Case report

Anterior segment OCT-based diagnosis and management of retained Descemet’s membrane following penetrating keratoplasty

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Abstract

Purpose: To report a case of retained Descemet’s membrane after penetrating keratoplasty for congenital hereditary endothelial dystrophy (CHED) documented by anterior segment optical coherence tomography and review of literature.

Methods: Case report and review of literature.

Results: A 14-year-old boy underwent penetrating keratoplasty for CHED. A retained host Descemet’s membrane was detected with a supernumerary anterior chamber on the first postoperative day. The retained Descemet’s membrane was documented using slit lamp adapted anterior segment optical coherence tomography (SLOCT). Surgical intervention for the Descemet’s membrane removal was done in the third postoperative week. The complete removal of the membrane was confirmed on SLOCT.

Conclusion: Inadvertent retention of the host Descemet’s membrane is a rare but possible complication in penetrating keratoplasty for CHED. Proper anticipation, early detection and removal will help in preventing any undue risk of graft failure.

Keywords: CHED; Descemet’s membrane; Keratoplasty; SLOCT

1. Case report

A 14-year-old boy underwent a routine penetrating keratoplasty in his left eye for bilateral CHED with nystagmus. On the first postoperative day, slit lamp biomicroscopic examination revealed a suspicious transparent membrane along with formation of a supernumerary chamber (Fig. 1). The graft was clear with no active inflammation in the anterior chamber with a visual acuity of 20/200 at end of first week. The poor acquisition of slit lamp imaging due to associated nystagmus urged us to confirm the origin of membrane using anterior segment OCT. Post-operative anterior segment OCT (Fig. 2) demonstrated the retained Descemet’s membrane (DM) with a break in the superonasal region which allowed the free flow of aqueous and the supernumerary chamber formation. Endothelial cell count by specular microscopy was not captured.

Removal of the retained DM was attempted 3 weeks following the initial surgery. Preoperative miosis was achieved with pilocarpine eye drops. Two limbal self-sealing stab incisions were made at the 2.30 and 10.30 O’clock positions and trypan blue dye staining of the DM was done. The graft’s endothelium was coated with Healon GV, pushing the retained DM further into the anterior chamber. Injection Healon GV anterior to the pupil was done to protect the lens. Removal of the DM was attempted with an automated vitreous cutter inserted into the anterior chamber after enlarging the side port. Despite trypan blue staining, it was relatively difficult to locate the DM under the surgical microscope and only a central opening could be successfully made. Better visualization of the DM was possible on gripping the membrane with the Uttrata’s forceps and further removal had to be facilitated with the forceps (descemetothesis). Histopathological evaluation confirmed the tissue as DM. Postoperatively, slit lamp biomicroscopy revealed no evidence of supernumerary chamber or retrocorneal membrane. SLOCT was done to know the extent of membrane removed which confirmed near total removal with a remaining peripheral skirt. The patient was treated with four hourly topical steroids and antibiotic along with lubricants. At 1 month of follow up, the graft was clear with
a single anterior chamber and a best corrected visual acuity of 20/60 and a postoperative endothelial count of 750 cells/mm².

2. Discussion

Retro-corneal membrane after penetrating keratoplasty is a well-known complication, occurring either as an inflammatory membrane or as a result of unintentional or intentional retention of the host DM, or donor DM detachment [1–10]. Inadvertent and incomplete trephination of edematous corneas as in congenital hereditary endothelial dystrophy, bullous keratopathy may cause retention of the host DM. Longstanding stromal edema has been suggested to lead to loosening of the attachment of the DM, thereby predisposing to its separation from the overlying stroma [2]. Lowenstein et al. had suggested intentional retention of the host DM in some severely damaged, high risk eyes, where opening the anterior chamber might be associated with difficulties and complications [3]. The retained DM may be associated with progressive opacification of the graft necessitating a laser optical opening [4–6]. Progressive opacification has been postulated to occur due to presence of a sliver of residual stroma with keratocytes from which the fibroblastic activity occurs [8]. The differential time taken for the opacification of the retained DM is due to the thickness of the residual stroma retained along with the DM in these cases [8]. The opacification of the retained DM has been reported to start from approximately 3 months postoperatively [2,5]. Long-term presence of a retained DM has also been reported to be associated with a clear graft for 33 months [1]. Successful simultaneous surgical removal of the retained DM and phacoemulsification with intraocular lens implantation has also been performed 3 months after PKP [7]. Aqueous flow between graft endothelium and the retained DM allows the graft to remain clear as was also noticed in our case [3]. To the best of our knowledge no previous reports are available where retained Descemet’s membrane after keratoplasty have been documented using SLOCT. The SLOCT picture clearly showed presence of the host DM which could be distinctly traced to the host cornea. The inadvertent perforation made in the DM could also be clearly shown using SLOCT which explains the double chamber. Postoperative images confirmed the removal of membrane with a small peripheral skirt remaining. Though earlier reports have highlighted retained DM after penetrating keratoplasty, our report highlights the documentation of the same with SLOCT and also emphasizes the difficulty in visualization and removal of the clear retained DM with an automated vitreous cutter, with the conventional approach of descemtomorhexis being the best approach [10]. Irrespective of the method used, it is imperative to ensure that adequate care is taken to protect the lens and the endothelium to prevent iatrogenic cataract and graft decompensation. Another advantage of using the SLOCT is the ability to differentiate the host DM from the donor DM therefore avoiding the inadvertent removal of the latter.

References

