

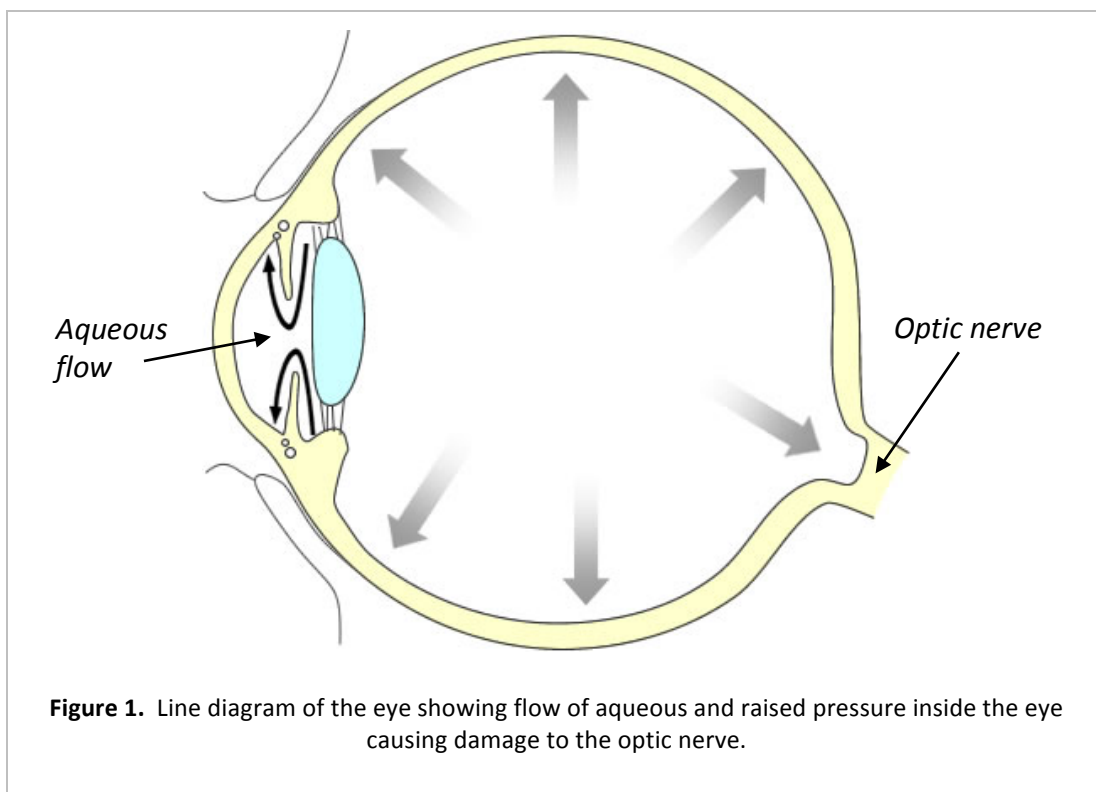
Glaucoma Drainage Tube Implant Surgery

Patient Information Leaflet

You have been given this leaflet because your eye doctor has recommended that you consider an operation in which a tube device is implanted to control your Glaucoma. This leaflet provides information about your condition and the operation. If you have any questions about the information in this leaflet, ask your eye doctor.

What is Glaucoma?

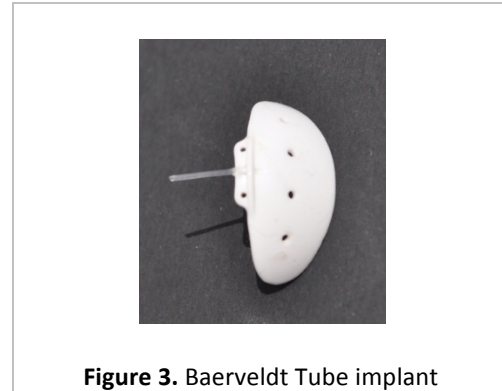
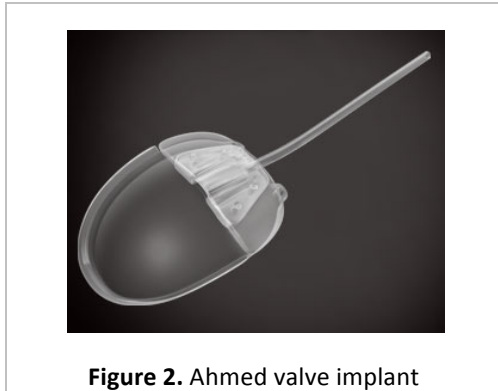
Glaucoma is a condition which causes damage to the nerve behind the eye (the optic nerve) that carries visual signals to the brain and if left untreated can lead to severe visual loss or even blindness. This damage is caused by the pressure inside the eye (intraocular pressure). This pressure is caused by the buildup of fluid (the aqueous) inside the eye. Aqueous builds up due to blockade of draining channels or occasionally due to a narrow door (angle of the eye) from where the fluid leaves the inside of the eye (Figure 1). Glaucoma is a common condition affecting around 60-70million people worldwide and around half a million people in England. It is also the second leading cause of blindness in the world.



What is a glaucoma drainage device?

A glaucoma drainage device also called as an aqueous shunt, or drainage tube implant, is a small plastic device that is implanted to reduce the pressure in the eye. There are several different types of glaucoma drainage devices; all have a similar basic structure comprised of two parts, a tube and a plate. The tube (less than 1mm in diameter) is made up of silicone and inserts into the front chamber of the eye through a small hole and drains aqueous fluid to the plate that acts like a reservoir for this fluid. The plate is attached to the eye ball and is covered by the conjunctiva (skin of the eyeball) so it is not visible. The drained aqueous is safely absorbed from the plate back into the blood through blood vessels in the conjunctiva.

The two most commonly used devices are the Ahmed valve and the Baerveldt tube implant. (Figures 2 &3)



Why do I need this operation? (Indication and Benefits)

There is currently no cure for glaucoma, treatment focuses on reducing the pressure inside the eye to slow down the damage to the optic nerve and preserve vision. Uncontrolled Glaucoma can lead to blindness, it is in fact one of the leading causes of preventable blindness worldwide.

Medications (usually eye drops) can be used to control the pressure inside the eye however these can become ineffective over time. In some patients eye drops are completely unsuitable or not enough. Laser procedures are also used to treat certain types of glaucoma however these are not suitable for all patients and their effect can also wear off with time. National Institute of Clinical Excellence (NICE) guidelines on glaucoma recommend use of up to two eye drops to control the eye pressure and then to consider drainage surgery if the pressure is not adequately controlled.

There are different surgical procedures which can be carried out to drain aqueous humor from the eye to reduce the excess pressure inside. The most common surgery is called 'Trabeculectomy' where a separate channel is created within the eye to drain the fluid. Another such surgical option is to implant a glaucoma drainage device. A glaucoma drainage device implantation is usually only performed after medications, laser procedures and other surgical procedures (e.g. trabeculectomy) have failed or are deemed unsuitable. In certain types of glaucoma a glaucoma drainage device is considered as the first surgical procedure due to high risk of failure of other procedures.

A glaucoma drainage device implant works by providing an artificial channel for aqueous humor to drain from the eye. A successful glaucoma drainage device implant can stop or reduce dependence on further eye drops for glaucoma. The aim of the surgery is to lower the intraocular pressure to slow the damage to the optic nerve and preserve the remaining vision. **Any vision already lost due to glaucoma cannot be restored.**

What are the Risks?

As with any surgical procedure there are potential complications which can occur during or after the operation. Approximately 5-10% patients need further surgery within a short period for high or low pressure or for exposure or tube position related problems.

Bleeding in the eye

Bleeding inside the back of the eye (called suprachoroidal haemorrhage) is uncommon but if severe it can lead to complete loss of sight and/or eye. This is different from bleeding under the white of the eye (called subconjunctival haemorrhage) which is present in almost all cases and settles over a few weeks. Occasionally bleeding occurs inside the front of the eye (called hyphema) and this settles over days to a few weeks as well.

Infection of the eye

An infection can affect part of the eye or the entire eye. Serious infections can also cause loss of vision or blindness. This can happen immediately or many years after surgery but is uncommon and in most cases, especially if caught early, can be effectively treated by antibiotics given as drops, tablets and as an injection inside the eye.

Double Vision

During the operation the plate is placed under the muscles and there is a small risk that double vision occurs due to scarring or damage to the muscles. Permanent double vision is rare as double vision generally settles with time. If it does not then corrective glasses or further surgery can be done to correct it.

Damage to the lens

The small protruding tube portion of the implant will sit in the front of the eye; during the operation this may cause damage to other structures like the lens of the eye. Your eye surgeon will take care to position it carefully. If there is constant touch to the lens then the tube can be repositioned to correct it.

Movement of the implanted plate

In rare cases the sutures which hold the implant in place may break or become loose causing it to move. This can cause, tube retraction out of the eye, wound leakage and tube failure.

High pressure inside the eye

Early or late increase of pressure inside the eye can occur. In the initial period high pressure is expected as stitches are used to obstruct the tube to reduce the risk of pressure dropping too low soon after surgery before the eye has had a chance to produce the desired healing. Tube can also become obstructed with proteins and blood from the eye. This usually settles on its own. Occasionally an adjustment or further surgery is required. Medications are usually required to lower the pressure in the initial stages and sometimes later on as well.

Low pressure inside the eye

Although steps are taken to reduce this risk, eye pressure can drop too low after the operation. This often corrects as the healing process occurs. Occasionally a jelly is injected in the clinic in the front of the eye to bring the pressure up. Persistently very low eye pressure can increase the risk of bleeding inside the eye and causing reduced vision and therefore it sometimes requires adjustment of the implant to increase the pressure.

Irritation or discomfort

Patients feel irritation in the eye after the operation that usually settles down with time over the weeks as the healing occurs and drops are used after the operation. If the eye is painful immediately after the operation then simple painkillers can help.

Droopy eyelid

The upper eyelid is swollen after surgery to a variable degree and resolves over weeks. The eyelid tends to be droopy afterwards, this largely resolves over weeks and sometimes months. Rarely the droopy eyelid persists and may need referral to an eyelid surgeon to correct it.

Decreased vision or Loss of vision

It is common for the vision to be slightly blurred after the operation but this settles down with time and fine focusing is again achieved once the glasses are adjusted. Patients with very advanced glaucoma can rarely get loss of vision (called wipeout) after the procedure due to early high pressure or for other reasons not fully understood. As well as bleeding and infection, swelling or detachment of the retina can also lead to decrease or loss of vision if left untreated.

Changes in glasses prescription

It is common for the eye focus to change after the glaucoma drainage device implant surgery. Patients wearing glasses may require a change to their prescription. In some cases patients previously not wearing glasses may require glasses for fine focusing. It is advisable to wait 2-3 months after the operation before your eyesight is tested by the optician and the glasses prescription adjusted, as needed.

Cataract

There can be an increased risk of developing or worsening of age related cataract after glaucoma drainage device implant surgery. However this can be treated by an operation to remove the lens and replace it with an artificial lens.

Damage to the cornea

There is small risk that the tube portion of the implant rubs against the inner lining to the cornea. This can cause damage to the cells and result in cornea losing its clarity. This complication would require further surgery to adjust the position of the tube. In extreme cases if the cornea loses its clarity a corneal transplant may be necessary.

Exposure of the tube/plate

The plate is secured on the sclera and covered with the conjunctiva while the tube is covered with a patch graft and the conjunctiva. In spite of this occasionally the plate or the tube or both become exposed. A further surgery to cover them again or even removal of the implant may become necessary in some cases. In such cases an implant in a different position or even other means of controlling pressure may become

necessary.

How successful is this procedure?

Patients who undergo drainage Tube surgery often have resistant or complicated glaucoma and may have received multiple other treatments which may have been inadequate on their own. These factors can affect the subsequent success rates of any procedure to control the glaucoma.

Success rates for glaucoma drainage implant surgery vary according to the type of device used. In general studies into outcomes of glaucoma drainage device implant show the majority of cases are successful. On average 1-2 years after the operation 75-80% of patients achieve adequate intraocular pressure control, approximately 25-30% still require glaucoma medication to achieve adequate pressure control and 5-10% require further surgery. In majority of cases pressure can be controlled with/without drops over 5 years or more. Longer term success i.e. over 10-15 years is not well studied however available literature suggests that implants that function over 5 years continue to do so over longer periods of time.

Like any other glaucoma operation the tube can fail as well. Occasionally this occurs early in the course of the disease. In cases of early or late failure further medications, laser or surgery is required to control the pressure.

Before the operation

The operation will be carried out in the eye theatres, confirmation of the date and time will be provided to you in a letter. If you are unable to attend the appointment please inform the eye department at the earliest possible opportunity. You must continue to use your medications for your glaucoma as prescribed up to the operation. Ensure that you have an up to date list of all medications and allergies and bring this with you on the day of the operation. The operation is usually done as a day case and you will need to organize for someone to bring you and take you home after the surgery.

Most cases are done as a day case under local anaesthetic. If you are due to have the operation under general anaesthetic or sedation additional information will be provided regarding fasting prior to the operation. Sometimes it becomes necessary to stay overnight after the general anaesthetic or sedation to fully recover from the anaesthetic therefore it is preferable to bring your usual medications, personal effects and a change in clothing. Patients undergoing general anaesthetic may also require additional investigations (e.g. blood tests, chest x-ray) this will be discussed with you by the nurse at the pre operative assessment.

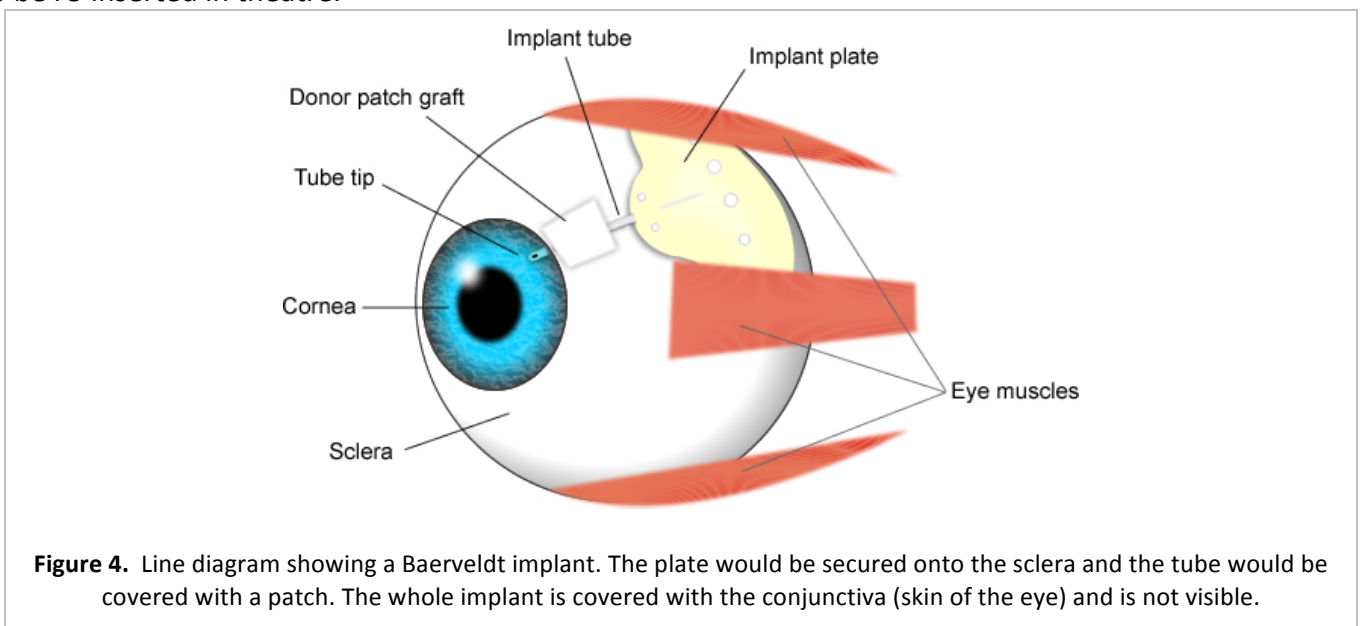
The operation

The glaucoma drainage device is usually inserted under a local anaesthetic injection given around the eyeball however in some cases a general anesthetic is required. Your surgeon will discuss the options best suited to you.

The procedure takes 60-90 minutes in total. After your eye has been made numb a drape will be positioned over the eye and eyelid retractors will be positioned to keep the eye open. A cut will be made into the conjunctiva (thin membrane layer that lies above the white of the eye). The implant is then placed under the conjunctiva and stitched on to the sclera (the white part of the eye).

A small needle puncture hole will be made in the sclera at the edge of the cornea (the clear window at the front of the eye) and the tube portion of the implant will be inserted through this hole into the front portion of the eye (anterior chamber). Once the implant is in place the tube portion is covered with a patch of processed pericardium (called Tutoplast) that is commercially available or by a donor sclera (tough white portion of the eye) or donor cornea (clear window of the eye).

If an implant without a valve is used (e.g. Baerveldt implant) the tube is initially blocked with a large suture threaded through the lumen of the tube (called a stent). It can also be tied off with an additional stitch (called a ligature) to prevent the pressure in the eye becoming too low. The ligature can be removed/Lasered in the eye clinic a few weeks after surgery depending on the eye pressure. The stent suture is left in place for several weeks to months and then subsequently removed in clinic or in theatre to reduce the pressure. This stitch is removed once the tissue around the plate has healed and a space for the aqueous to drain into in a controlled manner has formed, this space is called a 'bleb'. The timing of this suture removal depends on several factors including the type and stage of glaucoma, age of patient, level of pressure and the need for glaucoma medications. Occasionally after removal of this suture the pressure drops too low and if it does not build up in spite of stopping glaucoma drops and waiting then it may have to be re-inserted in theatre.



Anti-scarring drugs (anti-metabolites)

As the eye heals after the operation scar tissue will form around the plate portion of the implant, the scar tissue can occasionally hinder the aqueous drainage too much resulting in failure of the operation. If your surgeon thinks you are at high risk of excess scarring then anti-metabolite medication (called MMC or Mitomycin C) that prevents scar tissue formation may be applied to the eye during the operation.

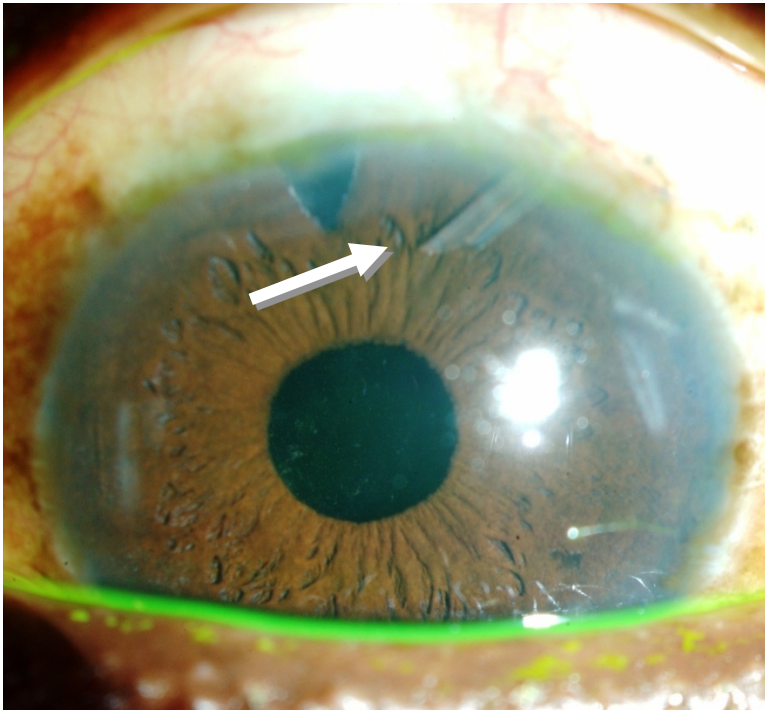


Photo 3. View of the anterior chamber of the eye showing the tube at the 1 o'clock position

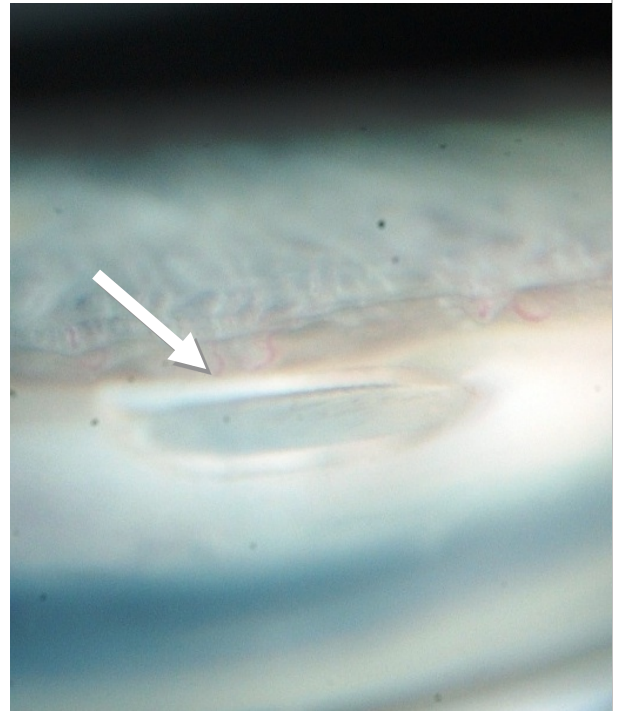


Photo 2. The angle of the eye showing the drainage tube tip inside the eye

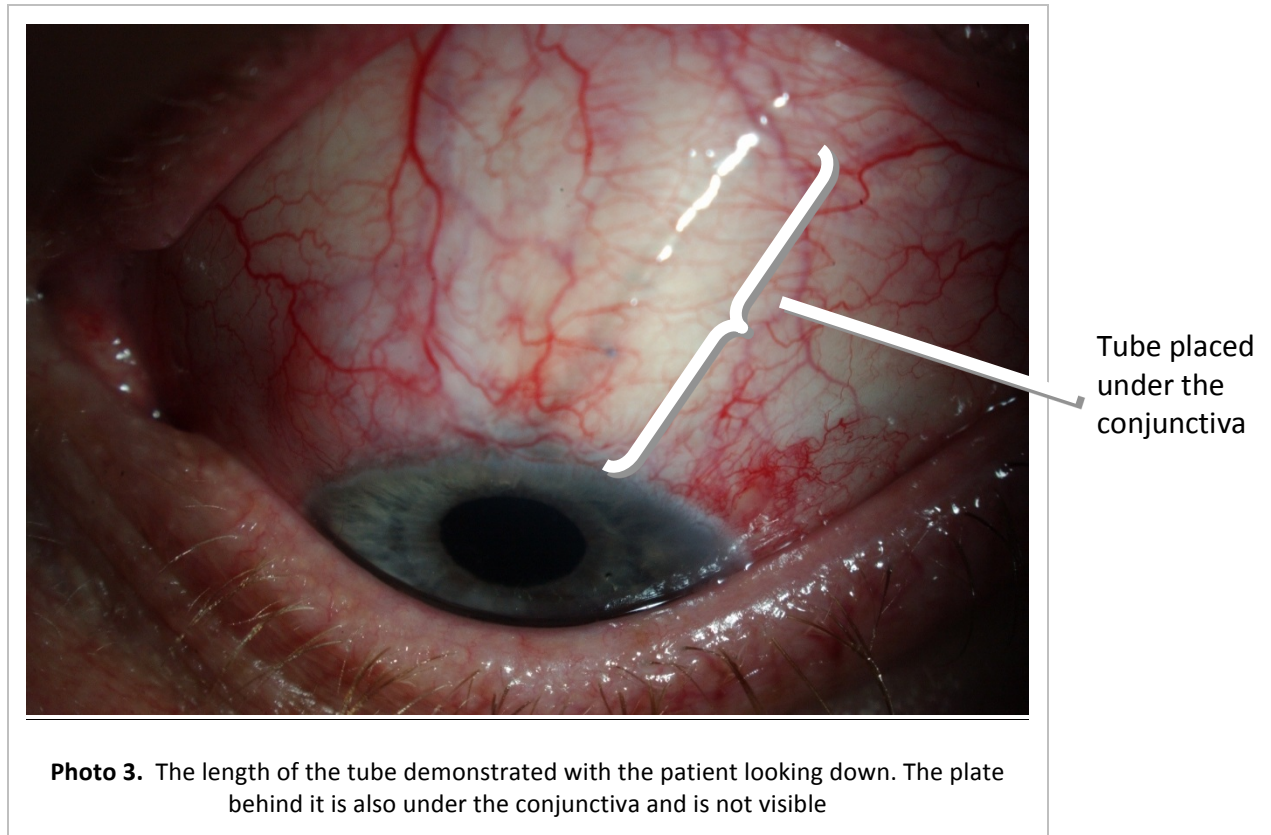
After the operation (Post operative care)

After the operation your eye will be covered with a patch to protect it. You will spend a few hours recovering (depending on the type of anaesthetic given) and you will normally be discharged home the same day. You will be seen in the eye clinic in the outpatients department (Level 2, B Block) usually the next day after the operation when the patch will be removed and your eye examined.

After the patch has been removed you will be given **two new eye drops to use only in the operated eye**. One is an antibiotic called chloramphenicol (to prevent infection). This is to be used 4 times per day for one month. The other drop is a steroid called dexamethasone (to prevent scarring and reduce the inflammation). This is to be used every 2 hourly during the day for the first 1-2 weeks then 4 times a day for a month and then reduced gradually over the next 3 months after the operation. Your surgeon will tell you how frequently to use these during the clinic visits. If you run out of these drops in between the hospital visits then you need to get more from your GP.

A few or all of the eye drops to lower the eye pressure in the operated eye are usually required after the operation. If you are using eye drops for glaucoma in the other (un-operated) eye it is important to continue using them as before. If you were using tablets called diamox before the operation to control the eye pressure then these are also stopped after the surgery as they can reduce the eye pressure too low.

What we do after the operation is equally important to ensure the success and safety of this operation. The eye pressure may fluctuate quite markedly after the surgery and will need to be closely monitored over the coming weeks and months. Generally you will be seen the next day after the operation and then weekly for the first four weeks, then monthly for the next 3 months. As the eye settles the frequency of follow-up appointments will decrease. During your clinic visits your eye pressure will be monitored and eye drops adjusted, sutures Lasered/removed as needed.



How will I feel after the operation?

After the operation your eye will feel uncomfortable and your vision blurred, this is normal. It may take several weeks to months before all the swelling resolves and your eye becomes accustomed to the new implant. The plate portion of the implant will not be visible as it will be attached to the side of the eye ball away from view. A tiny portion of the tube tip portion may be visible on very close inspection through the cornea.

How will this operation affect my day to day life?

It is important to avoid strenuous activity whilst in the early post-operative phase. The exact timing for resuming normal activities will vary based on how well your eye is recovering and the level of pressure. Below is a guide to daily activities which will be affected by your surgery: -

Activity	
Showering / Hair washing	Ensure no water enters the eye in the first few weeks
Sleeping	Try to sleep on the unoperated side or on the back. Wear the plastic eye shield to avoid inadvertent rubbing for the first 1-2 weeks
Wearing glasses	No restrictions. Avoid buying new glasses for 2-3 months after surgery as your glasses prescription can change during this time as your eye heals.
Contact lenses	May not be able to wear initially but ask your doctor as depends on the type of contact lens.
Driving	You will be advised in clinic after eye examination as it depends on your vision and fields.
Housework	1 – 2 weeks but this depends upon your intra-ocular pressure
Wearing eye make up	1 month. Use new makeup.
Going away on holiday	Avoid during the first 2 month post operative period in order to keep regular follow up appointments
Gym	2-3 months, ask for advice in clinic
Playing sports	2-3 months, ask for advice in clinic

Time off work

The duration of time off work required depends on a number of factors such as the nature of your job, the state of the vision in the other eye, and the intraocular pressure in the operated eye. Most people need 2 – 3 weeks off before they can resume working. People working in physically demanding jobs or dusty environment may need longer time off work.

Contact Information

If you have any further question or would like to discuss the information in this leaflet with someone please contact:-

Mr. Saurabh Goyal

Consultant Ophthalmic Surgeon
St. Thomas' hospital,
Blackheath Hospital & London Medical.

For Private Patients-

Telephone: 01689 885072

Fax: 01689 885074

E-mail: info@eyesurgeonlondon.co.uk

For NHS patients-

Telephone: 020 7188 2289

E-mail: thomas.wright@gstt.nhs.uk

For emergencies: St. Thomas' Hospital has a weekday (8.00am-4.00pm) Eye Emergency Unit and out of hours Accident and Emergency.

Eye Emergency reception can be contacted on 020 7188 7188 and ask for eye casualty

Thank you for reading this information sheet and being better informed about your eye care!

**This leaflet was written by Dr. Ali Hassan, specialty trainee and
Mr. Saurabh Goyal, Consultant Ophthalmologist.**

Copyright- Mr. Saurabh Goyal, www.eyesurgeonlondon.co.uk

