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Scleral Fixation of a One-Piece Toric Intraocular lens

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Abstract

Purpose—To describe a novel technique for toric intraocular lens (IOL) repositioning and fixation in the absence of adequate capsular support

Methods—Case report and literature review

Results—Two cases are presented with scleral fixation of a one-piece toric IOL (SN6AT series, Alcon Inc.) In both cases, toric IOLs initially placed within the capsular bag became decentered due to poor capsular support and/or posterior capsule rupture. To avoid the potential complications of lens explantation and maintain the astigmatic benefits of the toric IOL, scleral fixation of the lenses was performed. The Hoffman technique was used to create reverse scleral pockets without conjunctival dissection. A 10-0 suture was used to capture and then secure the lens haptics in a lasso-type fashion. Sutures were then buried within the previously created scleral pockets. Both patients had well centered lenses postoperatively and have remained stable at last follow-up, up to thirty months postoperatively.

Conclusion—In the absence of adequate capsular support, scleral fixation is a viable option for one-piece toric IOL fixation to avoid IOL explantation

Decentered intraocular lenses (IOLs) often require repositioning. However, for one-piece IOLs, repositioning options are limited as they are not suitable for iris fixation or sulcus placement due to the high potential for complications.¹ Scleral fixation of IOLs has been described with various techniques, including the reverse scleral tunnel technique described by Hoffman et al.^{2-3,4,5,6,7} This technique has been advocated for various IOLs; however, to our knowledge there are no reports of one-piece toric IOL fixation.

Herein we describe the utilization of this technique in two cases to reposition and fixate displaced toric-IOLs and discuss potential risks and benefits of this procedure.

Case Reports

Case 1

A 68-year old female with a manifest refraction of $-10.00 +4.00 \times 85$ and keratometry values of 43.75/47.25 $\times 92$ in the right eye underwent seemingly uncomplicated cataract extraction and placement of a toric-IOL (Alcon SN6AT5, +8.5 diopter) in the 90° meridian (JBR). On post-operative day 1, the IOL was significantly decentered and inferiorly displaced (Figure 1). The patient was taken back to the operating room for IOL repositioning. Upon examination in the operating room a capsular tear was noted inferiorly. The lens was

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repositioned and fixated using the technique described below [**Video 1**]. Four months after IOL repositioning, the patient's UDVA was 20/40 and CDVA was 20/30 with a manifest refraction of $-0.75 +1.50 \times 120$. Since then, her CDVA has improved to 20/25 and the IOL has remained stable for 30 months after surgery. She subsequently had uneventful toric IOL implantation in her left eye.

Case 2

An 81-year old female with a history of neovascular age-related macular degeneration (AMD) had complicated cataract surgery with placement of a toric-IOL at an outside facility approximately 4 months prior to presentation to one of the authors (SM). She was noted to have 2 clock-hours of zonular dehiscence, vitreous in the anterior chamber, and toric IOL displacement, with gross decentration but toric IOL alignment within 5 degrees of intended. The surgical technique utilized was the similar to Case #1 [**Video 2**]. Six weeks postoperatively, CDVA was 20/60, limited by AMD, with a manifest refraction of $-1.25 +0.75 \times 170$. The lens was centered and stable at this last postoperative visit.

Surgical Technique

For both cases, the Mendez degree gauge was used to mark the appropriate meridian for IOL orientation. Patients received retrobulbar block. Partial thickness limbal grooves were made using a crescent blade at the appropriate meridians. Two reverse scleral tunnel pockets were then created with a crescent blade, tunneling from the limbus through sclera for approximately 3–4mm. A stab incision paracentesis was created anterior to the pockets. A 27-gauge needle was passed approximately 2–3mm posterior to the limbus through conjunctiva and sclera through the scleral pocket until the tip of the needle was visible posterior to the IOL haptic. A 10-0 double-armed suture [prolene with STS needle (case 1), polyester with PC-7 needle (Case #2)] was passed through the opposite paracentesis, underneath the haptic, and into a 27-gauge needle passed through the scleral pocket. The suture needle was then fed out through the scleral pocket and externalized outside of conjunctiva. This procedure was repeated with the needle positioned anterior to the haptic and the suture passing anterior to the haptic, which was then externalized to capture the haptic in a lasso-type fashion. The above technique was repeated for the second haptic utilizing the opposite Scleral groove and paracentesis as compared to the first haptic to ultimately capture both haptics. Special attention was paid to ensure that the IOL complex was sufficiently posterior and haptics were within the capsular bag to avoid/minimize haptic-iris contact. The IOL was centered and positioned, sutures were pulled back through the scleral pockets, and knots were tied and trimmed to bury them within the scleral pockets.

Discussion

These cases demonstrate the potential for one-piece IOL scleral fixation in the setting of inadequate capsular support. This technique is applicable for one-piece toric IOLs that become decentered or dislocated after initially successful implantation. The described technique is minimally invasive, easy to learn, and reproducible.

Scleral fixation of one-piece IOLs continues to be controversial.⁸ There are potential complications with sulcus placement of one-piece IOLs related to iris chaffing from IOL movement, including pigment dispersion, elevated intraocular pressure, intraocular hemorrhage, and cystoid macular edema.^{1,9,10,11,12} Therefore, appropriate posterior positioning of the IOLs utilizing reverse scleral pockets to fixate the IOL to the sclera at a sufficient distance from the iris is necessary to prevent these complications. Maintaining the haptics within the remaining capsular bag may further minimize haptic-iris contact.

One-piece IOLs are not specifically designed to have sutures passed around their haptics; thus, the long-term stability of this technique remains unknown. While it is possible that these IOLs will suffer suture erosion with subsequent decentration, we feel that, if this situation arises, the same treatment options, scleral re-fixation or explantation, would be available as at the time of initial repair. As IOL explantation is more complicated than scleral fixation, it seems reasonable to attempt fixation of the current IOL prior to immediately proceeding with removal. At this time, we do not advocate planned scleral fixation of a one-piece toric IOL; however, this option remains to be evaluated.

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Figure 1. Slit lamp image showing decentered one-piece toric IOL. The haptic is within the pupillary borders, and the toric marks are visible.