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Scleral Fixation of Dislocated Intraocular Lenses by Haptic Externalization through a Clear Corneal Incision

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Several techniques have been employed for repositioning dislocated intraocular lenses (IOLs). Herein, we describe a simplified and modified technique in which scleral fixation is performed together with temporary externalization of IOL haptics through a small, superior clear corneal incision. The sutures are tied to the externalized haptics; the haptics are then repositioned into the anterior chamber followed by IOL reimplantation into the ciliary sulcus. Using this technique, the dislocated IOL is repositioned under direct visualization without need for IOL extraction or extensive intraocular manipulations.

Keywords: Cataract Extraction; Intraocular Lenses; Scleral Fixation

INTRODUCTION

Intraocular lens (IOL) dislocation is an uncommon complication of cataract surgery which may occur during the operation or up to several years thereafter; causes include marked zonular dehiscence, a large posterior capsule defect with inadequate anterior capsule support, or trauma. Stabilization of dislocated IOLs with inadequate capsular support can be accomplished by iris fixation or trans-scleral fixation through the ciliary sulcus or pars plana.

Different techniques for trans-scleral IOL fixation have been reported which can generally be classified into open- and closed-eye procedures. Extraction of the dislocated IOL in the open eye method involves the risk of vitreous prolapse, ocular collapse, intraocular hemorrhage and induction of large amounts of astigmatism. Repositioning of the dislocated IOL using a closed-eye method is a desirable alternative, however, these techniques entail disadvantages such as difficulty, increased risk of damage to intraocular structures, multiple instrument passages and insecure suture knots.

We recently reported the results of a closed-eye surgical technique for trans-scleral sulcus fixation of posterior chamber (PC) IOLs aiming to avoid the disadvantages of previous methods. Herein, we present useful hints and modifications of the original technique.

SURGICAL TECHNIQUE

Two fornix-based conjunctival flaps are made, the location of which depends on the fixation sites of IOL haptics and position of vitrectomy-related sclerotomies. A half-thickness triangular limbal based scleral flap (3*3 mm) is made using a crescent knife on both sides. The 3 and 9 clock hour meridians are avoided to prevent...
damage to the long posterior ciliary arteries. The scleral flaps should be selected at a safe distance from the sclerotomies to avoid interfering with vitrectomy instruments. A 1.5 mm clear corneal incision is made superiorly and the anterior chamber (AC) is filled with viscoelastic material. The dislocated IOL is displaced from the vitreous cavity into the AC using conventional three-port vitrectomy techniques, and the haptics are placed over the iris.

The straight needle of a 10-0 or 9-0 polypropylene (Prolene) or mersilene suture is introduced into the eye under the scleral flap 1 mm posterior to the limbus toward the pupillary space and exited from the eye under the opposite scleral flap 1 mm posterior to the limbus. Alternatively, a 27-gauge needle is introduced through the opposite scleral bed toward the pupillary space, followed by introduction of the straight suture needle into its lumen, withdrawing the #27 needle removes the suture needle as well. Next, the suture thread is withdrawn through the corneal incision using a Sinskey hook or intraocular forceps (Fig. 1) and cut. Suture passage can be performed prior to IOL displacement into the AC, however, the procedure would be difficult with suture threads present within the pupillary space.

One haptic is externalized through the superior stab incision and one of the previously passed sutures is securely tied around it (Fig. 2). The tip of the haptic can be blunted using thermal cautery to decrease the chance of suture slippage, however, secure tying under direct visualization and checking for suture tightness should be enough. The sutured haptic is dialed back into the anterior chamber and the lens is rotated to facilitate externalization of the other haptic. The suture length should be long enough to avoid loss during IOL rotation. The second haptic is then externalized and tied to the other piece of retrieved suture and reinserted into the AC in a similar fashion. The IOL is then inserted into the ciliary sulcus while the sutures are gently pulled to secure the position of the lens. When both haptics are in proper place and IOL centration is ideal, the sutures are securely fixed to the scleral beds (Fig. 3). The scleral flap is then sutured back using the same suture material. For this purpose, the needle tip is bent and used for scleral flap fixation using a buried knot. The surgeon may use a separate absorbable material for flap closure. It is important to cover the sutured area of the scleral bed completely to prevent later erosion and exposure. Finally, the conjunctiva is repaired.

**DISCUSSION**

Treatment options for visually significant IOL subluxation or dislocation include observation, implantation of a second IOL into the eye, and IOL repositioning, removal, or exchange. Theoretically, IOL repositioning is the ideal solution; it tends to be less traumatic than explantation and may provide optimal long-term visual and structural stability.6,15 If sufficient anterior cap-
sular support remains, the lens may be repositioned into the ciliary sulcus. In the absence of sufficient capsular support, anterior chamber IOLs (ACIOLs) and sutured PCIOLs (iris or trans-scleral fixation) may be employed to correct aphakia. Theoretically, PCIOLs impose less damage to the cornea, iris and angle structures thereby reducing the risk of corneal decompensation, inflammation, and glaucoma. Trans-scleral sutured PCIOLs entail fewer complications as compared to iris-sutured PCIOLs and eliminate the need for IOL removal through a large corneal wound, intraoperative hypotony and corneal damage. In actual clinical settings, however, the superiority of this method to iris claw IOLs remained to be determined.

Different techniques have been reported for trans-scleral IOL fixation. Open-system fixation techniques require a large 6-7 mm limbal incision to remove the dislocated IOL from the eye and refixate it after sutures are tied, or to replace it with an ACIOL. These techniques have the advantage of direct visualization for safe and secure tightening of sutures. However, extracting a dislocated IOL from the vitreous cavity requires a large corneal wound and entails the risk of damage to intraocular tissues. Methods for repositioning a dislocated IOL using closed-eye surgery have been reported; these procedures eliminate IOL extraction and are thought to minimize surgical trauma.

Closed-eye techniques necessitate suture placement around the haptics of a dislocated IOL via an internal approach and often involve complex intraocular maneuvers. Additionally, many of these techniques involve placing a suture loop, rather than knot, around the haptic; this may increase the risk of slippage during or after surgery. Externalization of the haptic behind the iris, the risk of haptic damage, and more posterior location of the IOL during repositioning maneuvers.

To decrease the disadvantages of pars plicata externalization techniques, Kokame et al described a modified technique of haptic externalization through a small corneal incision, placement of a suture loop around it, 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 both haptics are externalized and sutured, this is feasible even when capsular remnants are insufficient to bear one of the haptics. Furthermore, Kokame et al use a sclerotomy for retrieving the sutures, however, we use an ab externo method avoiding suture retrieval through the pars plana thereby eliminating the need for blind intraocular manipulation.

Our method is simple and practical and combines the advantages of a closed-eye approach, using only a small corneal incision, with that of an open system, i.e. direct visualization of haptics during externalization and easy suture placement. Possible disadvantages of this modified technique include the risk of corneal endothelial trauma, need for a small corneal incision, and difficulty in manipulating the dislocated PCIOL anterior to the iris plane especially in the presence of a miotic pupil. Although the results of this technique were promising in a series of 21 patients, studies comparing long-term outcomes between different surgical techniques are needed to draw a definite conclusion.

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