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Clinical Outcomes of pre-Loaded Descemet Membrane Endothelial Keratoplasty Grafts with Endothelium Tri-Folded inwards

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ABSTRACT

PURPOSE: To evaluate the initial outcomes and complications of Descemet membrane endothelial keratoplasty (DMEK) utilizing donor tissues tri-folded with the endothelium inwards, pre-loaded at the Eye Bank and delivered with bimanual pull-through technique.
DESIGN: Prospective, non-comparative, interventional case series.
METHODS: Setting: Eye bank and tertiary care Eye Department. **Patient Population:** Forty-six consecutive eyes of 41 patients with Fuchs endothelial dystrophy with or without cataract operated between November 2016 and March 2017. **Intervention:** DMEK tissues prepared with SCUBA technique and punched to a diameter of 8.25 mm were pre-loaded with the endothelium tri-folded inwards in an intra ocular lens (IOL) cartridge with a 2.2 mm opening filled with the same tissue culture medium contained in the vial used for shipment to the surgeon. Standardized DMEK was performed as a single procedure (n=15) or in combination with phacoemulsification and IOL implantation (n=31) within 48 hours from preparation using a bimanual pull-through technique. **Main Outcome Measures:** Preparation and surgical times, intraoperative and postoperative complications, best spectacle-corrected visual acuity (BSCVA), endothelial cell density (ECD), and graft detachment rate.
RESULTS: Preparation time averaged 26.2±4.1 minutes (range from 17 to 36 minutes), while the surgical time from opening of the stoppers to air fill of the anterior chamber never exceeded 9 minutes (range from 3 to 9 minutes). Surgery was uneventful in all cases. Postoperative complications included graft detachment in 9/46 cases (19.6%), successfully managed in all cases by single re-bubbling within 6 days from surgery, and glaucoma irresponsive to conservative treatment in 1/46 cases (2.1%). In all eyes without co-morbidities (n = 35 of 40) BSCVA was 20/25 (0.097 logMAR) or better as early as 3 months after surgery. Six months postoperatively, ECD was available in 24 of 25 eyes with an endothelial cell loss calculated as a percentage of the preoperative value determined at the eye bank (range from 2500 to 2800 cells/mm^2) of 29.5±14.8% (range from 8.3 to 52.1%).
CONCLUSIONS: Delivering a pre-loaded DMEK tissue, tri-folded with the endothelium inwards, minimizes surgical time and costs without negatively affecting the outcomes of the procedure.

Keywords:
DMEK; pre-loaded; clinical investigation; endothelium-inwards; bimanual pull-through technique; eye bank; graft preparation