Clinical outcomes of modern lamellar keratoplasty techniques

Dijk, K. van

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Korine van Dijk

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Korine van Dijk
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Promotor
Prof. Dr. M.J. Jager

Copromotor
Dr. G.R.J. Melles, Netherlands Institute for Innovative Ocular Surgery, Rotterdam

Leden Promotiecommissie
Prof. Dr. C. Koppen, Universiteit van Antwerpen
Prof. Dr. S.M. Imhof, Universiteit van Utrecht
Dr. Y.Y. Cheng

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PREFACE

Corneal transplantation (or keratoplasty) is one of the most successful and widely performed methods of tissue transplantation. Its major goal is to restore or improve vision, but globe preservation, pain reduction and improving the cosmetic appearance of the eye are also important motives. Leading indications for corneal transplantation are Fuchs endothelial dystrophy, bullous keratopathy, failed corneal grafts, keratoconus and corneal scars.

Since the first successful corneal transplantation in 1905, numerous ophthalmologists have contributed to further refinement, assisted by the development of surgical microscopes, the introduction of general anesthesia and corticosteroids, improved suture materials, and the founding of eye banks. Recently, the selective replacement of only the diseased corneal layers, rather than replacing all corneal layers (such as in penetrating corneal transplantation), has dramatically transformed corneal transplantation surgery. At present, endothelial keratoplasty (EK) has become the treatment of choice for corneal endothelial disease, and anterior lamellar keratoplasty is increasingly advocated for corneal stromal disease.

The latest innovation in the field of EK is Descemet membrane endothelial keratoplasty (DMEK). With this technique, only the Descemet membrane and endothelium are replaced, resulting in a restoration that approaches the original corneal anatomy. Alongside the trend towards more selective and minimally invasive transplantation techniques in endothelial keratoplasty, recently, also new treatment options have emerged for patients with (advanced) keratoconus, including the mid-stromal implantation of an isolated donor Bowman layer, referred to as Bowman layer transplantation.

This thesis will focus on the feasibility and clinical outcomes of DMEK for managing endothelial disorders, and the use of Bowman layer grafts, i.e. Bowman layer transplantation, in the management of advanced keratoconus.