

Trocar-assisted sutureless intrascleral posterior chamber foldable intra-ocular lens fixation

Y Totan¹ and R Karadag²

Abstract

Purpose We report a novel technique characterized by sutureless scleral fixation of three-pieces foldable intraocular lens (IOL) using 25-gauge transconjunctival sutureless vitrectomy (TSV) trocars in patients with insufficient posterior capsule support.

Materials and Methods We performed this technique on the eight eyes of the seven patients. The scleral tunnels (STs) are prepared by insertion of the 25-gauge TSV microcannulas using the trocars, and anterior vitrectomy is performed through the clear corneal paracentesis with the aid of anterior chamber maintainer (ACM). Finally, the three-piece foldable IOL haptics are incarcerated into the prepared STs.

Results The patients were followed up 5–8 months. None of the patients had complications such as postoperative endophthalmitis, glaucoma, IOL tilt or decentralization, and retinal detachment. Injection of a foldable IOL through a clear corneal small incision also contributes the less surgical-induced astigmatism.

Conclusion The presented novel sutureless scleral IOL fixation technique may provide minimal trauma to the surrounding tissues, good IOL stabilization decreasing the incidence of IOL tilt along with shorter operation time, and postoperative quiet eye.

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Keywords: intraocular lens; posterior chamber; scleral fixation; sutureless; vitrectomy trocar

Introduction

In patients with insufficient posterior capsule support after cataract surgery, the different intraocular lens (IOL) implantation techniques

have been used for optic rehabilitation.^{1–6} However, the sutureless scleral fixation (SSF) of posterior camera (PC)-IOL implantation has become more popular.^{7–10} Recently, Gabor and Pavlidis⁹ have first described a technique of SSF of PC-IOL. In this technique, IOL haptics are incarcerated into the prepared scleral tunnels (STs) and thus the stability of the PC-IOL is provided. Here, we have improved their previously described technique. In our technique, the ST are prepared by insertion of the 25-gauge transconjunctival sutureless vitrectomy (TSV) microcannulas using the trocars, and anterior vitrectomy is performed through the clear corneal paracentesis with the aid of anterior chamber maintainer (ACM). Finally, the three-piece foldable IOL haptics are incarcerated into the prepared ST.

Materials and methods

The peripheral cornea was marked with tissue pen at two points 180° apart using radial keratotomy marker (Figure 1a). Two transconjunctival ST, 1.5 mm from and parallel to the limbus, were then prepared with the 25-gauge TSV trocars, the entry sites of which exactly correspond to the previously marked points Image 1. During the tunnel preparation, the sclera was entered transconjunctivally with 10° angle using the 25-gauge TSV trocar preloaded with the overlying microcannula, and subsequently the trocar was removed leaving the microcannula in place (Figures 1b and c). An ACM was then placed and triamcinolone-assisted anterior vitrectomy was performed through clear corneal incision (CCI) (Figure 1d).

A standard IOL with propylene haptics was implanted with an injector through the CCI (Figures 2a and b). Then, a 25-gauge retinal forceps was entered into the PC through one of

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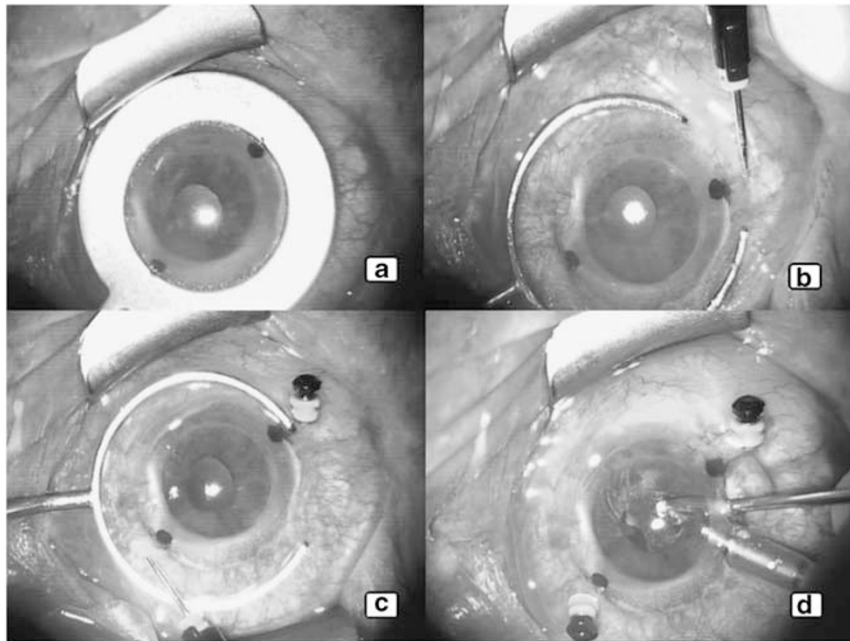


Figure 1 (a) Marking of the peripheral cornea 180° from each other; (b, c) preparing of two 10° transconjunctival STs, 1.5 mm from and parallel to the limbus; (d) performing of the vitrectomy after the placement of the anterior camera maintainer.

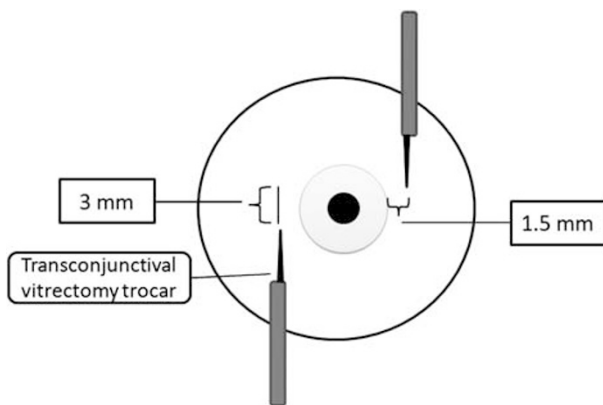


Image 1 Preparing of two transconjunctival 3 mm ST, 1.5 mm from and parallel to the limbus

the prepared 25-gauge cannula whereas a 23-gauge retinal forceps was being entered into the anterior chamber through the paracentesis to grasp the contra-lateral IOL haptic. The grasped haptic was then approached to the 25-gauge forceps, which subsequently grasped the tip of the haptic. The haptic and 25-gauge cannula were together explanted from the sclerotomy simultaneously (Figures 3a–c). The same procedure was performed for the other haptic and microcannula (Figure 3d). The haptics were then properly placed into the ST by pushing their tips up to the trocar entry under the conjunctiva. The ST was closed with a 10/0 monofilament transconjunctival suture (Figure 4a). After the closure of the CCI with hydration, the operation was ended (Figure 4b). The placed transconjunctival suture was removed 1 week following surgery.

Results

We performed this technique (see Supplementary Video) on the eight eyes of the seven patients. The patients were followed up 5–8 months. None of the patients had serious complications such as postoperative endophthalmitis, glaucoma, IOL tilt or decentralization (Figure 5), and retinal detachment.

Discussion

The different IOL implantation techniques have been used in aphakic patients with insufficient posterior capsule support.⁵ Nowadays, the SSF of PC-IOL has become more popular.^{7–10} In the SSF technique, described by Gabor and Pavlidis,⁹ IOL haptics are incarcerated into the prepared ST without sutures thereby allowing the stability confidently. This technique has been performed in the 66 patients with less trauma and scleral manipulation. They emphasized that ST incarceration of haptics provides IOL stabilization and decreases the incidence of IOL tilt.¹⁰ The suture-related complications of the conventional scleral IOL fixation technique are not encountered in the SSF technique.¹¹ Injection of a foldable IOL through a CCI also contributes the less surgical-induced astigmatism.¹⁰ The incidence of chronic inflammation or recurrent bleeding is lower in the SSF technique than the other techniques. The PC-IOL implantation by the SSF technique also decreases the risk of intraoperative maneuvers and trauma.⁹

We applied Gabor and Pavlidis's⁹ technique in some patients. However, we have encountered some difficulty

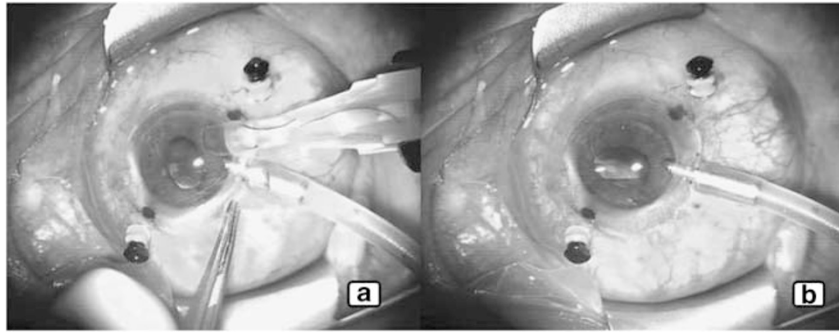


Figure 2 (a, b) Implantation of IOL with the injector.

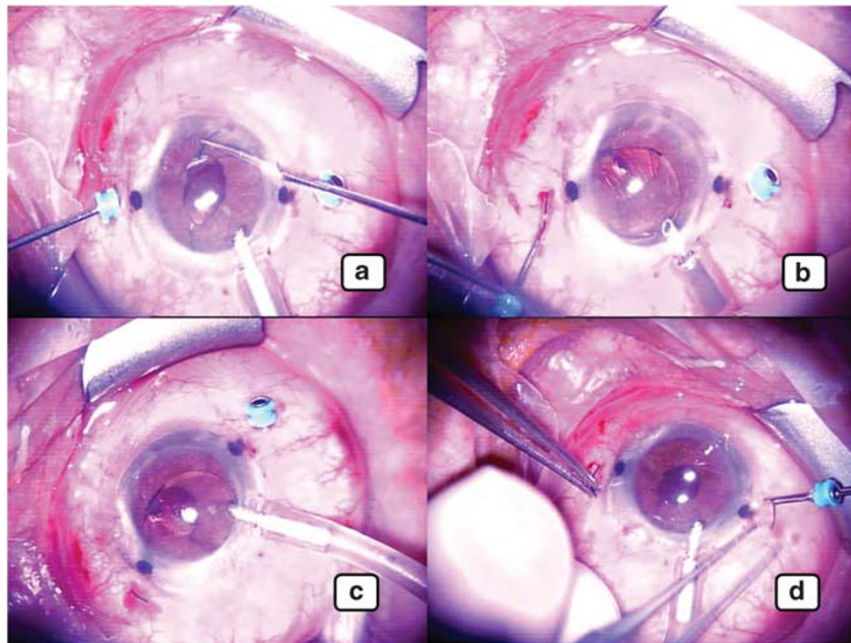


Figure 3 (a) Grasping of one of the haptic with the vitrectomy forcep in the pupillary area; (b) the removal of the grasped haptic from the ST with the transconjunctival vitrectomy trocar; (c) the appearance of the haptic exiting from the ST; (d) removing of the other haptic from the ST with the transconjunctival vitrectomy trocar.

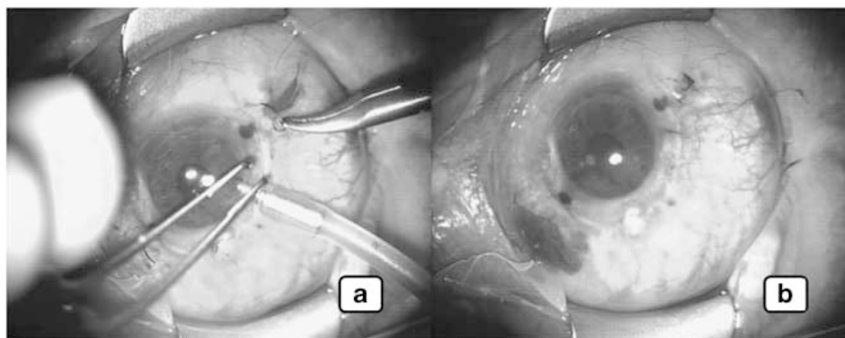


Figure 4 (a) Placement of the secure suture to the haptics; (b) the postoperative appearance.

particularly during the haptic incarceration into the limbus-parallel ST because of the fact that a haptic tip externalized from the 24-gauge sclerotomy should be redirected in to the limbus-parallel 24-gauge ST at the

same point. Therefore, we have developed our new technique in which the ST preparations and the haptics placements into the ST are more practical and safer.

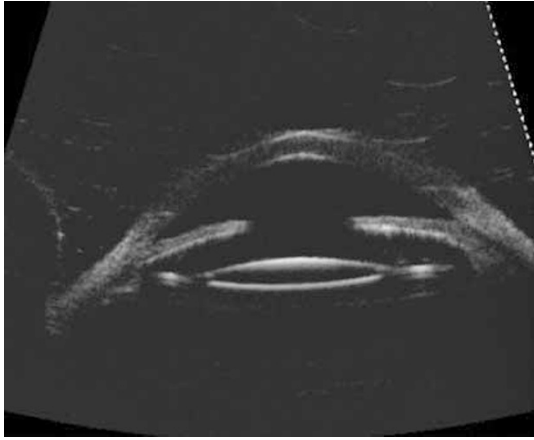


Figure 5 Ultrasound biomicroscopy image of the 3rd month after surgery.

Our technique also allows triamcinolone-assisted deep anterior vitrectomy by the aid of ACM and IOL injection in to the anterior chamber through the CCI. Therefore, the operation can be performed without any additional sclerotomy for vitrectomy before the PC-IOL implantation and for sustaining satisfactory globe maintenance during the surgery.¹²

In conclusion, the presented novel SSF IOL technique may provide minimal trauma to the surrounding tissues, good IOL stabilization decreasing the incidence of IOL tilt along with shorter operation time, and postoperative quiet eye.

Summary

What was known before

- Gabor and Pavlidis⁹ have first described a novel technique of sutureless scleral fixation of posterior camera intraocular lens (IOL). In this technique, IOL haptics are permanently incarcerated into the prepared scleral tunnels, and thus the axial stability of the posterior camera IOL is provided.

What this study adds

- In our technique, the scleral tunnels are prepared by insertion of the 25-gauge transconjunctival sutureless vitrectomy (TSV) microcannulas using the trocars, and anterior vitrectomy is performed through the clear corneal paracentesis with the aid of anterior chamber maintainer (ACM). Finally, the 3-piece foldable IOL haptics are incarcerated into the prepared scleral tunnels.

Conflict of interest

The authors declare no conflict of interest.

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Supplementary Information accompanies the paper on Eye website (<http://www.nature.com/eye>)