

## Spontaneous resolution of recurrent Descemet's membrane detachment after trabeculectomy: A case report

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### ABSTRACT

**Purpose:** We report a rare case of recurrent Descemet's membrane detachment (DMD) post-trabeculectomy which was resolved spontaneously without surgical intervention.

**Observations:** A 66-year-old patient with a history of acute angle closure glaucoma in his right eye presented to our hospital. The intraocular pressure (IOP) of his right was 40 mm Hg, and the visual acuity was 10/20. After trabeculectomy of the affected eye, a severe Descemet's membrane detachment was found by AS-OCT. Part of Descemet's membrane was lying in front of the iris and lens. Surgical repair was performed, and viscoelastics and sterile air were injected into the anterior chamber to return the detached Descemet's membrane. AS-OCT showed that the DMD was successfully resolved. However, on the 7th day of follow-up, the DMD was detached again as seen on AS-OCT images. The patient refused reoperation to repair the DMD. Six months later, the patient visited our hospital again, and, interestingly, the DMD was completely resolved spontaneously without reoperation.

**Conclusions and importance:** Descemet's membrane is the basement membrane that lies between the stroma and the endothelial layer of the cornea. Minor DMD may be resolved spontaneously within a period of time without surgery, but large DMD is difficult to recover spontaneously. We believe that this is a rare case with spontaneous recovery of extensive DMD after trabeculectomy. But, despite all this, we still remain of the view that DMD should be treated immediately once it occurs.

### 1. Introduction

Descemet's membrane is a basement membrane that lies between the stroma and the endothelial layer of the cornea. As the adhesion between Descemet's membrane and the stroma is weak, ocular trauma or anterior segment surgeries might cause Descemet's membrane to detach from the stroma. Here we report a rare case of a large Descemet's membrane detachment (DMD) post-trabeculectomy. However, interestingly, DMD in this patient resolved spontaneously without surgical repair. Meanwhile, it is important for ophthalmologists to maintain an awareness of the possibility of DMD resulting from trabeculectomy.

### 2. Case report

A 66-year-old woman suffered from paroxysmal eye distension and headache on the right side, nausea, and vomiting for more than half a month, and presented to Jinan Mingshui Eye Hospital in April 2015. The eye examination revealed that visual acuity of the patient was light

perception in the right eye (OD) and 10/20 in the left eye (OS), respectively. The intraocular pressure of the right eye was 40 mmHg and of the left eye was 15 mmHg. Slit lamp examination showed mixed conjunctival congestion, corneal edema, Descemet's folds, shallow anterior chamber, atrophic iris, slightly dilated pupil, and cloudy lens in the right eye. The diameter of the right pupil was about 5 mm, and the light reflex disappeared. The fundus of the right eye was not clear. For the left eye, the anterior chamber was shallow and the lens was cloudy, but the rest of the anterior segment was generally normal. Corneal endothelial cell parameters could not be measured by the specular microscope in the right eye. Corneal endothelial cell density (CD) of the left eye was 2344/mm<sup>2</sup>, and the coefficient of variation (CV) was 22. Ophthalmic A-scan showed that the axial length of the right eye was 22.11 mm, the anterior chamber depth was 2.30 mm, and the thickness of the lens was 5.00 mm. For the left eye, the axial length was 21.88 mm, the anterior chamber depth was 2.23 mm, and the thickness of the lens was 4.97 mm. She had medical histories of Schizophrenia and Parkinson's disease which were treated by taking oral medicines.

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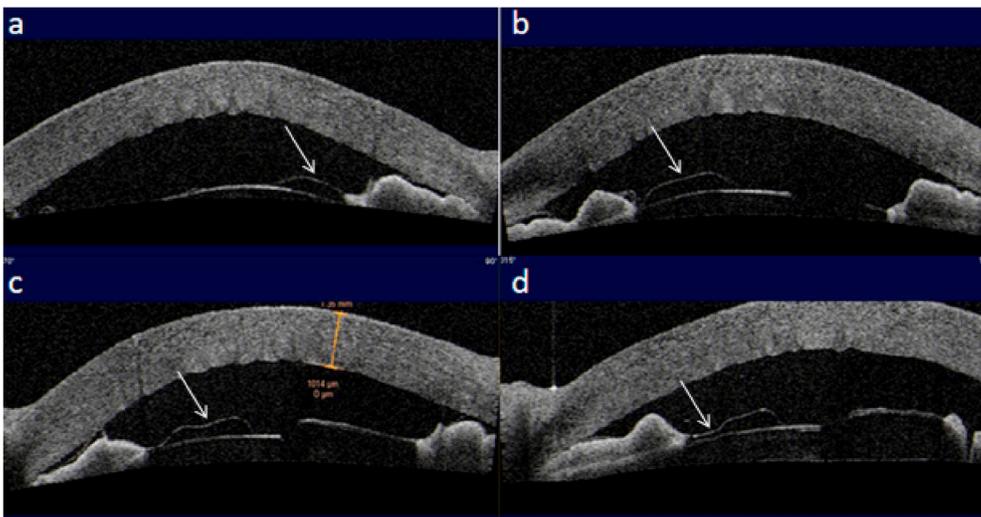
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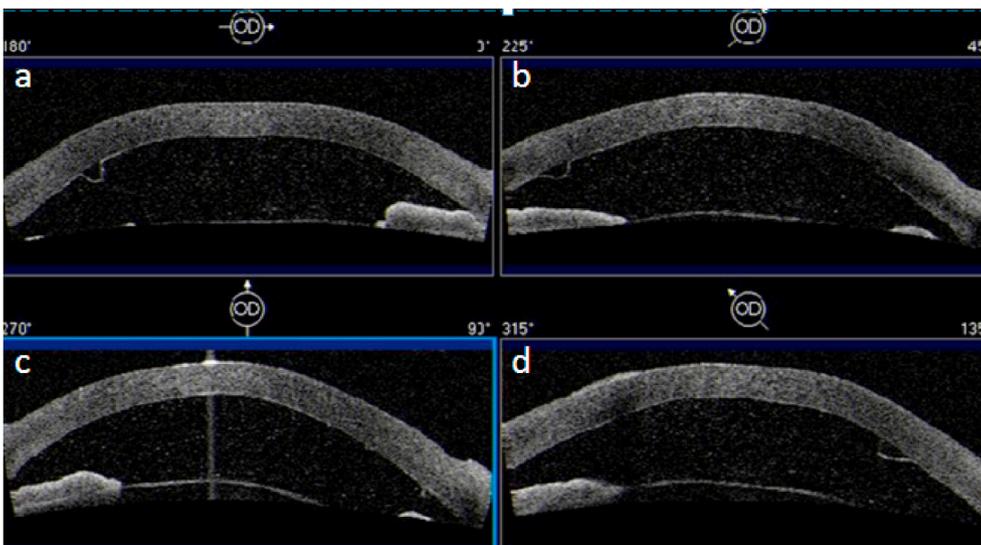
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**Fig. 1.** a,b,c,d AS-OCT of the right eye after trabeculectomy showed a severe detachment of the Descemet’s membrane; part of Descemet’s membrane was close to the anterior surface of the iris and lens (white arrows).a: Axial view 0° ~ 180°. b: Axial view 45° ~ 225°. c: Axial view 90° ~ 270°. d: Axial view 135° ~ 315°.



**Fig. 2.** a,b,c,d AS-OCT images of the right eye on the second postoperative day. AS-OCT showed that DMD was successfully resolved. a: Axial view 0° ~ 180°. b: Axial view 45° ~ 225°. c: Axial view 90° ~ 270°. d: Axial view 135° ~ 315°.

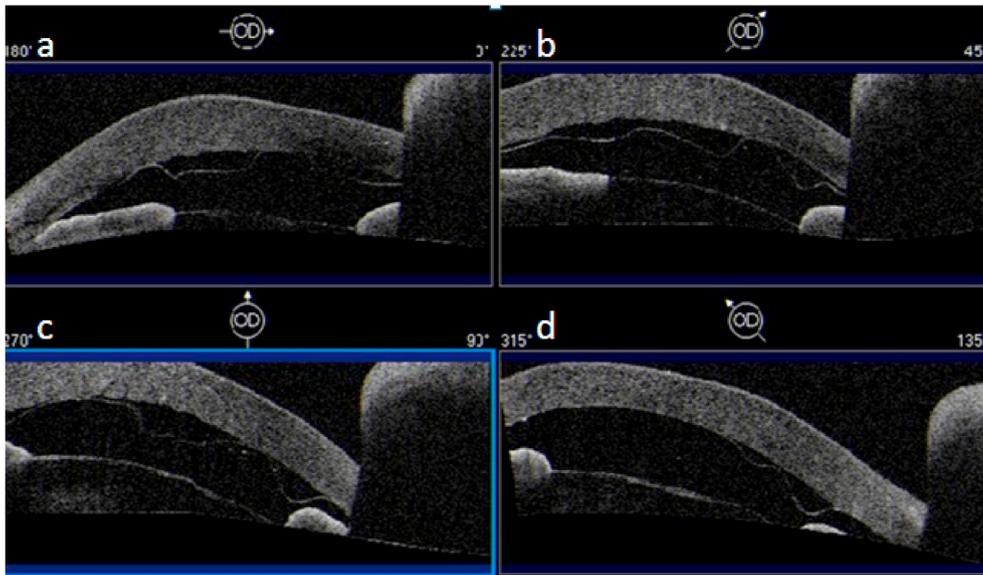
Anterior chamber paracentesis, eye drops and oral medicines were immediately given to lower the intraocular pressure of the patient’s right eye after admission. But it could not be reduced to normal. Then, with the approval of the patient, trabeculectomy was performed under local anesthesia two days later. The operation was successful, and no abnormality was found. On the first day postoperatively, the filtering bleb of the right eye was diffused, and the IOP was normal. However, the corneal edema and opacity were still present, and the anterior chamber was slightly shallow. Notably, a severe Descemet’s membrane detachment was found by anterior segment optical coherence tomography (AS-OCT), and part of Descemet’s membrane was lying in front of the iris and lens (Fig. 1 a,b,c,d). Considering the presence of DMD after trabeculectomy, a surgical repair was performed, and viscoelastics and sterile air were injected into the anterior chamber to reattach Descemet’s membrane. AS-OCT showed that the DMD was successfully resolved (Fig. 2 a,b,c,d). Furthermore, Nd:YAG laser peripheral iridectomy was recommended to avoid an acute attack of angle-closure glaucoma in the left eye, but the patient refused and asked to be discharged. Seven days later, the corneal opacity and edema persisted in the right eye, and AS-

OCT showed that the DMD appeared again, but to a lesser extent than before (Fig. 3 a,b,c,d). Surgical repair was advised, but the patient refused again and did not return for follow-up.

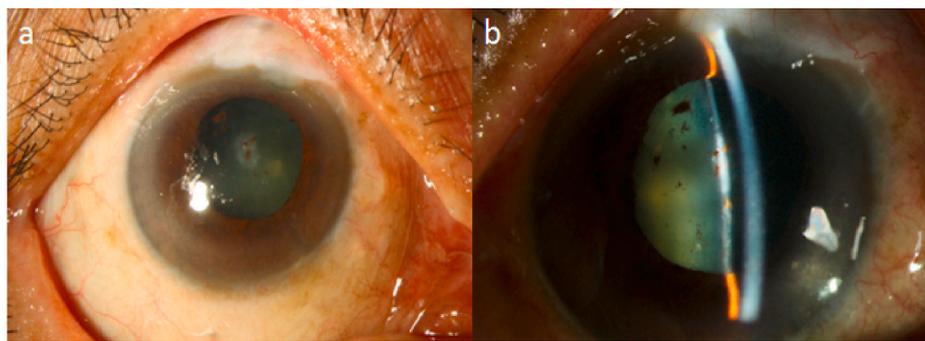
In December 2015, the patient was hospitalized again for an acute attack of angle-closure glaucoma in her left eye. Slit lamp examination revealed that the cornea of the right eye was clear (Fig. 4 a,b). AS-OCT was performed again and showed that the DMD recovered spontaneously (Fig. 5 a,b,c,d). The specular microscope examination exhibited that corneal endothelial cell density (CD) of the right eye was 1032/mm<sup>2</sup>, and the coefficient of variation (CV) was 20.

### 3. Discussion

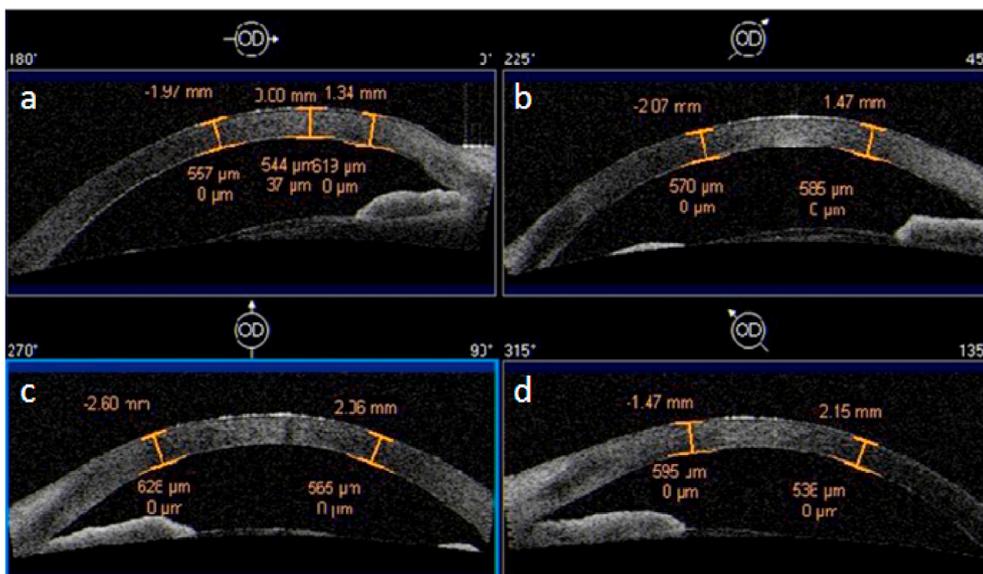
Descemet’s membrane, a basement membrane situated between the stroma and the endothelial layer of the cornea, is a transparent film with strong elasticity and good resistance to chemical and pathological damage. and it can be regenerated after injury. However, due to the weak adhesion between Descemet’s membrane and the stroma, DMD often occurs in eyes injured by external forces. In clinical practice, there



**Fig. 3.** a,b,c,d The DM was detached again as seen on AS-OCT on the seventh day postoperatively. a: Axial view 0° ~ 180°. b: Axial view 45° ~ 225°. c: Axial view 90° ~ 270°. d: Axial view 135° ~ 315°.



**Fig. 4.** a,b Slit lamp photographs showing subconjunctival filtering bleb and resolution of corneal edema of the right eye.



**Fig. 5.** a,b,c,d Complete, spontaneous resolution of Descemet's membrane detachment as seen on AS-OCT. a: Axial view 0° ~ 180°. b: Axial view 45° ~ 225°. c: Axial view 90° ~ 270°. d: Axial view 135° ~ 315°.

are also many other causes for DMD, such as surgery, shallow anterior chamber, and corneal endothelial dysfunction.<sup>1</sup> For ophthalmic surgery, DMD has most frequently been observed after cataract surgery, but it has also been reported in many other ophthalmic surgeries, such as peripheral iridectomy, trabeculectomy, lamellar keratoplasty, penetrating keratoplasty, vitrectomy, and so on.<sup>2–8</sup> Corneal edema and opacity, double anterior chamber, decreased vision, and even corneal endothelial dysfunction may appear once DMD happens. With the improvement of trabeculectomy, postoperative complications have been reduced significantly. However, DMD as a sight-threatening complication of trabeculectomy was rarely reported before. We believe that this is the first case with recurrent DMD that spontaneously recovered. Even so, we believe that DMD, once discovered, should be treated as soon as possible to save the patient's visual function.

Combined with the literature analysis, the reasons for DMD after trabeculectomy in this case might be as follows<sup>3,5,9</sup>: (1) The patient was elderly, and high IOP persisted for a long time before surgery. Prolonged corneal edema might cause the adhesion between the Descemet's membrane and the stroma to be much weaker; (2) The IOP of the affected eye was not reduced to normal before surgery. The sharp decline of IOP might loosen the adhesion between Descemet's membrane and corneal stroma, resulting in DMD; (3) The internal opening of the scleral tunnel is too close to the central cornea; (4) Due to the patient's poor physical condition, general anesthesia could not be performed, and the shaking of the patient's head caused by Parkinson's disease increased the difficulty of the surgery; (5) Shallow anterior chamber of the operative eye made the corneal incision more difficult than usual and the situation that the size of the internal opening of the auxiliary incision was smaller than that of the outer opening. These increased the risk of DMD. Furthermore, inadvertent injection of balanced salt solution between the stroma and DM might happen during the operation, and could also have been a cause of DMD.

The prognosis of DMD is related to the range and degree of detachment and whether the appropriate treatment is carried out. AS-OCT is an invaluable tool for assessing DMD. Minor DMD may be resolved spontaneously for some time.<sup>10</sup> Minkovitz JB. et al. found that DMD without scrolling is more likely to recover spontaneously, but with scrolling should be repaired early by surgery.<sup>11–14</sup> The Descemet's membrane/endothelial complex detached into the anterior chamber could also be nourished by aqueous humor. Therefore, the function of endothelial cells might be still maintained well within a period of time, and corneal transparency could be restored after spontaneous resolution of DMD. DMD with large detachment and scrolling will most likely not be able to recover spontaneously without surgical treatment. Anterior chamber injection of sterile air, inert gas, and viscoelastics was first recommended for the treatment of the patients with DMD. However, for persistent or recurrent DMD, Descemet's membrane suture or keratoplasty needs to be performed to save the visual function of patients.<sup>13,15</sup>

Due to the connection between the anterior chamber and the subconjunctival space, management of DMD after trabeculectomy is more challenging compared to those after cataract surgeries.

For this patient, the recurrent DMD that showed a broad detachment range resolved spontaneously. The reoperation, perioperative risks, and postoperative intraocular inflammation or infection were avoided, and the surgical injury to the corneal endothelial cells was also reduced to some extent. However, we noticed that the corneal endothelial cell density of the right eye was significantly lower than that of the contralateral eye. It was inferred that the prolonged DMD might cause corneal endothelial cell injury, though it recovered spontaneously. Moreover, the mechanism and required time for spontaneous resolution of DMD is still unclear. Although spontaneous resolution of DMD has been reported previously, most researchers still recommend to treat it immediately by surgery to save the patient's visual function, once it occurs.<sup>16</sup>

#### 4. Conclusion

DMD, a severe complication of intraocular surgery or ocular trauma, might resolve spontaneously in some cases. However, the mechanism involved in this process is still not clear and needs further investigation.

#### Declaration of competing interest

All authors declare that they have no competing interests.

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#### Authorship

All authors attest that they meet the current ICMJE criteria for Authorship. All authors read and approved the final manuscript.

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#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajoc.2022.101276>.

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