

## Herpes Simplex Virus Endotheliitis following Descemet's Membrane Endothelial Keratoplasty

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### Abstract

**Purpose:** To report a case of herpes simplex virus (HSV) endotheliitis following simultaneous phacoemulsification, intraocular lens (IOL) implantation and descemet's membrane endothelial keratoplasty (DMEK).

**Case Report:** A 45 year-old female with corneal endothelial decompensation and a mature cataract, and history of anterior uveitis underwent simultaneous phacoemulsification, IOL implantation and DMEK. Increased corneal edema and descemet's membrane (DM) detachment occurred on postoperative day 3 and 5, respectively. One week after surgery, active keratic precipitates (KPs) appeared. Polymerase chain reaction (PCR) analysis was performed on an aqueous sample which was positive for herpes simplex virus (HSV). After initiating oral acyclovir and frequent topical corticosteroids, the corneal edema resolved and the donor tissue became spontaneously reattached to the recipient corneal stroma.

**Conclusion:** HSV endotheliitis may occur in the early postoperative period after DMEK and manifest as endothelial dysfunction leading to donor detachment. Anti-viral medication may help treat the acute phase and reduce the risk of recurrence.

**Keywords:** Descemet's Membrane Endothelial Keratoplasty; Endotheliitis; Herpes Simplex Virus

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### INTRODUCTION

As the field of corneal transplantation progresses, more specific procedures are being used to treat the diseased layer of cornea with minimal disturbance of the rest of the cornea. For some corneal diseases such as pseudophakic bullous keratopathy (PBK), aphakic bullous keratopathy (ABK) and Fuchs'

endothelial dystrophy, the main malfunctioning part of the cornea is the endothelium. Transplant surgeons formerly treated these conditions with conventional penetrating keratoplasty (PKP), however at present the majority of surgeons select to replace the endothelium alone as opposed to replacing the entire cornea. Various techniques for endothelial keratoplasty have been described, namely deep lamellar endothelial keratoplasty (DLEK), descemet's stripping (automated) endothelial keratoplasty (DSEK/DSAEK) and descemet's membrane endothelial keratoplasty (DMEK).<sup>[1]</sup>

Recently, DMEK has been shown to be a promising alternative for management of corneal endothelial failure.<sup>[2-4]</sup> As a growing number of DMEK surgeries are

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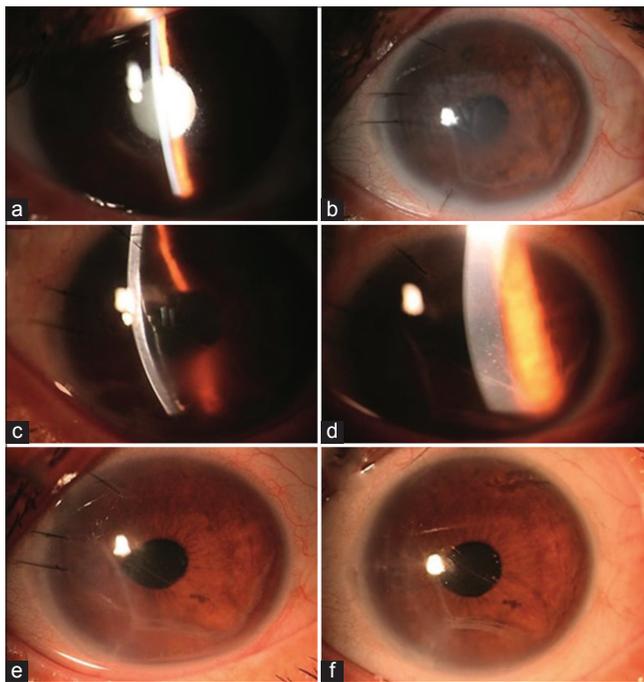
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being performed worldwide, more complications are expected to occur. A variety of complications related to this technique have been reported to date,<sup>[4-6]</sup> however, to the best of our knowledge, there is no report of herpes simplex virus (HSV) endotheliitis soon after DMEK or triple-DMEK procedure, i.e., simultaneous phacoemulsification, intraocular lens (IOL) implantation and DMEK.

## CASE REPORT

A 45 year-old woman was referred to our cornea clinic for evaluation of corneal edema in her right eye with only light perception vision. Slit lamp biomicroscopy revealed corneal stromal edema with old hyalinized keratic precipitates (KPs). The anterior chamber (AC) was quiet and a mature cataract together with iris pigment loss was observed [Figure 1a]. B-scan ultrasonography revealed an attached retina and a clear vitreous body. Central corneal thickness measured by ultrasound pachymetry was 685  $\mu$ .

The patient was scheduled for a triple-DMEK procedure two months after presentation and the donor graft was prepared by a reverse big bubble technique as previously described by Zarei-Ghanavati et al<sup>[7,8]</sup> The



**Figure 1.** (a) Mature cataract and corneal edema with old hyalinized keratic precipitates (KPs) before surgery, (b) completely attached descemet's membrane (DM) with mild corneal edema on postoperative day 1, (c) corneal edema with partial DM detachment on postoperative day 5, (d) partial DM detachment with active KPs seven days after the operation, (e) DM attachment and resolution of the KPs two days after initiating acyclovir (postoperative day 9), (f) clear cornea with some visually insignificant folds (postoperative month 3).

operation was uneventful and the donor was completely attached to the recipient cornea at the end of surgery.

On the first postoperative day, uncorrected visual acuity (UCVA) was 20/40. The cornea was clear with an attached descemet's membrane (DM) while intraocular pressure (IOP) was within normal limits. A regimen of topical antibiotic and corticosteroid was administered.

Three days after surgery, UCVA dropped to 20/200. Although the transplanted DM was completely attached, it showed some folds with inward rolling of its edge. Moderate corneal edema and striae on the posterior stroma were also observed. Two days later, partial detachment of DM developed [Figure 1b and c] and the patient underwent AC bubbling. On postoperative day 7, the patient developed diffuse KPs on the donor and recipient endothelium [Figure 1d]; the cornea was still edematous, partial DM detachment was present and IOP was normal.

Diagnostic AC tap was performed and aqueous fluid was sent for PCR analysis for HSV-1, HSV-2, and cytomegalovirus (CMV). Systemic acyclovir (400 mg, 5 times a day) was prescribed and the topical corticosteroid dosage was increased.

Two days later, the patient presented with significant improvement in vision (UCVA, 20/30). The PCR sample analysis was positive for HSV-1. The dramatic response to treatment was documented on slit lamp examination. The cornea was clear, the KPs disappeared and the DM was completely attached to the cornea; however, there were still some folds on the DM sparing the visual axis [Figure 1e].

Three months after surgery, UCVA remained 20/30 with best corrected visual acuity (BCVA) of 20/25. The cornea was completely clear and DM was totally attached with some visually insignificant folds [Figure 1f]. The patient received a prophylactic dose of acyclovir (400 mg, two times a day) with a diagnosis of HSV endotheliitis.

## DISCUSSION

The treatment of choice for corneal endothelial dysfunction has changed from full thickness corneal transplantation to endothelial keratoplasties such as DMEK and DSAEK. Similar to every other surgical procedure, several complications have been reported after DMEK including donor damage during preparation/insertion, early graft detachment, pupillary block, fibrin reaction in the AC, coiled DM with localized corneal edema and secondary glaucoma.<sup>[4,9,10]</sup> Postoperative corneal edema with complete DM detachment is often considered to be the result of donor endothelial dysfunction. The main reason for endothelial dysfunction closely after DMEK is surgical trauma. However, in the present case, the cornea was clear on postoperative day one and deteriorated shortly afterwards.

The presence of KPs after keratoplasty usually indicates endothelial rejection; however, in the first

week after surgery, endothelial rejection is rare even in patients undergoing PKP. It has been postulated that DMEK might cause less stimulation of the immune system. Endothelial rejection is less common after DMEK as compared to DSAEK and PKP performed for similar indications.<sup>[11,12]</sup> Anshu et al showed that in two years' follow up, the rejection risk was 17% and 9% for PKP and DSAEK, respectively, whereas it was only 0.7% for DMEK.<sup>[11]</sup>

Studies suggest that viral infection may be a cause of graft failure in the early postoperative period.<sup>[13,14]</sup> Anshu et al<sup>[15]</sup> reported four cases of CMV endotheliitis in patients who underwent DSAEK. The clinical findings were similar to our case including corneal edema, KPs, and no AC inflammation. As viral endotheliitis usually responds to appropriate antiviral treatment, performing AC tap for PCR is highly recommended. In our case, PCR confirmed the presence of HSV type I in the AC. The corneal donor could have been a potential route for HSV infection.<sup>[13,16]</sup> Meanwhile, the presence of KPs on the edematous cornea, washed-out appearance of the iris and mature cataract in the preoperative examination indicate the possibility of HSV recurrence.

In conclusion, one should keep in mind the possibility of HSV endotheliitis in the early postoperative period after DMEK. This may present as early corneal edema despite complete attachment of donor DM and progress to DM detachment. History of anterior uveitis, iris changes and the presence of KPs on the endothelium should be considered as diagnostic clues and PCR can be used adjunctively to confirm the diagnosis. Whenever the clinical findings are suggestive of prior HSV keratouveitis, acyclovir must be used both prophylactically and therapeutically.<sup>[17]</sup>

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### Conflicts of Interest

There are no conflicts of interest.

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