CASE REPORT

Successful management of misdiagnosed Descemet membrane detachment after phacoemulsification surgery

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An 85-year-old man without antecedents of ocular disease history presented with reduced vision 4 months after uneventful phacoemulsification cataract surgery and IOL implantation in the right eye at a local clinic in the right eye. The visual acuity in the right eye was counting fingers at 3 m and 20/20 in the left eye. Slitlamp examination of the anterior chamber showed corneal edema with folds and fibrotic opacified formations in Descemet membrane. Descemet membrane detachment (DMD) was clearly observed using Fourier-domain optical coherence tomography (OCT). The fibrotic formations were removed, and the DMD was successfully reattached with intracameral injection of sulfur hexafluoride. The healing of DM could be viewed clearly through anterior segment OCT.

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Descemet membrane (DM) is the basement membrane of corneal endothelium and retains the endothelial monolayer in place to maintain corneal transparency. DM detachment (DMD) is a well-recognized complication of cataract surgery, which can be encountered postoperatively even when the surgery is apparently uneventful.[1] Impairment of the endothelium causes corneal edema, and its severity varies depending on the width of the decollated area.[2]

DMD usually occurs as aqueous enters the predescemetic space along a tear in the DM, such as that created by a corneal incision, or trauma to the DM during ocular surgery. Severe corneal edema occurs after DMD, and diagnosis can be difficult owing to corneal opacification and anterior chamber fibrin reaction. Although spontaneous resolution of corneal edema can be seen in some patients within 2 to 3 months, surgical treatment strategies such as suturing, tamponade with ophthalmic viscosurgical device (OVD), pneumodescemetopexy with air, and nonexpansile and expansile gases (sulfur hexafluoride [SF_6] and perfluoropropane) should be considered to reattach the membrane.[3–6] Pneumodescemetopexy with intracameral has become the selected management strategy for DMD because of its ease of application and good outcomes. In this case report, we present a patient with severe visual loss secondary to DMD diagnosed 4 months after phacoemulsification and successful treatment.

CASE REPORT

An 85-year-old man without previous ocular disease history presented to our ophthalmology department with reduced vision 4 months after uneventful phacoemulsification cataract surgery and IOL implantation in the right eye at a local clinic. A minimal postoperative gain was attributed by the primary surgeon to corneal edema and was managed conservatively with topical steroids and antibiotics.

On presentation, visual acuity in the right eye was counting fingers at 3 m and 20/20 in the left eye. The intraocular pressure was 15 mm Hg measured by Goldmann applanation tonometry. Fundus examination was blurry, and the retina was attached in the B-scan ultrasonography. Slitlamp examination of the anterior chamber showed corneal edema with folds in DM. The operating surgeon noted a shallow anterior chamber with fibrin reaction and a centralized IOL in the right eye on postoperative day 3 and injected 25 mg/mL of 0.1 cc tissue plasminogen activator to resolve fibrin reaction. Fourier-domain high-resolution anterior segment optical coherence tomography (RTVue, OptoVue, Inc.) was used to image the

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Dr. Takashi Kojima (Keio University, Tokyo, Japan) assisted with patient management.

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anterior segment of the patient, and the subtotal DMD was clearly observed (Figure 1).

Surgery was performed by the cornea specialist (C.S.) from our department. The plan was to reattach the maximum DM area starting from the central cornea as much as possible and to remove the fibrotic opacified DM only in the peripheric area because it seemed that visual acuity was impaired due to corneal decompensation and the opacified DM located at the visual axis. At the beginning of the procedure, OVD was injected into the anterior chamber through 2 0.9 mm reciprocal incisions to reattach DMD. However, it was difficult to reposition DM that was already showing fibrotic formations with shrinkage. Hence, fibrotic formations were cut at the 3 and 9 o'clock positions from the edge by anterior chamber scissors to release DM, and pneumodescemetopexy was attempted with sulfur hexafluoride (15%–20% SF_6) to reattach the DM; 0.2 cc of SF_6 was injected into the anterior chamber. The central DMD was successfully reattached with intracameral injection of SF_6, and SF_6 gas was observed in the anterior chamber at the end of surgery. However, DMD did not reattach properly at the periphery of the cornea, and this part was removed intraoperatively. The incisions were then sutured with 10-0 nylon, and a bandage contact lens was applied at the end of the procedure. Corneal edema resolved, corneal central thickness decreased from 745 to 589 μm, folds disappeared, and visual acuity improved to 0.6 logarithm of the minimum angle of resolution over a period of 7 days (Figure 2).

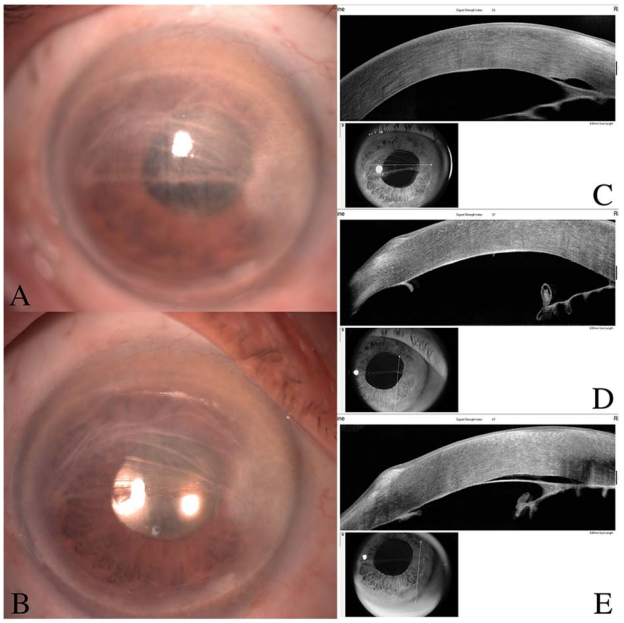

Figure 1. Representative slitlamp and anterior segment OCT images of the patient's preoperative cornea. *A*, *B*: Slitlamp image demonstrating DM detachment and corneal edema. *C*, *D*, *E*: Fourier-domain OCT showing the detached DM with increased central corneal thickness. Black bar indicates 250 μm (DM = Descemet membrane; OCT = optical coherence tomography).

DISCUSSION

It has been reported previously that DMD can occur after phacoemulsification, cyclodialysis, laser iridectomy, pars plana vitrectomy, full-thickness lamellar keratoplasty, penetrating keratoplasty, and trabeculectomy.[7–9] The most common surgery associated with DMD is phacoemulsification (0.04%–0.5%) and might also occur during foldable IOL implantation, stromal hydration, irrigation/aspiration, intracameral antibiotic application, or improper OVD cannula placement and injection through the side-port incision.[7,10–12] Generally, after DMD, severe corneal edema occurs in the detached area. In this patient, the corneal edema was due to not only corneal decompensation but also the fibrotic DM. However, from the anterior segment slitlamp photograph, it was clearly that cornea stroma was not much edematous in this case. In addition, corneal edema was observed more peripherally than at the central cornea. We speculated the reason for not observing severe central edema to be the migration of endothelial cells already from the healthy area to the detached area.

There are several strategies for treatment of DMD, such as observation, medical treatment, pneumodescemetopexy (air and nonexpansile and expansile gases), tamponade with OVD, suturing, manual unscrolling, release of scar tissue, posturing, and keratoplasty.[13] Pneumodescemetopexy with intracameral gas has become the preferred treatment mainly because of its ease of execution and subsequent good outcomes. Although to our knowledge there is no literature comparing the efficacy of different gases, most surgeons would likely choose air and nonexpansile concentration of SF_6 (15%–20%) first, reserving perfluoropropane (12%–14%) with its longer resorption time for cases failing reattachment with the other 2 gases or those detached for a prolonged period of time.[14] Use of 100% SF_6 has also been reported but is not widely used. Animal studies seem to show a similar endothelial toxicity profile for all 3 gases.[15] More recently, there seems to be a trend toward using just intracameral air alone to repair all types of DMDs.

In conclusion, we demonstrated that a combination of surgical approachs were effective for managing the

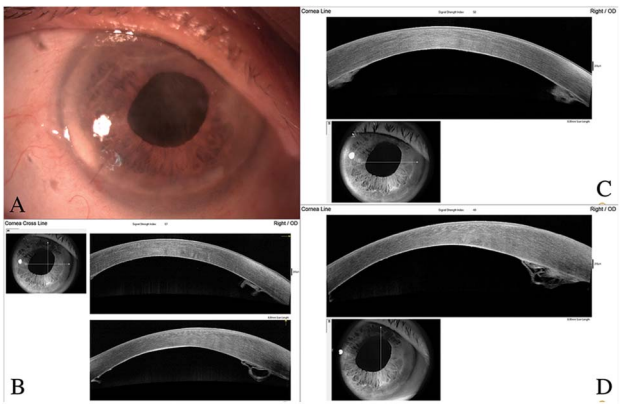

Figure 2. Representative slitlamp and AS-OCT images of the patient's cornea 1 week postoperatively. (*A*) Central clear cornea can be obviously seen with slitlamp biomicroscopy, with corrected visual acuity of 0.6 logarithm of the minimum angle of resolution. (*B*, *C*, *D*) One week postoperatively, AS-OCT showing reattached DM especially at the central cornea (AS-OCT = anterior segment optical coherence tomography; DM = Descemet membrane).

delayed-diagnosis DMD. The decision on when to intervene in DMD needs to be made on a case-by-case basis after evaluating the configuration of the detachment, the risks of additional intervention, and the need for rapid rehabilitation of vision. In addition, in our patient, the reason for misdiagnosis at the initial visit after cataract surgery were the DM folds and reduced visibility of the anterior chamber due to corneal edema. Imaging with anterior segment optical coherence tomography was useful for accurate diagnosis because the fine DM was challenging to visualize on slitlamp examination.

WHAT WAS KNOWN

- Single treatment option was believed to be sufficient for surgical repair with good structural and functional outcome in patients with Descemet membrane detachment.

WHAT THIS PAPER ADDS

- A combination of surgical approachs in a patient with misdiagnosed Descemet membrane detachment increased was successful.
- Careful clinical examination with the aid of anterior segment optical coherence tomography assisted in diagnosis and treatment.

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