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Case Report

Sutureless Intrascleral Pocket Technique of Transscleral Fixation of Intraocular Lens in Previous Vitrectomized Eyes

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In this case series, we assessed a new technique, the intrascleral pocket procedure of transscleral fixation (TF) of the intraocular lens (IOL) in post-vitrectomized eyes. We performed the transscleral fixation of IOL in four aphakic patients who underwent pars plana vitrectomy. Two points 180° apart were marked at the limbus. A 2-mm-sized intrascleral pocket was created by lamellar dissection using a crescent blade without conjunctival dissection. A 2.8-mm clear corneal incision (CCI) was made using a keratome. Prolene sutures were exteriorized through the CCI pocket and a three-piece foldable acrylic IOL was injected via CCI and the ends of the haptics were exteriorized through the CCI. The prolene sutures for each haptic in the intrascleral pocket bed were then tied and knots were buried under scleral flaps. No patient had complaints such as conjunctival irritation, and visual acuity was almost identical to preoperative best-corrected visual acuity at day 1 postoperatively. IOLs were well placed without tilting or subluxation. They had no wound dehiscence or endophthalmitis postoperatively. The intrascleral pocket procedure of TF without the need for conjunctival dissection is a successful method for sulcus fixation in post-vitrectomized eyes predisposed to developing glaucoma.

Key Words: Aphakia, Intraocular lens implantation, Intrascleral pocket, Transscleral fixation

Transscleral fixation of posterior chamber intraocular lenses (PCIOLs) is a well-established and effective method for implantation of PCIOLs in the absence of sufficient capsular support. There are many techniques for secondary intraocular lens (IOL) transscleral fixation through the ciliary sulcus or pars plana [1-6].

The technique of scleral fixation of the IOL requires a conjunctival dissection to make a scleral bed for the passage of fixation sutures and to prevent knot exposure [7-9]. However, post-vitrectomizied eyes are more likely to require trabeculectomy, and there is trouble performing conjunctival dissection without conjunctival or scleral injury due to tissue adhesion. We describe a new technique for the creation of a subconjunctival intrascleral pocket for the scleral fixation of IOLs without conjunctival dissection in previously vitrectomized eyes.

Case Report

The surgery was performed in four eyes of four patients after explaining the procedure and obtaining informed consent. All patients had a full preoperative evaluation, including refraction, best-corrected visual acuity (BCVA), intraocular pressure, slit lamp, and fundus examination. The IOL power was calculated using the Sanders-Retzlaff-Kraff II formula. Records of intraoperative and postoperative complications and visual outcomes were noted.

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Surgical technique

Two points 180° apart were marked at the limbus (Fig. 1A). A 2-mm-sized intrascleral pocket was created by lamellar dissection using a crescent blade 2 mm behind the limbus without conjunctival dissection (Fig. 1B and 1C). Transscleral transconjunctival passage of a straight needle with a 10-0 polypropylene suture was performed 1.5 mm behind the limbus into the posterior chamber along with the docking of the prolene suture needle using a 26-gauge needle (Fig. 1D). A 2.8-mm clear corneal incision (CCI) was made in the anterior limbus using a keratome. Prolene sutures were exteriorized through the CCI pocket with a hook and the anterior chamber filled with an ophthalmic viscosurgical device. A three-piece foldable acrylic IOL was injected with the injector system via CCI and the ends of the haptics were exteriorized through the CCI, and then prolene sutures for each haptic were tied (Fig. 1E). IOL were placed in the anterior chamber and the haptics were oriented into the sulcus by pulling the prolene sutures. After achieving centration of the IOL, ends of the prolene

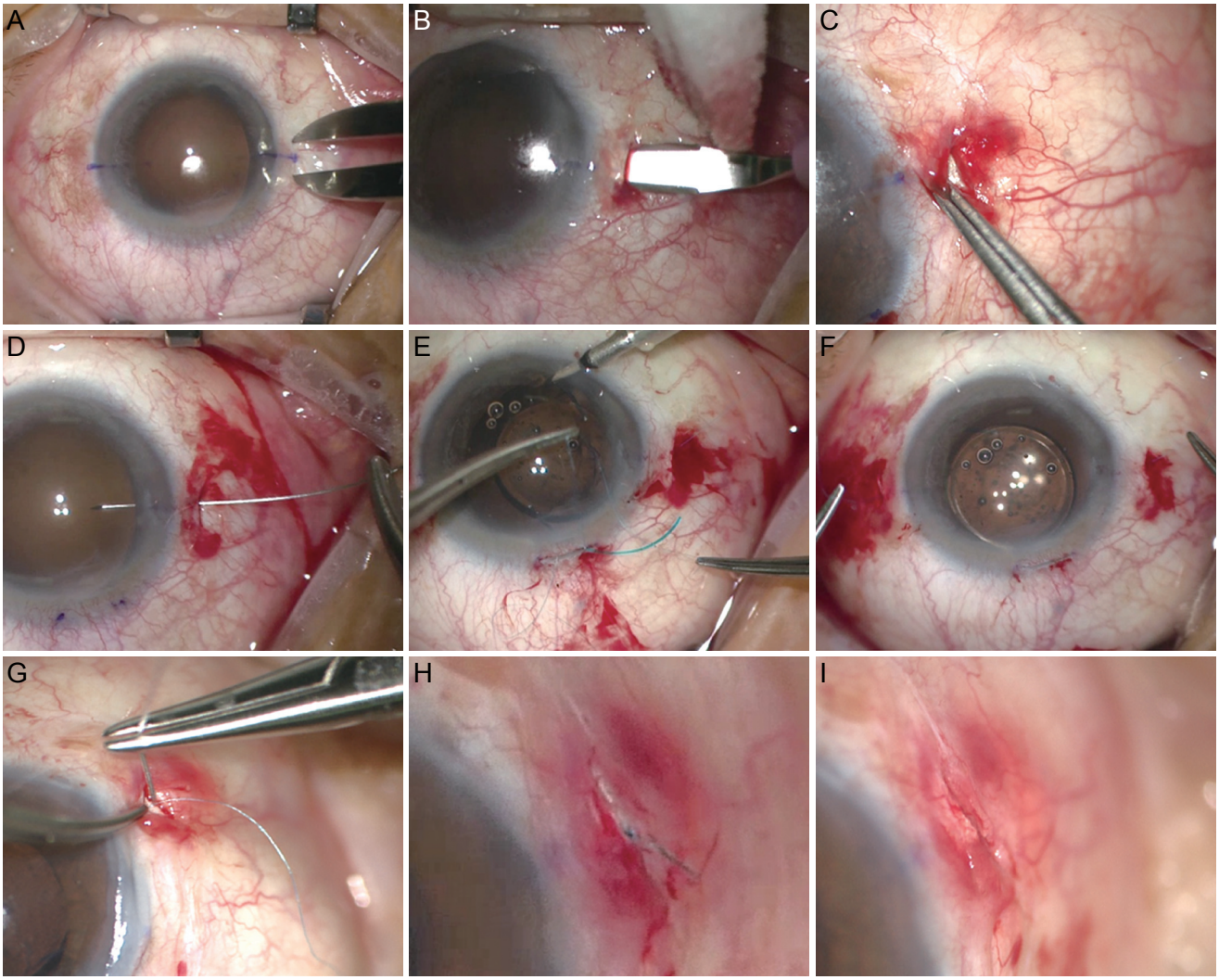

Fig. 1. Sutureless intrascleral pocket technique for transscleral fixation of intraocular lens (IOL). Two points 180° apart marked at the limbus (A) and intrascleral pocket were created by lamellar dissection using a crescent blade without conjunctival dissection (B,C). Transscleral passage of a straight needle with a 10-0 polypropylene suture was performed 1.5 mm behind the limbus (D). A 2.8-mm clear corneal incision (CCI) made in the anterior limbus using a keratome. Prolene sutures exteriorized through the CCI pocket with a hook and a three-piece foldable acrylic IOL were injected with the injector system via CCI and the ends of the haptics were exteriorized through the CCI, and then prolene sutures for each haptic were tied (E). After achieving proper centration of IOL, ends of prolene were sutured at the intrascleral pocket bed (F,G). Knots were buried under scleral flaps to prevent exposure and trued up the edges of the conjunctiva to be joined without suture (H,I).

were sutured at the intrascleral pocket bed (Fig. 1F and 1G). Knots were buried under scleral flaps to prevent exposure (Fig. 1H). CCI and other paracentesis wounds were hydrated, and trued up edges of the conjunctiva were joined without suture (Fig. 1I).

Case summary

Four patients who experienced vitrectomy were selected and underwent operation using a sutureless intrascleral pocket technique of transscleral sulcus fixation of IOL. All patients were followed for at least three months. Three patients were male and one patient was female. The causes of aphakia were IOL subluxation (two cases), retinal detachment surgery (one case), and lens subluxation (one case). As shown in Table 1, all patients recovered visual acuity one day after the operation without subconjunctival hemorrhage, irritation, pain, or wound dehiscence. At the last follow up, most patients recovered visual acuity at or better than the preop BCVA, and loss of endothelial cell count was not detected. In addition, there was no suture exposure, IOL tilting, dislocation, decentration, capture, IOP elevation, or vitreous hemorrhage.

Discussion

Since Malbran et al. [10]. first described the scleral fixation technique of PCIOLs in an aphakic patient, this method has frequently been used in eyes with inadequate posterior capsular or zonular support . Currrently, various modifications in the techniques of scleral fixation of IOL have been

Table 1. Demographics

Patient	Sex	Age (yr)	Cause of aphakia	Preop BCVA	Preop ECC	Postop 1 day VA	Last BCVA	Last ECC	FU period (mon)
1	F	68	IOL dislocation	1.0	2345	0.7	1.0	2300	3
2	M	81	IOL dislocation	0.4	2200	0.3	0.5	2150	5
3	M	52	Retinal detachment	0.7	1980	0.6	0.8	1960	4
4	M	55	Crystalline lens dislocation	0.8	1976	0.7	0.8	1860	4

Preop = preoperative; BCVA = best-corrected visual acuity; ECC = endothelial cell count; Postop = postoperative; VA = visual acuity; FU = follow up; IOL = intraocular lens.

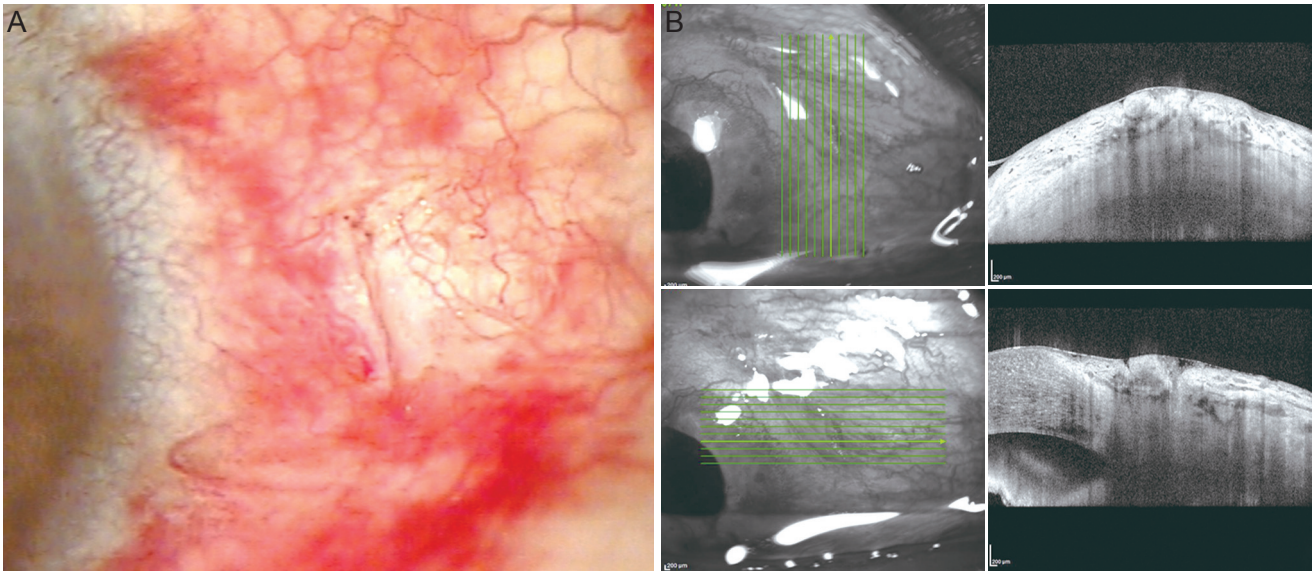

Fig. 2. Slit-lamp photography (A) and anterior segment optical coherence tomography (B) day 1 after transscleral fixation of intraocular lens using the intrascleral pocket technique showed that conjunctival and scleral alignment was maintained without a notable wound gap.

reported [4-8,11-13]. However, most of these techniques begin by initially dissecting the conjunctiva and Tenon's capsule so as to make a scleral flap for the passage of fixation sutures and for avoiding suture exposure. We have made several improvements in the technique of scleral fixation of IOLs. In our technique, first, conjunctival dissection is not required. Post-vitrectomized patients, especially those who received 20G vitrectomy, had relatively thin conjunctiva or had conjunctiva-Tenon-scleral complex that makes dissection harder due to adhesion with Tenon's capsule or sclera. This made conjunctival dissection difficult or led to conjunctival defects or sclera injuries. However, our technique helps to avoid these complications. The technique shortens operation time and lessens bleeding chances. Furthermore, conjunctiva and Tenon space maintain their native integrity, which increases the success rate of later glaucoma surgery. Secondly, by conducting a sutureless operation through a small CCI using a IOL injector, astigmatism and irritation develop less frequently. Therefore, visual recovery and timing of return to daily life is faster compared to older techniques. This is supported by the results of this study which demonstrate that visual acuity the day after the operation is comparable to BCVA before surgery. Mannan et al. [14] reported an intrascleral reverse pocket approach which includes a sclera flap around the limbus without conjunctival dissection in patients with histories of ocular trauma. When compared with this technique, ours have several advantages. Firstly, corneal nerve damage is not as frequent since the corneal limbus is maintained intact. This also leads to less dry eye syndrome after the surgery. Moreover, decreased pain allows for topical anesthesia for the operation. In addition, our technique is similar to the pocket-making procedure or scleral flap in glaucoma surgery, which is easier than making a reverse pocket at the limbus. Lastly, surgery around the limbus can cause vascular or angle structure damage, or puncture to the anterior chamber, and probabilities of these complications are less in our technique.

However, our technique also has several drawbacks. First of all, the initial conjunctival incision can induce bleeding. In this case, compression with a cotton swab may control the bleeding. Secondly, the roof of the scleral pocket can be damaged. Managing with a toothless forcep is especially important when manipulating the roof. Nevertheless, in some cases, conjunctival sutures may be necessary to improve wound healing. Lastly, the sutureless technique can lead to possibilities of erosion by knot exposure or endophthalmitis. By leaving enough length of knot in the pocket, knot exposure can be avoided. Also, there were no cases of endophthalmitis in our experience because a tract is not easily formed by covering the sclera roof and maintaining conjunctival alignment. This is shown by anterior segment optical coherence tomography a day after the operation (Fig. 2).

Our technique may be useful for patients who require rapid visual recovery or who are vitrectomized or have post-traumatic aphakia. Also, it is helpful for patients with conjunctival scarring, Stevens-Johnson syndrome, or those with anterior ocular disease such as dry eye syndrome. However, the sample size in this study was small. Further studies with a larger sample and longer follow-up period are required to evaluate the validity and reliability of this new technique.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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