Transscleral suture fixation following recurrent toric intraocular lens rotation

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We describe a surgical technique of transscleral suture fixation for recurrent rotation of a double-loop hydrophilic acrylic toric intraocular lens (IOL) in the capsular bag. Two 9-0 polypropylene sutures are placed in the proximal and distal angulations of 1 of the IOL haptics through the capsular bag. The clockwise and counterclockwise traction provided by these sutures prevents rotation of the IOL in either direction. This technique can be used in cases of spontaneous postoperative IOL rotation to achieve stabilization. In the case we describe, the IOL remained stable 11 months following transscleral suture fixation at the desired axis.

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Online Video

Posterior chamber implantation of a toric intraocular lens (IOL) offers a predictable and stable option to correct visually significant keratometric astigmatism.[1,2] Effective astigmatism correction is dependent on aligning the IOL cylinder axis along the steep corneal meridian.[3] However, spontaneous rotation of the IOL in the capsular bag is a potential complication that typically occurs early in the postoperative period.[4] Risk factors include myopia, a history of ocular trauma, pseudoexfoliation, uveitis syndromes, capsulorhexis size, and IOL design and material.[5,6] In cases in which the toric IOL is not aligned on the desired axis, the resulting astigmatism may be corrected with glasses or contact lenses (although often not desirable to patients who opted for surgical correction of astigmatism), limbal relaxing incisions (LRIs), or laser vision correction or the IOL can be repositioned surgically.

Techniques to suture a toric IOL in the absence of a capsular bag or within the bag for refixation of a dislocated IOL–capsular bag complex have been described.[5,7,8] We describe a through-the-bag transscleral suture fixation technique to manage recurrent rotation of a hydrophilic acrylic toric IOL with a double-loop haptic design.

SURGICAL TECHNIQUE

The toric IOL that was used (T-flex model 623T, Rayner Intraocular Lenses Ltd.) has a double-loop design; the inner and outer haptics are joined together, forming a loop with 2 angulations. The sutures are to be placed in the proximal and distal angulations of the haptic loop to achieve opposing bidirectional torque vectors and thus prevent clockwise or counterclockwise rotation of the IOL (Figure 1).

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Tetracaine 0.5% is instilled in the eye. With the patient sitting up with both eyes focusing on a distant target, the axis positions 0 degree, 90 degrees, and 180 degrees are marked on the eye using a sterile axis marking system (Mastel Precision Surgical Instruments, Inc.). Mild intravenous analgesia and sedation are administered. The eye is prepped and draped in the usual sterile fashion.

With the patient supine and after placement of the lid speculum, the desired axis is marked with ink using the axis marking system. Two paracenteses, 1 superior and 1 inferior, are created. The anterior chamber is then inflated with a dispersive and cohesive ophthalmic viscosurgical device (OVD) using the soft-shell technique described by Arshinoff.[9] A Kuglen hook is used to retract the iris and fully visualize the position of the entire IOL. The edge of the capsulorhexis overlying the optic is grasped with an Ahmed micrograsper (Microsurgical Technology) and lifted, allowing a cohesive OVD to be injected into the capsular bag. The IOL is then carefully freed from adhesion to the capsule using Sinskey and Kuglen hooks. The IOL is dialed in the capsular bag to the desired axis alignment. A conjunctival peritomy is then performed using Westcott scissors in the area of anticipated suturing of the IOL. Hemostasis is achieved using bipolar cautery. The location of the planned suture fixation is marked on the sclera with ink. Extra limbal paracenteses are made through which iris retractors (Grieshaber) are placed to allow visualization of the entire superior haptic (Figure 2, *A*).

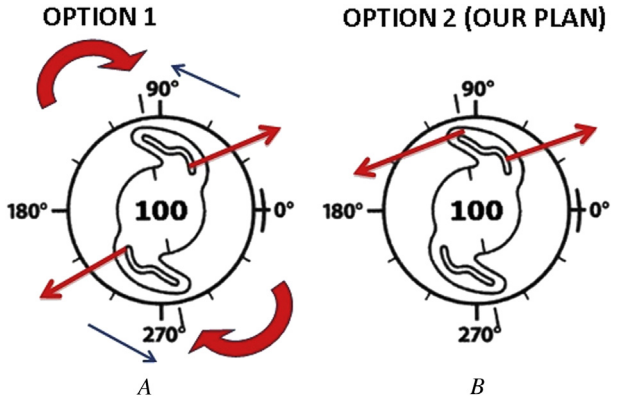

Figure 1. The toric IOL with double-loop design in the desired alignment. *A*: If the sutures were placed as indicated by the straight *red arrows*, theoretically counterclockwise rotation of the IOL (*blue arrows*) would be restricted but clockwise rotation (*curved red arrows*) might still occur. *B*: If sutures were placed at the proximal and distal angulations of the superior haptic loop to create bidirectional opposing torque vectors, both clockwise and counterclockwise rotation of the IOL would be prevented. The through-the-bag suture fixation technique was performed 1 month after the initial procedure to allow time for some degree of capsule fibrosis, thus reducing the risk for capsular tear extension.

At the planned suture-anchoring site, a partial-thickness scleral scratch incision is fashioned 1.5 mm posterior to the limbus using a tri-facet diamond blade (Figure 2, *B*). A 26-gauge hypodermic needle bent at the hub enters the eye perpendicularly in the scleral groove. The needle is passed under the superior haptic and through both the anterior and posterior capsular bag leaflets in the loop of the haptic. Ahmed micrograsperes are used to hold the capsulorhexis edge to support the IOL and apply counterforce during needle passage (Figure 2, *C*).

One of the 2 curved needles on a double-armed 9-0 polypropylene suture (Ethicon, Inc.) is passed through a paracentesis into the barrel of the 26-gauge needle using a docking technique (Figure 2, *D*). The needle is then retracted out of the eye, thus externalizing the suture. Adjacent to the previous entry site, the 26-gauge needle is passed through the scleral groove again, but this time it is directed into the sulcus and above the entire IOL–capsular bag complex. The needle from the other end of the same polypropylene suture is docked into the 26-gauge needle and externalized in the same manner. As a result, the suture forms a loop through the proximal angulation of the haptic. Using Hoffman/Ahmed microscissors (Microsurgical Technology), a 1.0 mm relaxing incision is made in the capsulorhexis to minimize tension on the capsular bag from the suture loop (Figure 2, *E*). After both curved needles on the suture are cut off, a slipknot is tied to allow tension adjustment later (Figure 2, *F*).

A similar technique is used to pass another double-armed 9-0 polypropylene suture, this time through the distal angulation of the loop in the superior haptic, and secure it to the sclera with slipknots (Figure 2, *G*). The IOL position is then finalized with a Sinskey hook and by adjusting tension on both slipknots to ensure centration of the IOL in the bag without tilt and stable orientation at the 100-degree axis. When the IOL position is satisfactory, the sutures are locked and the knots buried in the sclera grooves (Figure 2, *H*).

All OVD is removed from the eye. No vitrectomy is required. Hydration is used to close all the incisions (Video 1, available at: http://jcrsjournal.org).

Case Report

The transscleral suture fixation technique was performed in a 64-year-old man with visually significant cataracts and high corneal astigmatism who presented to our clinic for cataract extraction in the left eye. He had had unremarkable cataract surgery in the right eye. The baseline Snellen uncorrected distance visual acuity (UDVA) in the left eye was 20/200, and the corrected distance visual acuity (CDVA) was 20/30. The manifest refraction was −4.00 +7.00 × 98. On