THE CHRONIC GLAUCOMAS

WHAT IS GLAUCOMA

People with glaucoma have lost some of their field of all round vision. It is often the edge or periphery that is lost. That is why the condition can be missed until late on unless the eyes are checked regularly. The field of vision is affected as a result of damage to the optic nerve fibres, which carry visual messages from the retina to the brain.

PRESSURE INSIDE THE EYE (IOP: INTRA-OCULAR PRESSURE)

The eye requires pressure inside it to remain firm and to function normally. This is maintained by the flow of aqueous fluid. It is produced at the ciliary body behind the coloured iris. It passes forwards through the pupil and leaves the eye in front of the pupil where the iris meets the edge of the clear front window of the eye, the cornea. This junction or angle has a trabecular mesh work structure linked to a channel known as Schlemm’s Canal, where the fluid leaves the eye. There is also uveal tissue where further fluid can leave the eye. The normal range of pressure and its measurement is important in the diagnosis of glaucoma.

DETECTION OF GLAUCOMA

People over the age of 40, or 25 if black, should be screened especially if there is a family history of glaucoma. This is best done by local opticians.

Three per cent of people over 50 have glaucoma and it becomes more common with increasing age. The optician will check the intra-ocular pressure (IOP) and look at the optic nerve (optic disc) at the back of the eye. (fig.2)
A field of vision test may be done. If there is any concern the optician may review or refer to the hospital.

**DIAGNOSIS OF GLAUCOMA**

**IOP – Intra-ocular pressure.**
Intra-ocular pressure is measured by contact with a tonometer device after an anaesthetic drop is placed on the eye. A reading is given in the unit millimetres of mercury. The pressure can vary normally throughout the day and tends to be slightly higher in the morning than the afternoon. The level of 22 and above may need further investigation.

**CCT – Central Corneal Thickness**
The central corneal thickness is measured as a one off with a device known as a pachymeter. Corneal thickness allows us to grade the IOP reading.

**Visual Field Test**
The visual field test is carried out on a computerised Visual Field Analyser. This device maps out your peripheral or all round vision. A visual field technician or ophthalmic nurse will carry out the visual field test. Each eye is tested separately and the other eye is covered with a pad. You place your chin on a rest and look at the yellow light at the centre of the illuminated bowl. You are given a hand held buzzer and when you notice a short flash of light in different parts of the field of vision you press the buzzer to show that you have seen it. The idea is not to move your eye from the central point and not to be concerned if you think that you have seen a flash but are not sure, as the brightness of these varies all the time. The test can take up to ten minutes per eye. The machine will make some noise during the test, but this should be ignored. A normal visual field test will show a blind spot but the rest of the area should be clear. An abnormal visual field test will show some loss of the normal field of vision. (see Fig.3)
Fig. 3. Showing normal visual field with blind spot and visual field with additional abnormal inferior arc defect.

It is essential to advise the DVLA if both eyes have a defect of the field of vision. It is illegal not to do so. Also, if there is a visual field defect in one eye or both eyes you must inform your car insurer, as your insurance may be invalid if you do not.

**HRT/OCT/GDx Laser Scanning Image**
A laser scanning image will be helpful to assess the optic nerve as it enters the eye. It can accurately measure the shape of the optic nerve head or disc and the degree of central depression in the nerve head, or cupping (see fig.2). It also measures the thickness of the nerve fibres around the disc area on the retinal surface (see fig.4). These tests help us to decide whether someone is suspicious of glaucoma, even if their visual field is still normal, and these devices are also very useful at letting us know if there has been any change in the condition of the optic nerve between visits.
TYPES OF GLAUCOMA

PRIMARY AND SECONDARY CHRONIC OPEN ANGLE GLAUCOMA (COAG)
Primary and secondary chronic open angle glaucoma (COAG) make up 80% of all glaucomas. Refer to Fig.1 and Fig.6.

Primary Normal Tension Glaucoma (NTG)
Primary normal tension glaucoma (NTG) makes up to 40% of cases. Patients in this group have pressures that are within normal limits, yet still have disc and visual field abnormalities. They are more likely to have problems with migraine and Raynaud’s phenomenon where the fingers go cold and white. The problem is thought to arise from the fine circulation in the optic nerve being abnormal.

Primary High Tension Glaucoma (HTG)
These are patients with glaucoma and raised pressure who are thought to have a resistance to the outflow of aqueous fluid from the eye even though the angle is open. It is thought there may be an abnormality in the trabecular meshwork.

Secondary High Tension Glaucoma (HTG)

Pigmentary Glaucoma
These patients have similar findings to the primary HTG but we find association with pigmentation which has fallen out of the iris and has become trapped in the trabecular meshwork layer and is thought to increase resistance. These patients often have some pigmentation on the inner surface of their cornea and are myopic (short-sighted).

Pseudoexfoliation
This is another condition associated with blockage of the trabecular outflow and it is also possible to see some fluffy deposits on the surface of the lens in the eye and at the edge of the pupil. Such patients tend to be of Scandinavian or Irish descent.

The primary and secondary HTG groups comprise about 40% of all glaucoma cases.

Fig.4: Showing HRT scan of normal (above) and abnormal (below).
Chronic Angle Closure Glaucoma

These patients have raised pressure and sticking of the iris to the inner cornea. These patients have a small eye, are long-sighted, older, and mostly female. Such patients have a smaller anterior chamber or front chamber of the eye (see fig. 1). With age the lens in the eye grows and causes the anterior chamber to become even more shallow. This physically pushes the iris towards the cornea and can result in some sticking, to close the drainage channel from the eye.

Other patients have an abnormality of the shape of the iris, called plateau iris, where the iris is angled forwards despite a deep anterior chamber.

This group is bigger in certain ethnic groups, particularly Asian and Eskimo, they comprise about 10% of all glaucomas seen in this country. They can go on to develop acute glaucoma.

Acute Glaucomas
This is dealt with in another leaflet and also makes up about 10% of the total.

GLAUCOMA RELATED DIAGNOSES

Ocular Hypertension (OH)
There is a large group of patients with raised pressures, but no damage to the optic nerve or visual field. These patients are said to have ocular hypertension, taking the pressure in conjunction with the corneal thickness measurement allows us to decide whether treatment is recommended.

Glaucoma Suspect With or Without Raised Intra-Ocular Pressure
There is a group of patients whose optic disc is not normal in appearance, or certainly suspicious, even though the visual field test remains normal. Such patients may be monitored. If the pressure is also elevated are likely to receive treatment.
TREATMENT OF GLAUCOMA

Anti-Glaucoma Eye Drops
These drops are designed to reduce the pressure inside the eyeball and work in various ways. Initial treatment is usually a prostaglandin drop. This would be used once a day. Some people experience side effects, such as some redness of the eye and some grittiness. However, using the drop in the evening should get round this and most people tolerate it well. There are also combination drops and the combination of a prostaglandin drop with a beta blocker drop can be very effective. Beta blockers have a side effect of making asthma symptoms worse and should be used with care. There are also other drops known as carbonic anhydrase inhibitors, which reduce the formation of aqueous in the ciliary body. These can be added to one of the above drops.

There are many combinations and other types of drops used in glaucoma but really it is better not to try too many of these and not to use more than two types of drops together.

Laser Treatments
There are many sorts of laser treatment used in glaucoma. There are different types of laser treatment applied in the angle to the trabecular meshwork to help to improve drainage of fluid in open angle glaucoma.

There are treatments mainly useful for chronic angle closure consisting of treatments to the surface of the iris to change its shape and laser to make a small hole right through the iris to allow fluid to drain through the iris instead of through the pupil. This allows the iris to flop backwards and tends to open the angle.

There is a further treatment applied through the white of the eye or sclera. This is aimed at the ciliary body, which produces aqueous and would therefore reduce aqueous production. This treatment would be reserved for severe cases, which are not really suitable for surgical treatment.
SUMMARY OF GLAUCOMA CARE

Monitoring Glaucoma Patients
Patients are monitored to make sure that the pressures remain controlled and that the visual field tests have not progressed too badly. Monitoring helps us to adjust the treatment as time goes on, depending on the pressure and the visual field test changes.

Prognosis
Most people with a diagnosis of glaucoma will not be troubled by their relatively mild visual loss. However, a small percentage will progress and will be difficult to control and a very small percentage will end up not being able to drive and even being seriously incapacitated.

Patient Advice
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