Descemet Membrane Endothelial Keratoplasty for Corneal Endothelial Failure Due to Anterior Chamber Migration of a Dexamethasone Intravitreal Implant

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ABSTRACT

The migration of the intravitreal dexamethasone implant to anterior chamber is a rare complication and it may be result in corneal endothelial failure. In this study, two cases with corneal edema secondary to intravitreal dexamethasone implantation for macular edema and its management with Descemet Membrane Endothelial Keratoplasty (DMEK) surgery were evaluated. At the last visits, satisfactory anatomical results but limited visual improvement related to retinal disorders were achieved. As summary, this report revealed that DMEK surgery is a good option in cases with corneal edema secondary to dexamethasone implant migration.

Keywords: Descemet Membrane Endothelial Keratoplasty, Intravitreal dexamethasone, Macular edema, Corneal edema, Cataract surgery.

INTRODUCTION

Intravitreal dexamethasone implant injection has been a treatment method applied for various retinal and uveal diseases since 2007[1]. However, intravitreal dexamethasone implantation has several complications, including ocular hypertension, cataract formation, and retinal detachment. More rarely, the migration of the implant to anterior chamber and corneal endothelial dysfunction may be observed, especially in cases of insufficient capsular support[2]. This study reports two cases of decompensated corneal edema that were secondary to intravitreal dexamethasone implantation and were managed with Descemet Membrane Endothelial Keratoplasty (DMEK) surgery.

CASE REPORT

Case 1

An 82 year-old female was referred to our clinic for anterior migration of the intravitreal dexamethasone implant (Ozurdex® Allergan Inc., Irvine, California, USA) that was implanted secondary to diabetic macular edema. The intravitreal injection was performed two months ago. Her ocular history was significant for complicated cataract surgery and scleral-fixated intraocular lens implantation. At the presentation, the visual acuity in the affected eye was recorded as counting fingers, and the intraocular pressure was 18 mmHg. Anterior segment examination revealed diffuse corneal edema and a dexamethasone implant adhered to the corneal endothelium in the inferior anterior chamber (Fig.1A). On the same day, the dexamethasone implant was surgically removed from anterior chamber under topical anesthesia (Fig.1B). The dexamethasone implant was first stabilized using viscoelastic and removed using intraocular forceps, and the remaining implant particles were floated out with viscoelastic. The patient was treated with topical moxifloxacin, topical steroid, and NaCl 5% eye drops. Six months after the dexamethasone implant extraction, the corneal edema had not resolved with a 746 µm central corneal thickness and an endothelial keratoplasty was planned. The patient underwent a DMEK surgery 10 months after dexamethasone implant removal. DMEK surgery was performed using the techniques described by Melles et al[3]. Three months after surgery, the visual acuity was recorded as 3/10, the corneal graft was clear without any corneal edema. The intraocular pressure was recorded as 18 mmHg on Goldmann applanation

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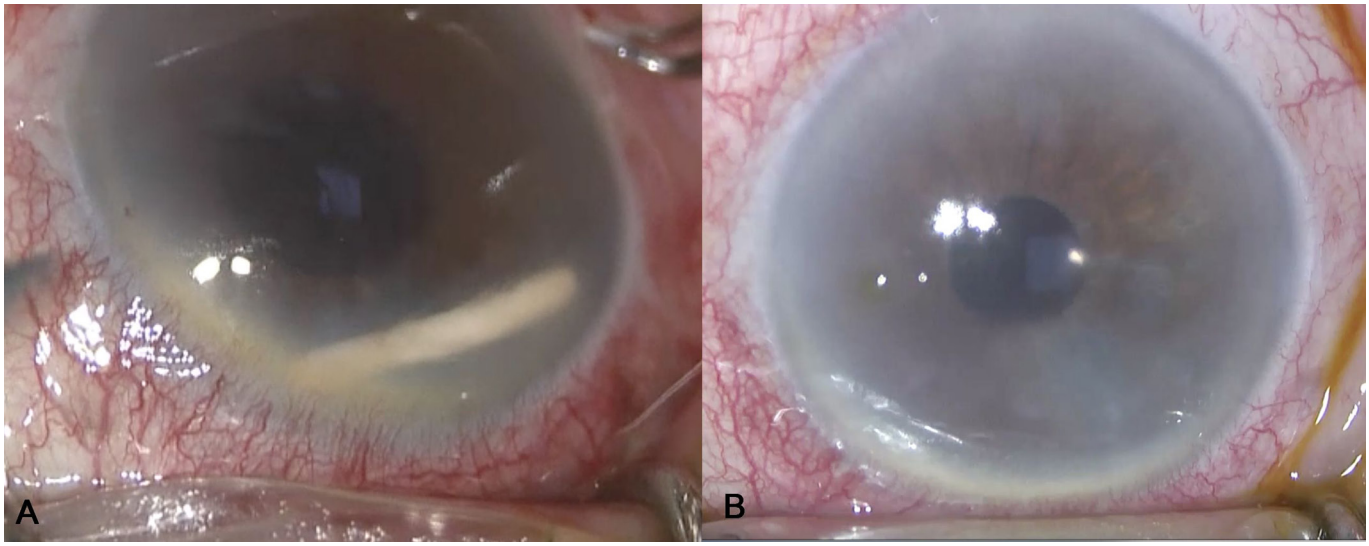

Figure 1: *Slit-lamp photography of dexamethasone implant in the anterior chamber* (**A**). *Endothelial failure after the Dexamethasone implant removed* (**B**).

tonometry. Endothelial cell density was 1912 cell/mm² and central corneal thickness was 536 µm**.**

Case 2

A 59-year-old female patient was referred to us due to corneal endothelial decompensation as a result of a dexamethasone implant (Fig. 2A). The dexamethasone implant was implanted a year ago due to uveitis. Twenty days after injection, the implant migrated to anterior chamber, and repositioning was applied at another clinic. The dexamethasone implant was never removed from the eye. The patient's ocular history was remarkable for complicated cataract surgery and scleral-fixated IOL implantation. The visual acuity in the affected eye was hand movement. Due to permanent corneal edema, the patient underwent DMEK surgery. Postoperatively, the patient received topical moxifloxacin, topical steroids, and artificial tear eye drops. Six months after surgery, the corneal graft was clear, the patient's visual acuity was 2/10, and the intraocular pressure was 11 mmHg (Fig. 2B). Additionally, the cell density was 1727 cells/mm², and the central corneal thickness was 564 µm after DMEK surgery.

DISCUSSION

The migration of the implant to anterior chamber after intravitreal dexamethasone implant injection is a very

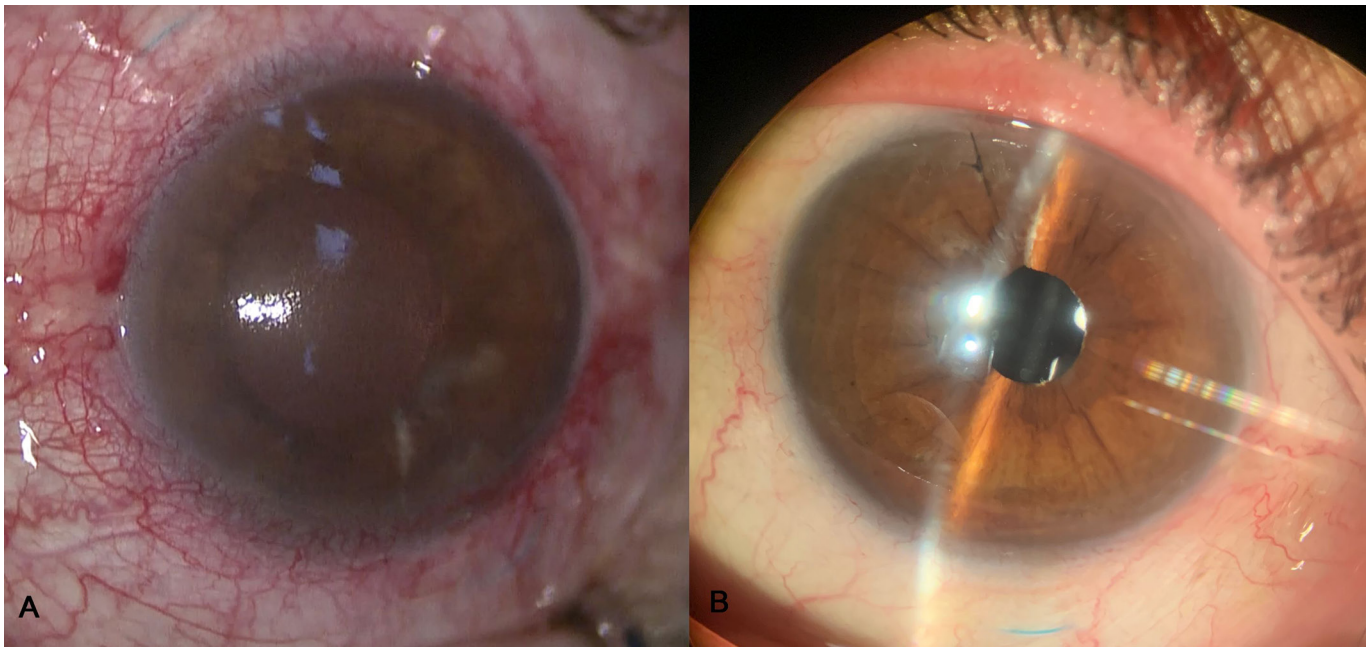

Figure 2: *Corneal edema secondary to dexamethasone implant* (**A**). *4 week after the DMEK surgery* (**B**).

rare complication. In a large clinical study evaluating 964 patients who received intravitreal dexamethasone implant, anterior chamber migration of the implant was detected in four patients. Permanent corneal edema developed in one of four patients[4]. In another study examining 640 patients with intravitreal dexamethasone implantation, four patients had implant migration. Corneal endothelial failure developed in two of four patients. In these patients, the weak capsular and zonular bag complex was a mutual risk factor[2]. In a case series by Khurana et al., 14 of 15 patients in whom the dexamethasone implant migrated to anterior chamber developed corneal edema, and edema became permanent in 7 of 14 patients[5].

Insufficient or absent lens capsule is a well-known risk factor for the migration of intravitreal dexamethasone implant [2]. Other reported risk factors include a defect in the posterior capsule, a history of prior vitrectomy, and large peripheral iridectomy[2,6,4,7,8]. In our study, both patients had a history of complicated cataract surgery and scleral-fixated intraocular lens implantation. The intravitreal dexamethasone implant was removed from anterior chamber in one patient at our clinic and had moved to the vitreous cavity in the other patient at another clinic. Although the exact mechanisms of endothelial damage are not fully understood, it could be related to drug toxicity or direct mechanical trauma to endothelium by the intravitreal dexamethasone implant. Moreover, corneal edema may also result from the toxicity of the vehicle to the corneal endothelium.

There are many studies in the literature on the treatment of chronic corneal edema that develops after the migration of the intravitreal dexamethasone implant into anterior chamber. Penetrating keratoplasty was applied for bullous keratopathy in some of these studies[2, 5,9]. On the other hand, endothelial keratoplasty has gained wide acceptance and is rapidly replacing conventional penetrating keratoplasty for corneal endothelial failure. There is limited information regarding endothelial keratoplasty for endothelial failure secondary to dexamethasone implant migration into anterior chamber. Commonly, Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) has been reported as a treatment for endothelial failure[10-12]. Zafar et al. reported achieving a clear cornea with 5/10 visual acuity after DSAEK[10]. In another case report by Stelton et al., the final visual acuity was 2/10 and the graft was clear in the patient who underwent DSAEK surgery[11]. To the best of our knowledge, there is only one case of DMEK for intravitreal dexamethasone implant-related permanent corneal edema[2]. Postoperatively, the visual acuity improved to 2/10 from 0.05/10, and cornea was clear.

Herein, we report two cases who underwent DMEK surgery for decompensated corneal edema secondary to anterior chamber migration of dexamethasone implant. No complications occurred during the perioperative and postoperative periods. At the last visit, we achieved good anatomical results but limited visual improvement related to macular edema. In summary, this report shows that DMEK surgery is a good option in cases with permanent corneal edema secondary to anterior chamber migration of intravitreal dexamethasone implant.

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