a watery fluid called aqueous. The aqueous fluid passes through the hole in the centre of the iris (called the pupil) into the space in front of the iris

(called the anterior chamber), and leaves the eye through tiny drainage channels called the trabecular meshwork. These drainage channels are in the space between the front of the eye (the cornea) and the iris, and they return the fluid to the blood stream. Normally, the amount of fluid produced is balanced by the fluid draining out, but if it cannot drain properly, or if too much is produced, then your eye pressure will rise. Aqueous fluid has nothing to do with tears, which is fluid on the surface of the eye.

Different types of glaucoma

There are four main types of glaucoma:

- Primary open angle glaucoma (POAG) also known as chronic glaucoma
- Acute angle closure glaucoma
- Secondary glaucoma
- Developmental glaucoma.

Primary open angle glaucoma

Primary open angle glaucoma (POAG) or chronic glaucoma is the most common type of glaucoma. As a chronic condition its effects occur slowly over time. In POAG, the drainage of the aqueous fluid from your eye doesn't happen as well as it should and this causes the pressure to rise. Your eye may seem perfectly normal and your eyesight will seem to be unchanged – because when the pressure starts to build up it doesn't cause you any pain – but your vision is still being damaged.

Your peripheral vision, which is the vision you have around the edge of what you are looking directly at, gradually gets worse if you have POAG. As your side vision is not as sensitive as your reading vision you may not notice any changes in your sight. The early loss of peripheral vision is usually in the shape of an arc a little above and/or below the centre of your vision when you look “straight ahead”. This blank area, if the glaucoma is untreated, spreads both outwards and inwards.

The centre of the visual field is affected last so that eventually it is like looking through a long tube – this is so-called “tunnel vision”. If this rise in pressure and glaucoma is left untreated you will gradually lose the ability to see things at the side and above and below where you are looking.

Risk factors

Several things increase your risk of developing POAG:

- your age: POAG becomes much more common as we get older. It is uncommon below the age of 40 but this type of glaucoma affects one per cent of people aged over 40. About five per cent of people over the age of 65 have primary open angle glaucoma
- your race: if you are of African origin you are more at risk of POAG. It is also more likely to develop at an earlier age and be more severe
- family: you are at a higher risk of developing glaucoma if you have a close relative who has chronic glaucoma
- short sight: if you are very short sighted you have a higher risk of developing chronic glaucoma
- diabetes: if you have diabetes you have an increased risk of developing POAG.

Detecting POAG

This type of glaucoma becomes more common over the age of 40, so you should have your eyes tested every two years.

It is even more important to have a regular eye test if you are in one of the groups at greater risk. If you know a member of your family has POAG it's a good idea for everyone in your family to have a full eye test. Usually POAG is detected in an eye test carried out by an optometrist (optician) in the high street. Glaucoma is one of the reasons why regular eye tests, every two years, are so important.

If you are over 40 years and one of your parents, children, brother or sister has been diagnosed with glaucoma then you are entitled to a free sight test every year under the NHS. When you book your eye test, ask for all three glaucoma tests. Having all three tests is much more effective in detecting glaucoma than just having one or two of the tests.

The three tests are very straightforward – they don't hurt and can be done by most high street optometrists (opticians) – and they:

- examine the back of the eye (retina), especially the area where the optic nerve leaves your eye (optic disc). This is done by shining a bright light into your eye from either a slit lamp, into which you place your chin or a hand-held ophthalmoscope

- measure the pressure in your eye, using a special instrument called a tonometer. This involves a machine which uses a few puffs of air in each eye to record the pressure. This can also be tested using eye drops and another instrument which touches the front of the eye. This method is most often used by the hospital clinic
- test your visual field. This involves being shown a sequence of spots of light on a screen and you say which ones you can see.

If the optometrist finds that the combination of your test results suggests you have or may have glaucoma they will usually refer you to a hospital eye consultant (ophthalmologist) who can then diagnose your glaucoma and start any treatment you may need.

Treating POAG

All glaucoma treatments aim to prevent further damage to your sight. However, treatment cannot repair or improve damage that may have already been caused by high pressure before it was found.

The main treatment for POAG aims to reduce the pressure in your eye. Some treatments also aim to improve the blood supply to the optic nerve.

You need to see an ophthalmologist to start any treatment and you will have regular check-ups to make sure the treatment is working.

Treatment to lower your eye pressure usually starts with eye drops. These act by reducing the amount of fluid produced in the eye or by opening up the drainage channels so that excess liquid can drain away. In the majority of cases, the drops lower your eye pressure and keep pressure stable which protects your eye against further damage and prevents sight loss. In some cases, the first drops you use may not work or might cause side effects but if this happens your ophthalmologist would explore alternative drops with you.

Using your eye drops as your ophthalmologist recommends is very important in stopping you losing sight to your glaucoma. Although you will not notice any difference in your vision when you use the drops, they will prevent you losing your sight. Like all medications, some drops do have side affects but usually only a small number of people experience these and the risk of these side affects is small compared to the risk of losing vision if you don't use the drops as prescribed.

If you experience any difficulties using the drops then you should let your ophthalmologist know as soon as possible as alternative drops may be available to you. Some people may find using the drops difficult because of problems with movement or their hands, such as arthritis. Most drops can be used with gadgets that make the bottles easier to handle, which often helps people with poor hand movement.

If you think that you will have serious problems using the drops then you should let your GP know, as they may be able to arrange help for you. Very occasionally, the drops do not lower eye pressure quickly enough or do not work as well as your ophthalmologist would like. If this is the case your ophthalmologist may suggest either laser treatment or an operation called a trabeculectomy to improve the drainage of aqueous fluid from your eye.

Laser treatment

There are two main types of laser surgery that can be used to control eye pressure:

- laser trabeculoplasty
- laser iridotomy.

Laser treatments are very successful. Laser trabeculoplasty helps to improve the drainage of aqueous fluid by stimulating the trabecular meshwork to work more efficiently. Laser trabeculoplasty is the more common laser treatment for people with POAG.

The alternative is laser iridotomy which creates a new drainage channel at the front of your eye. This new channel is usually made through the top of your iris, to allow aqueous fluid to drain through this channel as well. Laser iridotomy can sometimes be used for POAG but is more commonly used to prevent someone having closed angle glaucoma.

Both types of laser treatment reduce pressure and will usually only need to be done once. Laser treatments sometimes need repeating but often just need doing once. They are minor surgical procedures which you recover from very quickly. Normally they are performed under local anesthetic as an out patient (meaning you wouldn't stay in hospital). You would normally use glaucoma drops in the long-term after laser treatment to continue to keep eye pressure stable.

Trabeculectomy surgery

If eye drops and laser treatment cannot lower eye pressure and keep it stable then trabeculectomy surgery may be considered. Only five per cent of people with glaucoma require trabeculectomy surgery. This surgery creates a new, permanent drainage channel in the eye and lowers pressure. The new channel is made on the white part of your eye (the sclera), underneath your upper eye lid. Continued use of glaucoma drops is not normally needed following this surgery but your ophthalmologist will let you know what would be best for you. Your specialist will discuss with you which is the best method, drops, laser treatment or surgery to reduce your pressure and keep it stable.

Acute angle closure glaucoma

Acute glaucoma is much less common than POAG. Acute angle closure glaucoma happens when there is a sudden and more complete blockage to the flow of aqueous fluid from the eye. This is nearly always very painful and causes permanent damage to your sight if not treated promptly.

In acute angle closure glaucoma, the pressure in the eye rises rapidly. This is because the outer edge of the iris and the front of the eye (cornea) come into contact, which stops the aqueous fluid from draining away through the trabecular meshwork as normal. This can happen in one or both eyes but it is rare for both eyes to have an attack at the same time.

Symptoms of acute glaucoma

In the early stages you may see misty rainbow-coloured rings around white lights. But for most people sudden increase in eye pressure is very painful. The affected eye becomes red, the sight deteriorates and you may even black out. You may also feel nauseous and be sick. Acute glaucoma is an emergency and needs to be treated quickly if sight is to be saved.

Some people can experience a series of mild attacks, often in the evening. Vision may seem “misty” with coloured rings seen around white lights and there may be some discomfort in the eye. If you think that you’re having mild attacks you should have your eyes tested as soon as possible and let the optometrist know that you’re having these symptoms.

In some people the angle between the cornea and the iris is narrow, meaning there could be more risk of developing closed angle glaucoma. Your optometrist may notice this during your eye test and may refer you to the hospital for further tests and treatment even if you have no symptoms of acute glaucoma.

Treating acute glaucoma

If you are diagnosed and treated promptly, there may be almost complete and permanent recovery of vision. Delay in treatment may cause a permanent loss of sight in the affected eye. If you have an acute attack you need to go into hospital immediately so that the pain and the pressure in the eye can be relieved. You will be given medication, which makes your eye produce less aqueous fluid and also improves its drainage to help relieve the pain.

An acute attack, if treated early, can usually be brought under control in a few hours. Your eye will become more comfortable and sight starts to return. Your surgeon will probably suggest a procedure to make a small hole in the outer border of your iris to allow the fluid to drain away. This is usually done by laser iridotomy (see above) or by a small operation.

Usually the surgeon also advises you to have the laser iridotomy on your other eye because there is a high risk that it will develop the same problem. This treatment is not painful. Depending on circumstances and the response to treatment, you probably won't need to stay in hospital.

Occasionally, the eye pressure remains a little raised and treatment is required as for chronic glaucoma (for more information, see the section on POAG, above). Even though treatment brings the pressure down to near normal, you may also need to continue using eye drops to keep the glaucoma under control.

Can acute glaucoma be prevented?

Some people may have very mild or no symptoms of acute glaucoma but when their eyes are examined their angles may be very narrow. In these cases, an ophthalmologist may recommend surgery to prevent an acute attack. If you have had an acute glaucoma attack in one eye, usually surgery will also be performed on the other eye to avoid problems in the future.

Ocular hypertension

Ocular hypertension means high eye pressure. We all have eye pressure as it keeps the eye healthy and helps to maintain the shape of the eye. Most people's eye pressure is between 16-21mmHg. Sometimes eye pressure can be a bit below or above this range, which may be completely normal for your eye and not need any treatment. Eye pressure can go up and down slightly quite naturally but it does not go up with your blood pressure. Therefore, stress does not cause high eye pressure or glaucoma.

If your eye pressure is above 22mmHg, you will generally be told that you have ocular hypotension. This is not the same as having glaucoma. A diagnosis of glaucoma means that the pressure in the eye has caused some damage to the optic nerve but a diagnosis of ocular hypertension may mean your pressure is high but there isn't any damage to your optic nerve.

Due to a change in NHS referral guidelines used by optometrists, more people are being seen at hospital with suspected ocular hypertension. Not everyone with ocular hypertension will develop glaucoma or need treatment but some will. Ocular hypertension is treated with drops in the same way as chronic glaucoma (POAG) and your eye health should be monitored regularly at a hospital.

Low tension glaucoma

Low tension, or normal tension glaucoma, means that your optic nerve is damaged like it is in other types of glaucoma but your eye pressure is well within normal ranges. If you have low tension glaucoma your eye pressure will need to be reduced to keep your sight safe. Low tension glaucoma is treated in the same way as glaucoma caused by high eye pressure. Your specialist will determine what level of eye pressure is right for you.

Secondary glaucoma

An increase in ocular pressure can also occur as a secondary effect of other eye conditions, operations, injuries or medications. This can lead to damage to the vision and when this happens it is called secondary glaucoma. The treatment in each case is always aimed at reducing the pressure as well as treating the cause. If this is the type of glaucoma you have, your specialist will talk to you about the planned treatment.

Developmental glaucoma

Developmental or congenital glaucoma affects young babies and is a very rare condition. It is usually identified in the early years and managed by specialist clinics.

Monitoring glaucoma and hospital visits

If you are diagnosed with glaucoma you may need to visit the hospital frequently to start with. This is because your ophthalmologist will want to make sure you are responding to treatment and that your eye pressure is in the right range for you and it is stable.

If your eye pressure continues to be stable and you are not having any problems with treatment then you will be able to go for check-ups less often. With time, you may only need to be seen every 6 or 12 months. However, it is very important that you attend these appointments to make sure your eye pressure continues to be stable as you will not be aware of any changes to the pressure, and you could permanently lose more sight if your current treatment becomes ineffective.

On each visit, you will have the pressure measured in the eye, the visual field tested and the back of your eye examined using drops to dilate your pupil. The effects of the drop usually wear off in about six hours, although sometimes it will happen overnight. It is not safe to drive until the effects have worn off.

The visual field test used in monitoring glaucoma is much more detailed than the screening tests used by your optometrist. Some of the tests can take 10 minutes per eye and this can get boring. It is important to be prepared for this as accurate testing allows the specialist to make the right decisions about your treatment

Changes in your glaucoma

Most people with glaucoma use drops for glaucoma for many years or for life. Using your drops regularly can help to keep your eye pressure under control and minimise the damage to your sight. Not using your drops could in the long term make your glaucoma unstable and lead to permanent sight loss, as sight loss in glaucoma is not reversible.

When you have been on drops for a long time they may not be as effective as they were before, or you might develop sensitivity to them. The hospital will monitor you at your regular appointments and suggest different eye drops, or other treatment, if needed.

Coping

Being diagnosed with an eye condition can be very upsetting. You may find that you are worried about the future and how you will manage with a change in your vision. All these feelings are natural.

Some people may want to talk over some of these feelings with someone outside their circle of friends or family. RNIB can help you with our telephone Helpline and our emotional support service. Your GP or social worker may also be able to help you find a counsellor if you think this would help you.

Help to see things better

Early detection and treatment of glaucoma usually prevents or slows down any further damage. If you do experience some sight loss there are a lot of things you can do to make the most of your remaining vision. This may mean making things bigger, using brighter lighting or using colour to make things easier to see.

You should ask your ophthalmologist, optometrist or GP about low vision aids and whether you are eligible to register as sight impaired (partially sighted) or severely sight impaired (blind). Registration can act as your

“passport” to expert help and sometimes to financial concessions. Even if you’re not registered, a lot of this support is still available to you.

Local social services should also be able to offer you information on staying safe in your home and getting out and about safely. They should also be able to offer you some practical mobility training to give you more confidence when you are out.

Our Helpline can also give you information about low vision clinics and the help available from social services on 0303 123 9999. They can also offer advice if you have any difficulties accessing these services. Our website offers lots of practical information about adapting to changes in your vision and products that make everyday tasks easier.

Driving

Most people with glaucoma carry on driving in the long term if the loss of visual field is not advanced, but you are required by law to report a condition which might affect sight. You need to report a glaucoma diagnosis to the Driver and Vehicle Licensing Authority (DVLA) so they can carry out regular tests to assess if it is safe for you to drive. To assess possible damage to your peripheral vision, you will need a special test to see whether your sight meets the standards of the DVLA. Ask your specialist about this. You may like to obtain a leaflet about driving published by the International Glaucoma Association (IGA).

Useful contacts

Royal National Institute of Blind People

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t: 0303 123 9999

helpline@rnib.org.uk

www.rnib.org.uk

Royal College of Ophthalmologists

17 Cornwall Terrace, London NW1 4QW

t: 020 7935 0702

www.rcophth.ac.uk

International Glaucoma Association (IGA)

Woodcote House, 15 Highpoint Business Village

Henwood, Ashford, Kent TN24 8DH

SightLine 01233 64 81 70

www.glaucoma-association.com

Driver and Vehicle Licensing Agency (DVLA)

Drivers Customer Services (DCS)

Correspondence Team DVLA

Swansea SA6 7JL

t: 0300 790 6801

www.dvla.gov.uk

The Partially Sighted Society

7/9 Bennetthorpe, Doncaster DN2 6AA

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Information sources

We do all we can to ensure that the information we supply is accurate, up to date and in line with the latest research and expertise.

The information used in RNIB's understanding series of leaflets uses:

- Royal College Of Ophthalmologists guidelines for treatment
- clinical research and studies obtained through literature reviews
- information published by specific support groups for individual conditions
- information from text books
- information from RNIB publications and research.

For a full list of references and information sources used in the compilation of this leaflet email publishing@rnib.org.uk or call 020 7391 2006.

RNIB Helpline

0303 123 9999

helpline@rnib.org.uk

If you, or someone you know,
is living with sight loss, we're
here to help.

Alcon

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