Patients who are longstanding aphakes or who have significantly compromised capsular support at the time of cataract extraction are challenging cases for IOL implantation. Today, surgeons may choose from three available options: (1) an anterior chamber IOL (ACIOL); (2) a posterior chamber IOL (PCIOL); and (3) an iris-sutured PCIOL. Each lens type has its own advantages and disadvantages.

OPTIONS FOR IOL FIXATION

ACIOLs

New-generation ACIOLs are easy to insert and fairly safe, but they require a large corneal incision for implantation. These lenses also carry the long-term risk of inflammation, pigment dispersion, increased IOP, and possible adverse effects on corneal clarity.

Scleral-Sutured PCIOLs

Surgeons enthusiastically embraced the concept of suturing a PCIOL to the sclera in the late 1980s, but many surgeons have since found it to be a complicated procedure requiring much manipulation of the eye and possible bleeding as they pass the suture needle through choroidal tissue without direct visualization. Long-term problems...

BY GARRY P. CONDON, MD

Figure 1. The surgeon may use the modified McCannel suture to reposition and fixate a dislocated IOL. Preoperatively, the significant dislocation of this IOL can clearly be seen through the dilated pupil. The lens is actually still inside the capsular bag, which became detached as a result of pseudoexfoliation. Because this lens was not amenable to simple refixation, the author removed and exchanged it for an iris-sutured IOL (A). After fixation with sutures placed through the peripheral iris (arrows), the IOL optic is well centered, as seen on the dilated view (B). Because the sutures are located in the peripheral, nondynamic area of the iris, little if any displacement occurs from the dilated to the photopic pupil. This situation minimizes the long-term physical stress on the sutures (C).
now becoming evident include a substantial possibility of the sutures’ eventually breaking, thus leading to IOL dislocation. Another potential complication is that the buried sutures may become exposed, thereby opening a pathway for infectious agents to enter the eye and potentially cause late endophthalmitis.4,5

Iris-Sutured PCIOLs
The concept of iris-sutured PCIOLs dates back to 1976 and the work of Malcolm McCannel, MD, of Edina, Minnesota, who proposed the idea of a retrievable suture that the surgeon could pass through anterior segment tissues.6 The ends of the sutures could be grasped through a small corneal stab wound and tied. Surgeons could employ this technique for recentering previously implanted IOLs that had become dislocated.

A Comparison
Schein et al conducted a prospective study of IOL fixation during penetrating keratoplasty and concluded that iris suturing resulted in fewer complications than scleral suturing or anterior chamber placement.7 A recent extensive review of the literature on IOL fixation in the absence of capsular support, however, failed to determine clear differences among the visual outcomes or complication rates of these three fixation methods.6

I had used the McCannel technique to fixate dislocated IOLs— with sutures placed in the peripheral iris— and had found it to be reliable and safe. One of the technique’s advantages is that it does not leave patients with the large corneal stab incision that is required when exchanging a PCIOL for an ACIOL. Although a dislocated PCIOL could also be repositioned with scleral-suture fixation, I believe the potential risk of suture erosion and late endophthalmitis is unacceptable. Iris fixation keeps the sutures entirely within the eye. The peripheral iris is also a nondynamic location where less long-term stress will be placed on the sutures (Figure 1).

One question remained: How could this approach be used in patients who did not already have an IOL behind the iris? The answer came with the introduction of the three-piece AcrySof lens (Alcon Laboratories, Inc., Fort Worth, TX), which I found to unfold inside the eye in a slow, controlled fashion. By allowing the lens to unfold over a spatula, I was able to place the haptics behind the iris while keeping the optic in the anterior chamber. The temporary optic capture holds the lens in position while I place modified McCannel sutures in the peripheral iris to fixate the haptics. The final step is to prolapse the optic through the pupil.

Although this technique is well suited to acrylic lenses such as the AcrySof, I would not recommend trying it with a silicone lens. The rapid unfolding and more slippery surface of silicone lens optics might make it difficult to control and maneuver them with the spatula.

I and others now prefer an iris-suturing technique using the foldable multipiece AcrySof lens in cases of primary or secondary IOL implantation in the absence of capsular support.9,10

SURGICAL TECHNIQUE
To achieve pupil constriction and topical anesthesia, I apply topical pilocarpine 4% to the eye 30 minutes preoperatively, followed by intravenous sedation and topical tetracaine 1%. With a 3.0-mm disposable keratome, I create a

Figure 2. The author folds the AcrySof MA60AC multipiece acrylic IOL across the 3- to 9-o’clock meridian and grasps the lens in the Fine Inserter II.

Figure 3. The leading haptic is compressed gently against the edge of the optic as the IOL enters the incision. Once the IOL is inside the anterior chamber, the author directs both haptics downward through the pupil while holding the optic just above the iris plane. The author relaxes the optic slightly within the inserter, passes a Cleasby iris spatula through the paracentesis, and gently places the spatula within the fold of the optic.
COVER STORY

3.5-mm clear corneal tunnel incision temporally, while taking care to avoid the prior incision site in secondary implant cases. Preservative-free lidocaine 1.5% and acetylcholine are placed in the anterior chamber. I deepen the chamber slightly with Provisc (sodium hyaluronate 1.0%; Alcon Laboratories, Inc.) while avoiding posterior iris displacement and pupillary expansion. A 1-mm peripheral paracentesis stab incision is made opposite the corneal incision. I used to reduce the power of the multipiece AcrySof model MA60AC IOL (Alcon Laboratories, Inc.) by 1.00 D from the value calculated for in-the-bag placement. Currently, I usually do not reduce the calculated power at all, because most patients receiving an iris-sutured IOL have a very deep anterior chamber postoperatively. In none of my current cases is the lens power reduced by more than 0.50 D.

I fold the lens across the 3- to 9-o’clock meridian, thereby creating a “bucket handle” or slight “mustache” haptic configuration. I hold the IOL in a Fine Inserter II instrument (05-2339-R; Rhein Medical Inc., Tampa, FL) (Figure 2). While taking care to avoid kinking the haptic, I gently compress the leading haptic against the edge of the optic as the IOL enters the incision. Once the IOL is in the anterior chamber, both haptics are directed downward through the pupil while the optic is held just above the iris plane. After slightly relaxing the optic within the inserter, I pass a Cleasby iris spatula (Storz E 0485-C; Bausch & Lomb, Rochester, NY) through the paracentesis and gently place it within the fold of the optic (Figure 3). The IOL slowly unfolds, which results in the haptics extending behind the posterior iris surface. The spatula supports the optic above the iris plane during unfolding so that the optic is completely captured by the pupil and stabilized (Figure 4). I then remove the spatula.

To fixate the haptic to the peripheral iris, I make an additional paracentesis (located slightly oblique to the meridian of the IOL’s haptic) so that the needle can enter the anterior chamber without distorting the soft globe. A 10–0 polypropylene suture on an Ethicon CIF-4 (Ethicon Inc., Somerville, NJ) or an Alcon PC-7 needle passes through the paracentesis perpendicular to the haptic orientation. The needle tip is advanced down through the peripheral iris, behind the haptic, and back out through iris and peripheral cornea, approximately 4 clock hours from the initial entry.

Creating another additional paracentesis directly over the haptic allows the retrieval of both ends of the suture. The knot is initiated with a triple throw, and gentle traction is applied as the haptic is pulled toward the iris and the knot is secured. In most of my cases, I have used a Siepser sliding knot through the entry paracentesis, a technique that I feel provides more security for the haptic. I secure the second haptic in the same manner (Figure 5) and trim the sutures.

Next, I use a lens manipulator to prolapse the optic into the posterior chamber. Gentle manual or automated irrigation removes the viscoelastic. All incisions should be checked to ensure that they are watertight and free of any vitreous strands. Postoperative medications include a topical steroid/antibiotic combination and a topical ophthalmic nonsteroidal anti-inflammatory tapered over approximately 8 weeks, depending upon the patient’s postoperative status.

RESULTS

At the 2003 ASCRS meeting, I reported on a review of 30 cases in which investigators (including myself) implant-
ed AcrySof IOLs using the modified McCannel suture for iris fixation. Most of the patients were aphakes, but the other cases involved IOL exchange or a dislocated crystalline lens. The mean follow-up period was approximately 1 year, and we saw no cases of significant IOL decentration or tilt, uveitis, or CME. A few eyes experienced transient pigment dispersion, but there were no new cases of glaucoma and no eyes with pre-existing glaucoma requiring an increase in medication. In one case, an iris tear occurred intraoperatively.

I have personally performed more than 35 cases with the modified McCannel technique during the past 4 years. The results continue to be excellent. My co-investigators and I have encountered one late IOL subluxation and one lens that dislocated because the haptic became disinserted from the lens optic. The latter case was easily corrected using a new lens implanted by the same method, and that patient is doing well today. Based on the accumulating experience, I recommend this technique to other surgeons confronting similar cases where capsular support is absent.

Garry P. Condon, M.D., is Associate Professor of Ophthalmology at Drexel University College of Medicine in Philadelphia and Clinical Assistant Professor of Ophthalmology at the University of Pittsburgh. Dr. Condon is in private and academic practice at Allegheny General Hospital in Pittsburgh. He is on the Alcon Speakers Bureau. Dr. Condon may be reached at (412) 359-6298.