A case of inferior rhegmatogenous Descemet’s membrane detachment after stromal hydration in cataract surgery

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We describe the uncommon case of an inferior rhegmatogenous Descemet’s membrane detachment (DMD) from stromal hydration at the side port during cataract surgery that was successfully treated with pneumodescemetopexy and head posturing. A temporally located, transverse and inferior, DMD was noted during stromal hydration. An air bubble was inserted at the end of cataract surgery. This failed to appose the detached Descemet’s membrane against the overlying stroma because of the inferior location of the detachment and the superior position of the bubble without appropriate head positioning. Corneal edema persisted with an associated visual acuity of counting fingers. Two weeks after initial cataract surgery, a further air bubble with appropriate head positioning (Trendelenburg, ie, feet up and head down) for 6 hours was performed. The patient’s corneal edema and associated poor vision almost completely resolved within the 6 hours of air bubble reinsertion and appropriate head positioning. His corrected distance visual acuity remains at 6/6.

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Small Descemet’s membrane detachments (DMDs) are a relatively frequent intraoperative complication, seen more commonly in extracapsular cataract extraction and manual small-incision cataract surgery than in phacoemulsification. Older articles report rates as high as 43%, but this figure includes subclinical detachments that mostly reattached with conservative management and were only diagnosed on gonioscopy. Moderate to large detachments that require intervention are seen in less than 0.5% of cataract surgeries.

CASE REPORT
We present the rare case of an inferior DMD that involved the central visual axis and initially failed to reattach because of inappropriate superior positioning of the air bubble. Our case highlights the importance of appropriate head posturing for an adequate time period in order for the pneumodescemetopexy to be effective.

Our patient was a 65-year-old man with no previous ophthalmic history. He underwent routine phacoemulsification cataract extraction surgery by a junior trainee with a sub-Tenon regional block. During the final stage of stromal hydration to the temporal side-port wound, a transverse tear in the Descemet’s membrane (DM) was seen to spread from the wound inferiorly. The senior consultant took over and inserted an air bubble filling roughly 80% of the anterior chamber in an effort to appose the detached DM to its overlying stroma. The patient was discharged home on topical steroids and antibiotics and reviewed the next morning. A small air bubble was positioned superiorly, and there was significant corneal edema with a visual acuity of hand movements. He continued topical steroid and antibiotic therapy and was reviewed again the next week. The air bubble had reabsorbed at this stage, but corneal edema and poor acuity persisted (Figure 1). The classic undulating membrane associated with rhegmatogenous tears was seen on anterior segment optical coherence tomography (Figure 2). The decision was made for reinsertion of an air bubble over the next few days with appropriate Trendelenburg head posturing for 6 hours. Again, an air bubble filling roughly 80% of the anterior chamber was inserted with immediate head posturing. After 6 hours, the patient was examined, and it was noted that the corneal edema had completely resolved, and there was associated visual improvement to 6/9 on Snellen testing (Figure 3). Over the next few days, the patient was reexamined, and his cornea remained clear.
His vision improved to 6/6 and remained so after 1 month of follow-up (Figure 4).

DISCUSSION
Some classification systems exist for Descemet’s detachments that attempt to predict the severity of the detachment and help guide the surgeon in ongoing management, weighing up the possibility of spontaneous reattachment against the need for surgical intervention.

Mackool and Holtz classified detachments as planar (DM and stromal separation < 1.0 mm) and nonplanar (DM and stromal separation > 1.0 mm). They suggested that planar detachments were more likely to resolve conservatively and that nonplanar detachments were less likely to spontaneously resolve, thus requiring intervention.

Samarawickrama et al propose another classification system, dividing DMD into 2 categories: peripheral and central. They suggested observation of peripheral detachments with minimal corneal edema for up to 3 months and advocate early intervention for central detachments with corneal edema involving the visual axis. Odaiyappan et al did not find any influence on reattachment rates with timing of intervention. However, prolonged observation may be unpredictable, and the DM may fibrose or shrink, which may prevent reattachment and require endothelial transplantation.
With the advent of superior imaging and anterior segment OCT, Jacob et al proposed a new clinico-tomographic classification of DMDs into rhegmatogenous, bullous, tractional, and complex based on their cause, treatment required, and clinical and imaging findings.6

Insertion of air bubbles into the anterior chamber is not without complications. One study reports rates of appositional angle closure in 18% of 112 patients, with 9.8% of these having a raised IOP.1 Pupillary block was reported in 2.7% of patients. If severe and unresponsive to medication, these cases may require surgical decompression of the air bubble volume.

Interestingly, Odayappan et al recommended repeated attempts at air descemetopexy if the initial intervention fails, even for severe cases of DMD.1 In fact, they reported no statistically significant difference in success rates between moderate and severe DMDs. This may preclude the need for major interventions such as endothelial keratoplasty.

Other techniques apart from air pneumodesemetopexy exist, using SF6 and C3F8 for gas tamponade.7,8 These methods may be preferable in revision descemetopexy attempts, given their slower absorption rates (2 to 3 weeks) compared with air. However, Jain et al found that outcomes with air tamponade were anatomically and functionally superior to C3F8 tamponade, with reduced incidence of pupillary block.9

Our case report shows that repeat air descemetopexy with appropriate Trendelenburg head posturing can appose the centrally detached DM with severe corneal edema even 2 weeks after the initial detachment. This is worthwhile and notable, given the ease and efficiency in air bubble insertion compared with the complexity of procedures such as keratoplasties and the level of postoperative care and medication that they require.

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