CATARACT SURGERY FEATURE STORY

Technique for Small-Incision IOL Exchange

Explantation through a small clear corneal incision reduces risk of complications.

BY NIKOLAOS KARAMAOUNAS, MD; DIMITRIOS KOURKOUTAS, MD; AND CHRISTOS PREKATES, MD

Cataract surgery with foldable IOL implantation is one of the most commonly and successfully performed surgical procedures. Recent innovations have led to minimally invasive surgical techniques that use increasingly smaller (1.8 to 2.2 mm) self-sealing clear corneal incisions. Although they occur only occasionally, IOL-related complications such as opacification, incorrect IOL power, malpositioning, and visual dysphotopsia may necessitate IOL exchange. To retain the benefit of the small incision, the anterior segment surgeon must develop techniques to exchange IOLs through today’s increasingly smaller incisions.

Numerous techniques for explanting foldable IOLs through 2.75- to 4-mm incisions have been described. Most recent is a trisection technique that allows IOL explantation through incisions ranging from 2.2 to 2.65 mm. We recently developed a modification to Eguchi’s bisection technique for IOL exchange through a small clear corneal incision (2.2 mm). Our bisection technique does not require specially designed instruments or devices and is performed with the instruments used in small-incision cataract surgery.

SURGICAL TECHNIQUE

Before surgery, the pupil is dilated with tropicamide and phenylephrine HCl 2.5%. Topical application of ropivacaine HCl and intracameral injection of ropivacaine HCl 7.5% are used for anesthesia. During surgery, a 0.8-mm clear corneal paracentesis is created with a 15° ophthalmic knife at the 1-o’clock position. After the ophthalmic viscosurgical device (OVD; sodium chondroitin sulfate 4%, sodium hyaluronate 1.65%; DisCoVisc; Alcon Laboratories, Inc., Fort Worth, Texas) is injected into the anterior chamber, the main clear corneal incision (2.2 mm) is created with the HP2 ClearCut 2.2-mm slit knife (Alcon Laboratories, Inc.; Figure 1).

A 25-gauge irrigating cystotome (side cutting 0.5 mm) and Vannas scissors (Katena Products, Inc., Denville, New Jersey) are used to create relaxing incisions in the anterior capsule rim. With the OVD cannula and a Kuglen hook (Katena Products, Inc.) mobilizing the opacified IOL, OVD is injected under the IOL and into the capsular bag. The IOL is carefully removed from the capsular bag into the anterior chamber (Figure 2).
With the Vannas scissors, a radial incision is made in the IOL, approximately one-half of its 6-mm diameter. The IOL is then rotated 35° to 40°, and a second radial incision is made, connecting with the previous incision and thus freeing a triangular segment of the IOL. The segment is explanted with McPherson forceps (Katena Products, Inc.) via the 2.2-mm incision (Figures 3 and 4). The remaining portion of the IOL is explanted with two McPherson forceps using circular movements. The incision does not have to be enlarged (Figures 5 and 6).

After the anterior chamber and the capsular bag are filled with OVD, a replacement IOL is implanted through the 2.2-mm clear corneal incision without the need for enlargement (Figure 7). The OVD is then removed. Our preferred replacement IOL is the three-piece hydrophobic acrylic IOL MA60BM (Alcon Laboratories, Inc.). Endophthalmitis prophylaxis is in the form of an intracameral injection of 0.1 mL cefuroxime 750 mg and 0.1 mL (1:100) acetylcholine chloride.

**EXPERIENCE IN EIGHT EYES**

Between January 2007 and July 2008, we used this technique in eight eyes. In all cases, the original IOL was a one-piece hydrophilic ACRL-C160 (Ophthalmed, California), and lens exchange was uneventful. The mean interval between initial IOL implantation and exchange was 85.1 ±5.7 months (range, 74–92 months).

The replacement IOLs were implanted in the sulcus. Seven eyes received the three-piece AcrySof MA60BM IOL (Alcon Laboratories, Inc.) using the Royale Monarch injector (ASICO, Westmont, Illinois); one eye received the Oculaid (Ophtec BV, Groningen, Netherlands), using the Acri.shooter injector (Carl Zeiss Meditec, Jena, Germany).

**TAKE-HOME MESSAGE**

- This lens exchange technique minimizes intraocular manipulation, produces minimal wound stress, and reduces the risk of complications.
- Smaller wounds minimize surgically induced astigmatism and may allow faster healing.
Additionally, the thin optic of these lenses results in leakage and endophthalmitis. Edema and retinal detachment. Moreover, smaller technique should minimize the risks of cystoid macular edema and reduced risk of complications. Therefore, our technique minimizes intraocular manipulation, produces minimal wound stress, and reduces the risk of complications.

Our technique promotes fast improvement in distance BCVA and enhances patient recovery. Smaller incisions minimize surgically induced astigmatism, allow it to be withdrawn easily from the eye; wound stress is minimal as it passes through the 2.2-mm clear corneal incision. Therefore, our technique minimizes intraocular manipulation, produces minimal wound stress, and reduces the risk of complications.

Our technique promotes fast improvement in distance BCVA and enhances patient recovery. Smaller incisions minimize surgically induced astigmatism, and may reduce the risk for accumulation of inflammatory mediators such as prostaglandins. Therefore, our technique should minimize the risks of cystoid macular edema and retinal detachment. Moreover, smaller wounds may heal more rapidly and reduce the risks of leakage and endophthalmitis.

Lens exchange requires ciliary sulcus placement of the IOL. We believe three-piece hydrophobic acrylic IOLs are the ideal implants in this situation because the modified C-loop haptics improve stabilization in the sulcus and apply equal tension to the adjacent tissues. Additionally, the thin optic of these lenses results in greater distance between the IOL and the posterior surface of the iris, minimizing the chance of iris trauma. One-piece foldable hydrophobic acrylic IOLs may not be suitable for sulcus implantation because they have a significantly different haptic configuration.

DISCUSSION
Our technique differs from Eguchi’s in two respects. First, the IOL is removed through a small incision (2.2 vs 3.5 mm). Second, the radial incisions are made 35º to 40º apart (vs 90º) and extend 1 mm beyond the center of the IOL optic. The IOL is bisected, creating one triangular segment that is explanted first. The benefits of bisecting the IOL are that minimal rotation is needed and both IOL pieces have a maximum width of 2.7 mm.

Although the remaining IOL segment may be slightly larger than the triangular piece, its shape and flexibility allow it to be withdrawn easily from the eye; wound stress is minimal as it passes through the 2.2-mm clear corneal incision. Therefore, our technique minimizes intraocular manipulation, produces minimal wound stress, and reduces the risk of complications.

Our technique promotes fast improvement in distance BCVA and enhances patient recovery. Smaller incisions minimize surgically induced astigmatism, and may reduce the risk for accumulation of inflammatory mediators such as prostaglandins. Therefore, our technique should minimize the risks of cystoid macular edema and retinal detachment. Moreover, smaller wounds may heal more rapidly and reduce the risks of leakage and endophthalmitis.

Lens exchange requires ciliary sulcus placement of the IOL. We believe three-piece hydrophobic acrylic IOLs are the ideal implants in this situation because the modified C-loop haptics improve stabilization in the sulcus and apply equal tension to the adjacent tissues. Additionally, the thin optic of these lenses results in greater distance between the IOL and the posterior surface of the iris, minimizing the chance of iris trauma. One-piece foldable hydrophobic acrylic IOLs may not be suitable for sulcus implantation because they have a significantly different haptic configuration.

CONCLUSION
Our IOL bisection concept is a useful technique that allows explantation of posterior chamber IOLs through small, 2.2-mm clear corneal incisions. The technique is simple and effective, resulting in rapid visual recovery and reduced risk of complications.

Nikolaos Karamaounas, MD, is the Head of the Ophthalmology Department, 417 Hellenic Army Shared Fund Hospital, Athens, Greece. Dr. Karamaounas states that he has no financial interest in the products or companies mentioned. He may be reached at e-mail: ni_kara@yahoo.gr.

Dimitrios Kourkoutas, MD, is a Consultant Glaucoma Specialist in the Ophthalmology Department, 417 Hellenic Army Shared Fund Hospital, Athens, Greece. Dr. Kourkoutas states that he has no financial interest in the products or companies mentioned. He may be reached at e-mail: d_kourkoutas@hotmail.com.

Christos Prekates, MD, is a Senior Resident in the Ophthalmology Department, 417 Hellenic Army Shared Fund Hospital, Athens, Greece. Dr. Prekates states that he has no financial interest in the products or companies mentioned. He may be reached at e-mail: xristosprek@yahoo.gr.