Retropupillary fixation of subluxated flexible intraocular lens by suturing through the optical part of the lens and iris

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An 81-year-old patient with pseudophakia and pseudoexfoliation syndrome experienced subluxation of an acrylic foldable intraocular lens (IOL) 10 months after extracapsular cataract surgery and IOL implantation in the posterior chamber. Reoperation was performed by extracting the IOL and fixating it to the iris with sutures through the IOL optic; retropupillary reimplantation was then performed by securing the IOL to the iris. This is a new technique of fixating the acrylic IOL by suturing through the peripheral part of the optic. The IOL was stabilized and at the 3-month examination, the corrected visual acuity was 1.0 (20/20) and the intraocular pressure was 13.0 mm Hg. This IOL fixation method is an alternative to scleral and other types of IOL fixation in patients with a ruptured posterior lens capsule and ruptured zonular fibers.

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Ideally, surgical extraction of lenticular material and intraocular lens (IOL) implantation is accomplished as a single procedure resulting in a centered IOL stably supported by the native capsular bag. When endocapsular placement is not possible, the most widely used approaches include fixation to the sclera (with or without suture),1–5 fixation to the iris by suturing6,7 or iris claw,8–10 and support by the anterior chamber angle.11 Each technique has strengths and weaknesses with respect to surgical difficulty, operative time, and intraoperative and/or postoperative complications.

Common sources of capsule damage include trauma and complicated cataract surgery. Marfan syndrome, homocystinuria, Weill-Marchesani syndrome, sulfite oxidase deficiency, and pseudoexfoliation syndrome are some of the diseases that alter zonular integrity and therefore capsule stability. In some cases, a previously placed IOL may be dislocated or cannot be retained and surgery is required for IOL removal and replacement and subsequent extracapsular fixation. We describe our technique of suture-fixating acrylic foldable 3-piece posterior chamber IOLs (PC IOL) to the iris by passing the needle through the soft acrylic optic.

CASE REPORT

An 81-year-old man was examined at the clinic. Cataracts were diagnosed in both eyes, incipient cataract in the right eye and mature cataract in the left eye. Pseudoexfoliation of the lens capsules were observed in both eyes. The distance visual acuity was 0.6 (both uncorrected and corrected) in the right eye and hand motion in the left eye. The intraocular pressure (IOP) measured by Goldmann applanation tonometry was 14.0 mm Hg and 14.0 mm Hg, respectively.

Cataract surgery was performed in the left eye by extracapsular extraction through the corneoscleral incision from the 10 o’clock to the 2 o’clock positions. After expression of the nucleus, aspiration/irrigation of cortical lens mass with a preserved posterior lens capsule, an acrylic foldable 3-piece IOL (Acrysof MA60AC, Alcon Laboratories, Inc.) was implanted in the posterior chamber with sulcus fixation because of zonular fiber weakness. The optic diameter of this particular IOL is 6.0 mm and the total diameter, 13.0 mm. The corneoscleral incision was closed by a double running suture with monofilament nylon 10-0. Cefuroxime 0.1 mg

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was injected into the anterior chamber. One drop of povidone–iodine 5.0% solution and 1 drop of 0.1% dexamethasone solution were instilled into the conjunctival sac. The surgery was completed with a subconjunctival steroid and antibiotic (dexamethasone and gentamycin) injection.

At the first checkup a week later and the second checkup a month later, the postoperative findings were normal and the uncorrected distance visual acuity (UDVA) was 1.0 (20/20) and the IOP was 15.0 mm Hg. At the subsequent checkup, 10 months after the operation, the patient complained of poor vision in the operated eye. The UDVA was 1/60; with +11.0 diopter sphere (DS), the distance visual acuity was 1.0. The IOP was 14.0 mm Hg. On slitlamp examination, it was observed that the IOL subluxated toward the vitreous body and was held to the iris by a single haptic (Figure 1). Ophthalmoscopic findings in the fundus of the eye were unremarkable. It was decided to reposition the subluxated IOL into its original posterior chamber position, ie, behind the pupil, and fixate the IOL to the iris by sutures through the optic.

Surgical Technique

The surgery was performed under general endotracheal anesthesia. The anterior chamber was opened by a corneoscleral incision at the same position as the original incision and an ophthalmic viscosurgical device was injected into the anterior chamber. Using a McPherson forceps, the haptic located in front of the iris was grasped (Figure 1); using a microspatula, the IOL was extracted from the eye. Aphakia ensued with a round pupil of 4.0 mm, with a small quantity of vitreous in the anterior chamber (Figure 2, A). The IOL optic was sutured through the periphery. A long CTC-6 needle double armed with 10-0 polypropylene was used for the sutures. First, 1 suture was passed through the peripheral optic close to the haptic 1.0 mm from the optic edge with 1 needle and then with the second needle, close to the haptic, through the optic 1.0 mm from the optic edge, with 3.0 mm between the 2 sutures. The same procedure was performed using the other double-armed suture close to the other haptic (Figure 2, B).

The anterior chamber was entered through the corneoscleral incision with suture needles beside 1 haptic; the needles were passed under the iris and exited through the central part of the cornea. The sutures were pulled, positioning the IOL behind the iris. For ease of removing the long polypropylene suture needle from the eye inferiorly, a 2.0 mm long horizontal stab incision (with a 15-degree paracentesis knife for cataract surgery 3.0 mm from the center of pupil at the 6 o’clock meridian) was made. In the cornea, peripheral to the externalization of the 2 suture ends, a horizontal incision was made through which both ends of the suture were recovered using a hook and tied. The IOL was fixated in this manner at the 6 o’clock position. The 2 needles of the second suture, sutured through the
optic of the IOL near the second haptic, were used to enter beneath the iris at the 12 o’clock position and penetrate the iris centrally. The suture was then tied to the iris (Figure 2, C and D). The IOL was fixated behind the iris.

An anterior vitrectomy was performed and the corneoscleral incision closed with a continuous double running 10-0 monofilament nylon suture. Finally, antibiotic cefuroxime 0.1 mg per mL was injected into the anterior chamber and povidone–iodine 5.0% solution and dexamethasone 0.1% solution were applied topically.

At the 1-day, 1-week, 1-month and 3-month checkups, the anterior chamber was of normal depth, the pupils were round and of normal width, and the IOL was in the desired position. Sutures were visible at the 6 o’clock and 12 o’clock positions in the central part of the iris, fixating the IOL to the iris (Figure 3, arrows). The UDVA was 0.7; with −0.5 DS, the distance visual acuity was 1.0 (20/20). The IOP was 13.0 mm Hg.

**DISCUSSION**

The requirements for normal IOL implantation in the posterior chamber following cataract surgery are an intact posterior lens capsule and intact zonular fibers. These provide support to the implanted IOL. The most frequent reasons for posterior capsule damage are trauma and complications in cataract surgery and for rupturing of zonular fibers, the pseudoexfoliative syndrome. Alternative fixation of an implanted IOL is applied in such cases, and various methods have been developed.

Dislocation of an implanted IOL occurred in our patient 10 months after surgery. The reason was weakened zonular fibers due to pseudoexfoliation syndrome. We were faced with 2 options: to reposition the existing IOL without extraction (to extract and reimplant the same IOL with adequate fixation) or to extract it and implant another IOL with appropriate fixation.

We decided to extract the existing dislocated IOL from the eye and perform reimplantation with special fixation. We were against the idea of scleral fixation because such an operation is long-lasting and accompanied by serious complications. We were concerned that a hemorrhage could occur during surgery because the needle passes beneath the iris unseen (without visualization) and can puncture the well-vascularized ciliary body, as well as endophthalmitis later because of the erosion of the conjunctiva by the sutured haptic. We decided against the iris-claw IOL because later dislocation of this IOL is possible due to disenclavation and we wanted to reimplant the original IOL. After fixating the IOL with 2 nonabsorptive sutures (10-0 polypropylene), we hoped that no tearing would occur later with dislocation of the IOL, which occurs occasionally with iris-claw IOLs.

Considering that we used the IOL that had been implanted in the bag before and that we positioned it in the retropupillary area, namely, somewhat anterior to its originally intended position, a half diopter correction was required to achieve the best visual acuity. This need to adjust the dioptic IOL power according to the IOL position has been described by others. We did not perform a basal iridectomy to prevent possible pupillary block because although it is potentially useful, we thought it was unnecessary; ie, additional trauma to the iris could have caused additional bleeding, and iris damage causes breakdown of the blood–aqueous barrier. The IOP outcome seemed to support our decision. Also, to our knowledge, basal iridectomy has not been reported for retropupillary IOL positioning. Furthermore, basal iridotomy can be performed later with a neodymium:YAG laser, if necessary.

We decided in favor of suturing the IOL through its optic and fixation with nonabsorptive sutures to the iris because we believe that this achieves better IOL stability. To our knowledge, this is the first time this particular type of IOL (hydrophobic acrylic) was fixated to the iris by suturing it through the optic. A technique of suturing through the optic was presented by Navia-Aray in a series of 30 cases. Zeh and Price7 and Parker and Price17 sutured the IOL through the optic but performed open-sky fixation of a 3-piece silicone PC IOL to the iris through the optic by 2 passes through the optic at both 6 o’clock and 12 o’clock with a suture needle and, subsequently, through the iris, with suture tying afterward. This technique is adequate for this special purpose; however, it is not useful in more common clinical situations in which keratoplasty is not indicated, as it is usually advantageous.
for cataract surgery to be performed through smaller incisions than keratoplasty incisions with the anterior chamber closed or open for as short a time as possible. Parker and Price\(^\text{17}\) have proposed that iris fixation through the optic of other soft IOL types, such as the acrylic soft IOL used in our case, is possible. We basically performed the same technique as Parker and Price, but we performed it through much smaller openings (1 limbal of 4 clock hours and 1 clear corneal of 2.0 mm half way between the pupil center and the limbus).

In conclusion, we believe that this IOL fixation technique is relatively easy and safe to perform and represents an alternative to other IOL fixation methods for this particular IOL type and other soft IOLs in cases of ruptured posterior lens capsule and ruptured or weakened zonular fibers.

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