Partial Descemet’s Membrane Overlap due to Previously Grafted Descemet’s Membrane Remnant: a Case Report

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Running Title: A DMEK case of Partial Descemet’s Membrane Overlap
Dear Editor,

In case of graft failure after Descemet’s membrane endothelial keratoplasty (DMEK), repeat DMEK can be performed if there are no contraindications [1, 2]. However, repeat DMEK has a risk of failure to remove the previous graft, which can lead to graft detachment or re-bubbling after DMEK [2, 3]. We report a case with clinical features of partially overlapped DM. We also provide clinical guidance for descemetorhexis of firmly attached DM and prophylactic maneuvers to reduce complications when DM overlap is inevitable.

A 78-year-old female experienced vision fluctuation after DMEK approximately 5 years previously. At the initial presentation to our institution, the visual acuity of the right eye was counting finger 10 cm, and the cornea was swollen. Corneal opacities were observed in the lower half of the cornea (Figure 1A). Repeated DMEK was planned because scarring of the stroma was minimal. Intraoperatively, the previously grafted DM was firmly attached to the posterior stroma in the inferior half area and could not be completely removed. After a preloaded DMEK lenticule (Eversight, Ann Arbor, MI, USA) with a diameter of 8.5 mm was injected and unscrolled, room air was injected and maintained in a supine position for 30 min. At postoperative Day 1, linear detachment was observed at the border of the remnant DM and showed a slight increase until the 2nd week after surgery (Figure 1B). At 6 weeks after surgery, DM detachment completely resolved, but a thickening of the DM-by-DM overlap was observed (Figure 1C). At 5 months after surgery, the new DM was well attached, but DM overlap remained, and significant posterior astigmatism was observed (Figure 1D, E).

A recent large-scale study of repeat DMEK described previously grafted DM being more firmly attached to the posterior stromal surface than the naive DM; remnant DM can lead to graft detachment or re-bubbling postoperatively [3]. Histopathologically, fibrous scar tissues are formed between grafted DM and recipient stroma in the early postoperative period, and DM detachment and re-attachment process can strengthen scar formation [4]. In our case, during descemetorhexis for repeat DMEK, the lower half of the DM with some opacity was firmly attached, probably due to suspected DM reattachment or endothelial damage due to previous DMEK. The remaining lower half of the DM caused temporary postoperative focal detachment, which was completely resolved without any intervention at 6 weeks. Moreover, partially remaining DM did not cause a significant effect on visual acuity except coma aberration.

A case series of overlapped DM with histopathological evaluation reported that peripheral overlapping DMs did not cause a significant detachment owing to the fibrous scar tissue made between host and donor DM interface in case the whole DM was not scraped. Conversely, DM detachment happened when only the posterior part of DM was
scraped [4]. Therefore, it is recommended that descemetorhexis be performed thoroughly, preferably by filling the anterior chamber with air bubbles using trypan blue dye to obtain good visibility of remnant DM structures. However, in case DM is attached too firmly to be removed because unnecessary damage to the posterior stroma also causes unexpected haziness in the posterior stroma-DM interface, it is recommended to try to attach the healthy DM over the remnant DM rather than attempt excessive descemetorhexis. Furthermore, in case graft detachment would be expected due to remaining DM, providing a full air filling or long gas retention after inferior iridotomy and maintaining a supine position for more than 60–120 min would be suggested to minimize graft detachment [4].

Declarations

Consent for publication

Written informed consent was obtained from the patient for the publication of this report and any accompanying images.
References


Figure 1. Pre- and post-operative photography of slit-lamp examinations. (A) At initial presentation, diffuse corneal edema with focal thick opacity is identified inferiorly (black asterisk). (B) Anterior segment OCT image at 2 weeks after surgery. Descemet’s membrane (DM) detachment is observed around the residual DM (yellow arrows). Due to the function of endothelial cells of residual DM, only minimal increase in corneal thickness is observed despite DM detachment (yellow asterisk). (C) On the AS-OCT image at postoperative 6 weeks, DM detachment has completely disappeared, but thickening and tiny fold of DM are observed due to the overlap of the two layers of DM (red arrows). (D) At 5 months postoperatively, the DM detachment completely disappears, but the remaining DM border is observed on slit lamp microscopy (blue arrowheads). (E) Scheimpflug image shows still minimal elevation of the posterior corneal surface at the inferior half area at 5 months.