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Case report

Ocular coherence tomography for the diagnosis of Descemet's detachment after deep sclerectomy and resolution after intracameral air injection

Abdulrahman AlZaid[a,*], Abdulrahman AlDarrab[b,c], Rizwan Malik[b], Ohoud Owaidhah[b]

[a] Vitreoretinal Division, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia
[b] Glaucoma Division, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia
[c] Department of Surgery, College of Medicine, Prince Sattam Bin Abdulaziz University, Alkharj, Saudi Arabia

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ABSTRACT

Purpose: to report the use of optical coherence tomography (OCT) in a case of Descemet's membrane detachment (DMD) secondary to a nonpenetrating deep sclerectomy (NPDS) and the efficacy of intracameral air injection for management.

Observations: DMD was identified by anterior segment OCT (AS-OCT) in a 61-year-old male patient who was blind in the right eye and had advanced open angle glaucoma. This patient underwent NPDS in the left eye and developed localized corneal edema postoperatively. Air was injected into the anterior chamber resulting in reattachment of Descemet's membrane and resolution of corneal edema.

Conclusions and Importance: This case highlights the need for a high suspicion of DMD in cases of localized corneal edema after non-penetrating surgery. Following confirmation with AS-OCT, DMD can be successfully managed with air injection. DMD is a rare complication of NPDS with all the reported cases associated with implant. To the best of our knowledge, this is the first case report of NPDS without any type of implant.

1. Case report

A 61-year-old male was referred to the glaucoma clinic with high intraocular pressure (IOP) in the left eye. The patient was a diabetic and hypertensive. His right eye had no light perception vision due to neovascular glaucoma (NVG). His previous ocular history of his seeing left eye included branch retinal vein occlusion with subsequent macular edema that was treated with multiple injection of intravitreal Ranibizumab.

On examination of his left eye, the visual acuity (VA) was 20/100 with an IOP of 40 mmHg measured by Goldmann applanation tonometry (GAT), the cornea was clear with a deep and quite anterior chamber, clear lens, open angle on gonioscopy and advanced optic disc cupping with a cup–to-disc ratio of 0.9. The patient was diagnosed with primary open angle glaucoma (POAG) and topical anti-glaucoma medications were started for his left eye. However, IOP was not controlled despite a maximally tolerated topical anti-glaucoma medication regimen of Combigan (brimonidine tartrate 0.2%/timolol maleate 0.5%, Allergan, NJ) twice daily, Azopt (brinzolamide 1%, Alcon, Fort Worth) twice daily and Travatan (travoprost 0.004%, Alcon, Fort Worth) once daily. Hence, selective laser trabeculoplasty was performed on the left eye and the topical anti-glaucoma regimen was initiated again. However, the IOP was still 20 mmHg, which was above the target level.

Hence, surgical intervention was planned and the patient underwent non-penetrating deep sclerectomy (NPDS) with mitomycin C 0.2 mg/ml in the left eye under local anesthesia. The surgery was uneventful without any penetration or any type of implant. Good separation of the iris and corneal endothelium had been maintained intraoperatively and there was no collapse of the anterior chamber. There was adequate operculation of aqueous into the scleral lake intraoperatively and viscodilation of Schlemms canal was not performed. On the second day following surgery, he was asymptomatic. The vision in the left eye was the same as preoperatively and the IOP was 13 mmHg. The bleb was patent with no leak and the cornea was clear. The patient was discharged on Oflox (ofloxacin 0.3%) drops four times daily for 1 week and Pred Forte (Prednisolone acetate 1%) drops tapering over 1 month. At 20 days postoperatively, the ophthalmic examination was unremarkable. At 50 days postoperatively, the visual acuity had decreased to 20/300 with IOP measured at 13 mmHg by GAT with a localized bleb, localized corneal edema with Descemet's folds in upper third of cornea towards the bleb (Fig. 1A and 2B). The clinical examination raised the suspicion for DMD. AS-OCT confirmed the suspicion of DMD (Fig. 1C). Air injection into the anterior chamber

* Corresponding author.
E-mail address: azaid@kkesh.med.sa (A. AlZaid).

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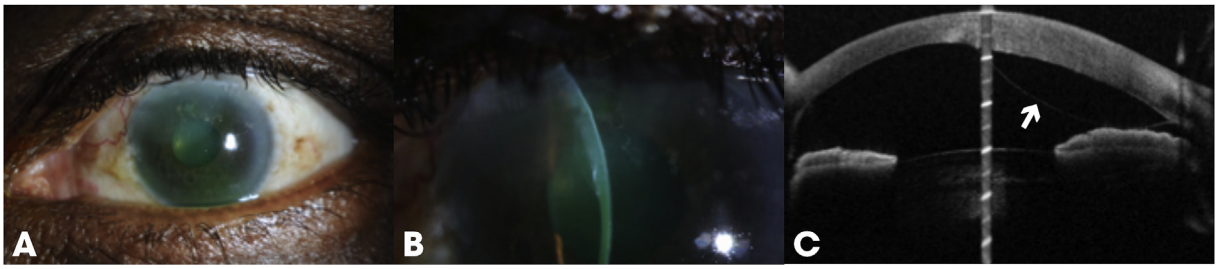

Fig. 1. A) External photo of the left eye showing localized superonasal corneal edema. B) slit lamp photo showing localized superonasal corneal edema. C) Anterior segment optical coherence tomography (AS-OCT) confirming Descemet's membrane detachment (arrow).

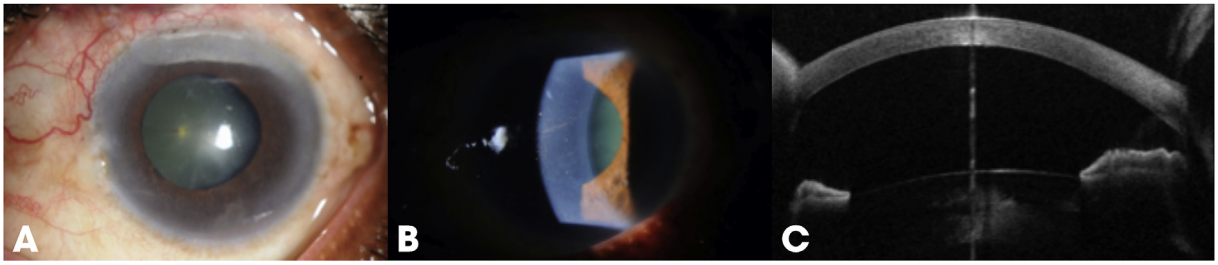

Fig. 2. A) External photo of the left eye showing a clear cornea 1 week after air injection for Descemet's detachment. B) Slit lamp photo 1 week after air injection showing clear cornea. C) AS-OCT 1 week after air injection confirming reattachment of Descemet's membrane.

(AC) was performed using 30-gauge needle under aseptic conditions filling 80% of the AC. Post-injection, Oflox (ofloxacin 0.3%, Allergan, NJ) drops were prescribed four times daily for 3 days. At 1 week follow up the vision improved to the baseline measurement of 20/100 and IOP remained at 13 mmHg, with a well- formed localized bleb and clear cornea with pigmented semicircular line delineating the old DMD and another perpendicular pigmented line formed toward the bleb (Fig. 2A, B). AS-OCT was repeated confirming reattachment of Descemet's membrane (Fig. 2C).

2. Discussion

DMD is classified as planar when there is 1 mm or less separation of Descemet's membrane (DM) and non-planar DMD when the separation exceeds 1 mm. Planar detachments carry a much better prognosis than non-planar detachments, with or without descemetopexy.[1] A larger detachment leads to more severe corneal edema and marked reduction in visual acuity. Descemet's membrane detachment (DMD) is a rare complication that usually occurs after cataract, glaucoma and corneal surgeries and is likely due a break in Descemet's.[2,3] DMD with mild corneal edema can be observed by slit lamp biomicroscopy. However, in the presence of significant corneal edema, diagnosis with slit lamp is challenging.[4–6]

DMD is an unusual complication after external non-penetrating deep sclerectomy. To the best of our knowledge, published reports of DMD after deep sclerectomy are rare.[4,10] DMD can easily be overlooked or misdiagnosed after non-penetrating glaucoma surgery and AS-OCT can aid in the presence of significant corneal edema.[5,6]

Treatment options include observation, descemetopexy using intracameral air or expandable gas injection (sulphur hexafluoride SF_6 or perfluoropropane C_3F_8), viscoelastic injection, transcorneal suturing, endothelial keratoplasty, and conventional penetrating keratoplasty in persistent cases.[7–9]

Although there is no clear cause for DMD after non-penetrating deep sclerectomy (NPDS), trabeculo-DM offering a potential route for fluids to extend behind the corneal stroma and separate the DM have been hypothesized[4,10], although recurrent DMD has not been reported so far. There are few reports of DMD after a non-penetrating deep sclerectomy. Osman et al.[4] reported a case of total DMD after an uncomplicated external NPDS with mitomycin C and SK-Gel implant. Their case presented with severe corneal edema, confirmed by ultrasound biomicroscopy (UBM) and was managed with 15% SF_6 gas injection into the AC.[4]

Ravinet et al.[10] retrospectively reviewed nine eyes of nine patients with DMD after non-penetrating filtering surgery. Both planar and nonplanar detachments were observed and neither scrolls nor tears in the Descemet membrane were observed in any patient.[10] Five patients underwent deep sclerectomy (DS) with a collagen implant; the detachment developed after weeks to months postoperatively with adjacent corneal edema.[10] Four patients underwent viscocanalostomy: the detachment was noticed shortly after the procedure, and the cornea remained clear.[10] Four patients had descemetopexy while the other five had only conservative treatment with observation.[10] Two detachments persisted although they diminished in size: one after viscocanalostomy and conservative treatment and one after descemetopexy after deep sclerectomy with a collagen implant.[10] However, at last follow up none of the patients had any clinical signs of significant corneal damage that was confirmed by specular microscopy and pachymetry.[10]

Kozobolis et al.[11] reported a case of hemorrhagic DMD after deep sclerectomy. The hemorrhage was resorbed rapidly in the first two weeks after presentation and then the rate of absorption decreased.[11] There was a complete reattachment of DM 6 months postoperatively without any intervention, with a para-central corneal scar.[11] The bleb was not functionally impaired during the entire postoperative period and intraocular pressure remained at the target level.[11]

Ultrasound biomicroscopy (UBM) and anterior segment optical coherence tomography (AS-OCT) are useful tools to visualize, locate, and guide surgical repair of DMDs, particularly if hazy media impede satisfactory visualization.[12,13] AS-OCT remains the best imaging tool because of the higher resolution, speed and ease of image acquisition, the ability to image patients in the upright position, and acquisition of images without direct corneal contact that may reduce the risk of infection. In our case, AS-OCT played an important role in confirming the diagnosis especially in the presence of significant cornea edema as well as in confirming reattachment after intracameral air injection.

In conclusion, postoperative corneal edema after NPDS should raise the suspicion of DMD. DMD can occur following NPDS even in cases without any penetration or implant use. AS-OCT is not an invasive tool

that can confirm diagnosis and reattachment without any risk. Intracameral air injection is relatively safe and effective in managing DMD post-NPDS and should be attempted before considering more invasive options.

Patient consent

Consent was not obtained to publish the case report, as it does not contain any personal information that could lead to the identification of the patient.

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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