Surgical technique for suture fixation of an acrylic intraocular lens in the absence of capsule support

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We present a technique for suture fixation of an intraocular lens (IOL) in the absence of capsule support. This technique is useful for the treatment of aphakia and the management of IOL complications or cataract surgery when all capsule support is lost.


Inadequate capsule support is a rare but potential complication associated with cataract surgery. Options include leaving the patient aphakic, placing an anterior chamber (AC) intraocular lens (IOL), or suture-fixating an IOL in the ciliary sulcus; the latter is usually accomplished with scleral fixation.1–7 We present a surgical technique for suturing a foldable acrylic IOL in eyes without capsule support. This technique is useful for the treatment of aphakia and the management of IOL complications or cataract surgery when capsule support is lost.

Surgical Technique

A standard 3.2 mm corneal wound is created temporally (right eye) or nasally (left eye). A paracentesis is created opposite the corneal wound. Acetylcholine (Miochol®) is injected to induce miosis and facilitate pupil capture. Viscoelastic material is injected into the AC. The IOL is folded using the “moustache fold” and inserted through the corneal wound, placing the haptics within the sulcus and positioning the optic above the plane of the iris (Figure 1). A Barraquer sweep is passed through the paracentesis and placed beneath the optic as the lens is unfolded. Additional viscoelastic material is injected into the AC, pushing the iris posteriorly against the haptics. The Barraquer sweep is used to elevate the optic. Both maneuvers facilitate visualization of the haptics, simplifying passage of the sutures.

Using a modified McCannel-type iris-fixation technique,1–6 a 10-0 polypropylene (Prolene®) suture is passed on a needle (Ethicon CTC-6) through clear cornea and the iris, under the peripheral aspect of the inferior haptic, then out through the iris and clear cornea (Figure 2). A paracentesis is created over the inferior haptic, and 2 ends of the suture are pulled through this site (Figure 3). The superior haptic is secured in a similar manner. The sutures are loosely tied with a single throw (Figure 4) and are not locked.

If necessary, a vitrectomy through a pars plana incision or an anterior vitrectomy through the corneal wound is performed. The retained viscoelastic material is removed from the AC.

Air is injected into the AC and checked for unidentified strands of vitreous. If vitreous is present, a Barraquer sweep is used to break the strands or a more extensive vitrectomy is performed. Then, a repeat injec-
tion of air is made into the AC, again inspecting for vitreous.

A balanced salt solution is injected into the AC, bringing the eye to a more normal physiologic pressure. The wound is tested for leaks.

Results

Between July 2001 and January 2002, secondary IOL implantation or IOL replacement was performed through a 3.5 mm incision in 12 patients (13 eyes) without capsule support using the technique described. Patients had a mean age of 77 years (range 59 to 93 years); the series included 9 women and 3 men. The same surgeon (W.J.S.) performed all procedures (Table 1). An AcrySof® MA50BM IOL (Alcon) was used in the cases presented.

Six patients (7 eyes) had secondary IOL implantation because of a history of aphakia and increasing contact lens intolerance. Four patients were having an IOL exchange. One of the 4 (patient 9) had had uneventful cataract surgery and later sustained blunt trauma that dislocated the IOL. Two patients (patients 4 and 10) had had IOL repositioning and a history of posterior capsule disruption at the time of surgery; an acrylic posterior chamber IOL (PC IOL) was implanted and subsequently dislocated. Patient 12 had a history of pseudoexfoliation of the lens capsule had complicated cataract surgery during which capsule support was lost. An IOL was suture-fixated at the time of the original surgical procedure. The mean BCVA improved from logMAR 0.92 (20/220) preoperatively to logMAR 0.24 (20/35) postoperatively. In 1 of these patients, the IOL haptic slipped out of the suture knot inferiorly during the postoperative period. This was corrected by refixation of the haptic without a loss of BCVA.

Discussion

The technique of suture fixation of a foldable IOL inserted through a 3.5 mm incision had excellent results in the small population presented here. Only 1 complication occurred: displacement of 1 loop of the IOL postoperatively in 1 patient. The haptic had come out of the inferior Prolene suture. This was resutured uneventfully and without compromising the final visual outcome. To avoid this complication, when placing the optic behind the iris, the surgeon should push it downward with vector forces equal in all planes. The other modification we made to this technique is iris manipulation to round the pupil. In the first patient who had the original procedure, the postoperative pupil was slightly oval. Manipulating the iris with the Sinskey hook produced round pupils postoperatively in all subsequent cases (Figure 7).

The technique has proved valuable in a variety of clinical situations in which patients have inadequate capsule support. Scleral fixation of the IOL has been used for the management of secondary IOL implantation in patients with aphakia. The procedure traditionally required a 7.0 mm scleral incision through a superior limbal incision; this often aggravates preexisting against-the-rule astigmatism. A recent study looked at scleral fixating a foldable 1-piece IOL through a...
3.0 mm incision. Scleral fixation remains a more technically challenging technique. The technique reported permits a 3.5 mm temporal or nasal clear corneal or limbal incision, which tends to promote a with-the-rule astigmatism shift. Additionally, this technique can be used safely in eyes with preexisting superior blebs.

This technique has also been used when a previously placed foldable IOL becomes dislocated or subluxated; if the lens is not of the correct power or size or has been damaged, it can be refolded in the eye and removed through a 3.5 mm incision. The technique can also be used at the time of cataract surgery that becomes com-

Figure 1. (Stutzman) The IOL is folded using a moustache fold. The haptics are placed within the sulcus, and the optic is captured above the plane of the iris. A Barraquer sweep is passed through the paracentesis and placed beneath the optic as the IOL is unfolded.
Figure 2. (Stutzman) Passage of the 10-0 Prolene suture to fixate the haptic.

Figure 3. (Stutzman) Creation of a paracentesis over the haptic, allowing the 2 ends of the suture to be pulled through and tied off.

Figure 4. (Stutzman) A single throw of the suture.

Figure 5. (Stutzman) Manipulation of the iris with a Sinskey hook to facilitate rounding the pupil.

Figure 6. (Stutzman) Injection of Miocoh to ensure papillary miosis.

Figure 7. (Stutzman) Postoperative photograph showing a round pupil in an eye that had the modified technique.
complicated by the loss of capsule support. It allows the surgeon to place a PC IOL at the time of the initial surgery.

The ability to insert and suture-fixate an IOL through a 3.5 mm incision gives the surgeon greater flexibility in treating patients with no capsule support. This technique permits secondary IOL insertion in aphakic patients who are contact lens intolerant, facilitates the management of IOL problems after surgery that require IOL exchange, and allows the surgeon to properly treat patients who develop loss of capsule support at the time of cataract surgery.

References

Table 1. Overview of the patient population, preoperative visual acuity and diagnosis, associated comorbidity ocular conditions, and postoperative visual acuity.

<table>
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<tr>
<th>Patient</th>
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<td>Pseudoxefoliation</td>
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ARMD = age-related macular degeneration; OD = right eye; OS = left eye
*Haptic slipped through the suture knot