

Management of Bilateral Descemet's Membrane Detachment Following Cataract Surgery: A Case Report

**Pey Yih Ng, Vanitha Hema Ratnalingam, Sujaya Singh,
Fazliana Ismail, Shamala Retnasabapathy**

UM Eye Research Centre, Department of Ophthalmology, University of Malaysia, Malaysia

Abstract: Unilateral, small peripheral Descemet's membrane (DM) detachment (DMD) associated with cataract surgery is fairly common. However, bilateral DMD following uneventful cataract surgery is relatively rare. Conventional treatments for DMD include the injection of air, viscoelastic, or a gaseous tamponade agent. Here, we report a rare case of extensive bilateral DMD following uneventful cataract surgery and highlight a simple surgical approach that can be performed by a general ophthalmologist in treating DMD.

Keywords: Bilateral descemet detachment, Corneal venting incisions, Air tamponade

EyeSEA 2024;19(2):1-4

Background

Iatrogenic unilateral small Descemet's membrane (DM) detachment (DMD) during cataract surgery is common but is believed to be underreported,¹ while bilateral DMD following uneventful cataract surgery is relatively rare. Here, we report a rare case of extensive bilateral DMD following uneventful phacoemulsification cataract surgery. The detachments were successfully treated with corneal venting incisions and air tamponade.

Case Report

A 77-year-old woman, with underlying hypertension and dyslipidemia, was noted to have a Descemet's membrane (DM) detachment (DMD) in her left eye one week after uncomplicated phacoemulsification cataract surgery. Pneumatic descemetopexy was attempted by the surgeon but failed to reattach the DMD after which the patient was then referred to our center for further management. At presentation, her vision was 6/9 in the right

eye (OD) and perception of light (PL) in the left eye (OS). RAPD was negative. Slit lamp examination and AS-OCT showed a near-total, shallow, diffuse DMD with corrugations and multiple pockets of fluid (Figure 1a). Otherwise, the intraocular lens (IOL) was stable and the B-scan was unremarkable. The right eye showed the presence of an immature cataract.

The patient's left eye underwent corneal venting incisions with air tamponade under topical anesthesia. The left corneal epithelium was debrided to aid visualization. Air was injected into the anterior chamber as tamponade. Multiple venting incisions were then made over the pockets of fluid using a 20G MVR blade. Subsequently, the anterior chamber was maintained with 80% air. Post-operatively, the patient was prescribed topical Pred Forte and Moxifloxacin. The left DM reattached the next day and vision gradually improved to OS 6/24 ph 6/18 one week after the surgery. AS-OCT revealed resolution of the DMD (Figure 1b).

Correspondence to:

Pey Yih Ng, UM Eye Research Centre, Department of Ophthalmology, University of Malaysia, Malaysia

E-mail: peyyih@hotmail.com

Received : 3rd March 2021

Accepted : 21st November 2024

Published : 31st December 2024



Figure 1: AS-OCT image of LE (a) Prior to corneal venting incisions surgery: Near-total diffuse DMD. (b) 1 week after corneal venting incisions surgery: DM well adhered to posterior stroma.

One month later, the patient was referred again, this time for a DMD in the opposite eye, two weeks after uneventful phacoemulsification cataract surgery. At presentation, her vision was OD 6/18 ph 6/18 OS 6/18 ph 6/12. Examination of her right eye revealed generalized cornea edema with DMD (Figure 2a). AS-OCT demonstrated DMD from the superotemporal wound involving the peripheral cornea 360 degrees (Figure 3).

Similar corneal venting incisions with air tamponade surgery were performed to her right eye. The DM in the right eye was observed to have reattached to the posterior stroma the next day, although there was still remaining superficial DMD inferotemporally (Figure 2b). A repeat air tamponade with corneal venting incisions were carried out, and the DM successfully reattached.

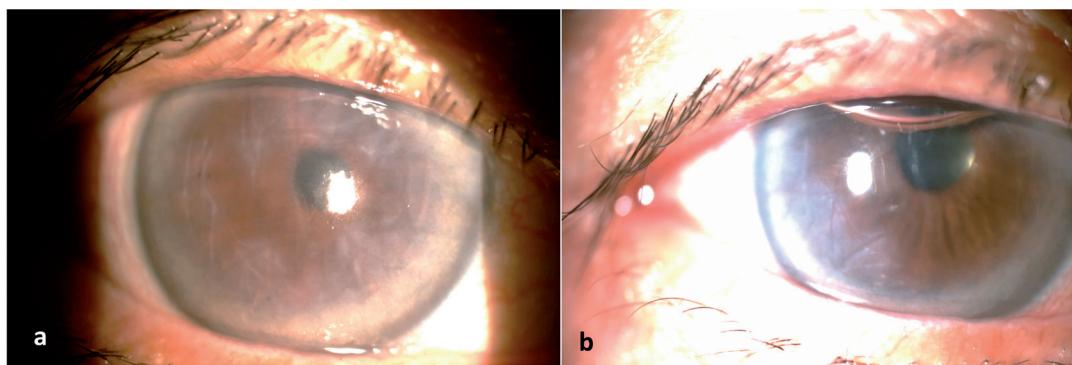


Figure 2: Anterior segment photo of RE (a) Prior to corneal venting incisions surgery: Diffuse corneal oedema (b) Post-operative day 1 of 1st corneal venting incision surgery: remaining superficial DMD inferotemporally

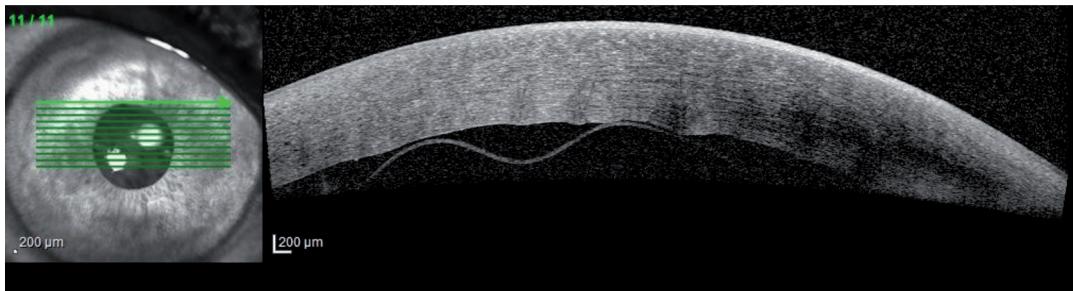


Figure 3: AS-OCT image of RE (Prior to corneal venting incisions surgery): RE DMD from superotemporal wound involving the peripheral cornea 360 degrees

Upon review one month later, both right and left eye Descemet's membranes were seen well attached to the stroma and right vision restored to 6/12 (due to macular epiretinal membrane) and left to 6/6.

Discussion

Descemet's membrane (DM) detachment (DMD) is a distressing complication of cataract surgery that can result in irreversible visual loss due to bullous keratopathy and corneal scarring. It occurs when fluid enters the pre-Descemet's membrane (DM) space through a break in the membrane. Due to the termination of the Schwalbe line, the clear corneal incision is the major site of DMD associated with cataract surgery, particularly if the incision wound is jagged.¹⁻⁴ The friction between the phaco handpiece against the corneal wound can lead to mechanical injury to the DM, potentially causing avulsion.⁵ In some cases, this injury may extend and result in a larger DMD.

Other well-established risk factors for DMD have also been identified: (1) Genetic: Among endothelial dystrophies, Fuchs' endothelial dystrophy (FED) is the most well-known autosomal dominant condition. Slow progressive endothelial cell loss, dysfunction of sodium-potassium ATPase pumps, loosening of tight junctions between endothelial cells, and abnormal banding of the DM weaken the adhesion between the DM and the posterior stroma.^{6,7} (2) Older age: Peripheral degeneration and age-related thickening of the DM further compromise the bond between the DM and the posterior stroma.⁸ (3) Ocular factors: Hard cataracts or complicated surgeries requiring

more intraoperative manoeuvres increase friction between instruments and the corneal wound, contributing to DMD.⁵ (4) Iatrogenic factors: Blunt instruments and the surgeon's skill are also identified as contributing factors.^{4,8}

There is no gold standard in treating DMD and the choice between early repair and conservative treatment remains debatable.⁹ Mackool et al. classified DMD into planar (DMD \leq 1 mm from posterior stroma) and non-planar (DMD $>$ 1 mm from posterior stroma).¹⁰ According to their observation, planar DMD has a good prognosis with spontaneous resolution, while non-planar DMD should be offered surgical intervention earlier as it does not resolve spontaneously.¹⁰ However, Samarawickrama et al. suggested early surgical repair of DMD should be considered if the DMD involved visual axis, regardless of whether it is planar or non-planar.¹¹

Conventional surgical treatment of DMD includes injection of either air, viscoelastic, or a gaseous tamponade agent such as C3F8 and SF6.^{3,12} Gaseous tamponade agents are effective in treating DMD, but no studies have been performed to assess their corneal safety profile.

The presence of fluid in the pre-DM space hinders the apposition of the DM against the posterior stroma and can contribute to the failure of pneumatic descemetopexy, as seen in our case. This can be addressed by draining the fluid sandwiched between the DM and posterior stroma using corneal venting incisions performed over the fluid pockets. The air acts as a tamponade, helping to oppose the DM against the posterior stroma. In our case, bilateral DMD was resolved completely using this technique.

Conclusion

Cataract surgery is a refractive procedure where patients often have high expectations for visual recovery. Delaying DMD repair not only delays visual rehabilitation but also increases the risk of bullous keratopathy and corneal scarring. Early surgical intervention should be performed for DMD involving the visual axis. Corneal venting incisions with air tamponade offer good visual outcomes and should be considered in patients with large Descemet's membrane detachments.

Ethics

This report complies with all local laws and the principles of the Declaration of Helsinki.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Keywords

Descemet's membrane detachment, Corneal venting incisions, Air tamponade

Abbreviations

AS-OCT	Anterior segment optical coherence tomography
DM	Descemet's membrane
DMD	Descemet's membrane detachment
FED	Fuchs' endothelial dystrophy
IOL	Intraocular lens
LE/OS	Left eye
PL	Perception-of-light
RAPD	Relative afferent pupillary defect
RE/OS	Right eye

References

1. Anderson CJ. Gonioscopy in no-stitch cataract incisions. *J Cataract Refract Surg*. 1993;19(5):620-1.
2. Monroe WM. Gonioscopy after cataract extraction. *South Med J*. 1971;64(9): 1122-4.
3. Ti SE, Chee SP, Tan DT, Yang YN, Shuang SL. Descemet membrane detachment after phacoemulsification surgery: risk factors and success of air bubble tamponade. *Cornea*. 2013;32(4):454-9.

4. Titiyal JS, Kaur M, Ramesh P, Shah P, Falera R, Bageshwar LMS, Kinkar A, Sharma N. Impact of Clear Corneal Incision Morphology on Incision-Site Descemet Membrane Detachment in Conventional and Femtosecond Laser-Assisted Phacoemulsification. *Curr Eye Res*. 2018;43(3):293-9.
5. Dai Y, Liu Z, Wang W, Han X, Jin L, Chen X, et al. Incidence of Incision-Related Descemet Membrane Detachment Using Phacoemulsification With Trapezoid vs Conventional 2.2-mm Clear Corneal Incision: A Randomized Clinical Trial. *JAMA Ophthalmol*. 2021;139(11):1228-34.
6. Moshirfar M, Somanı AN, Vaidyanathan U, Patel BC. Fuchs Endothelial Dystrophy. 2023 Jul 31. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.
7. Nanda GG, Alone DP. REVIEW: Current understanding of the pathogenesis of Fuchs' endothelial corneal dystrophy. *Mol Vis*. 2019;25:295-310.
8. Beniwal A, Vanathi M, Venugopal A, Chaurasia S, Tandon R. Descemet's membrane detachment: An updated comprehensive review of etiopathogenesis, diagnosis, and management. *Indian J Ophthalmol*. 2024;72(11):1560-8.
9. Marcon AS, Rapuano CJ, Jones MR, Laibson PR, Cohen EJ. Descemet's membrane detachment after cataract surgery: management and outcome. *Ophthalmology*. 2002;109(12):2325-30.
10. Mackool RJ, Holtz SJ. Descemet membrane detachment. *Arch Ophthalmol*. 1977;95(3):459-63.
11. Samarawickrama C, Beltz J, Chan E. Descemet's membrane detachments post cataract surgery: a management paradigm. *Int J Ophthalmol*. 2016;9(12):1839-42.
12. Shalchi Z, O'Brart DP, Ilari L. Bilateral descemet membrane detachment following cataract surgery. *JAMA Ophthalmol*. 2013;131(4):533-5.