Descemet’s Stripping Endothelial Keratoplasty (DSEK)

Your doctor has decided that you will benefit from a corneal transplant operation. This handout will explain your options to you. It explains the differences between a traditional corneal transplant and the DSEK, Descemet’s Stripping Endothelial Keratoplasty.

Corneal Transplant Surgery

The human cornea is made up of three layers.

- Outer – epithelial layer
- Middle – stromal layer (about 90% of the total thickness)
- Inner – endothelial layer

The endothelial layer is made up of a single layer of thousands of small pump cells. These cells sit on a thin strip of tissue called Descemet’s membrane. These endothelial pump cells pump fluid out of the cornea so it can remain clear and thin to provide good vision for the eye. If the pump cells stop working, the cornea fills up with fluid. It becomes swollen and cloudy, and causes blurry vision.

The endothelial cells can be lost due to

- Aging
- Inherited diseases (such as Fuchs’ Corneal Dystrophy)
- Trauma
- Previous intraocular surgery

If a critical number of endothelial cells are lost, the cornea becomes swollen and cloudy. Medical treatment is not helpful. A corneal transplant operation is needed. The other corneal layers, the stroma and outer epithelium, are most often healthy. Many patients needing corneal transplant surgery have problems only with the endothelial cells.
Advantages and Disadvantages of Traditional Technique

A standard corneal transplant consists of removing the entire cloudy cornea. It is replaced with a full thickness donor cornea which replaces all three layers of the cornea. This surgery was first developed one hundred years ago. The success rate today is based on many refinements to this technique. It has stood the test of time.

The advantage of the traditional corneal transplant is the long success record that we have with it. There is a 90% success rate. The rate of rejection is only about 8%. It is fairly easy to combine other surgery with it, such as cataract extraction or glaucoma surgery.

Disadvantages of the traditional corneal transplant
- Length of time for the operation (90 to 120 minutes).
- Problems in suturing the new cornea into place.
- Sutures may come loose or cause infections.
- Sutures may cause astigmatism (an irregular corneal shape). Astigmatism after this surgery can be so major that eyeglasses alone won’t correct it. In the end, some patients need contact lenses or more surgery.
- Risk of a rupture or break from mild or minor trauma, even years after the surgery.
- Recovery time, until good vision, can take 12 to 18 months.

Advantages and Disadvantages of DSEK Technique

Researchers and surgeons have long known that for many patients only the diseased or missing endothelial cells need to be replaced. The other layers were normal. Recently, a new technique called DSEK has been developed. It replaces only the endothelial cell layer. A thin button of donor tissue with only the endothelial cell layer is inserted onto the back surface of the patient’s cornea. This new technique appears to be a big improvement over the standard operation.

There are several major advantages to the DSEK operation.
- The operation is faster (60 to 90 minutes).
- The wound is smaller and closer in size and location to a cataract surgery incision.
- The smaller wound is more stable and less likely to break open from trauma.
- Because the wound is smaller and requires fewer sutures, there is very little postoperative astigmatism.
• Recovery takes only about 3 to 4 months.
• Since only the thin inner layer of the cornea is replaced, over 90% of the patient’s own cornea remains behind. This adds to greater structural integrity and reduced chance of rejection.

DSEK is not for everyone. Some patients with corneal scarring or other conditions are not good candidates for DSEK. There are risks involved with the DSEK operation.
• Since DSEK has been done since 2005, there is no long-term follow-up.
• There is a 10% risk of the graft becoming displaced within the first few days or weeks after surgery. This means the graft must be redone with a replacement air bubble in the eye.
• If the DSEK operation fails, the operation can be repeated with another button of donor endothelium.
• If the DSEK fails, a traditional corneal transplant can be done.

The DSEK Surgery

Donor corneal tissue is obtained from an Eye Bank for the day of your surgery. In a pre-operative area, you will be given eye drops. An IV line will be placed in your hand. While you are briefly asleep, the eye is anesthetized with a numbing injection. A 5mm incision is made at the edge of the cornea. If cataract surgery is planned, the cataract is removed using a standard technique. Your cornea is marked on the outside to guide removal of the diseased Descemet’s membrane and endothelium from the inside of your eye. Descemet’s membrane is stripped and removed from your eye. The new donor cornea is cut to match the size of the membrane removed from the eye. The donor tissue is folded gently and placed into your eye. The graft is then unfolded and secured in the correct place on the cornea using an air bubble that is injected into the eye. As the air bubble seals the newly transplanted tissue in place, dilating eye drops are given. Some of the air is removed from the eye to make the eye pressure normal. The incision sites are tested and closed with 2 to 3 small sutures. You will be moved to the recovery room.

In the recovery room, you will lie on your back for 1 hour so that the air bubble can keep helping to maintain pressure against the back of the cornea so the new tissue stays in place. You are also asked to remain flat on your back as much as you can at home for the first 24 hours after the surgery. Your eye will be patched shut over night. You are seen in the eye clinic the next day.
Risks of DSEK Surgery

The risks of the DSEK include

- Hemorrhage in the eye
- Infection
- Swelling of the retina causing temporary or permanent blurring of vision
- A retinal detachment
- Glaucoma or high pressure in the eye
- Rejection of the transplanted tissue
- Chronic inflammation
- Double vision
- A droopy eyelid
- Loss of corneal clarity
- Poor vision
- Total loss of vision
- Loss of the eye
- Graft dislocation

Rarely, the transmission of infectious diseases can occur such as Hepatitis, AIDS, and syphilis, although the corneal donor is routinely tested for these diseases before the tissue is approved and released for transplantation.

There may also be complications from the local anesthesia including

- Perforation of the eyeball
- Damage to the optic nerve
- Droopy eyelid
- Problems with the circulation of the blood vessels in the retina
- Respiratory depression
- Hypotension
- Rarely, useful vision can be permanently lost.
When to Call the Doctor

- New or increased drainage from the treated eye.
- Increased or a change in eye pain.
- Increased redness of the eye.
- Decreased clearness of vision in the treated eye.
- If you have any questions.

Early attention to problems often results in simple, successful treatment so don’t delay. Putting off a call or visit may lead to worse problems.

Phone Numbers

University Station Eye Clinic, 8 a.m. to 4:30 p.m., Monday through Friday
(608) 263-7171

When the clinic is closed, your call will be forwarded to the hospital paging operator. Ask for the “Eye Resident on Call”. Give the operator your name and phone number with area code. The doctor will call you back.

If you live out of the area, call 1-800-323-8942 and ask to be transferred to the above number.

Please call if you have any questions or concerns.