

CASE REPORT

Descemet Membrane Detachment Post-Phacoemulsification

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ABSTRAK

Ini adalah siri laporan kes penanggalan membran descemet berkaitan dengan pembedahan katarak di sebuah hospital tertiar di Kuala Lumpur. Kes pertama melibatkan penanggalan membran descemet disebabkan oleh pembedahan katarak yang berjaya dikesan semasa pembedahan dan dirawat awal dengan hasil yang baik. Kes 2 dan kes 3 menggambarkan penanggalan membran descemet boleh hadir dengan penampilan luar biasa yang pada awalnya tidak dapat dikesan. Laporan ini menunjukkan penggunaan imbasan bahagian hadapan mata (ASOCT) bagi membantu dalam mengenalpasti diagnosis yang tepat dalam kes penanggalan membran descemet. Melalui pengalaman pakar kornea mata, diagnosis kes penanggalan membran descemet boleh dipastikan dengan bantuan ASOCT. Rawatan telah diberikan dan berjaya menyembuhkan edema pada kornea serta pemulihan pada tahap penglihatan. Siri kes ini menunjukkan kepentingan catatan pembedahan yang tepat dan keperluan yang tinggi untuk menjangkakan penanggalan membran descemet pada kes pembedahan katarak yang hadir dengan edema kornea. ASOCT merupakan alat yang sungguh berkesan bagi memastikan penanggalan membran descemet dan keberkesanan rawatan.

Kata kunci: kornea edema, membran descemet, pembedahan katarak, pembedahan pemindahan membran descemet

ABSTRACT

We report the case series of phacoemulsification-related Descemet membrane detachment (DMD) encountered at a tertiary hospital in Kuala Lumpur. Case 1 was an iatrogenic DMD which was detected intraoperatively and managed

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early with good outcome. Case 2 and case 3 described unusual presentation of DMD which was initially undiagnosed. This report highlights the use of anterior segment optical coherence tomography (ASOCT) in detecting and confirming the correct diagnosis for DMD. With the aid of an experienced corneal specialist, the higher threshold for suspicious occurrence of DMD was confirmed using ASOCT. Treatment was tailored accordingly, with successful clearance of corneal oedema and visual recovery. This case series highlighted the importance of proper operative documentation and high threshold for suspicion for DMD in focal corneal oedema following an otherwise uneventful cataract surgery. It is concluded that ASOCT is an excellent tool to confirm diagnosis of DMD and success of treatment.

Keywords: corneal edema, descemet membrane, descemet stripping endothelial keratoplasty, phacoemulsification

INTRODUCTION

Descemet membrane detachment (DMD) is a known complication of any intraocular surgeries, including uncomplicated phacoemulsification. The incidence of DMD was found to be only 2.6% for extracapsular cataract extraction (ECCE) and 0.5% for phacoemulsification (Mulhem et al. 1996). However, focal DMD diagnosed with gonioscopy after cataract extraction is relatively common, occurring in 43% of patients (Monroe 1971). Patients may present with decreased visual acuity (VA), corneal oedema and presence of Descemet membrane (DM) folds. Clinically, a detached layer of DM can be seen with slit lamp examination, underlying an area of focal oedema typically corresponding to the area of DMD. Early and prompt recognition and treatment is vital in order to restore corneal clarity and function. This complication may be recognized and treated intraoperatively. However, DMD may go unrecognized during

surgery, as corneal clarity may be compromised days later which delays the diagnosis. If discovered post-operatively, a second surgical procedure becomes necessary.

CASE REPORT

Case 1:

A 77-year-old male underwent right eye phacoemulsification and posterior chamber intraocular lens implantation under local anaesthesia on 10/08/16 at Universiti Kebangsaan Malaysia Medical Centre. His preoperative vision was 6/18 with pinhole correction of 6/12. Intraoperatively, a large Descemet membrane detachment extending from the main wound at 11 o'clock towards the central cornea was noted during viscoelastic material injection. Intracameral air bubble was injected at the end of the procedure and patient was advised to sit up postoperatively. Unfortunately, 12 days later, the Descemet detachment persisted near the main wound with

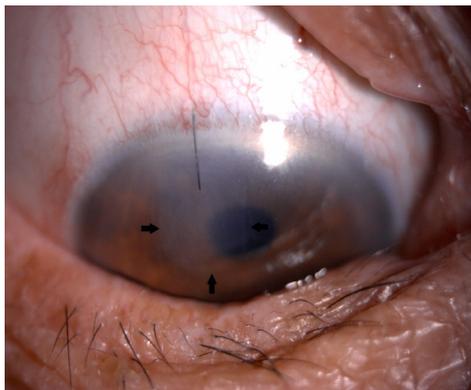


Figure 1: Superior corneal oedema extending to visual axis post-phacoemulsification in case 1

overlying cornea oedema (Figure 1) and this was confirmed with AS-OCT (Figure 2). His vision was 6/18 with pinhole correction of 6/12. He was referred to the corneal team for further management of DMD. Air descemetopexy with corneal venting incisions were performed on the same day. During procedure, full air-fill was left in-situ for 10 minutes to ensure good adhesion, before slowly being released to a final of 50% of air in the anterior chamber. The Descemet membrane remained well-attached during follow-up review. His vision improved to 6/9 during the last review at two months post-descemetopexy. The best corrected vision was 6/9.

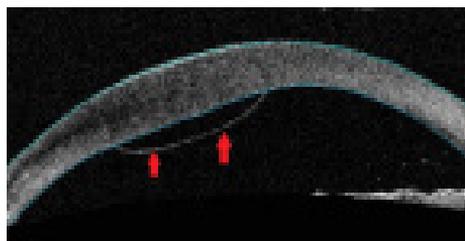


Figure 2: AS-OCT of case 1 showing localized DMD involving central cornea

Case 2:

A 77-year-old female with underlying bilateral high myopia was referred to Universiti Kebangsaan Malaysia Medical Centre corneal service for the management of right eye pseudophakic bullous keratopathy from a private eye centre. She underwent right eye phacoemulsification and posterior chamber intraocular lens implantation two months prior to the referral. Her right eye vision at presentation to our centre, was counting fingers. Ocular examination revealed generalized corneal decompensation with no view of the fundus. Relative afferent pupillary defect (RAPD) was not present. Subtotal DMD was suspected on slit lamp examination and confirmed with AS-OCT (Figure 3). Descemet stripping automated endothelial keratoplasty (DSAEK) was performed for the right eye two months after her first presentation. Corneal epithelium was removed intraoperatively to improve visualisation. The surgery went without complication with good graft attachment and epithelial healing post-operatively. Corneal clarity gradually improves, however fundus examination revealed tessellated fundus with Foster Fuchs spot at the macula. Her best

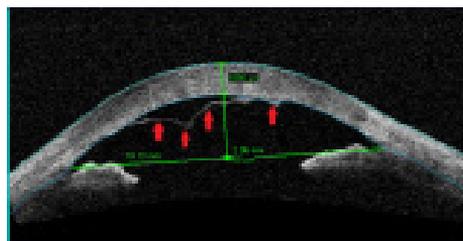


Figure 3: AS-OCT of case 2 with DMD involving central cornea

corrected vision was limited at 3/60, due to macular pathology.

Case 3:

A 61-year-old female with underlying bilateral Fuchs endothelial dystrophy underwent uneventful right phacoemulsification and posterior chamber intraocular lens implantation through temporal wound incision. Her corneal endothelial cell count was over 1000/mm² and within acceptable limits for a safe cataract surgery. Her vision improved to 6/12 after one week. However, mild corneal oedema was noted at the main wound site. Corneal decompensation ensued and she was referred for further management of pseudophakic bullous keratopathy. At this point, her vision had deteriorated to 3/60 with oedematous cornea and multiple bullae. DMD was noted extending from the main wound towards central cornea, as delineated on AS-OCT (Figure 4). DSAEK was performed, and she recovered well post-operatively with good graft attachment. However, there was residual posterior stromal scarring which explained her best corrected vision of 6/18.

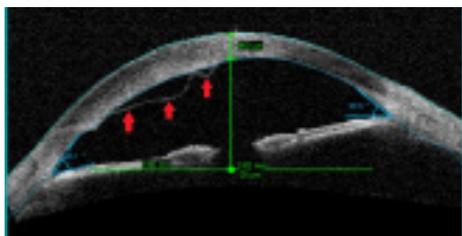


Figure 4: AS-OCT of case 3 with DMD approaching central cornea and severely oedematous corneal stroma

DISCUSSION

Descemet membrane detachment occurs from a small Descemet tear which progress. This tear can be detected intraoperatively but some can be easily overlooked. A tear may happen during any steps of cataract surgery. Literature has identified that technique of wound creation and instruments manipulation in and out of the eye as among the commonest steps responsible for the initial tear (John et al. 1992; Zusman et al. 1987; Zeiter et al. 1983).

DMD can also happen spontaneously. Gatziofas and colleagues (2009) describe a case with bilateral spontaneous DMD after uneventful phacoemulsification, in the same patient. It was thought that some patients are anatomically predisposed to DMD such as patients with shallow anterior chamber (Samuels 1928) and abnormally weak adhesion between corneal stroma and Descemet's membrane (Hirano et al. 2001).

The commonest site of initial tear is usually at the main corneal incision. The fact that it is a transparent membrane makes it slightly difficult for surgeon or assistant to detect the tear. It may be easily mistaken as a remnant of anterior capsule because both structures appear as layer of membrane, intraoperatively. In an inexperienced hand, DM detachment understandably occurs more commonly due to excessive instrumentation.

Case 1 was noted to have DMD intra-operatively and re-attachment was attempted at the same setting by means of air bubble injection

into anterior chamber. Despite failure to achieve DM attachment, descemetopexy with air was repeated with success after the second time. This case proves that air descemetopexy is a repeatable procedure and successful re-attachment with this method is possible even after 10 days of separation between DM and posterior stroma. We recommend leaving a full air-filled anterior chamber for 10 minutes to improve the chance of DM adhesion with posterior stroma before releasing some of the air. Some corneal surgeon combined full thickness venting incision to aid in trapped fluid drainage posterior to the posterior stroma. Harsimran and colleagues (2016) reported a DMD case with multiple failed attempt of air and gas descemetopexy. Successful DM attachment was only achieved when he combined air descemetopexy with corneal venting incision for the case.

A localized and small DM tear can be left untreated and will usually re-attach spontaneously (Minkovitz et al. 1994; Mark et al. 1995). However, even a small tear should be documented in order to assist in the post-operative monitoring as it may progress to a larger tear and detachment with corneal decompensation. Large area of corneal decompensation and generalized oedema may be mistaken for pseudophakic bullous keratopathy (PBK), especially if the view is obscured. Hence, ASOCT is invaluable in confirming presence of DMD, and monitoring improvement after descemetopexy.

In contrast to case 1, both cases 2 and 3 were referred following uneventful

cataract surgeries, with initial impression of PBK causing generalized corneal oedema. The relatively dense corneal oedema makes the clinical detection of DMD difficult in both cases. High threshold of suspicion is necessary in such cases, which lead to ASOCT imaging of the DMD as a tool to aid in the diagnosis. ASOCT allows cross-section imaging, even through hazy cornea. A positive study will reveal a detached layer corresponding to the Descemet membrane. The OCT will also give additional information such as the extent of the detachment, and the highest point of detachment which might be an important factor to consider before deciding the appropriate treatment. DMD can be classified according to the extent of the detachment from the posterior corneal stroma; planar if the extent is less than 1mm and non-planar if the extent is more than 1mm, based on appearance on ASOCT (Mark et al. 1995).

The mainstay treatment for a detached Descemet membrane is re-attachment procedure. However there are several factors which need to be taken into account. If the tear or detachment is detected intra-operatively, then air injection into the anterior chamber at the end of the surgery is recommended to tamponade the Descemet membrane (Mark et al. 1995). A small and localized detachment sparing the central cornea which is detected post-operatively can be treated conservatively and monitored closely, as long as the vision is not compromised. However, a large detachment identified during post-operative period with central

corneal involvement should be treated accordingly. Air injection into anterior chamber (AC) remains the treatment of choice (Rajat et al. 2013). Substitution of air with expansile gas does not increase the success rate of re-attachment but carries additional risk of complications such as pupillary block, as gas remains longer than air in the AC (Rajat et al. 2013). However, in late onset DMD, successful re-attachment using iso-expansile C_3F_8 20% had been demonstrated (Manish et al. 2003), hence iso-expansile gas may be useful in such cases as it stays longer in the eye compared to air which has faster reabsorption.

Another important factor in determining success of descemetopexy is the duration of detachment. It is postulated that longer duration of detachment results in lower chance of DM re-attachment. If left untreated, the detached membrane becomes more stiff and rigid, making re-attachment more difficult (Mark et al. 1995). Furthermore, once the tamponade effect of air becomes less after 24 to 48 hours following descemetopexy, this rigid membrane tends to re-detach again. However, Vinekar and colleagues (2007) recommended that a re-attachment procedure should always be attempted first before offering corneal transplant, as successful anatomical and visual outcome of a prolonged DMD over one year period was achieved with gas descemetopexy. Repeated injection with gas is also possible if first attempt were not successful. Reattachment procedure by air or gas descemetopexy with or without venting incision

provides a simpler, cheaper and more readily repeatable method in an office setting compared to transplant. The severity of cornea oedema and any presence of associated scarring will also influence the decision of best treatment method as illustrated in case 2 and case 3. Corneal transplant by means of endothelial keratoplasty should be attempted in order to treat the DMD, and restore functional vision.

CONCLUSION

In conclusion, DMD may occur following uneventful cataract surgery, resulting in focal or generalized corneal oedema which may be misdiagnosed as it can mimic other diseases of the cornea. ASOCT provides a useful tool in aiding accurate diagnosis and monitoring success of reattachment following descemetopexy. Simple air descemetopexy combined with venting incision proves to be a useful method and cost-effective in treating DMD in an office-based setting.

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