Royal Berkshire
NHS Foundation Trust

Glaucoma drainage device (tube) surgery

This leaflet provides information about glaucoma drainage device surgery (also called glaucoma tube surgery) recommended by your ophthalmologist (eye doctor). Please read it carefully, since it contains important and useful information for you. If, after reading this, you have any questions, please ask a nurse or eye doctor.

What is glaucoma?

Glaucoma is an eye condition where the nerve at the back of the eye (the optic nerve) is damaged, which can lead to loss of vision.

There are many factors which affect the optic nerve in glaucoma, including the pressure in the eye (the intraocular pressure).

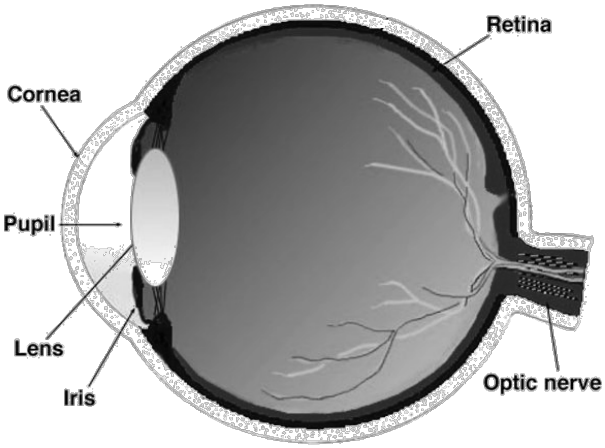


Diagram of the eye

Evidence shows that by lowering your intraocular pressure, we can stabilise and slow down glaucoma damage to the nerve – regardless of the level of intraocular pressure to begin with.

If your intraocular pressure is not controlled effectively enough, there can be further damage to the optic nerve leading to irreversible loss of vision.

What are glaucoma drainage devices?

Glaucoma drainage devices, also known as tube implants, are used to lower the intraocular pressure. The device consists of a slender silicone tube attached to a collection plate (see image on the next page).

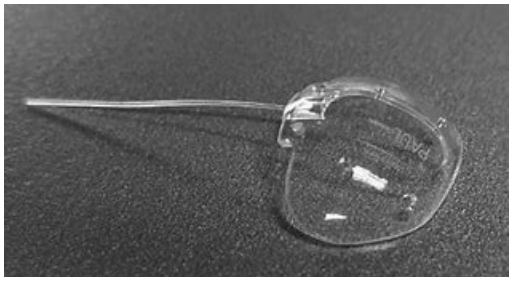
The tube is surgically implanted into the front section of the eye. The attached plate is secured onto the white of the eye (sclera) and is

covered completely by the outer skin of the eye (conjunctiva). It is positioned behind the upper eyelid, leaving it well hidden from view.

The tube allows excess fluid (aqueous humour) inside the eye to drain out in a controlled way; the fluid forms a reservoir over the collection plate, which is then absorbed by the surface blood vessels of the eye.

Our department most commonly uses the PAUL® glaucoma implant, though other types may be offered, such as the Baerveldt glaucoma implant and the Ahmed glaucoma valve.

PAUL® glaucoma implant



Actual size 23mm in width and 44.9mm in length (plate and tube)

During surgery, the implant is partially blocked with a stitch threaded through the inside of the tube (occluding suture). This reduces the risk of the eye pressure becoming too low in the initial post-operative period as the eye heals. This occluding suture can be removed after 3 months (or sometimes sooner). Suture removal is either done in clinic or performed as a small procedure in the operating theatre.

If your eye pressure is initially high after surgery, it does not mean that the surgery has not worked – with time, and once the occluding suture is removed, the drainage device will eventually lower eye pressure to the desired level. During this period, you may temporarily need pressure lowering eye drops, which is not unusual and will not affect outcomes.

Why do I need glaucoma drainage device surgery?

Glaucoma can damage eyesight. If you lose part of your eyesight because of glaucoma, we cannot bring it back. Our only effective treatment (based on evidence) to stabilise and slow down this glaucoma damage, is lowering your intraocular pressure.

Lowering your intraocular pressure can usually be achieved with medications and/or laser treatment and this can often effectively stabilise glaucoma. However, over time, it is not uncommon for

glaucoma to progress and no longer be stable. In this situation surgical procedures may be needed to prevent further loss of vision.

The most appropriate surgical procedure offered to each individual will depend on multiple factors and considered on a case-by-case basis by the ophthalmologist. Generally, those offered glaucoma drainage device surgery may have uncontrolled pressure in the eye, previous surgeries which no longer sufficiently control glaucoma, or have a particular type of glaucoma (such as those secondary to other eye conditions) which makes this surgery more appropriate than others.

This operation effectively reduces high pressures in the eye, aiming to preserve your current level of vision. It is important to note that it cannot restore vision that has already been lost.

Are there any alternatives treatments?

Treatment aims to lower eye pressure to prevent or delay further damage. Alternative treatments to glaucoma drainage device surgery include eye drops or tablets, which you may have already tried, laser treatment (cyclodiode and selective laser trabeculoplasty) and other glaucoma surgeries (iStent implantation, Hydrus implantation, Preserflo microshunt, and trabeculectomy).

These alternatives each have their risks and varying success in lowering eye pressure. Each alternative may or may not be a valid option for your particular situation. The pressure to ‘aim for’ varies from case to case and your eye doctor will discuss this with you.

Does glaucoma drainage device surgery work?

Successful drainage device implants continue to function over long periods of time. Studies show that at an average of 1-2 years after surgery about 70-80% (up to 4 out of 5) patients have their eye pressure adequately controlled. A successful procedure may eliminate the need for eye drops; however, patients may still require the need for some medication to maintain control of their eye pressure.

Your glaucoma will be regularly monitored following this procedure and if the drainage device implants stop functioning, you would be re-assessed and both medical (i.e. drops) and surgical treatment options would be considered.

It is important to recognise that your vision will not improve – this operation only aims to lower the pressure inside your eye to prolong any useful vision you may currently have. Often, your vision may be temporarily worse as the pressure inside your eye stabilises.

What are the risks?

All operations can have complications. In most cases the complications can be treated and in a small proportion of cases, further surgery may be needed. Very rarely, some complications can result in loss of vision.

- **Vision:** your sight may take several weeks to return to normal.
- **High or low eye pressure:** after surgery your eye pressure might change temporarily, which is common, and does not usually lead to any great problems. If the pressure is too high, then further eye drops may be needed. If the eye pressure becomes too low, this can worsen vision and may uncommonly cause bleeding inside the eye (see below regarding bleeding risk). Low eye pressure is usually detected during clinic appointments and may require changes to medications or further procedures. Rarely, additional surgery may be required to reduce the drainage from the tube.
- **Corneal changes:** there is a small chance that the tube may affect the inside of your cornea, causing it to be cloudy. This may result in further surgery to reposition the tube. Rarely, if significant corneal damage has occurred, corneal transplant surgery may be required.
- **Cataract:** there is a reasonable chance that a cataract may develop some years following surgery (if it has not already been removed). This may require an operation.
- **Double vision (diplopia):** there is a small chance that double vision can occur after surgery, requiring further surgery.

- **Irritation**: you may have grittiness or discomfort in your eye that may persist.
- **Eyelid droop:** there is a risk that the eyelid may become droopy on the side of surgery.
- **Tube blockage:** there is a small chance that the tube will become blocked requiring further surgery to unblock it.
- **Tube erosion:** there is a small chance that the tube can become exposed or erode (wear away) the outer skin of the eye (conjunctiva). If this happens, further surgery will be needed to repair the defect.
- **Bleeding:** redness of the eye immediately following surgery is to be expected and settles with time. There is a small chance of bleeding insider the eye, usually associated with low eye pressure (suprachoroidal haemorrhage). **If you experience sudden severe pain and decreased vision, you should seek immediate medical help.** Bleeding inside the eye may require further treatment and may ultimately result in loss in sight.
- **Infection:** there is a rare risk of infection inside the eye after surgery (endophthalmitis). If this occurs, it may need further treatment and may ultimately result in loss of sight. **If your eye becomes painful or red or the vision becomes blurred, you should seek immediate medical help.**

Pre-operative Assessment Clinic

You will need to attend a pre-operative assessment clinic a few weeks before the operation. You will see a specially trained ophthalmic nurse and, if necessary, a doctor too.

The aim of the pre-operative assessment is to ensure that all the investigations or tests are done before your hospital admission and to ensure we have all the information about your eye and general health, including medications, and any possible allergies you may have.

You can drive as normal after this appointment.

The day of the operation

On arrival on the ward, you will be given some instructions by the nurse. You will not need to undress but you should wear comfortable loose clothing and flat non-slip shoes. The surgeon will mark the correct side for surgery with a pen mark on your forehead and ask you to sign the consent form, having answered any further questions you may have.

The operation

When it is your turn to have the operation, a nurse will take you into the anaesthetic room, where you will have your anaesthetic before being moved into the operating room.

The operation is usually done under general anaesthetic (with you asleep). However, it may sometimes be performed with you awake, with or without sedation, and always with a local anaesthetic (numbing injection given around the eye) to prevent pain. In this situation, you may be aware of the surgeon working around the eye, but you should not feel any pain.

If you are having a local anaesthetic, you will be aware of a sterile, lightweight drape tented over your face, ensuring you can breathe freely. We will place a small spring-clip to keep your eyelids apart. All you have to do is lie still.

Your surgeon will discuss with you beforehand what type of anaesthesia is most suitable for you.

The glaucoma drainage device surgery normally takes around 120 minutes.

At the end of the operation a pad or shield may be put over your eye to protect it.

What special medications or materials are used during the operation?

During the operation, we apply anti-scarring medications called Mitomycin C and Bevacizumab. The use of these medications reduces the chances of failure from excessive scarring.

As described above, the glaucoma drainage device is covered by the outer skin of the eye (conjunctiva). A patch of donor tissue is used to reinforce this protection of the device and reduces the chance of exposure of the tube and infection leading to loss of vision.

The patch of donor tissue used is usually Tutoplast treated and sterilised pericardium tissue (from the outer layers around a donor heart). **Donor tissues are tested and treated extensively to rule out infectious diseases such as HIV, Hepatitis B and C and syphilis.** It is currently not possible to test for Creutzfeldt-Jakob Disease (CJD), otherwise known as ‘mad cow disease’. However, the risk of transmission of this disease appears to be extremely low.

Feel free to discuss any concerns about using donor tissue with your surgeon or nurse at your pre-op assessment appointment.

Please note, after receiving donor tissue, you will currently no longer be able to donate blood in the United Kingdom.

What to expect afterwards

If you have any discomfort, we suggest you take painkillers such as Paracetamol every 4-6 hours (not Aspirin as this can make any bleeding worse). Discomfort can be expected for up to 10 days after surgery but this should gradually improve day by day.

It is normal to feel itching, sticky eyelids, and mild discomfort after surgery. You will be given eye drops to reduce inflammation and to protect against infection. The hospital staff will explain how and when to use them.

Please do not rub your eye. Please do not perform any activities which involve bending over, straining, or heavy lifting.

You will be seen frequently by the eye team for a number of weeks after the surgery. Your nurse or doctor will tell you when your next follow up appointment will be.

What should I do if I have problems after surgery?

If you have got a minor eye problem, please seek advice from your GP, optician or pharmacist. If you think you problem might be urgent, please attend Eye Casualty or call 111.

Eye Casualty (Reading):	Mon-Fri 8.00am to 5pm; Sat & Sun & bank holidays 9am-12.30pm; Closed Christmas Day and New Year's Day.
Eye Casualty: Prince Charles Eye Unit (Windsor):	Mon-Fri 8.00am to 5pm; Sat 8.30am-12.30pm; Closed Sun & bank holidays.
Dorrell Ward (Reading):	0118 322 7172 (24 hours a day)
Eye Day Unit (Reading):	0118 322 7123 (Mon-Fri 7am to 6pm)

Further information

- NHS Website www.nhs.uk
- Glaucoma UK https://glaucoma.uk/about-glaucoma/treatments-surgery/aqueous-shunt-implantation/

To find out more about our Trust visit www.royalberkshire.nhs.uk

Please ask if you need this information in another language or format.

RBFT Ophthalmology, March 2026
Next review due: March 2028