

# **AQUEOUS SHUNT IMPLANTATION**

## **INFORMATION FOR PATIENTS**

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## 1. INTRODUCTION – WHAT ARE AQUEOUS SHUNTS AND WHAT DO THEY DO?

Aqueous shunts are devices that are used to reduce the eye pressure in glaucoma by draining the aqueous humour (natural fluid of the eye) from inside the eye to a small blister or *bleb* behind the eyelid.

Draining the aqueous humor, using a shunt, reduces the pressure on the optic nerve that causes loss of vision in glaucoma. The purpose of lowering the eye pressure is to prevent further loss of vision. Control of the eye pressure with an aqueous shunt will not restore vision already lost from glaucoma.

Aqueous shunts have various other names such as tube implants, glaucoma tube shunts, glaucoma drainage devices and glaucoma drainage implants. These all refer to the same thing. Although there are many types of shunts available, two main types are in use at Moorfields Eye Hospital Dubai and they function in a similar fashion. These are called the *Ahmed Glaucoma Valve* and *The Baerveldt Glaucoma Implant*. In certain eye conditions, a third type, known as the *Molteno Implant*, might also be used.



**Baerveldt 350 Implant**



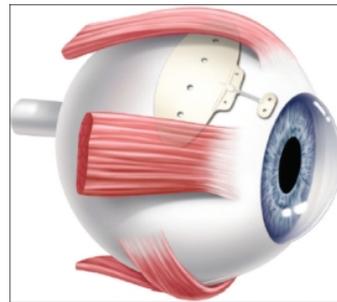
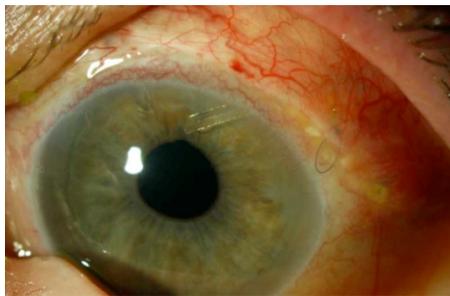
**Ahmed Glaucoma Valve**

These shunts are all made up of a small silicone tube (less than 1mm in diameter) that takes the aqueous humor from inside the eye to a plate just under the outer surface of the eye, between the sclera (eye wall) and conjunctiva (outer skin of the eye surface).

All shunts perform approximately the same function and your Glaucoma specialist will discuss the best one for you.

## 2. HOW WILL THE SHUNT AFFECT THE EXTERNAL APPEARANCE OF THE EYE?

### On the outside of the eye



Initially after surgery, the eye will be red and swollen to a variable degree. After most types of major eye surgery the eyelid may droop. This resolves slowly over a period of weeks to months. The aqueous shunt itself is not normally visible on the outside of the eye.

When the shunt is functioning normally, the drained fluid accumulates in a blister or *bleb* in the conjunctiva that is hidden by the eyelid. This fluid is slowly absorbed back into the blood vessels on the eye surface. The aqueous shunt and its bleb are positioned far back behind the eyelid so usually they cannot be seen. Likewise the bleb does not cause any sensation or feeling.

Occasionally, the shunt or bleb can be seen in extremes of gaze, where the eye is looking very far down and inwards.

Most shunts are implanted behind the upper eyelid. Occasionally other areas are used, such as below the lower eyelid.

A patch made of donor eye tissue, either from sclera (eye wall) or donor cornea (window at the front of the eye) is often used to keep the shunt in place (see 3. The surgery itself). This is the only part of the operation that might be visible after surgery.

### On the inside of the eye

The tube part of the shunt is placed inside the eye at the time of surgery. This is very small and cannot be seen with the naked eye.

## 3. THE SURGERY ITSELF

Successful aqueous shunt surgery takes longer than many other types of ophthalmic surgery, typically lasting one to two hours. At Moorfields Eye Hospital Dubai, aqueous shunt implantation is usually performed under general anaesthesia, although local anaesthesia is also possible under certain circumstances.

Typically a drug called Mitomycin C (anti-scarring medication) is also used at the time of surgery to suppress healing and a donor scleral or corneal patch graft is used to prevent the implant becoming exposed.

### **Donor cornea or scleral patch**

A patch made from cornea or sclera from an eye bank is often used to keep the aqueous shunt in place. In eyes where this is not used, the conjunctival surface of the eye over the shunt sometimes breaks down, so that the shunt has to be repaired. This happens in 10-14% of cases where the donor tissue is not used compared with approximately 3% in those in which it is used. The donor tissue used in Moorfields is obtained from The North Carolina Eye Bank in USA.

The donor tissues used in aqueous shunt surgery are not live transplants. They are simply used to reinforce the eye surface over the outside of the shunt. However, these tissues do come from donors and are therefore tested to ensure that they cannot transmit certain infectious diseases such as Syphilis, Hepatitis B and C and HIV (the AIDS virus).

There are absolutely no contraindication to any religious activities of Islam after having had this donor. Although one cannot donate blood after having this implant.

### **Complications at the time of surgery**

Complications occurring at the time of aqueous shunt surgery are rare. Complications when they do occur, tend to occur during the first 5-6 weeks after the surgery (see below under *Success rates and complications*).

## **4. AFTER SURGERY – POSTOPERATIVE CARE**

### **The day of surgery and the next day**

You will usually be discharged home from hospital later the same day after surgery. It is usually necessary for the operated eye to be examined again one day after surgery.

The eye is normally patched the first night after surgery and the patch removed the following day. If the un-operated eye does not see well, then the operated eye will not be patched. Instead, a clear shield will be placed on the operated eye so that you will still be able to see to get around after surgery.

### **What should I expect to feel during the postoperative period?**

It is normal for the vision to be blurred and the eye to be uncomfortable after surgery. The period of blurring is variable. The blurring is usually worst for the first 1 to 2 weeks after surgery, and improving slowly afterwards. It takes about 2 months for the eye to feel completely normal and the vision to stabilise.

Soreness in the eye after surgery is partly due to the surgery itself, and partly due to the sutures. Sutures are usually removed in the clinic during the first few weeks after surgery. After removal of sutures, the eye usually feels more comfortable.

## Eye Drops

Eye drops and tablets to lower the eye pressure are not normally required for the operated eye during the first night after surgery, unless the surgeon recommends that you continue to use them. It is important to continue any eye drops for the un-operated eye unless advised otherwise.

The following day, the postoperative eye drops are usually started after removal of the eye patch and cleaning of the eye. The postoperative eye drops will usually consist of an antibiotic (eg. *Chloramphenicol*) and anti-inflammatory steroid (eg. Predforte) eye drops to use for the first 2 months after surgery. You will be advised if any changes in these are required at each clinic visit.

To start with the steroid eye drop will be used intensively (every 2 hours or about 8 times daily) during the day and the antibiotic four times daily.

## Postoperative visits to clinic

As the intraocular pressure may be too high or too low in the first few weeks after shunt surgery, the patient is usually examined in clinic once weekly for approximately the first month, with visits reducing in frequency after that. If indeed the pressure is too high or too low, rest assured that your specialist will manage this appropriately. The Ahmed shunt works immediately and has a risk of immediate low pressure after surgery. The Baerveldt implant has a stitch blocking the tube and pressure reduction is controlled with drops initially until the tube opens between 6 – 8 weeks from surgery.

There is less manipulation involved than a trabeculectomy if you have had one before.

## Activity and Instructions of care after tube insertion

Following surgery you are able to read and watch television as normal as these activities will not harm your eye. It is however important to avoid strenuous activity during the first few weeks after surgery. The following table is a general guide to do's and don'ts.

IF ANYTHING DO NOT RUB/BUMP/PRESS THE EYE. IN DUSTY ENVIRONMENTS PLEASE WEAR EYE SHIELD OR YOUR OWN GLASSES. DO NOT STOP YOUR EYE DROPS UNLESS THE DOCTOR ADVISES. DO NOT USE ANY OTHER PRODUCTS IN THE EYE.

If in doubt please ask your doctor or nurse in clinic.

Activity	Advice
Hair Washing	No need to avoid but back wash advised to avoid getting shampoo into your eye. It may be easier to have someone else wash your hair for you.
Showering/Bathing/Wadhu	No need to avoid but don't allow soapy/dirty water to go into your eye
Sleeping	Try to sleep on your un-operated side. Tape the plastic eye shield provided over your eye every night for two weeks to avoid accidentally rubbing your eye whilst asleep.
Walking	No restrictions
Wearing glasses/sunglasses	Do not change the prescription of your glasses until the doctor advises. You may wear sunglasses for comfort and UV protection.
Driving	Your doctor shall advise you. If advised against driving and you continue to do so, this shall be at your own risk.
Flying	No restrictions
Going away on holiday	Discuss with your doctor/nurse as it is very important to attend your follow up appointments.
Wearing eye makeup	Avoid for one month then use new makeup. Never share eye make up with anyone else.
Household chores e.g. cleaning, ironing, hovering	Avoid for 1 – 2 weeks
Sexual Activity	Avoid for 1 – 2 weeks
Gym workout	Avoid for 3 months
Playing any sport	Avoid for 3 months
Running/jogging	Avoid for 3 months
Swimming	Avoid for 3 months, after which you must use goggles
Prayers (Salah)	You may continue prayers but do the rockoo/sajdah in a chair, your head must not go below your heart level.

### When can I go back to work?

The duration of time off work will depend on a number of factors such as the nature of your employment, the state of the vision in the other eye and the pressure in the operated eye.

Typically someone working in an office environment would require 2 weeks off if the postoperative course is smooth. Someone whose occupation involves heavy manual work or work in a dusty environment may require a month or more (e.g. builders, working in baren dessert).

## **When is the eye back to normal?**

It takes 2 to 3 months for the eye to feel completely normal in most cases, and sometimes longer in more complicated cases. At that point, the patient will usually have a refraction (spectacle) test as often the spectacle prescription will be slightly different than before surgery.

## **5. SUCCESS RATES AND COMPLICATIONS**

### **Success rates**

Most glaucoma surgical studies examine success rates over a 5 year period. With aqueous shunts such as the *Baerveldt*, the expected success rate over 5 years is now between 70 and 80%. Although a sizable proportion of patients achieve good pressure control without the need for continued glaucoma medication, many patients still require some medication to assist the shunt in controlling the pressure. In such circumstances, the medication required is usually less than that required before the surgery.

### **Complications**

As with any surgery, there is a potential for complication or problems to arise. Complications can occur during the surgery, shortly after the surgery or many months after surgery.

Severe complications are rare and may happen either if the eye pressure drops very low, or very quickly during the early postoperative period, or if the eye becomes infected.

#### *Bleeding*

The most serious problem that can occur is bleeding inside the eye. This can lead to loss of vision and even blindness but occurs in less than 1 in 1000 patients. There are measures taken to prevent this but this is not a predictable complication.

#### *Infection*

An infection inside the eye can be very serious and also cause loss of vision or blindness. This also happens in less than 1 in 1000 patients. Measures are taken and aseptic techniques used to prevent this complication.

#### *Pressure*

After the operation the eye pressure may be too high or too low. This may require additional treatment in the outpatient clinic or sometimes further surgery is required.

#### *Inflammation*

This can occur inside the eye and is usually treated with eyedrops.

#### *Droopy lid*

This can occur after the operation and some patients can be aware of the drainage bleb under the upper eyelid but this usually settles down with time.

#### *Astigmatism, Change in glasses & Cataract*

As your eye settles and heals and stitches removed you may need a change in glasses, to get your best vision. About 10% of patients notice that their vision is reduced by one line on the eye chart a year after the operation. This is often due to cataract formation which may be increased by trabeculectomy surgery but is easily manageable and treatable.

#### *Double vision*

This is very rare even with the bigger Baerveldt implant and usually the eye gets use to the implant over a few months.

#### *Extrusion of implant/tube*

This is very rare in its entirety and is further reduced by using a scleral/corneal patch graft as aforementioned. However some patients are more susceptible to this due to their healing response and the Glaucoma specialist will warn you about this.

#### **What if I don't have the operation?**

The advice that has been given to you by the Glaucoma specialist is based on the balance of risk and benefits and if an operation has been recommended then the benefits outweigh the above risks of surgery.

If the operation is not performed in a timely manner then there is potential for further irreversible visual loss due to high pressure/fluctuating pressure in the eye leading to blindness.

However the informed decision rests with the patient and your Glaucoma specialist will be available and very happy to discuss your concerns and expectations before proceeding with surgery.

#### **1. CONTACT DETAILS**

#### **2. DISCLAIMER**

#### **Accuracy**

While every step has been taken to compile accurate information and to keep it up to date, we cannot guarantee its correctness and completeness. The information provided in this information sheet is designed as an adjunct to, and not a substitute for professional healthcare advice, by a qualified doctor or other healthcare professional, which will be tailored to a patient's individual circumstances. Dr Sohaib Mustafa cannot take responsibility if you rely solely on the information in this information sheet.