



Case report

Descemet's membrane detachment following an intracameral injection of viscoelastic

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1. Introduction

Descemet's membrane detachment (DMD) is a well-described complication of intraocular surgery. Most commonly reported following cataract surgery, DMD has also been observed after such ophthalmic procedures as cyclodialysis cleft creation, holmium laser sclerostomy, iridectomy, pars plana vitrectomy, penetrating keratoplasty, trabeculectomy, and viscocanalostomy.¹ Descemet's membrane detachment has also been reported as a complication of intracameral viscoelastic injection for hypotony following trabeculectomy.²

A single case of elevated intraocular pressure (IOP) due to pupillary block associated with spontaneous, hemorrhagic DMD has been reported in the setting of suspected interstitial keratitis.³ Herein, we report a case of a DMD created during an intracameral injection of sodium hyaluronate (23mg/ml) (Abbott Medical Optics Inc., Santa Ana, CA, USA) to reform a shallow anterior chamber. We further describe how anterior segment optical coherence tomography may be useful to confirm this finding when it is not clearly apparent on clinical examination.

2. Case report

An 81-year-old man was referred to New York Eye and Ear Infirmary of Mount Sinai (NYEE) for suspected malignant glaucoma in his left eye. His ophthalmic history was notable for an ischemic central retinal vein occlusion with subsequent development of neovascular glaucoma in his left eye for which he had undergone Ahmed glaucoma valve (New World Medical Inc., Rancho Cucamonga, CA, USA) implantation 10 days previously. The operating surgeon had noted hypotony and a shallow anterior chamber on the third postoperative day and injected sodium hyaluronate (23mg/ml) (Abbott Medical Optics Inc., Santa Ana, CA, USA) in an attempt to reform the anterior chamber. The IOP was reportedly elevated (range 14–24 mm Hg) at subsequent follow-up visits over the next 6 days and the patient was referred to NYEE for further management of the shallow anterior chamber.

On initial examination of the patient's left eye, the visual acuity was counting fingers at 3 inches and the IOP was 14 mm Hg by Goldmann applanation tonometry. Slit lamp examination revealed a shallow

peripheral anterior chamber and with areas of iris bombé. The central anterior chamber appeared moderately deep over the phakic lens. The intraocular portion of the Ahmed tube was embedded in the superotemporal iris and the proximal tip appeared occluded. Significant nuclear sclerosis of the lens prevented adequate visualization of the fundus. B-mode echography demonstrated moderate nasal and temporal serous choroidal detachments. A large central DMD was suspected but difficult to confirm due to significant corneal edema. (Fig. 1). The DMD was clearly visualized using spectral domain anterior segment optical coherence tomography (AS-OCT) (Heidelberg Engineering, Heidelberg, Germany) (Fig. 2).

After obtaining informed consent, topical anesthesia was administered and a drop of povidone iodine was instilled into the left eye. A sterile eyelid speculum was inserted. A 25g needle on a tuberculin syringe was introduced into the viscoelastic-filled cavity between the corneal stroma and Descemet's membrane under direct visualization using a slit lamp biomicroscope. The sodium hyaluronate was aspirated until Descemet's membrane was observed to contact the tip of the needle. This procedure was repeated multiple times until most of the sodium hyaluronate was removed. The anterior chamber was then filled with sodium hyaluronate (10 mg/ml) (Abbott Medical Optics Inc., Santa Ana, CA, USA) until a physiologic pressure was achieved. The patient was discharged on topical antibiotic, steroid, and cycloplegic agents.

At follow-up 2 days later, a central Descemet's detachment remained, although of considerably smaller size. The endothelium was no longer in contact with the lens (Fig. 3). The iris bombé noted on initial exam had become less pronounced. Sodium hyaluronate was still present in the anterior chamber and the IOP was 10 mm Hg. The peripheral choroidal detachments were smaller and completely resolved over the next week. The IOP remained stable between 10 and 14 mm Hg at subsequent visits and the central DMD improved as residual sodium hyaluronate dissipated. After one month, the inflammatory debris between Descemet's and stroma reabsorbed and the DMD reattached. The patient eventually underwent cataract extraction and Descemet stripping automated endothelial keratoplasty.

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Fig. 1. Image of the affected eye showing seemingly moderate central depth. The posterior slit lamp beam delineates the Descemet's membrane detachment with lens-endothelial touch.

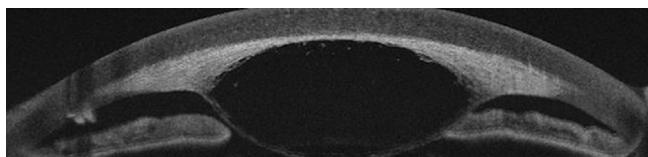


Fig. 2. Spectralis spectral domain anterior segment optic coherence tomography (Heidelberg Engineering, Heidelberg, Germany) showing the detached Descemet's membrane with iridocorneal touch in the horizontal meridian.

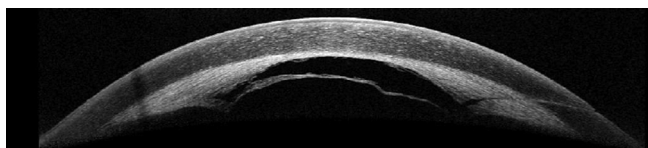


Fig. 3. Spectralis spectral domain anterior segment optic coherence tomography (Heidelberg Engineering, Heidelberg, Germany) after removal of viscoelastic from between the corneal stroma and detached Descemet's membrane illustrating smaller Descemet's detachment in the horizontal meridian.

3. Discussion

Determining the etiology of a shallow anterior chamber following glaucoma drainage device implantation can be challenging. Distinguishing pupillary block, malignant glaucoma, and overfiltration requires careful examination of the anterior and posterior segments and assessment of the IOP. Pupillary block typically presents with elevated IOP, anterior bowing of the peripheral iris, and a relatively deep central anterior chamber. In contrast, malignant glaucoma classically presents with a normal or elevated IOP and shallowing of both the central and peripheral anterior chamber due to forward displacement of the entire lens-iris diaphragm. While overfiltration may present with a uniformly shallow anterior chamber resembling that observed in malignant

glaucoma, a relatively low IOP distinguishes this condition. Additionally, while a soft, overfiltering eye is usually amenable to re-formation with intracameral viscoelastic, anterior chamber injection in an eye with malignant glaucoma is often difficult due to rapid elevation of the IOP.

Suprachoroidal hemorrhage and annular peripheral choroidal detachment may also present with a shallow peripheral anterior chamber. B-mode echography can confirm or rule out the presence of suprachoroidal hemorrhage. Annular peripheral choroidal detachments are clinically indistinguishable from malignant glaucoma although they may, in some cases, be visible on ultrasound biomicroscopy. Some cases of presumed malignant glaucoma amenable to medical therapy may represent misdiagnosed annular choroidal effusions.

In our patient, what was initially perceived to be the anterior chamber was actually a pocket of sodium hyaluronate within the cornea. Imaging with AS-OCT was very helpful in confirming the correct diagnosis, as the fine Descemet's membrane was difficult to visualize with the slit lamp. Anterior segment OCT uses the principle of low-coherence interferometry instead of ultrasound to produce high-resolution, cross-sectional images. Most devices can scan angle-to-angle and offer the advantage of being performed in non-contact fashion. The Visante anterior segment OCT (Carl Zeiss Meditec, Dublin, CA, USA) is a time domain OCT that uses a wavelength of 1310 nm and is designed specifically for imaging the anterior segment. Newer spectral domain OCT devices allow imaging of the anterior segment with higher image resolution, but provide limited visualization of the structures posterior to the iris due to a shorter wavelength, often in the range of 830–870 nm. Anterior segment swept source OCT complements the shortcomings of time domain OCT and spectral domain OCT. Its faster scanning speed and longer wavelength allow for high-resolution, deep-penetration images of the entire anterior segment in a few seconds.

In our patient, the inadvertent intracorneal injection of sodium hyaluronate resulted in separation of Descemet's membrane which was forced posteriorly against the iris and lens. Accumulation of aqueous humor in the posterior chamber subsequently led to sectoral anterior bowing of the peripheral iris with iridocorneal touch. Notably, the IOP during the initial exam was not elevated, perhaps due to aqueous hyposecretion in the setting of supraciliary effusion and postoperative inflammation. Aspiration of the sodium hyaluronate allowed Descemet's membrane to separate from the iris and lens at the pupillary margin, re-establishing normal anterior segment anatomy and aqueous flow, and averting further IOP elevation.

This case illustrates a complication of an anterior chamber viscoelastic injection in an eye with hypotony. Entry into the anterior chamber during the creation of a paracentesis or an intracameral injection in a soft eye is difficult due to the lack of corneal rigidity, thereby increasing the risk of Descemet's detachment. Careful clinical examination along with the aid of AS-OCT allowed for the correct diagnosis to be made and treatment rendered.

References

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