

Glued Intraocular Lens Combined with Endothelial Keratoplasty: A Case Report

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Abstract

In an aphakic eye with corneal edema, performing Descemet's stripping automated endothelial keratoplasty (DSAEK) combined with implantation of intraocular lens can be a challenge. This case report describes a surgical technique for postsurgical aphakia with endothelial decompensation in a 42-year-old female with Marfan syndrome and subluxated lens. This technique comprised implanting DSAEK with fibrin glue-assisted sutureless posterior chamber intraocular lens. The donor lenticels were formed on a 60-kHz femtosecond laser platform (Intralase®). Two partial-thickness scleral flaps and sclerotomies were created, and then, the Descemet's membrane was scored and stripped. A posterior chamber intraocular lens was implanted, and its haptics was pulled out through the sclerotomies and tucked beneath the flaps. The flaps were then apposed with fibrin glue. The donor lenticule was introduced to the anterior chamber and unfolded. Air tamponade was used to stabilize and center it. This technique significantly improved the uncorrected and best-corrected visual acuities of the patient, and no donor dislocations were reported. This case corroborates the findings of few similar cases that have found combined use of glued intraocular lens with DSAEK to be beneficial in such cases.

Keywords: Corneal edema, Descemet's stripping automated endothelial keratoplasty, DSAEK, glued intraocular lens, intrascleral fixation, subluxated lens

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INTRODUCTION

Descemet's stripping automated endothelial keratoplasty (DSAEK) is a partial thickness cornea transplant procedure that involves removal of the patient's Descemet's membrane and endothelium, followed by the donor's corneal endothelium and stroma transplantation. It is considered to be the first-choice surgical treatment for endothelial decompensation, represented by a progressive endothelial cells' loss in function and density that results in corneal edema.^[1]

In a case of aphakic corneal edema, performing DSAEK combined with the implantation of intraocular lens (IOL) can be challenging. To implant, an anterior chamber IOL (AC-IOL) together with performing DSAEK has shown to increase the risk of graft rejection and decrease AC volume, which makes graft unfolding more difficult. In addition, it requires a long-term follow-up. On the other hand, a scleral-fixed posterior chamber (PC) IOL has a high anatomic success rate.^[1] However, this technique is associated with a longer learning curve,

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prolonged intraoperative manipulation, postoperative pseudophacodonesis and risk of postoperative decentration resulting from suture degradation or knot slippage.^[2]

In the absence of posterior capsule support, the most recent successfully performed technique to overcome the above-mentioned problems with minimal postoperative complications is to combine fibrin glue-assisted sutureless intrascleral fixation of PC IOLs with DSAEK or penetrating keratoplasty.^[2,3]

This is a case report of combined DSAEK procedure along with intrascleral glued PC-IOL fixation in a postsurgical aphakic corneal edema.

CASE REPORT

A 42-year-old female with Marfan syndrome and complete superotemporal and partial subluxation of the right and left lens since birth, respectively, had undergone an implantation of AC iris-fixated Artisan IOL for her right eye 7 years ago [Figure 1]. Her postoperative period was uneventful.

Four years later, she underwent left eye lens removal for secondary IOL fixation, but due to intraoperative complications with manipulation to the iris and the corneal endothelium, the patient was left aphakic. Postoperatively, a corneal edema developed, for which she was on a 6-month prednisolone acetate 1% drops four times a day and NaCl 5% ophthalmic solution five times a day; however, there was no improvement. Three months later, the patient presented to our anterior-segment ophthalmology clinic with unresolving corneal edema. On presentation, the best-corrected visual acuity was counting fingers at 2 ft, sphere of +13.00, and astigmatism of -1.00 at 90°. Slit-lamp biomicroscopy showed diffuse corneal edema +3, intraocular pressure (IOP) was 14 mmHg and fundus examination was normal. Central corneal thickness was 0.673 mm, but endothelial cell count could not be assessed.

A decision was taken to perform DSAEK combined with glue-assisted sutureless transscleral fixated PC-IOL implantation technique. IOL calculation was done using Carl Zeiss IOL Master (Carl Zeiss Meditec, Dublin, CA, USA) in SRK/T formula, a sensor lens with a constant 118.40 and lens power of 20.5 was chosen to meet a targeted refraction of -0.67. The donor cornea had endothelial counts of >2500 cells/mm².

Lenticule preparation and handling

The freshly prepared donor's corneoscleral button was fitted on Barron artificial AC (Katena Product Inc.,

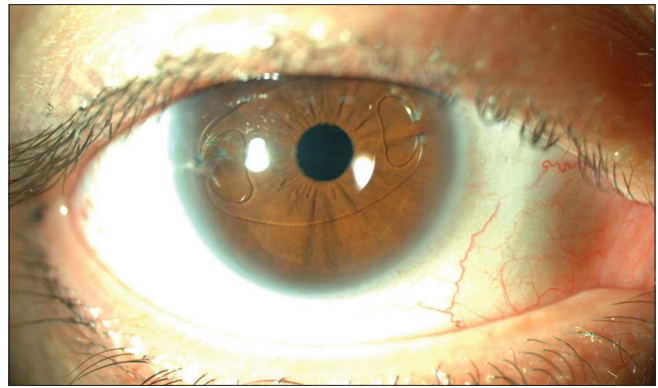


Figure 1: Right eye with anterior chamber intraocular lens (Artisan type) in place

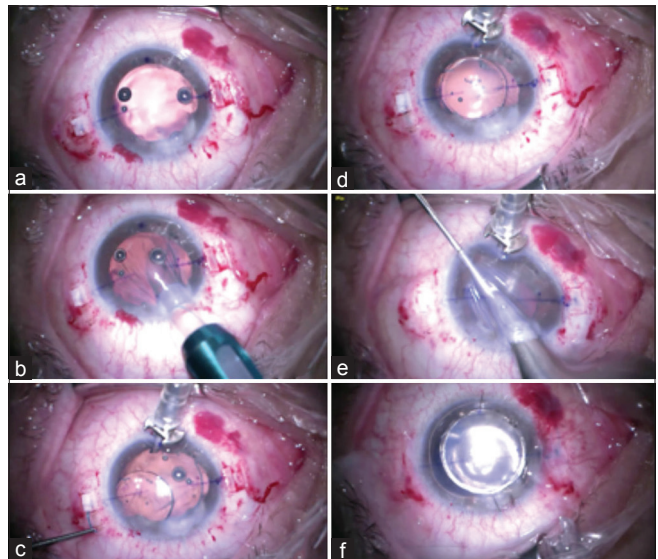


Figure 2: (a-f) Intraoperative steps on glued intraocular lens implantation and Descemet's stripping automated endothelial keratoplasty

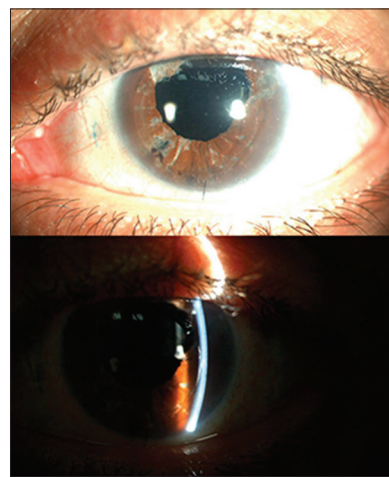


Figure 3: Slit-lamp examination of the left eye in diffuse illumination

Denville, NJ, USA), ensuring that it is centralized and the chamber is filled with balanced salt solution. Then, the assembly was docked with IntraLase applanation

cone (Abbott Medical Optics, Santa Ana, CA, USA). The laser pass was achieved using a 60-kHz femtosecond IntraLase-enabled keratoplasty mode. The posterior side of the donor's corneoscleral graft was cut, the full lamellar was passed, and then, the anterior side was cut. The calculated lamellar cut depth was 100 μm posterior lenticule with a diameter of 8.0 mm.

Descemet's stripping automated endothelial keratoplasty with glued intraocular lens

Following a limited conjunctival peritomy, a localized peritomy was performed near the nasal (3 o'clock) and temporal (9 o'clock) limbus, by marking the sclera with 1.5 mm and 3.0 mm from the limbus and then creating two partial-thickness scleral flaps [Figure 2a]. A 20-gauge microvitrectomy blade (Alcon Laboratories Inc., Fort Worth, TX, USA) was used to create 2 sclerotomies, each in the bed of the flap, 1.5 mm from the limbus. A superior limbal tunnel was made using a 2.75 mm keratome. A limited anterior vitrectomy was performed to clear vitreous strands. A paracentesis was created at the limbus adjacent to the corneal incision. Descemetorhexis was done under air. Descemet's membrane and the endothelium were scored with a Reverse Sinsky Hook, and the membrane was removed. A 20-gauge infusion cannula was placed in the inferonasal area, and a foldable three-piece PC-IOL (Sensar[®] Abbott Medical Optics, Santa Ana, CA, USA) was introduced into the AC from the corneal incision [Figure 2b].

The haptic was then directed into a vitreoretinal forceps introduced through the site of temporal sclerotomy and externalized through the sclerotomy site under the temporal scleral flap [Figure 2c]. Scleral pockets were fashioned using 26-G needle. The other haptic was managed in the same manner [Figure 2d]. Further, a reconstituted fibrin glue (Baxter AG, Vienna, Austria) was injected into the pockets and beds of the scleral flap, and then gentle pressure was applied locally for 20–30 s to promote adherence of the scleral flaps.

The donor lenticule was held by Busin glide and introduced into the AC through the corneal incision, and the inferior paracentesis was created in which a Busin forceps was used to pull the lenticule [Figure 2e]. The donor lenticule was brought into position by injecting air. The corneal tunnel was sealed using a single suture of 10-0 monofilament nylon. The irrigation cannula was removed, and the port was closed with a single 10-0 monofilament nylon suture. Finally, the fibrin glue was applied to close the conjunctival flaps and to stick them to the sclera [Figure 2f].

Postoperatively, the patient was discharged on the same day, and she was kept on moxifloxacin eye drops (0.5%) three-time a day, prednisolone acetate drops (1%) four-time a day, antiglaucoma medications (dorzolamide hydrochloride-timolol maleate [Cosopt] drops two times a day and brimonidine tartrate [Alphagan P] drops two times a day), and glycerin-carboxymethylcellulose sodium (Optive) lubricating drops four times a day, which were subsequently tapered down. The patient was followed up after 1 day, 1 week, every 2 weeks, and then as appropriate. The patient had a gain in best-corrected visual acuity reaching to 0.10 LogMAR after the surgery. Her postoperative sphere was +1.50, spherical equivalent of 0.50 LogMAR and astigmatism of -2.25 . The donor lenticule was clear and properly adhered, and the IOL was perfectly centered with a normal IOP of 18 mmHg [Figure 3]. Corneal edema progressively resolved. Six months after the surgery, the endothelial count improved to 2183 cells/ mm^2 . The central corneal thickness was 592 μm with an AC depth of 5.08 mm.

During the entire 6-month follow-up, there were no graft-related problems (such as infection, surgically induced astigmatism, delayed stromal wound healing, rejection, dehiscence or decompensation) or IOL-related complications (such as endophthalmitis, dislocation and decentration, glaucoma or haptic extrusion).

DISCUSSION

The surgical options for endothelial decompensation have improved significantly in the past few years. DSAEK is the procedure of choice to manage corneal endothelium diseases, such as Fuchs' endothelial dystrophy, pseudophakic bullous keratopathy and endothelial graft failure.^[2] In case of aphakia with endothelial decompensation, the implantation of an IOL combined with DSAEK has been successfully performed.^[1]

Studies have shown that intrascleral glue fixated PC-IOL has potential benefits over the use of an AC-IOL owing to the fact that it does not reduce the AC volume and does not necessitate intact iris tissue. In addition, with this technique, the postoperative graft survival is longer, IOP is lower and visual outcomes are better, unlike suture-fixated IOLs, as well as there is no risk of complications related to sutures such as knot slippage, pseudophakodonesis, late subluxation or secondary IOL implantation.^[2-4] Nonetheless, two-point fixated suture has more risk of axial IOL tilt, and a 3- or 4-point fixation increases complications risk that results from too much intraocular manipulations.^[5]

In aphakic patients, it is a challenge to maintain the air in the AC. Because these patients lack the capsular bag to isolate the AC, there is risk for migration of injected air bubble posteriorly and dislocation of lenticule into the vitreous cavity. Therefore, the placement of an IOL before the donor lenticule helps overcome these complications.^[6] Sinha *et al.*^[2] concluded that, because there were no cases of IOL decentration during the procedures, the glued intrasceral fixation technique might provide a strong fixation and an adequately stable IOL to sustain the manipulation required during DSAEK.

The fibrin glue acts rapidly in the scleral bed within 20 s, and it also aids in the adhesion and hemostasis, which in turn minimizes the surgery time and reduces the risk of retinal photic injury, as seen with scleral-fixated IOLs.^[7] Another point worth noting is that fibrin glue completely blocks the sclerotomy, lowering the risk for hypotony and infection. However, the use of fibrin glue increases the procedure's cost.^[2]

On the other hand, significant intra- and post-operative complications may occur in glued IOL surgery, which may not be unanticipated with the underlying ocular pathology and concurrent surgical procedures.^[8,9] Among these, some may be encountered intraoperatively as intraocular hemorrhage from the site of sclerotomy; iridodialysis and its resultant bleeding; deformation/breakage of the haptic tip during externalization; IOL exchange demanded by haptic breakage; unequal scleral tuck; haptic slippage; nondiagonal scleral flaps; and IOL drop, decentration or tilt. Postoperative complications that may occur are anterior chamber cells and flare; corneal edema; high IOP; wound leakage; hypotony; choroidal effusion; optic capture; IOL tilt, decentration or subluxation; retinal breaks or detachment; cystoid macular edema; vitreous hemorrhage; uveitis–glaucoma–hyphema syndrome; endophthalmitis; and haptic erosion.^[9]

CONCLUSION

This case report demonstrates that intrasceral glued fixated PC-IOL in combination with DSAEK is safe and effective for endothelial decompensation in an aphakic eye. However, as this procedure has not yet been universally adopted, late postoperative complications have not been

clearly studied. Therefore, there is a need for larger comparative trials to produce definitive evidence.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the Journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

Peer review

This article was peer reviewed by one independent and anonymous reviewer.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Wylegala E, Tarnawska D. Management of pseudophakic bullous keratopathy by combined Descemet-stripping endothelial keratoplasty and intraocular lens exchange. *J Cataract Refract Surg* 2008;34:1708-14.
2. Sinha R, Shekhar H, Sharma N, Tandon R, Titiyal JS, Vajpayee RB. Intrasceral fibrin glue intraocular lens fixation combined with Descemet-stripping automated endothelial keratoplasty or penetrating keratoplasty. *J Cataract Refract Surg* 2012;38:1240-5.
3. Prakash G, Agarwal A, Jacob S, Kumar DA, Chaudhary P, Agarwal A. Femtosecond-assisted Descemet stripping automated endothelial keratoplasty with fibrin glue-assisted sutureless posterior chamber lens implantation. *Cornea* 2010;29:1315-9.
4. Brunette I, Stulting RD, Rinne JR, Waring GO 3rd, Gemmil M. Penetrating keratoplasty with anterior or posterior chamber intraocular lens implantation. *Arch Ophthalmol* 1994;112:1311-9.
5. Narang P, Narang S. Glue-assisted intrasceral fixation of posterior chamber intraocular lens. *Indian J Ophthalmol* 2013;61:163-7.
6. Suh LH, Kymionis GD, Culbertson WW, O'Brien TP, Yoo SH. Descemet stripping with endothelial keratoplasty in aphakic eyes. *Arch Ophthalmol* 2008;126:268-70.
7. Agarwal A, Kumar DA, Jacob S, Baid C, Agarwal A, Srinivasan S. Fibrin glue-assisted sutureless posterior chamber intraocular lens implantation in eyes with deficient posterior capsules. *J Cataract Refract Surg* 2008;34:1433-8.
8. Kang JJ, Ritterband DC, Toles SS, Seedor JA. Outcomes of glued foldable intraocular lens implantation in eyes with preexisting complications and combined surgical procedures. *J Cataract Refract Surg* 2015;41:1839-44.
9. Jacob S. Intrasceral IOL fixation. *Asia Pac J Ophthalmol (Phila)* 2017;6:381-7.