Chapter 6

CORNEAL TRANSPLANT

Corneal Transplants are mainly of three types :

(a) **Penetrating graft** : In such cases the entire cornea is opaque and the full opaque cornea is replaced by a transparent cornea. A good quality cornea is required for a successful penetrating graft. The endothelium cell count forms an important criterion in case of penetrating graft. As per the norms laid down by the International Federation of Eye & Tissue Banks (IFETB), USA, endothelium cell count of 2000 cells/mm. sq. is required for penetrating graft.

(b) **Therapeutic graft** : These are corneal grafts done when the integrity of the eye ball is at risk. In cases of corneal infection and severe injury, when the cornea has been perforated or threatens to be perforated, the contents of the eye are exposed and need to be covered immediately. When the eye heals and the infection resolves, the therapeutic graft can be exchanged for an 'Optical Graft' allowing such an 'injured' or 'infected' eye to see again. Performing a Therapeutic Graft is a medical emergency and the cornea has to be supplied to such patients on priority basis. However, the quality of cornea need not be an optical grade cornea.

(c) **Lamellar graft** : Here only some layers of the cornea are opaque and only such opaque portions are removed and replaced by the transparent cornea. The cell layer does not form a part of the lamellar button to be grafted and the donor corneas can be preserved in sterile glycerine and stored under room temperature for utilisation for lamellar graft.

The surgery is performed using an operating microscope under local or general anesthesia and usually takes between 1 and 2 hours. A cookie-cutter-like instrument called a trephine is used to remove a central portion of the abnormal cornea and to replace with a similarly sized donor cornea. If a cataract is present, it can be removed and replaced with an implant at this time. The donor cornea is then secured in position with many fine stitches, each of which is much thinner than a human hair. At the conclusion of surgery, a patch and protective shield are placed over the eye.

The transplant operation, if performed in a private hospital, may cost between Rs.5,000.00 to Rs.30,000.00. While the corneas are provided free of cost by the eye banks except to cover the cost of Tissue processing fees as discussed in Chapter 5, the operation charges incurred cover the professional fees of the ophthalmic surgeon and other medical personnel involved besides charges for operation theatre

and cost of the patient's stay in the hospital. In municipal and govt. hospitals, these operations are performed free of cost.

Lazy Eye (Amblyopia)[1]

Vision develops simultaneously in both the eyes, with a fixation of objects beginning as early as 4 months of age. If either eye is deprived of visual stimulation, that eye becomes 'lazy' and will not develop its full visual potential and in medical terminology it is said to become a 'Lazy Eye'. **The earlier this pathology is cured, the better is the visual prognosis.** This cure must be attempted as early as possible and latest before the age of six or seven. The various conditions in children that can cause the eye to become 'lazy' include differences in the power of glasses between the two eyes, squint and even corneal opacities due to congenital diseases, vitamin A deficiencies and injuries which prevent an image from forming in the retina, that sends signals to the brain. It is, therefore, necessary that for such children suffering from corneal opacity, the transplant must be performed as early as possible as otherwise the delay may cause permanent and irreversible damage to the eye.

For the guidance of the corneal transplant patients, data from the brochure provided by Dr. Quresh Maskati, (a Bombay based Ophthalmologist) is reproduced below.

"Usually, the surgery is performed on an outpatient basis. Under certain circumstances, you will remain hospitalised for 1 or 2 days. Improvement in vision following surgery is slow. It often takes 6-12 months after surgery before the final vision can be determined. Because the shape of the transplant changes as it heals, a prescription for glasses may not be given for months after surgery. Some stitches may be removed weeks to months following surgery, or may be left indefinitely. Removal of stitches is painless.

You can be up and around almost immediately after the surgery. There are no restrictions on reading, watching TV, or other visual tasks. The eye should be protected at all times, either by wearing goggles or a protective shield. Showering or bathing is permitted and your hair may be washed but water should be kept out of the operated eye. The eye should never be rubbed.

It is most important to avoid any activity in which there is a possibility of being struck directly in the operated eye. There is no restriction on walking, but physical activities such as golf, jogging, or swimming are best avoided for 4-8 weeks after your surgery. Sexual relations may be resumed at your discretion.

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[1]Based on the data provided by Dr. Nisheeta Agarwalla, Ophthalmologist and Honorary Medical Director, EBCRC.

Risks of Surgery : Corneal transplantation, like other eye surgery, is extremely delicate. As with any eye operation, there are risks of bleeding or infection in the eye at the time of surgery; although rare, if these occur, vision within the affected eye may be lost. Other possible complications may include:

Donor failure : Although the donor cornea is inspected by the Eye Bank, it is impossible to determine for certain whether it will remain clear after it is transplanted. A small percentage of donor corneas never become clear after surgery. If this occurs, the cornea will require replacement.

Healing problems : Corneal transplants heal very slowly. It is for this reason that the stitches must remain in position for such a long time.

Rejection : Even if the new cornea functions well, it is possible that the body will "reject" the donor cornea because it recognizes the cornea as coming from another person. The risk of rejection is relatively rare. However, in cases in which blood vessels have grown into a diseased or damaged cornea, the risks are higher. If detected early, a high percentage of rejection episodes can be successfully treated. If the rejection cannot be reversed, the result is a cloudy cornea. A rejected transplant can usually be replaced with repeat corneal transplant surgery. The likelihood of rejection is reduced by the eye drops which are used after surgery. Although most rejections occur within two years after transplant surgery, a rejection episode may occur many years postoperatively.

Astigmatism : Optimally, the shape of the cornea should be spherical like a round ball. This is rarely the case after corneal transplantation – the irregularity of corneal shape is called astigmatism. Astigmatism can result in distortion of vision, even if the cornea is clear. Sometimes astigmatism can be corrected with glasses or a hard contact lens. Larger amounts of astigmatism may require corrective surgery.

Macular Edema : Some people who develop extra fluid in the cornea also have excess fluid in the macula, that part of the retina which provides the central vision necessary for reading, watching television and driving. It is usually not possible to determine before surgery which patients have this macular edema. Even with a successful transplant, if macular edema is present, vision may be poor. Currently, there is no specific treatment for macular edema, although it occasionally improves with time".

Success of Corneal Transplant

The success rate of corneal transplant depends a lot on the quality of cornea utilised for the transplant. With proper screening, testing and preservation in a suitable medium, the success rate is between 80 to 90 per cent. On an average out of all the corneas received, between 50 to 70 per cent are not found viable for the transplant. While age need not be the sole criterion, it does have a bearing as the percentage of viable corneas from donors above the age of 70 is much less as compared to the corneas retrieved from the younger age group. In a country like the USA, where the general standard of health is better than in our country the percentage is between 40 & 50 percent of viable corneas whereas in our country the percentage of viable corneas is around 25 to 35 percent of the total number of corneas received. The rejected corneas have, however, their own utility. Either they are used for research or for manufacturing a special kind of contact lens (Epikeratophakia). In places like Mumbai, Hyderabad etc. where proper facilities for evaluation, screening etc. are now established, the success rate has improved considerably as compared to other cities where these facilities are non-existent. It is also necessary that to achieve the required proficiency in corneal transplants, an Ophthalmologist ought to work under an experienced and expert corneal transplant surgeon. In some places like L.V. Prasad Eye Institute at Hyderabad the facilities have been established to provide additional training for corneal transplants. It may be mentioned that for most ophthalmologists as compared to other areas of their practice, such as cataract (which forms a bulk of the blind patients), the Keratoplasty is much less profitable. In fact, the insertion of intra-ocular lens has made cataract operations a highly lucrative practice. It is also true that majority of the corneally blind patients in our country are from the weaker sections of the society and this does not make the corneal transplant very lucrative from the monetary point of view for Ophthalmologists. The absence of good quality viable corneas has also dampened the enthusiasm among the ophthalmologists inducing them to adopt a lukewarm attitude for Keratoplasty till now. However, with more and more eye donation centres and eye banks coming up providing good quality viable corneas, the scenario is slowly changing for the better.

Scarcity of Corneas

It is over 45 years since the first corneal transplant was performed in India. As compared to other transplants, the corneal transplant has a number of advantages in its favour such as :

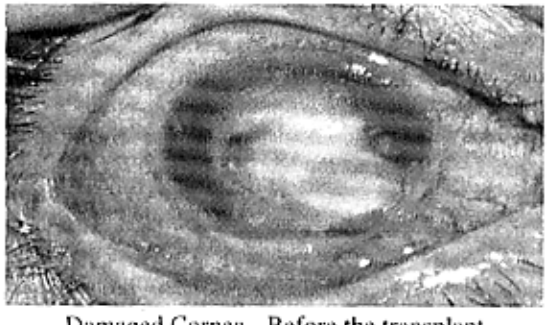
(a) An elaborate tissue matching as required in the case of the heart or kidney or liver transplants is not required.

(b) The cornea to be transplanted is always removed from the body of a dead person and given proper care, it is as good as that of a live person and hence there is no suffering caused to the living person.

(c) It is simple and relatively less expensive than other types of transplants.

(d) Unlike other transplants where the donee has to take a lot of precaution after the transplant including a regular dosage of immuno suppressive drugs such as prednisolon, cyclosporine, celltap (which not only are costly but have some serious side effects like weakening of bones, diabetes or liver abscess), the same is not necessary in the case of the corneal transplants or if required, in a very small dosage.

Inspite of all these advantages, the progress achieved in this field in our country is much slower as compared to that in other fields of transplants. It is hoped that with the opening of more number of eye banks this gap will be bridged and an increasingly large number of corneally blind persons will be able to regain their vision, the most precious gift the nature has bestowed on Man.



Damaged Cornea - Before the transplant

Transparent Cornea - After a successful corneal transplant