Sclerally Sutured PCIOLs: Part I

An overview of surgical technique and results.

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Most cataract surgery performed today in the US is extracapsular cataract extraction with phacoemulsification and the implantation of a posterior chamber IOL (PCIOL). When an intact posterior capsule is present, almost all surgeons favor in-the-bag placement of a PCIOL. In the absence of capsular support, however, the choice of lens type and the technique used to secure it in the eye is much more controversial.

Anterior chamber intraocular lenses (ACIOLs) are easier to insert than PCIOLs (particularly sutured PCIOLs), but they have been associated with various complications, including pseudophakic bullous keratopathy, iris atrophy, glaucoma, and the uveitis-glaucoma-hyphema syndrome.[1-4] Although the newer Kelman-Multiflex–style open-loop ACIOLs offer a significant improvement over the previous closed-loop lenses, these lenses cannot be implanted in the absence of adequate iris support or when there is significant angle pathology.

Unlike ACIOLs, sutured PCIOLs are located away from the corneal endothelium and anterior chamber angle and closer to the nodal point of the eye. They are therefore less likely to cause endothelial cell loss, peripheral anterior synechiae, or secondary angle-closure glaucoma.[5] Unfortunately, suturing a PCIOL is much more difficult technically. In the case of transsclerally sutured IOLs, multiple loops of the suture can become entangled or twisted. An inability to directly visualize the sulcus means that the surgeon essentially must perform the procedure blind. A lack of symmetry in suture placement for each of the haptics can lead to lens tilt or decentration. Furthermore, a more anteriorly placed lens can produce a myopic outcome, whereas a more posteriorly placed lens can result in postoperative hyperopia.

MY TECHNIQUE

Prior to suturing a PCIOL transsclerally, it is important to perform a thorough vitrectomy, which prevents vitreous from displacing the IOL or prolapsing around the edges of the optic. I retract the iris during the vitrectomy in order to remove any vitreous from the sulcus, where the sutures will emerge. I do not want to incarcerate vitreous with the sutures, because this situation can cause traction on the retina and potentially lead to a retinal detachment.

I prefer to use a large optic, which I find to be slightly more forgiving of any decentration than a smaller one. I personally use a Storz P366UV PMMA PCIOL (Bausch & Lomb, Rochester, NY). It has a 6.5-mm optic and an overall length of 13.4 mm. Each of the haptics has an eyelet through which I pass a double-armed, 10–0 PROLENE suture (polypropylene; Ethicon, Inc., Somerville, NJ), which exits from the sclera. This technique results in four-point fixation of the PCIOL—the most stable fixation, in my opinion. I also believe there is less risk of lens tilt with this technique. Generally, I try to have the sutures emerge at the 7- to 8-o'clock and 1- to 2-o'clock positions. I avoid the 3- and 9-o'clock positions because of the risk of encountering the ciliary arteries.

When I combine suturing a PCIOL with a corneal transplant, then the procedure is done open-sky. Otherwise, I make a 6.5-mm scleral tunnel. With the open-sky technique, I prefer the needles of the PROLENE suture to be short (Ethicon CS140-6; 6.2-mm needle). If I am using a scleral tunnel, then the needles that I use for the distal haptic are long (Sharpoint 2xSSL15, Surgical Specialties Corporation, Reading, PA; 14.99-mm needle), and the needles that I use for the proximal haptic are short and curved (Ethicon CS140-6; 6.2-mm needle). I bury the knots of the exiting sutures beneath either a scleral or conjunctival flap.

RESULTS AND COMPLICATIONS

Although excellent results have been achieved with transsclerally sutured PCIOLs, complications are not rare. For instance, the sutures may erode through the scleral flaps and cause irritation. They may also loosen or break and cause either tilting or dislocation of the optic. In addition, a persistent suture extending between intraocular and extraocular environments may provide a track for bacteria to enter the eye and establish endophthalmitis. A choroidal hemorrhage and detachment can occur from inadvertent injury to the ciliary body. Moreover, traction on the peripheral retina or vitreous during suture placement in the sulcus may increase the risk of retinal detachment.[6]

Interestingly, despite the uncomplicated placement of the polypropylene sutures through the sulcus, histopathologic studies[7] have shown that the distal haptics probably lie outside the ciliary sulcus. This situation may relate to the surgeon's difficulty observing the sulcus intraoperatively during suture placement, even when limbal indentation is performed. Furthermore, fibrosis of the haptic to the ciliary body does not universally occur. As a result, the sutures provide the primary support for the lens, thereby preventing dislocation into the vitreous. Nevertheless, several cases of suture removal from transsclerally fixated PCIOLs without lens dislocation have been reported.[8-10]

Late cases of sutured IOL dislocations have occurred. After more than 15 years at Minnesota Eye Consultants, my colleagues Richard Lindstrom, MD, and David Hardten, MD, and I are aware of eight patients who have experienced suture erosion and the dislocation of implants that were transsclerally sutured an average of 10 years earlier. All of the patients required surgical repair, which was quite challenging in certain instances. Reports and experiences such as these have prompted some surgeons to advocate the use of 9–0, rather than 10–0, polypropylene or even 8–0 GoreTex sutures (W. L. Gore and Associates, Milpitas, CA), as mentioned to me by Randall Olson, MD (written communication, February 2004).

CONCLUSION

Despite rare but significant late complications, I feel that the transscleral suturing of PCIOLs plays a role in cases of capsular compromise. These lenses are preferred to ACIOLs when the cornea shows signs of compromise (eg, guttata), if the anterior chamber is shallow, or if the patient has glaucoma or angle pathology. They are also preferred over iris-fixated IOLs in cases of iris atrophy. Each case is unique, however, and must be individualized. ■

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