

Surgical management of post-Descemet stripping automated endothelial keratoplasty interface haze associated with interface deposits

George D Kymionis¹, Nafsika Voulgari¹, George A Kontadakis^{1,2}, Dimitrios Mikropoulos³, Aleksandra Petrovic¹, Konstantinos Droutsas⁴

We describe an effective technique for the management of graft–host interface haze associated with interface deposits after Descemet-stripping automated endothelial keratoplasty (DSAEK) with bimanual irrigation/aspiration. A Tan marginal dissector was used to separate the graft from the stroma in the nasal two-thirds of the graft–host interface. The aspiration handpiece was inserted in the interface through the nasal side-port corneal incision and a separate irrigation tip was placed in the anterior chamber (AC) through the temporal corneal paracentesis. Meticulous rinsing of the two-thirds of the interface area and the AC was performed. At the end of the procedure, air was injected into the AC to float the donor graft against the host stromal bed and facilitate graft adherence. Postoperative anterior segment optical coherence tomography and slit-lamp examination confirmed elimination of the interface haze–deposits and a well-attached graft. An improvement in visual acuity was noted.

Key words: Descemet-stripping automated endothelial keratoplasty, DSAEK complications, interface deposits, interface haze, surgical management

Descemet-stripping automated endothelial keratoplasty (DSAEK) has emerged as the leading treatment modality for the surgical management of corneal endothelial dysfunction. Recognized complications include graft dislocation, rejection, pupillary block, epithelial downgrowth, and interface problems.^[1] Post-DSAEK interface haze is a relatively infrequent sequela that leads to compromise of postoperative visual acuity and, if persistent, to repeat surgery. One of the suggested potential mechanisms underlying the origin of this interface opacity is retained ophthalmic viscosurgical device (OVD).^[2-6] Herein, we describe a technique of bimanual irrigation and aspiration of the graft–host interface for the surgical management of post-DSAEK interface haze probably due to residual OVD.

A 73-year-old woman with Fuchs dystrophy underwent an uneventful combined DSAEK and phacoemulsification with intraocular lens (IOL) implantation in the left eye. Phacoemulsification and implantation of the posterior chamber IOL were performed using a dispersive OVD (Viscoat; Alcon Laboratories, Inc., Fort Worth, TX, USA), followed by stripping of the Descemet membrane and insertion of the

donor button under an anterior chamber (AC) maintainer. On the first postoperative day, a mild central graft detachment with interface fluid was apparent on slit-lamp examination. At the 1-month follow-up, the cleft between the donor and the recipient cornea persisted, and associated diffuse interface opacities became evident as the postoperative corneal edema resolved [Fig. 1]. Best-corrected visual acuity (BCVA) was 20/25. Anterior segment optical coherence tomography (AS-OCT) revealed the presence of interface hyperreflective deposits and interface gap correlating with the clinically observed interface haze, which was presumed to be retained viscoelastic. Endothelial cell count (ECC) was not measurable. The patient was placed on intensive topical therapy with dexamethasone 0.1% for 3 months without regression of the opacities [Fig. 2]. BCVA decreased to 20/40 three months postoperatively. Manual irrigation/aspiration was performed for the removal of the interface debris, described as follows.

Surgical Technique

The surgery was performed under topical anesthesia using tetracaine 0.5% drops. Two 20-gauge side-port incisions

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¹Department of Ophthalmology, University of Lausanne, Jules-Gonin Eye Hospital, Fondation Asile des aveugles, Lausanne, Switzerland, ²Ophthalmology Department, Faculty of Medicine, University of Crete, Heraklion, ³rd University Department of Ophthalmology, AHEPA Hospital, Thessaloniki, ⁴First Department of Ophthalmology, National and Kapodistrian University of Athens, Athens, Greece

Correspondence to: Prof. George D Kymionis, Hôpital Ophtalmique Jules Gonin, 15 avenue de France, Lausanne - 1002, Switzerland. E-mail: gkymionis@gmail.com

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were made at the 10 o' and 4o' clock positions. A cohesive OVD (Provisc; Alcon Laboratories, Inc.) was injected into the AC temporally. A Tan marginal dissector (Asico, USA) was used to separate the donor graft from the recipient bed allowing controlled creation of the corneal pocket in the nasal two-thirds of the graft–host interface. The aspiration handpiece was inserted in the interface through the nasal side-port corneal incision and a separate irrigation tip was placed in the AC through the temporal corneal paracentesis. Meticulous rinsing with balanced salt solution (BSS; Alcon Laboratories, Inc.) of the two-thirds of the interface area and the AC was performed. At the end of the procedure, air was injected into the AC to float the donor graft against the host stromal bed and facilitate graft adherence [Video 1]. After surgery, the patient was instructed to lie in a supine position in the recovery room for 2 h and then was rechecked to ensure graft apposition. Postoperative topical therapy consisted of dexamethasone 0.1% ophthalmic solution five times per day.

On postoperative day 1, the interface haze had resolved, and the graft was clear and remained well-apposed. At the 1- and 3-month follow-up examinations, there was no visible interface haze and no signs of graft detachment or failure [Fig. 3]. AS-OCT confirmed good adhesion of the donor lenticule to the recipient bed [Fig. 4].

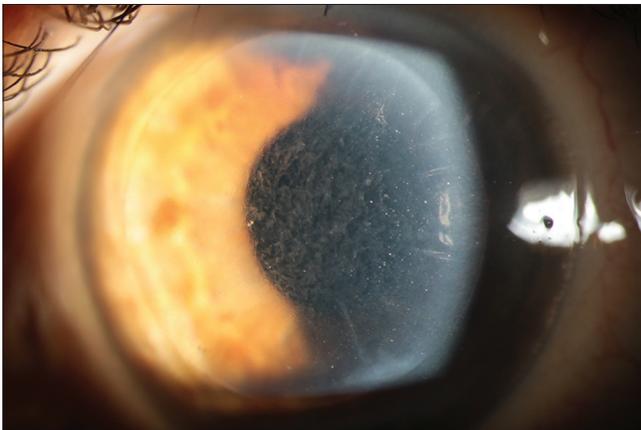


Figure 1: Slit-lamp photograph 1 month after combined DSAEK with phacoemulsification depicting the diffuse interface opacities

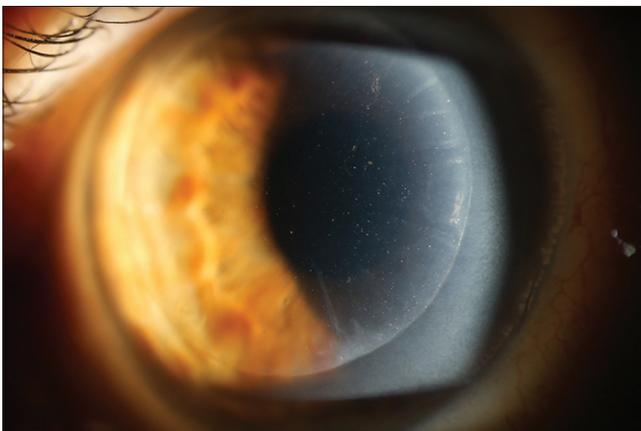


Figure 3: Slit-lamp examination 1 month after bimanual irrigation/aspiration demonstrating near-complete resolution of the interface opacities. The image remained unchanged at the 3-month follow-up examination

ECC was 1255 cells/mm². BCVA returned to 20/25 at 1 month and remained stable until the last follow-up visit at 3 months.

Discussion

While frequently encountered but perhaps underreported, interface opacities and haze can be a cause of decreased vision in a few cases and warrant intervention. Their etiology remains elusive. Proposed hypotheses include infection, microkeratome, or blade precipitates,^[2,7] precipitates from preservation media,^[7] shearing of the stromal fibrils due to an irregular lamellar microkeratome blade cut of the donor tissue,^[3,8] calcareous deposition,^[9] retention of fibers or Descemet membrane,^[10] persistent interface fluid, interface blood, retained OVD,^[2-6] and residual talc from the gloves.^[7] Recently, the term “textural interface opacities” has been introduced by Vira *et al.* referring to retained viscoelastic and irregular stromal surface of the donor lenticule.^[3]

In our case, the haze was attributed to residual OVD trapped in the donor–recipient pocket. A cohesive OVD might be used during the stripping process of the recipient DM as an AC maintainer, which is then meticulously evacuated. Incomplete removal might result in residual OVD in the donor–recipient interface which is responsible for the later observed opacities. The use of a dispersive OVD in cases undergoing DSAEK is not suggested due to the increased risk of inadequate removal.

Interface haze may spontaneously resolve with time. Nevertheless, in cases of significant persistent interface haze that severely compromises visual acuity, a repeat DSAEK or penetrating keratoplasty might be considered inevitable. Therefore, our technique represents a viable alternative in these patients who would otherwise be subjected to a more invasive

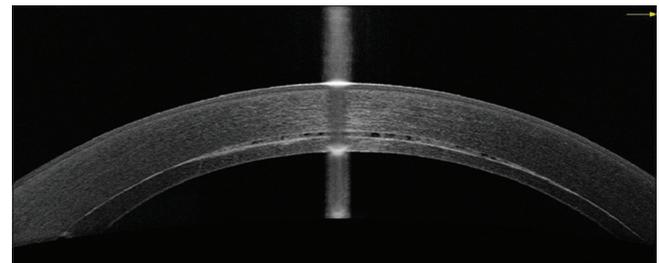


Figure 2: Anterior segment optical coherence tomography 1 month after combined DSAEK with phacoemulsification showing the interface space and the hyperreflective interface deposits between the recipient cornea and the donor lenticule

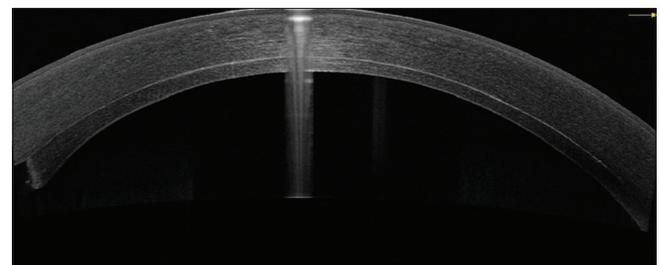


Figure 4: Anterior segment optical coherence tomography 1 month after bimanual irrigation/aspiration depicting the resolution of the interface opacities and total graft attachment

procedure. The management of post-DSAEK interface haze with a coaxial irrigation-aspiration tip has been previously reported by Anshu *et al.*; however, the authors did not describe the details of the surgical technique in that case.^[4] Moreover, resolution of the interface fluid with venting incisions has been proposed;^[11] however, this method may have been ineffective in this case due to the high viscosity of the retained OVD.

The rationale behind the approach we propose is that we can address the complication and preserve the graft at the same time. The bimanual surgical manoeuvres aim to cautiously evacuate any debris that has accumulated in the interface, creating a polished stromal surface, thus promoting graft adherence. Cautious rinsing is required as to not shear the adjacent stromal fibrils which might impede the adhesion of the posterior donor lenticule. In our opinion, with the bimanual irrigation/aspiration technique, the stability of the graft is protected. On the contrary, fluid infusion by a coaxial irrigation/aspiration tip placed in the interface could destabilize the graft and jeopardize its integrity.

Conclusion

In conclusion, we propose an effective surgical technique for the removal of deposits from the donor–recipient corneal interface that avoids the risks of a repeat corneal transplantation. Bimanual irrigation/aspiration offers the patient a chance at achieving good visual outcome with rapid resolution of the haze while maintaining graft attachment.

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Conflicts of interest

There are no conflicts of interest.

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