Modified transscleral fixation technique for refixation of dislocated intraocular lenses

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PURPOSE: To evaluate the results of transscleral fixation of dislocated posterior chamber intraocular lenses (PC IOLs) by externalizing the haptics through a clear corneal incision.

SETTING: Department of Ophthalmology, Rassoul Akram Hospital, Iran University of Medical Sciences, Tehran, Iran.

METHODS: This retrospective interventional case series comprised 21 eyes (21 patients) in which a dislocated posterior chamber IOL was transsclerally refixated using a small superior clear corneal incision for externalization of the haptics. The suture was tied to the externalized haptic, after which the tied haptic was placed back in the anterior chamber and dialed to externalize the second haptic. After the second externalized haptic was tied, the IOL was reimplemented in the ciliary sulcus. The minimum follow-up was 6 months.

RESULTS: The mean follow-up was 42.7 months ± 21 (SD). The difference between the mean best corrected visual acuity before IOL dislocation (0.34 ± 0.21 logMAR) and the mean after IOL refixation (0.38 ± 0.19 logMAR) was not statistically significant (P = .16, t test). During follow-up, the PC IOL remained well centered in all eyes and no tilt or dislocation was observed.

CONCLUSION: Scleral fixation of dislocated PC IOLs using temporary haptic externalization through a clear corneal incision minimized the need for complicated intraocular maneuvers, had a low incidence of complications, and provided an easy and effective way to reposition dislocated PC IOLs.


Transscleral suturing of posterior chamber intraocular lenses (PC IOLs) is a well-established and effective option for fixation of PC IOLs in the absence of sufficient capsule support. Transscleral suturing can be used as a primary procedure, for secondary implantation, or to refixate malpositioned IOLs.1,2

There are many techniques of transscleral suture fixation of dislocated IOLs.1–12 They are generally divided into 2 main categories. The first, extraction of the dislocated IOL with an open-system method, carries the risk for vitreous prolapse, collapse of the ocular structures, intraocular bleeding, and significant surgically induced astigmatism. The second main technique, repositioning the dislocated IOL using a closed-eye method, is a desirable alternative to extraction.4,5 The closed-eye method can further be divided into 2 categories: (1) techniques in which a suture loop is created around the haptic with surgical maneuvers around the dislocated PC IOL inside the eye and (2) techniques in which the haptic is externalized and a tightened suture knot is placed around the haptic outside the eye.13

We evaluated the long-term outcomes in a series of patients in whom a modified technique of temporary externalization of the haptics was used to refixate dislocated PC IOLs.

PATIENTS AND METHODS

This retrospective review included 21 eyes of 21 consecutive patients who had surgery for dislocation of a PC IOL.
Conditions for exclusion included active proliferative diabetic retinopathy and retinal detachment. All eyes had inadequate or no posterior capsule support.

**Surgical Technique**

One 1.5 mm clear corneal incision was created superiorly, and the anterior chamber was filled with an ophthalmic viscosurgical device. Two fornix-based conjunctival flaps were then created 180 degrees apart. A half-thickness triangular limbus-based scleral flap (3.0 mm × 3.0 mm), which was the fixation site of the IOL haptic, was made on both sides. The 3 o’clock and 9 o’clock meridians were avoided to prevent damage to the long posterior ciliary arteries. The dislocated IOL was then displaced from the vitreous cavity into the anterior chamber using a conventional 3-port vitrectomy procedure.

The needle of a 10-0 polypropylene (Prolene) suture with straight 16.0 mm STC-6 needles (Ethicon Inc.) was introduced into the eye under the scleral flap 1.0 mm posterior to the limbus to the pupillary space and then pulled out of the eye under the opposite scleral flap 1.0 mm posterior to the limbus (Figure 1). The suture thread was withdrawn through the superior corneal incision using a Sinskey hook and cut in 2 pieces (Figure 2).

After 1 haptic was externalized from the superior stab incision, 1 of the previously passed sutures was tied securely to it (Figure 3). The sutured haptic was dialed back into the anterior chamber and the IOL rotated to facilitate externalization of the other haptic. The second haptic was then externalized and tied by the other piece of retrieved suture and put back into the anterior chamber (Figure 4). After each haptic was tied, the tightness of the suture placed around the haptic was checked to ensure the loops would not slip off the haptics during rotation back into the anterior chamber and into the ciliary sulcus.

The IOL was inserted back in the ciliary sulcus while sutures were gently pulled to secure the position of the IOL.

When both haptics were in the proper place and centration of the optic was judged to be ideal, the sutures were fixated securely in the scleral beds (Figure 5). Finally, the scleral flaps and conjunctiva were closed.

**Patient Evaluation**

All patients were evaluated for preoperative status including visual acuity, refractive error, preexisting ocular conditions, duration of symptoms, time from primary IOL
implantation to dislocation, and time from dislocation to repositioning of the IOL. Postoperative measurements included visual acuity, refractive error, complications, and the need for further surgery.

RESULTS

The modified technique was successfully performed in all 21 eyes. Table 1 shows the clinical characteristics of each patient. The mean follow-up after IOL repositioning was 42.7 months ± 21 (SD) (range 6 to 73 months).

There was no statistically significant difference in the mean best corrected visual acuity (BCVA) before IOL dislocation (0.34 ± 0.21 logMAR) and the mean BCVA at the final examination after IOL refixation (0.38 ± 0.19 logMAR) (P = .16, t test). The difference in the mean astigmatism at the final examination (1.35 ± 0.64 diopters [D]) and the mean astigmatism before IOL dislocation (1.25 ± 0.69 D) was not statistically significant (P = .19, t test).

In all cases, the IOL remained stable without further dislocation or decentration. No patient lost more than 3 lines of BCVA. No major intraoperative complication (eg, choroidal hemorrhage, significant intraocular hemorrhage, iris trauma) occurred. Postoperative complications after IOL repositioning included mild corneal edema (14 eyes), self-limited cystoid macular edema (CME) (3 eyes), chronic CME (1 eye), and mild self-limited vitreous hemorrhage (6 eyes). Postoperative retinal detachment, iris capture of the optic, glaucoma, uveitis, suture erosion, or pseudophakic bullous keratopathy did not occur in any case, and no patient required further surgical intervention.

DISCUSSION

Treatment options for visually significant subluxated or dislocated IOLs include observation; placement of a second IOL in the eye; and repositioning, removal, or exchange of the IOL.1–14 Repositioning the IOL is theoretically the best surgical option because in most cases it is less traumatic than explantiing the IOL and may provide optimum long-term visual and structural stability.12 The IOL can be repositioned in the ciliary sulcus, especially when adequate peripheral capsule support remains.8,12

In the absence of sufficient capsule support, anterior chamber IOLs (AC IOLs) and sutured PC IOLs (iris or transscleral) can be used to correct aphakia.3 A PC IOL theoretically causes less damage to the cornea, iris, and angle structures, thereby reducing the risk for corneal decompensation, inflammation, and glaucoma.3 It also eliminates the need for IOL removal for insertion of an iris-claw anterior chamber IOL, avoiding the disadvantage of a large corneal wound, intraoperative hypotony, and corneal damage.

Several techniques for transscleral IOL fixation have been reported. The open-system fixation technique requires a large (6.0 to 7.0 mm) limbal incision to remove the dislocated IOL from the eye and refixate it after the sutures are tied to it or to replace it with an AC IOL. These techniques have the advantage of direct visualization for safe and secure tightening of the suture to the IOL haptics. However, extracting an IOL that has dislocated into the vitreous cavity carries the risks
Table 1. Patient demographics.

<table>
<thead>
<tr>
<th>Pt</th>
<th>Age (Y)/Sex</th>
<th>Cause of Surgery</th>
<th>IOL Type</th>
<th>BCVA Before Dislocation</th>
<th>Cause of Dislocation</th>
<th>Time to Dislocation (Mo)</th>
<th>Time from Dislocation to Surgery (Mo)</th>
<th>Final BCVA</th>
<th>Complications</th>
<th>F/U (Mo)</th>
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BCVA = best corrected visual acuity; CME = cystoid macular edema; F/U = follow-up; IOL = intraocular lens; Nd:YAG = neodymium: YAG; PMMA = poly(methyl methacrylate); Pt = patient
inherent to a large corneal wound and can cause related problems and also risks damage to intraocular tissues.\textsuperscript{4,5} Methods for repositioning a dislocated IOL by closed-eye surgery have been reported, and a procedure that can be performed without extracting the IOL is considered desirable as it minimizes surgical trauma.\textsuperscript{4,5,8,13}

Closed-eye techniques in which the sutures are placed around the haptics of a dislocated IOL via an internal approach often require complex intraocular maneuvers. In addition, many techniques involve placing a loop rather than a knotted suture around the haptic, which can increase the likelihood of the haptic slipping free of the suture during or after surgery.\textsuperscript{4,9,11}

Externalization of the haptic through a sclerotomy site in the pars plicata allows placement of the suture loop around the haptic externally followed by reimplantation of the haptic. The advantages of externalization are that it minimizes intraocular manipulations to create a suture loop around the haptic and stabilizes the IOL while the suture loop is placed around the haptic. Disadvantages of the pars plicata and pars plana externalization techniques are the blind externalization of the haptic behind the iris, the possible risk for haptic damage, and the more posterior location of the IOL during repositioning maneuvers.\textsuperscript{4,6,8,9}

To decrease the disadvantages of pars plicata externalization techniques, Kokame et al.\textsuperscript{8,13} used a modified technique of externalization of the haptic of dislocated IOLs through a small corneal incision, placement of a suture loop around the externalized haptic, and subsequent retrieval of sutures through the sclerotomy site for scleral fixation using a hook. Our technique differs from that described by Kokame et al. in that we used an ab externo method, avoiding suture retrieval from the sclerotomy site and eliminating the need for blind intraocular manipulation and possible damage. Also, we did not cauterize the end of the haptics, and this did not compromise the results.

In our study, there were no major complications attributable to haptic externalization through a clear corneal incision such as intraoperative iris trauma, persistent corneal edema, or bullous keratopathy. No hypotony-related complication such as choroidal detachment or maculopathy occurred. Although single-suture fixation techniques for transscleral haptic fixation may risk haptic rotation out of the knot, particularly with open haptic shapes, no IOL in our series became dislocated again over the long follow-up. The results show that our method is practical, combining the advantages of a closed-eye approach with a small corneal incision and those of the open-system technique with direct and clear visualization of the haptics during externalization and the ease and safety of suture placement by externalizing the haptics. This technique minimizes operating time with an open globe, reduces surgical complications, and provides early visual rehabilitation.

There are no randomized studies comparing different techniques of transscleral fixation or comparing scleral fixation of dislocated IOLs with iris fixation. However, simpler techniques such as ours are preferred over the more complex.

This study has limitations. The presence of associated ocular conditions such as diabetic retinopathy and corneal scar due to previous laceration repair limits the accuracy of visual acuity measurements. Also, the absence of age-matched control groups with similar etiologies and different surgical methods precludes a definitive conclusion. However, our study shows that our modified technique of transscleral fixation of dislocated PC IOLs offers the advantages of a small incision, minimizing the need for complicated intraocular maneuvers and the risk for intraoperative and postoperative complications.

REFERENCES


