

Common Questions about Tube Shunt Surgery

Tube shunt surgery is a common surgical approach to treating glaucoma. The procedure aims to reduce the eye pressure to help prevent further loss of vision from glaucoma.

What is tube shunt surgery?

Tube shunt surgery involves placing a small tube implant in the eye. This tube, less than 1mm in diameter, connects the front aqueous fluid chamber of the eye, where pressure usually builds up, to an area underneath the conjunctiva, or 'superficial layer' of the eye. Attached to this shunt is a plate which acts like a reservoir, allowing fluid to drain to a space above it.

One of the main advantages of the tube shunt is that it is more resilient to the healing process which can affect other types of glaucoma surgery such as trabeculectomy. The position of the tube and the reservoir tends to be underneath the eyelid, normally the upper eyelid, so it is not usually cosmetically apparent in most positions of eye gaze for somebody's who's had this operation.

Are there different types of tube shunts?

There are multiple versions of tube shunts available, each with slightly different characteristics. Each surgeon may have a preference for a different tube shunt depending on their particular experience and suitability for their local patient population.

Professor Anthony Khawaja's current preference is the PAUL Glaucoma Implant, one of the newer and most innovative tube shunts currently available. Its main advantages are that the diameter of the tube is substantially smaller compared to other tubes (enabling safer positioning within the eye) and that it is

usually possible to achieve a good pressure reduction even from day 1 following surgery (other implants such as the Baerveldt tube may take weeks or months to function fully).

Am I suitable for a tube shunt?

Tube shunt surgery is particularly valuable for patients who are at high risk of a strong healing response following surgery. Traditional glaucoma operations, which involve draining the aqueous fluid to underneath the conjunctiva, are susceptible to the body healing closing this space, so fluid can no longer flow and the operation therefore fails. This is a common reason for failure of trabeculectomy surgery. With the PAUL Glaucoma Implant, because the tube is attached to a plate which is resistant to conjunctiva sticking down, this ensures a space above the plate for fluid to drain to, even in people who heal strongly.

Typical types of patients this is suitable for include people who have had previous surgery affecting the conjunctiva. For example, those who've had previous glaucoma surgery, squint surgery or retinal surgery. Similarly, it's suitable if there is a strong possibility of further eye surgery in the future, e.g. corneal surgery or retinal surgery, as this further surgery can stimulate a healing response which can result in failure of other glaucoma surgeries, but is less likely to cause failure of tube shunt surgery due to the tube plate.

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Other suitable patients, even when they haven't had previous failed glaucoma surgery, may include people who have very inflamed eyes, for example uveitis disease, and also people from different ancestral backgrounds who are more likely to heal strongly e.g. on average people from African or Asian ancestries are more likely to scar strongly compared to people of European ancestry.

Are there any potential complications after a tube shunt?

Some of the risks of tube shunt surgery are similar to other glaucoma surgeries. The eye will likely be red and a bit sore afterwards and the vision can remain blurry until the eye settles over the period of weeks. The pressure may remain too high at first, and there is a risk that the pressure will rise again or will require adjustments to bring the pressure to a safe level. The pressure may also become too low, and this may require a further procedure to resolve.

Because the tube plate is placed underneath the muscles of the eye, sometimes this can affect eye movement and cause double vision; this usually settles and if it doesn't settle it can be addressed by other means. Because of where the tube shunt is placed within the eye, it can sometimes irritate the cornea, the clear front window of the eye, and make that swollen. Swelling can cause blurred vision and that might need surgical treatment. Because the modern PAUL Glaucoma Implant is substantially smaller than previous implants, it is possible to keep this tube further away from the cornea to reduce the risk of this cornea swelling.

If the thin tissue overlying the tube wears down and opens up (exposure/erosion of the tube), this can increase the risk of infection. However, this is usually prevented with the use of a patch graft (see next section).

Like other glaucoma surgeries, the surgery might cause a droopy eyelid which usually recovers and if it doesn't recover it can be rectified. Tube shunt surgery also carries a very low risk of a severe bleed at the back of the eye or an infection which can result in permanent loss of vision.

If you are using any blood thinning treatments you should inform your surgeon

a) the type of blood thinner you are using, and
b) the reason you need to use it.

You may be asked to stop this ahead of your surgery to reduce the risk of a severe bleed in the back of the eye, which can cause permanent loss of vision. However, this risk is relatively low and would need to be balanced against the risk to your general health with stopping the blood thinner.

What is the purpose of the patch graft?

A patch is required because the tube shunt needs to be placed underneath the thin superficial layer of the eye, the conjunctiva. The conjunctiva which overlies the tube shunt is thin and would be liable to breaking open and exposing the underlying tube which in turn could result in infection. To reduce the risk of an erosion, Professor Anthony Khawaja always places a patch graft on top of the tube shunt, underneath the conjunctiva. This patch graft is made up of donor tissue (a transplant). Sometimes, this can be the white of an eye of a donor of someone who's passed away or it can be made up from the lining of the heart from somebody who's passed away.

All patch grafts have been thoroughly tested for any infections and, to date, it has never been known that using one of these patch grafts has transmitted an infection. Regardless, because of the theoretical risk of infection, you will no longer be eligible to donate blood.

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What should I expect after tube shunt surgery?

With the PAUL Glaucoma Implant, the tube usually should start functioning straight away, so you can expect a lowering of your pressure from day one. This involves placing a stent suture within the tube and precisely adjusting this at the time of surgery to create the correct amount of flow through the tube. After surgery, you should be careful to not bend forwards or strain as this can result in a bleed at the back of the eye if the eye pressure is on the low side.

If the pressure remains at a good level it might be that the shunt suture doesn't need to be removed. If the pressure is higher than ideal, then it is usually safe to remove the stent suture after around 3 months following the original surgery. This is a quick procedure which some surgeons carry out in the clinic, but Professor Anthony Khawaja prefers to carry it out in a controlled manner in the operating theatre.

What activities should I avoid in the short term?

Bending, placing your head below your heart, or straining should be avoided as these can increase the risk of a severe bleed at the back of the eye. You should avoid getting water in the eye although washing carefully with your eyes closed is fine.

You should wear a shield over the eye at night time until your surgeon says it's safe to no longer do that.

Whether you can drive or not will depend on the status of your other eye and other individual factors which you should discuss with your surgeon.

In the longer term in general it's safest to not use contact lenses if you have a tube implant. That's because the contact lens may rub on the conjunctiva overlying the tube, increasing the chance of the tube exposing. However, if wearing contact lenses is absolutely essential for good sight, it may be that with a specialist fitting you do wear contact lenses in the longer term, accepting the increased risk of an erosion, and this can be monitored.

How effective is a tube shunt for lowering pressure?

A tube shunt is very reliable at lowering pressures, especially once the stent suture has been removed. In general, tube shunt surgery does not lower the pressure as much as a trabeculectomy, all things being equal. However, it can lower pressure much more effectively than trabeculectomy in eyes which are likely to have a strong healing response.

A good outcome would be that your pressure is at a low enough level afterwards such that your glaucoma stops worsening. But the precise eye pressure level that is targeted varies person to person. For some patients, even a pressure in the low 20s would be a good outcome, whereas for other people a pressure lower than 15 may be the goal of surgery.

Because the pressure isn't lowered quite as much as a trabeculectomy, it is quite common for people to continue to use one or two glaucoma medications even after the surgery to get the pressure to the desired level.

If you have any other questions, please do not hesitate to get in touch.

About Professor Anthony Khawaja

Professor Khawaja is a Consultant Ophthalmic Surgeon who cares for patients with glaucoma and cataract. He carries out the full spectrum of medical, laser and surgical treatments. His NHS practice is at Moorfields Eye Hospital and his private clinics are at Moorfields Private Eye Hospital and the London Eye Diagnostic Centre on Harley Street.

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