Dr Geoffrey Ryan

Glaucoma tube/ Aqueous shunt

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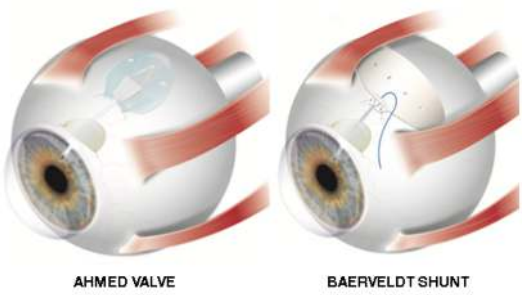
What is an aqueous shunt or tube?

An aqueous shunt or tube is a tiny device that is used to decrease the pressure inside the eye. It is indicated for cases of uncontrolled glaucoma. The device consists of a hollow tube which is connected to a plate made of silicone. The tube diverts excess aqueous humour (fluid inside the eye) to the plate. Over time scar tissue forms around the plate (reservoir for the fluid). This is positioned under the eyelid and is called a "bleb". Once the tube functions, it lowers intra-ocular pressure (IOP) by diverting fluid from the inside of the eye to under the conjunctiva.



Two types of glaucoma tubes and how they are positioned.

Are there any other alternatives?

If Dr Ryan has suggested a glaucoma tube device then it is unlikely that there is a suitable alternative. It is only reserved for serious cases of glaucoma which have often failed other treatments. If your current medication is deemed insufficient then you are at risk of permanent visual loss without intervention.

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Prior to surgery

Fasting instructions

Do not have anything to eat or drink for 6 hours prior to your operation. This ensures it is safe to give sedating medicine during your operation.

Medication

You should continue your regular medications before and on the day of surgery. Despite the instructions regarding fasting, you are still permitted to take your regular medication with a small sip of water. Please notify Dr Ryan of any blood thinning medication you are on. He can then instruct you regarding whether or not to continue this. Diabetic medication including tablets and insulin will need to be adjusted and you will be advised accordingly.

On the day of surgery

Your operation will take place at the South Bank Day Hospital located in South Brisbane (140 Melbourne St). It is expected that you will spend 3-4 hours at the hospital whilst the anaesthetist and nursing staff perform pre and post-operative safety checks. The operation may be performed under local anaesthetic and sedation (where the eye is numbed and you receive heavy sedation) or general anaesthetic (you will be asleep). There are a number of factors to consider when deciding which anaesthetic is suitable and Dr Ryan will discuss this with you prior.

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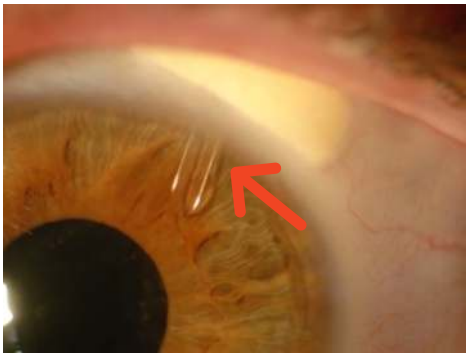
What happens during the operation?

The tube operation takes approximately one to two hours. Dr Ryan will insert a small silicon tube (less than 1 mm in diameter) into the front chamber of your eye. It is so small you need a microscope to see it. To stop the tube from moving around and becoming exposed through the conjunctiva, Dr Ryan will stitch a patch made from donor eye tissue onto the surface of your eye. The donor tissue comes from the Queensland Eye Bank after being tested for infections (the risk of infection is extremely low). If you have personal or religious beliefs that prohibit you from having donor tissue then please notify Dr Ryan prior to surgery.

During the operation a stitch is inserted inside the tube and around it, to stop fluid flowing through the device. This gives time for scar tissue to surround the plate and form a reservoir. The placement and subsequent removal of these stitches, allows for a controlled opening of the tube over a three month period.



Glaucoma tube sitting in the anterior chamber (red arrow).

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What happens after the operation?

All glaucoma procedures require close follow up and monitoring of eye pressure. You may require a review once a week for the first four weeks. If everything is stable, the length between reviews can then be increased. The stitches that control the flow of fluid through the tube will need to be removed after the operation. The stitches outside the tube can be removed in Dr Ryan's office (often with a quick application of laser). These are often removed in the first few weeks. The stitch that sits inside the tube can only be removed three months after the operation. Dr Ryan may take you back to theatre to remove this stitch.

A glaucoma tube operation requires patience, as obtaining a stable pressure can take between 3-6 months to achieve. Two scenarios that may occur following surgery are:

- **The pressure may be too low after the operation.**

If there is excessive fluid flowing through the tube then the pressure may drop too much. This can result in blurred vision due to swelling of the retina (back of the eye). Most cases can be monitored whilst we wait for the pressure to increase to a safe level. In some situations an injection is required of viscoelastic material (jelly-like material made for the eye) to increase the pressure. Serious cases require a trip back to the operating theatre to restrict the flow of fluid.

- **The pressure may be too high after the operation.**

As previously explained the tube does not function during the first few weeks after the operation. Therefore it is common to require glaucoma eyedrops and in some situations tablets to lower the pressure in the short-term. Long-term if the pressure does not decrease to a sufficient level, a surgical revision of the tube is required or a second tube can be placed into the eye.

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Caring for your eye after surgery

Which drops and how often do I use them after surgery?

Chloramphenicol 0.5% eye drop four times a day for two weeks.

Dexamethasone (Maxidex®) eye drops every two hours initially and this will reduce as per Dr Ryan's advice.

How do I protect my eye?

Avoid rubbing or touching your eye. This is extremely important in the first two weeks after the operation. An eyeshield is provided for you to wear for two weeks when sleeping (there is a risk of unintentionally rubbing your eye when asleep).

When can I exercise?

In the first week after surgery do not do any strenuous activities like running or lifting weights heavier than 5kg. A light walk around the neighbourhood is an acceptable form of exercise in the first week. You may then resume normal activities after this period of time. Eye protection should be worn if you feel there is a risk of inadvertent trauma to the eye.

When can I drive?

Most patients can drive 3-4 days following surgery. Your ability to drive will depend on your recovery and the vision in your other eye. Dr Ryan can advise you when it is safe to resume driving.

When can I swim?

Do not swim for two weeks after surgery.

When can I return to work?

Returning to work depends on your occupation and can be discussed with Dr Ryan (most patients can resume office duties 1-2 days following surgery).

What is your advice about cleaning around my eye?

You are advised to be careful when washing: do not directly splash water into your face in the shower or immerse your head in the bath for one week after surgery, but a clean face cloth can safely be used. It is also advised to avoid make-up around the eye for two weeks.

Should I continue my glaucoma drops in the operated eye?

It is advised to continue all glaucoma drops to the operated eye until Dr Ryan advises otherwise.

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Risks

Reduced vision

Complete vision loss is rare following tube insertion. A more common complication is a slight reduction in vision following surgery. This is often outweighed by the risk to your vision if the glaucoma continues to progress.

Eyelid drops lower (ptosis)

Your eyelid position might change after the operation and you may require another operation to correct this.

Infection/ Endophthalmitis

An infection inside the eye requires urgent injections of antibiotics.

Hypotony (low pressure)

If the pressure drops too low then this may lead to a choroidal haemorrhage (large bleed under the retina) or a choroidal detachment (swelling of the layer under the retina). This can significantly compromise the vision.

Conjunctival erosion

The tissue over the tube may break down over time exposing the device. This needs urgent intervention due to the risk of infection.

Cloudy cornea

If the tube comes in contact with the back surface of the cornea, it can cause swelling and clouding. Advanced cases may require a corneal graft.

Failure of the tube

The implanted device may not lower the pressure enough and further procedures may be required including a revision of the tube.

Double vision

The tube device is implanted next to the eye muscles which move the eye. Any effect on the muscles can result in double vision.

Infection from sclera

The tube is covered by donated tissue called sclera to prevent erosion through the conjunctiva. Transmission of an infectious disease from the tissue is extremely rare. This is made even lower through infectious screening by the Eye Bank.

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