DRUGS FOR GLAUCOMA

Glaucoma is the name given to a group of conditions in which the pressure in the eye builds up to an abnormally high level. This compresses the blood vessels that supply the nerve connecting the eye to the brain (optic nerve) and may result in irreversible nerve damage and permanent loss of vision.

In the most common type of glaucoma, called chronic (or open-angle) glaucoma, reduced drainage of fluid from the eye causes pressure inside the eye to build up slowly. Progressive reduction in the peripheral field of vision may take months or years to be noticed. Acute (or closed-angle) glaucoma occurs when drainage of fluid is suddenly blocked by the iris. Fluid pressure usually builds up quite suddenly, blurring vision in the affected eye (see below). The eye becomes red and painful, accompanied by a headache and sometimes vomiting. The main attack is often preceded by milder warning attacks, such as seeing haloes around lights in the previous weeks or months. Elderly, far-sighted people are particularly at risk of developing acute glaucoma. The angle may also narrow suddenly following injury or after taking certain drugs, for example, anticholinergic drugs. Closed-angle glaucoma may develop more slowly (chronic closed-angle glaucoma).

Drugs are used in the treatment of both types of glaucoma. These include miotics (see Drugs affecting the pupil, p.130) and beta blockers (p.55), as well as certain diuretics (carbonic anhydrase inhibitors and osmotics, p.57).

Why they are used

Chronic (open-angle) glaucoma

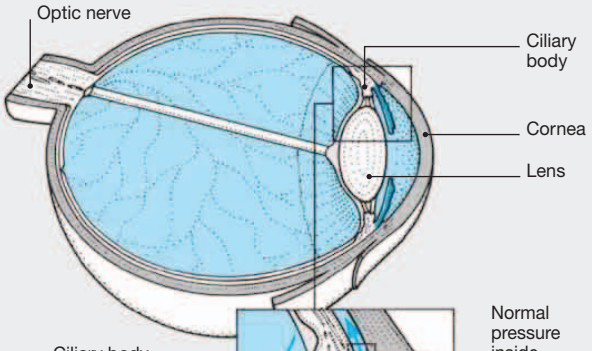
In this form of glaucoma, drugs are used to reduce pressure inside the eye. These drugs will prevent further deterioration of vision, but they cannot restore damage that has already been sustained and may therefore be required lifelong. In most patients, treatment is begun with eye drops containing a beta blocker to reduce fluid production inside the eye. Miotic eye drops to constrict the pupil and improve fluid drainage may be given. The prostaglandin analogues, such as latanoprost, are also used to increase fluid outflow. If none of these drugs are effective, dipivefrine, apraclonidine, or brimonidine may be tried to reduce secretion and help outflow. Sometimes a carbonic anhydrase inhibitor such as acetazolamide or dorzolamide may be given to reduce fluid production. Laser treatment and surgery may also be used to improve fluid drainage from the eye.

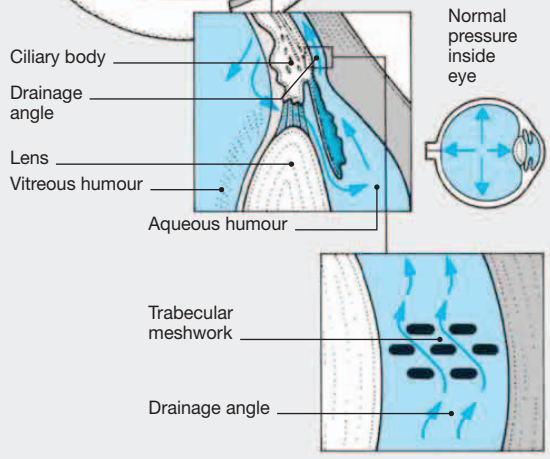
Acute (closed-angle) glaucoma

In acute glaucoma immediate medical treatment is required in order to prevent total loss of vision. Drugs are used initially to bring down the pressure within the eye. Laser treatment or surgery is then carried out to prevent a recurrence of the problem so that long-term drug treatment is seldom required.

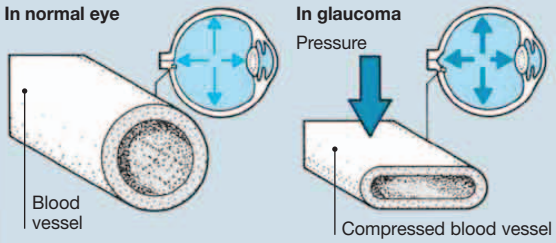
WHAT HAPPENS IN GLAUCOMA

Normal eye
The ciliary body, situated at the root of the iris, continuously produces aqueous humour – a watery fluid that helps to maintain the normal shape of the eyeball. Aqueous humour drains via the angle between the cornea and iris through a mesh of fibres (the trabecular meshwork) into a channel in the sclera (white of the eye).



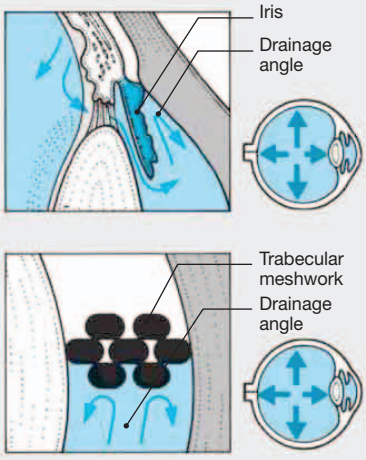


How vision is lost



In glaucoma, rising pressure inside the eye compresses the blood vessels that supply the optic nerve.

The consequent reduction in blood supply causes damage to the optic nerve fibres and permanent loss of vision.



Acute glaucoma
In acute glaucoma, the drainage angle between the cornea and the iris becomes completely closed, so the pressure inside the eye rises rapidly. This may cause permanent damage to the nerve fibres.

Chronic glaucoma
In chronic glaucoma, the trabecular meshwork through which the aqueous humour normally drains slowly closes off, so that fluid pressure builds up gradually and damages the optic nerve.