

Corneal Transplants: Endothelial Keratoplasty

Why would I need an endothelial transplant?

The cornea is the clear window at the front of the eye that acts as a transparent lens, allowing light into the eye and focussing it on the retina (the photographic film at the back of the eye). The transparency of the cornea is maintained by a single layer of cells on the inside of the cornea, known as the endothelium. Unlike other tissues in the body the endothelium is not able to regenerate or repair itself. Therefore the endothelial cells you are born with are required to last your lifetime in order to maintain a clear cornea. Common causes of damage to the corneal endothelium include hereditary conditions such as Fuchs Endothelial Dystrophy or can occur following multiple/complicated eye operations or intra-ocular implants such as lenses or tubes in the front chamber of the eye. Damage to the endothelium causes symptoms ranging from mild blurriness (often worse first thing in the morning) to a painful blind eye (in the worst cases).

Historically, corneal transplants have involved replacing the full thickness of the cornea and replacing with a full thickness transplant from a deceased donor. This procedure is still occasionally required, but has largely been replaced by more recent developments.

In the last 20 years techniques have been developed to replace only the corneal endothelium rather than the full thickness of the cornea. This avoids some of the risks of full thickness transplantation. These are safe techniques with excellent long term safety data and are now the procedures of choice for endothelial failure.

What are the benefits of Endothelial Keratoplasty

Compared with full thickness transplant, endothelial keratoplasty has:

1. Lower risk of rejection
2. Faster visual recovery
3. No requirements for sutures (stitches) to hold the transplant in place (which require removal later on)

4. As it is performed via 'keyhole' surgery, the structural integrity of the eye is maintained
5. Less astigmatism following surgery, meaning a simpler glasses prescription is required
6. The duration of surgery is reduced (under 30 minutes compared with under 2 hours for full thickness)

The Operation

The operation is usually performed under local anaesthetic, and takes under 30 minutes.

The transplant is prepared by the surgeon before you are brought into theatre. Your endothelium is removed via a 'keyhole' incision approximately 2mm in size. The endothelial transplant is then inserted into your eye and positioned at the back of your cornea. A gas bubble is used to keep the graft in place as the transplant is too thin and delicate to use sutures. Attachment of the transplant to the back of your cornea requires the transplant to 'wake up' and begin functioning. Once it does this, it attaches and begins to clear the cornea. The gas bubble is absorbed over the first week after the surgery. While the gas bubble is present the vision is poor to begin with, but you will usually begin to notice the benefit after 1-2 weeks and achieve final vision by about 3 months after surgery.

What are the risks of endothelial keratoplasty:

Primary failure: A small number of endothelial transplants will never clear the cornea. This may occur in less than 1 in 20 operations. If this occurs the transplant may need to be repeated.

High pressure: Very rarely, the gas bubble causes extremely high pressure in the eye in the first 1-2 days after surgery. This would cause headache and nausea. If this occurs, a small release of some of the gas bubble is required.

Rebubbling: In less than 1 in 5 cases the transplant has not yet fully attached by the time the gas bubble dissipates. In these cases it needs assistance in attaching by introducing a second gas bubble, which is usually performed in theatre in a procedure lasting less than 5 minutes. This could happen at between 1 – 2 weeks after the initial procedure and is usually highly successful in reattaching the transplant.

Once the transplant has cleared and the vision improved there are 2 main ways in which the transplant may fail later on:

Rejection – your body's immune system detects the transplant as foreign and attacks it. Caught early this process can be reversed and the transplant saved. If too much damage has occurred to the transplant then it may need to be repeated.

Secondary failure – even without rejection, the transplant may come to the end of its natural life. (Remember the transplant has already been part of someone else's cornea for possibly up to

80 years before it was inserted into your eye!) If this occurs you would notice very slow clouding of the vision over several months. If a transplant begins to naturally fail there is not anything that can be done to prevent this, however the transplant can usually be repeated. In a healthy eye (without other significant disease) we would expect approximately a 90% chance your transplant should last at least 10 years.

Side effects from steroid eye drops

– the steroid eye drops you have to take after the transplantation reduce the risk of rejection but carry their own side effects, such as:

1. Cataract – if you have not already had cataract surgery, then the combination of eye surgery and long term steroids may accelerate the rate at which you will develop a cataract (a clouding of the natural lens inside the eye) so you may require cataract surgery at a younger age than the national average of approximately 75.
2. Raised eye pressure – high eye pressure left untreated can lead to glaucoma, which damages the optic nerve slowly over years leading to reduced peripheral vision. Detected early, this can usually be managed very successfully, often with drops or further surgery.
3. There are other less common side effects from long term steroid use such as increased predisposition to corneal infections.

In addition to the risks of transplant as above there are also risks common to every intraocular procedure, such as:

1. Retina swelling (macular oedema). This may occur in less than 20% of endothelial transplants. It can lead to reduced vision but usually gets better on its own or with eye drops. Occasionally steroid injections are needed in or around the eye.
2. Any intraocular procedure has a risk of approximately 1:1000 of an intraocular infection or haemorrhage that can leave you significantly worse off, blind, or requiring removal of the eye. This is extremely uncommon.

If there are any other significant risks that are relative to you individually, this will be discussed with you by your surgeon.

What happens after the operation?

You will return home later the same day after surgery. You may need to wait for a while on the ward before going home. In a minority of cases you may be asked to posture on your back for a certain amount of time on the ward before you leave.

You will need to use steroid eye drops usually **lifelong** after a corneal transplant to minimise the risk of rejection. The frequency of instillation of steroid eye drops is usually 4-6 times a day to begin with and is tapered over a few months to once a day which usually continues indefinitely unless there are problems with steroids.

Follow up

Typical follow up after endothelial transplantation is usually:

1 weeks, 2 weeks, 6 weeks, 3, 6, 12 months and then annually thereafter. If you have been referred to Exeter from another hospital then often you may be able to return to your original hospital for long term follow up if the journey is difficult for you – please remember to speak to your surgeon about this if this is the case.

It is of vital importance that you do not stop your steroid eye drops without informing the eye department. The eye department will provide you with the initial prescriptions but subsequent repeat prescriptions should come from your GP.

SOS

If you develop the following symptoms after your surgery:

- Worsening redness of the eye
- Increasing light sensitivity
- Vision Loss/Cloudiness
- Pain

You need to contact the eye department to organise an urgent review.

The Trust cannot accept any responsibility for the accuracy of the information given if the leaflet is not used by Royal Devon staff undertaking procedures at the Royal Devon hospitals.

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