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Case Report / Olgu Sunumu

Evaluation of Descemet's Membrane Detachment Using Anterior Segment Optical Coherence Tomography

Descemet Membran Dekolmanının Ön Segment Optik Koherens Tomografi ile Değerlendirilmesi

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Summary

We report the use of anterior segment optical coherence tomography (ASOCT) in Descemet's membrane detachment (DMD). A patient who developed DMD after uneventful cataract surgery with posterior chamber lens implantation is presented in this case report. At the follow-up examination after cataract surgery, slit-lamp evaluation showed stromal striae, but it was impossible to diagnose the DMD due to the corneal edema. ASOCT imaging of the cornea revealed a DMD, and the patient underwent intracameral air injection to the anterior chamber through the site which was identified as intact by ASOCT. Follow-up ASOCT imaging revealed the reattachment of the Descemet's membrane and reduced corneal thickness. If DMD is suspected in any cases, ASOCT can be useful to document and follow the postsurgical detachment of DMD and also to determine the site, configuration, and extent of the DMD, thus guiding the treatment method and monitoring the treatment outcome. (Turk J Ophthalmol 2014; 44: 407-9)

Key Words: Descemet's membrane detachment, phacoemulsification, anterior segment optical coherence tomography

Özet

Bu yazıda kliniğimizde komplikasyonsuz katarakt ameliyatı ve arka kamara lens yerleştirilmesi sonrası gelişen Descemet membran dekolmanının (DMD) tanı ve takibinde ön segment optik koherens tomografi (ÖSOKT) cihazı kullanımının bildirilmesi amaçlanmıştır. Katarakt ameliyatı sonrasında yarıklı lamba mikroskopik incelemesinde, korneal stromal strialar ve ödem nedeniyle DMD teşhis edilememiştir. Ön segment optik koherens tomografi ile gerçekleştirilen görüntülemede DMD saptanmış olan olguda, ÖSOKT ile Descemet membranının intakt olduğu korneal taraf tespit edilerek buradan gerçekleştirilen enjeksiyonla ön kamaraya hava verilmiştir. Takip muayenelerin ÖSOKT ile DMD'nin yatıştığı, korneal kalınlığın gerilediği gösterilmiştir. Descemet membran dekolmanından şüphelenilen olgularda, ÖSOKT'nin tanı, tedavi planlaması ve takipte faydalı olabileceğini düşünmekteyiz. (Turk J Ophthalmol 2014; 44: 407-9)

Anahtar Kelimeler: Descemet membran dekolmanı, fakoemulsifikasyon, ön segment optik koherens tomografi

Introduction

Descemet's membrane is the basement membrane of the corneal endothelium, which has a crucial function in maintaining corneal clarity. Descemet's membrane detachment (DMD) can cause severe corneal edema due to the loss of endothelial pump function of the corneal stroma. It can lead to irreversible bullous keratopathy and loss of vision over time.[1-3]

DMDs generally occur when aqueous humor enters the predescemetic space through a tear in the Descemet's membrane, which can happen during ocular surgeries through a corneal incision or blunt trauma to the eye. Cataract extraction is the most common surgery related to DMD. The incidence rate is 2.5% in extracapsular cataract extraction and 0.044%-0.5% in phacoemulsification.[4-6] The rate of DMD obtained in detailed gonioscopic examinations after cataract surgeries is 43%-47%.[6]

Visualization of the Descemet's membrane may be obscured by corneal edema and this may make it difficult to diagnose. A diagnosis of DMD used to be done by slit-lamp biomicroscopy with the aid of topical glycerin to dehydrate the edematous cornea, before the introduction of advanced machines.[7-10] In this study, we present the case of a patient who was diagnosed with DMD and whose post-treatment outcome was monitored by anterior segment optical coherence tomography (ASOCT).

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Case Report

In this manuscript, we present the case of a patient who developed DMD after uneventful cataract surgery with a posterior chamber lens implantation by clear corneal incision. At the first week follow-up examination after the surgery, slit-lamp examination showed stromal striae, but it was impossible to examine the anterior chamber details and diagnose the DMD due to the corneal edema. ASOCT imaging of the cornea revealed a centrally located DMD, and the patient underwent intracameral air injection to the anterior chamber through the site which was identified as intact by ASOCT. Follow-up ASOCT imaging revealed the reattachment of the Descemet's membrane and reduced corneal thickness (Figure 1, 2a-b, 3a-b, 4).

Discussion

There are many types of intraocular surgeries such as phacoemulsification, trabeculectomy, deep sclerotomy, viscocanalostomy, holmium laser sclerostomy, deep anterior lamellar keratoplasty, endothelial keratoplasty, intracorneal ring segment implantation, and pars plana vitrectomy, that are known to result in DMD.[10-18] Among the most common causes of DMD are blunt keratomes, shelved or anteriorly placed incisions, shallow anterior chamber, inadvertent injection of saline, viscoelastic or antibiotics at the pre-Descemetic space such as during irrigation-aspiration, stromal hydration, intraocular lens insertion, and intracameral antibiotic injection.[10-18] Other surgeries reported with DMD include laser peripheral iridotomy and surgical iridotomy.[10] Detachment can also be present after alkaline injuries, bleeding from deep corneal vascularization, blunt trauma or, rarely, in atypical keratoconic eyes, even in intact Descemet's membranes.[10,11]

Before the introduction of advanced machines, the diagnosis of DMD used to be done by slit-lamp examination with the aid of topical glycerin to dehydrate the edematous cornea.[8-10] Small localized peripheral DMDs can also be detected by gonioscopy. However, the diagnostic yield of such tools is often limited by the presence of severe corneal edema. Quick and non-contact diagnosis of DMDs, which is particularly beneficial in eyes that

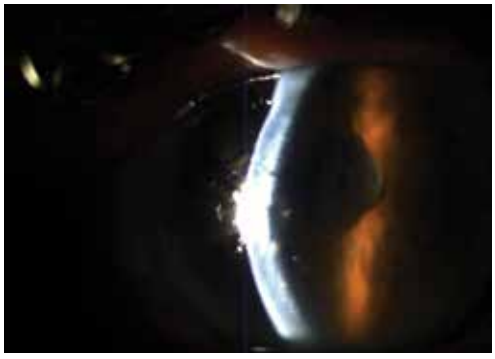

Figure 1. Slit-lamp photograph showing corneal edema which masks DMD at 1-day follow-up visit after phacoemulsification surgery

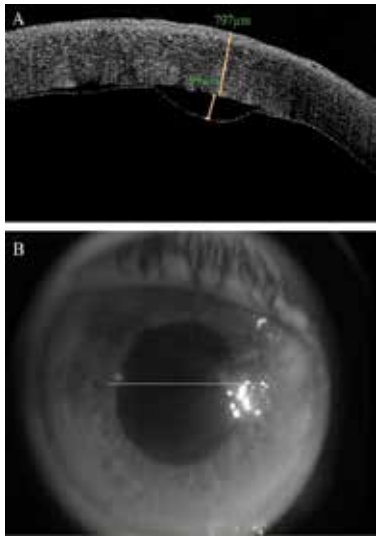

Figure 2 a,b. ASOCT imaging showing planar DMD at 1-week follow-up visit after phacoemulsification surgery. Corneal thickness was 797 µm, Descemet's membrane was 292 µm away from the corneal stroma. In horizontal plane, Descemet's membrane is still attached to the stroma at the temporal side of the cornea

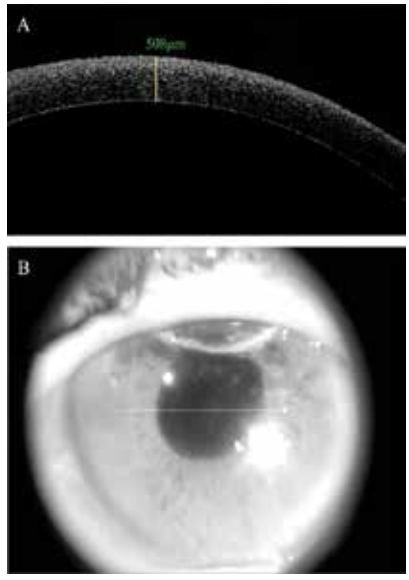

Figure 3 a,b. ASOCT imaging at day 1 after pneumodescemetopexy. Air bubble is seen in the anterior chamber with reattached Descemet's membrane. Corneal thickness reduced to 508 µm

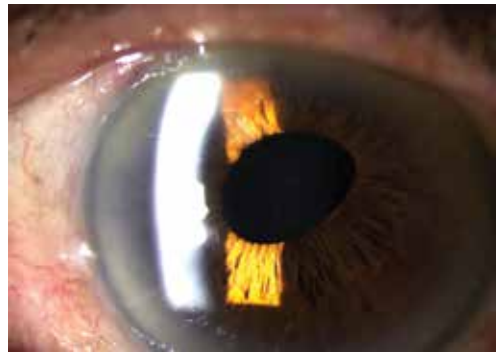

Figure 4. Slit-lamp photograph showing a clear cornea one month after pneumodescemetopexy

have undergone surgery recently, became available with the introduction of ASOCT and Scheimpflug imaging.[7-10] Moutsouris et al.[7] compared the efficacy of ASOCT and Scheimpflug imaging with slit-lamp biomicroscopy for the detection of graft detachment following Descemet's membrane endothelial keratoplasty in 120 eyes of 110 patients. They found that while ASOCT could be valuable for diagnosis in 36% of cases, slit-lamp biomicroscopy alone was not sufficient enough to obtain conclusive information. They did not find any interobserver differences or false-negative/ false-positive diagnoses. Because of the scattering in edematous corneas, Scheimpflug imaging did not yield a better visualization than slit-lamp biomicroscopy. ASOCT's further determination of the site, configuration, and extent of the DMD provides a guide for the treatment method and for monitoring treatment outcome.

However, it has been suggested that DMDs can be managed conservatively, as some spontaneous reattachment cases have been reported, and also some cases were reported with progression leading to irreversible corneal decompensation or opacification.[1,3,10,19] Performing a surgical operation in the early stage by injecting gas with a 27-30G needle to create an airtight seal, preferably from a site where Descemet's membrane is still attached, is becoming more common.[10] DMD can be classified as planar and nonplanar.[20] Detachments separated less than 1 mm from the stroma are classified as planar and detachments with a separation of more than 1 mm are classified as nonplanar. Planar detachments have a much better prognosis than nonplanar ones. It has been emphasized that the differentiation of a DMD with and without the scroll on the cut edge is an important indicator for surgical intervention. Many authors now support an early surgical repair, after the number of publications reporting successful results of pneumodescemetopexy have increased. This is particularly the case for scrolled, extensive, and visually impairing DMDs, enabling an accelerated visual rehabilitation and prevention of wrinkling, fibrosis, and shrinkage of the Descemet's membrane that can occur with time and cause a poor visual outcome. The term pneumodescemetopexy means injection of air, nonexpansile and expansile gases into the anterior chamber. Because its execution is easy and its use gives good results, pneumodescemetopexy with intracameral gas is preferred as the main treatment for DMD. There are no studies in the literature comparing the efficacy of different gases. However, most surgeons would prefer air and a nonexpansile concentration of sulfur hexafluoride (15%-20% SF6) first, reserving perfluoropropane (12%-14% C3F8) that has longer resorption time for cases that fail to reattach with the other two gases, or those detached for a prolonged period of time.[1,10,13] Chaurasia et al.[21] treated 14 eyes which had extensive and nonplanar DMDs that had been detached from 4 to 49 days with intracameral air. The treatment was successful in 13 out of 14 eyes, and while 8 of them resolved within the first week, the remaining resolved at 4-6 weeks. Ti et al.[5] reported similar results with successful treatments in 14 out of 16 eyes, of which three required two injections. The mean time for reattachment of Descemet's membranes was 4 days (range: 1-55 days), and the mean time for regaining corneal clarity was 30 days (range: 4-82 days).

In patients with corneal edema following anterior chamber reformation, the presence of clinically relevant DMD should be considered even though it is relatively uncommon. DMD is reported in this study after an intraocular surgery which was not possible to detect by slit-lamp examination, but it could be shown by ASOCT. ASOCT can be used for the documentation and follow-up of postsurgical DMD and also for determining the site, configuration, and extent of the DMD, thereby guiding the treatment method and monitoring the treatment outcome. We also think that it is beneficial to treat large nonplanar DMDs with surgical intervention in the early stages to obtain good results and earlier vision recovery.

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