

Descemet membrane detachment post-viscoelastic injection for ocular hypotony

Nurul Faaiah Jainuddin¹, Amir Samsudin¹,
Norlina Ramli¹, Sujaya Singh¹

¹*Department of Ophthalmology, University Malaya,
50603 Kuala Lumpur, Malaysia.*

Background: To report a case of extensive Descemet membrane detachment treated with repeated air Descemetopexies and venting incisions.

Results: A 69-year-old diabetic and hypertensive man with medically uncontrolled mixed POAG and pseudophakic glaucoma underwent left eye Ahmed valve implantation. Although the implantation was uneventful, the eye had a shallow anterior chamber (AC) with iridocorneal touch on the first post-operative day, due to overfiltration. We performed AC reformation using Healon GV on the same day. The following day, an extensive Descemet membrane detachment was seen, confirmed by anterior segment optical coherence tomography (AS-OCT). With non-resolution after 1 week, and worsening of vision to hand movement perception, we performed Descemetopexy and AC reformation with Healon GV on day 8 after the initial surgery. On day 16, visual acuity was 6/24 although there was still partial detachment of the Descemet membrane. We repeated Descemetopexy with venting incisions. The detachment completely resolved after 20 days. About 2 months later, visual acuity was 6/24 with mild interface scarring. IOP was well controlled.

Conclusion: Early and repeated Descemetopexy in extensive Descemet membrane detachment can lead to reattachment and return of useful vision.

Conflicts of interest: The authors report no conflicts of interest.

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Background

Descemet Membrane Detachment (DMD), first reported in 1928 by Bernard Samuels¹, occurs when there is a separation of the endothelium-Descemet Membrane complex from the posterior corneal stroma. It is a potentially serious complication of intraocular surgery or trauma. It most often occurs after cataract surgery, but can also occur after

a wide range of ophthalmic procedures. The natural history of DMD has long been an area of controversy, and the appropriate timing for intervention remains unclear.² Most DMDs remain small and localized to the wound, but some cases can present with large, extensive detachments which result in severe corneal edema, a double anterior chamber, corneal decompensation and reduced visual acuity. Most surgeons attempt to reattach the membrane by injecting air, slowly-reabsorbing gases, or viscoelastic substances into the anterior chamber.¹ The literature also contains reports of spontaneous reattachment of large DMD.²

Correspondence to:

Nurul Faaiah Jainuddin, *Department of Ophthalmology, University Malaya, 50603 Kuala Lumpur, Malaysia.* E-mail: nurulfaaiqah239@gmail.com

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Descemet Membrane detachment post glaucoma surgery and Ahmed Glaucoma Valve implantation is unusual.⁴ Its management is more challenging since the eye is no longer a closed system and tamponade agents can escape through the tube.⁴ We present a case of Descemet Membrane Detachment (DMD) in a patient who underwent uneventful Ahmed Glaucoma Valve (AGV) implantation but was complicated by early post-operative shallow anterior chamber (AC) and hypotony. Viscoelastic (Healon GV) was injected into the AC on the 5th post-op day but this was complicated by a large central DMD, confirmed by anterior segment optical coherence tomography (AS-OCT). Surgical intervention led to Descemet Membrane reattachment and satisfactory visual outcome.

Case history

A 69-year-old diabetic Chinese man with medically uncontrolled, mixed POAG and pseudophakic glaucoma underwent left eye Ahmed Glaucoma Valve (AGV) implantation. About 5 years before that, he had a complicated left eye cataract operation done at another centre. At that time, the patient had intraoperative iris prolapse and iris trauma. Subsequently, he had slow visual recovery, with prolonged anterior chamber inflammation. He also developed secondary glaucoma post operatively, with intraocular pressures (IOP) ranging from 20-30 mmHg with maximal medical treatment. In September 2016, the patient underwent left eye micropulse laser trabeculoplasty. The IOP came down for few months but later increased again. Just prior to the AGV surgery, the patient's best corrected visual acuity (BCVA) for both eyes was 20/25. IOP was 20 mmHg in the right eye with one antiglaucoma medication, and 30 mmHg in the left eye with 4 antiglaucoma medications. On examination, both eyes had clear corneas and deep anterior chambers. Fundus exam-

ination showed cup:disc ratios (CDR) of 0.8 in both eyes. The macula and peripheral retina were normal. On gonioscopy, the right eye angle was open but the left eye had peripheral anterior synechiae in the superior and inferior quadrants. Although the AGV implantation was uneventful, on the 1st post-operative day, the patient had a shallow anterior chamber (AC) with iridocorneal touch due to overfiltration. The IOP was 5 mmHg. The patient underwent AC reformation with Healon GV on day 2 and day 5 post operatively, at the slit lamp microscope from the side port at 2 o'clock. During the second AC reformation, part of the Healon GV entered the space between the Descemet Membrane and posterior corneal stroma, causing a large central Descemet Membrane detachment. His visual acuity dropped to hand movement due to significant corneal edema. The detachment was confirmed with anterior segment optical coherence tomography (AS-OCT) (Figure 1).

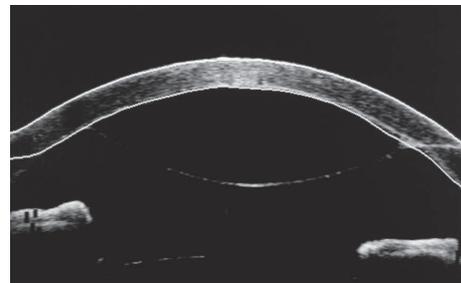


Figure 1: AS-OCT showed central Descemet Membrane Detachment post AC reformation with Healon GV

He underwent surgical intervention for DMD. Intraoperatively, an attempt was made to release the viscoelastic from the side port at 2 o'clock by gently pressing on the posterior lip of the wound while a new side port was made at 4 o'clock to inject Healon GV into the anterior chamber.

The first Descemetopexy was attempted with a cohesive viscoelastic as air or gas would have easily escaped through the AGV tube. No venting incision was attempted as escape of cohesive viscoelastic through the small incisions was assumed not possible. Post-operatively, a bandage contact lens (BCL) was applied and the patient was treated with Gutt Pred Forte and Gutt Vigamox 2 hourly. Post-intervention, there was still a persistent partial Descemet Membrane Detachment, for which the patient underwent a second procedure one week later. The reason to wait for 1 week was to let the viscoelastic degenerate so it would become easier to express out of the trapped space. During the second surgical procedure, again the initial side port was depressed to release the remaining viscoelastic trapped in the space and it was noted to have liquified. Subsequently, non-expansile 12% C_3F_8 was injected into the anterior chamber and 4 venting incisions were made. Venting incisions were made at the second surgery as we expected the viscoelastic to have liquified so it would be easier for it to escape through the incisions. Post-operatively, another BCL was applied and the patient given G. Pred Forte and G. Vigamox 2 hourly. The patient responded well to this intervention, and the cornea became clear and detachment resolved completely. At his last follow up, the patient's refraction was $+0.25/-1.00 \times 55$ (6/6⁻²) for his right eye and $+2.00 /-1.00 \times 45$ (6/30 ph 6/24) for his left eye. Endothelial cell count was done, which was 4427 cells/mm² for his right eye and 1172 cells/mm² for his left eye. The cornea had mild interface scarring but AS-OCT showed no more Descemet Membrane detachment (Figure 2). The IOP was also well controlled at 16mmHg. Currently 2 years post-operatively, his vision remain good and IOP well controlled with 2 anti glaucomas

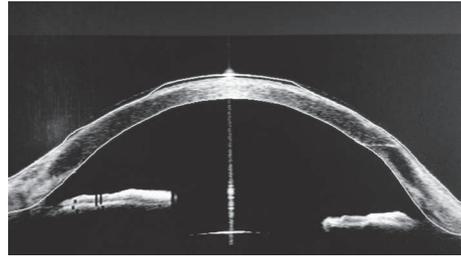


Figure 2: AS-OCT of resolved Descemet Membrane Detachment after venting incision.

Discussion

Descemet Membrane Detachment (DMD) is a rare but sight-threatening complication. Predisposing factors include shallow AC, accidental insertion of instruments or saline or OVD between the posterior stroma and DM, blunt keratomes, or weak adhesions between the posterior stroma and DM.³⁻⁶ In our case, accidental injection of Healon GV between the posterior stroma and DM was the cause of DMD. Sometimes diagnosis of DMD on slit lamp examination may be difficult due to significant corneal edema.⁴ AS-OCT is thus a useful tool to diagnose and monitor the progress of DMD.⁷

Minor DMD may resolve spontaneously without medical intervention, but large detachments should be repaired in a timely manner as there is potential for irreversible damage to the cornea.⁴ The management includes both medical and surgical treatments, depending on the size and severity of the detachments.^{2,4}

In our case, one of the lessons to be learned is that viscoelastic (or other liquids e.g. balanced saline) injection, especially into shallow anterior chambers, should be performed with the use of microscopes. This would enable easier visualisation of the tip of the cannula, to ensure proper placement inside the anterior chamber before injecting. In reforming anterior chambers, a common viscoelastic used is Healon GV as its properties are very suitable in an-

terior chamber reformation post filtration surgery. It has high molecular weight and high viscosity up to 500,000 times that of aqueous humour.⁹ The molecules are easily deformed and it has been reported that Healon GV remains in the anterior chamber for less than 6 days.⁸ It was explained in our case that the first intervention was to release the viscoelastic through the side port. Only after 1 week when we expected the Healon GV to have degraded, then we do the venting incisions, and indeed it was easily expressed from the trapped space.

Conclusion

Descemet Membrane Detachment (DMD) after injection of viscoelastic into the anterior chamber is a known complication and can lead to severe and extensive corneal edema. Early recognition and repair of the detachment may prevent complications, such as corneal decompensation, corneal opacities and oedema, and an overall decline in visual acuity.

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