

A Review of Corneal Transplantation

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Abstract

Corneal transplantation, also known as keratoplasty, is a surgical procedure in which a damaged or diseased cornea is replaced with a healthy cornea from a donor. This procedure is performed to restore vision in patients who have suffered corneal damage due to various reasons such as infection, injury, or degenerative diseases. The cornea is the transparent outermost layer of the eye that covers the iris and the pupil. It functions as a protective barrier against environmental factors and helps in focusing light onto the retina. Corneal disease or damage can result in reduced vision, and in severe cases, blindness.

Keywords: Corneal; Retina; Transparent

Introduction

Corneal transplantation has been practiced for over a century and has undergone several advancements in surgical techniques and tissue preservation methods, leading to improved outcomes and increased success rates. This review article aims to provide an overview of the indications, types, techniques, and outcomes of corneal transplantation [1].

Indications

Corneal transplantation is indicated for various conditions that affect the cornea, including: Keratoconus: a condition in which the cornea weakens and thins, causing it to bulge outward and take on a cone-like shape. This causes astigmatism and distorted vision. Corneal scars [2]: caused by injury, infection, or inflammation, resulting in visual distortion or blindness. Fuch's dystrophy: a genetic disorder that causes progressive damage to the corneal endothelium, leading to cloudy vision and eventually blindness. Corneal edema: swelling of the cornea caused by accumulation of fluid, leading to blurred vision. Corneal degeneration: progressive thinning and weakening of the cornea, resulting in vision loss [3].

Types of corneal transplantation

There are different types of corneal transplantation techniques, including:

- Penetrating keratoplasty (PK): This is the traditional method of corneal transplantation, where the entire thickness of the cornea is removed and replaced with a donor cornea. The donor cornea is sutured onto the recipient's eye [4].
- Deep anterior lamellar keratoplasty (DALK): In this technique, only the diseased or damaged layers of the cornea are removed and replaced with a donor cornea. The recipient's healthy endothelial layer is preserved, reducing the risk of rejection [5].
- Endothelial keratoplasty (EK): This technique involves the replacement of only the affected endothelial layer of the cornea with a donor graft. EK is further classified into two types: Descemet's stripping endothelial keratoplasty (DSEK) and Descemet's membrane endothelial keratoplasty (DMEK) [6].

Surgical techniques

Corneal transplantation is typically performed under local anesthesia, although general anesthesia may be used in some cases. The

surgical technique used depends on the type of corneal transplantation being performed.

During a PK procedure, the damaged cornea is removed first. A circular incision is made in the center of the donor cornea to match the size of the recipient's cornea [7]. The donor cornea is then placed onto the recipient's eye and sutured into place. In a DALK procedure, only the diseased or damaged outer layers of the cornea are removed using a microkeratome or a femtosecond laser. The donor cornea is then sutured onto the recipient's eye. During an EK procedure, the diseased or damaged endothelial layer is removed, and the donor endothelial graft is inserted through a small incision in the cornea using a specialized instrument. The graft is then positioned over the Descemet's membrane and gently pushed into place [8].

Outcomes

Corneal transplantation has a high success rate, with most patients achieving improved vision and quality of life. The success of the procedure depends on several factors, including the indication for surgery [9], the type of corneal transplantation performed, and the age and overall health of the patient. Complications such as graft rejection, infection, and glaucoma may occur in some cases. The risk of rejection is highest in PK and lowest in EK procedures, as only the endothelial layer is replaced in the latter [10].

Conclusion

Corneal transplantation continues to be a viable treatment option for various corneal diseases and injuries. Advances in surgical techniques and tissue preservation methods have resulted in improved outcomes and increased success rates. Early diagnosis, proper patient selection, and careful postoperative follow-up play integral roles in ensuring optimal outcomes following corneal transplantation.

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