Summary

corneal Endothelial dysfunction has previously been treated with full thickness corneal transplantation. Endothelial keratoplasty (EK) has now become the standard of care for the treatment of visual loss due to corneas with the primary etiology of endothelial dysfunction such as Fuchs' endothelial dystrophy, pseudophakic bullous and aphakic bullous keratopathy ***(Fernandez and Afshari ; 2010) .***

An alternative to PK is lamellar keratoplasty (LK), which is a selective transplantation of only a certain layer of the cornea. Although technically more difficult, lamellar surgery results in a much more stable cornea tectonically and refractively. Interest in PLK has grown because of the significant advantages over PK procedures ***(Baddon et al ; 2010)*** .

Posterior lamellar keratoplasty (PLK) is a selective replacement of posterior stroma and endothelium, Further modification of the technique, called small-incision Deep Lamellar Endothelial keratoplasty (DLEK), being replaced by stripping of the host Descemet's membrane and endothelium known as Descemet-Stripping Endothelial keratoplasy (DSEK). The combination of DSEK with the use of the automated microkeratome for donor preparation, instead of manual deep lamellar dissection, has resulted in the technique of Descemet-stripping automated endothelial keratoplasty (DSAEK) ***(Mashor et al ; 2010) .***

DSEK has gained popularity because the selective transplantation of the endothelial layer avoids the potential complications of PK such as wound dehiscence, wound infections, and high postoperative astigmatism. In DSEK the recipient Descemet's membrane and endothelium are stripped and a posterior lamellar graft, or DSEK graft,

then is inserted and allowed to unfold with subsequent recipient-to-donor stromal adherence. Preparation of the posterior lamellar graft, containing the donor posterior stroma, Descemet's membrane, and endothelium .The donor cornea is prepared first, followed by surgery on the recipient.It is prefered to use precut tissue from an eyebank ***(Price et al ; 2010).***

Donor dissection can be done manually (DSEK) or with a microkeratome (DSAEK) or Femto Second Laser–assisted posterior lamellar dissection , followed by host then donor insertion ,There are several current methods in use for the introduction of the donor including forceps insertion ,pull through and glide techniques ***(Bahar et al ; 2009)***

Corneal transplant surgery is evolving so that only the diseased part of the cornea is removed and replaced/transplanted with a similar part of the donor cornea. Melles et al., introduced another modification to the procedure, which is named Descemet's membrane endothelial keratoplasty (DMEK). The same amount of host tissue is removed as in DSAEK; however, the donor graft consists of only Descemet's membrane and the endothelium. While the DMEK cornea has a near-perfect anatomic restoration that may improve the optical quality, the thinner lenticule is much more fragile, prone to wrinkles and endothelial cell damage . A variation of this technique called Descemet's membrane automated endotheial keratoplasty (DMAEK), in which the donor tissue is first dissected with a microkeratome as in DSAEK ***(Price and Price ;2010***) .

Contraindications for endothelial keratoplasty include any anterior corneal scarring, opacity, or dystrophy affecting vision. In these cases, a full-thickness penetrating keratoplasty is indicated. Other contraindications include amblyopia, uncontrolled glaucoma, or any

retinal or optic nerve disease that would deter final visual results ***(Terry et al ;2009)***

Graft dislocation is the most frequent early postoperative complication after EK . A dislocation represents lack of adherence of the donor posterior lenticule to the recipient stroma ,other complications such as primary graft failure, Pupillary Block, Graft rejection episodes are a risk with any type of allograft and occur after EK. Epithelial ingrowth , Endothelial decompensation in the absence of any documented graft rejection is a leading cause of graft failure, Endophthalmitis ,others include Peripheral Anterior Synechiae, Hypotony, and Choroidal effusions, Graft Decentration, Retained Interface Fibers, partial detachment of the donor lenticle, Asmall peripheral fold in the donor lenticle ***(Price and Price ;2010***) .

Future research in EK should be directed at enhancing endothelial cell survival. Continued laboratory and animal research is needed to study different tissue preparation techniques, including adjunct use of femtosecond lasers . Research in stem cell endothelial layer regeneration has been exciting . One possibility for endothelial restoration maybe culturing a patient's own endothelial cells in vitro for later autograft transplantation ***(Lee et al ;2009) .***