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Indications and Strategies for Multifocal IOL Explantation

Successfully navigating the *seven Cs* can lead to happier patients.

BY ALLON BARSAM, MD, MRCOPHTH; AND ERIC D. DONNENFELD, MD

The vast majority of multifocal IOL patients, if appropriately selected, are extremely satisfied with their vision.[1-5] Explantation is a last resort for managing unhappy patients. We have identified seven situations, which we call the *seven Cs*, that are the typical causes of patients' dissatisfaction with their vision after multifocal IOL implantation. It is important to be familiar with the seven Cs before considering explantation in any patient who is not completely satisfied following presbyopic IOL cataract surgery. This article discusses the seven Cs and describes a surgical technique for multifocal IOL explantation.

THE SEVEN Cs

No. 1: Consecutive treatment. We expect patients not to be fully functional until the second presbyopic IOL is placed in the fellow eye, and we warn patients about this preoperatively. It is important to inform patients that they will be dissatisfied with their vision after one eye has undergone surgery. Having both eyes completed is crucial for the success of the procedure, along with an adequate neural adaption period. In the rare circumstance that the patient is extremely unhappy following surgery on the first eye, we do not recommend operating on the second eye until the first surgical result has been optimized. The second IOL choice may be predicated on the patient's response to the first surgery.

No. 2: Cylinder and residual refractive error. Presbyopic IOL patients are incredibly sensitive to small refractive errors, and the surgeon must be willing and able to treat these errors. Astigmatism greater than 0.50 D in a symptomatic patient should be treated. Limbal relaxing incisions (LRIs) can be useful for less than 1.50 D of cylinder and surface ablation for more than 1.50 D of cylinder. LASIK, which is another option, provides more accurate results than LRIs. For patients with high cylinder, it is reasonable to debulk the refractive error with an LRI and then fine tune with an excimer laser.

No. 3: Capsular opacification. These patients are extremely sensitive to any opacification of the posterior capsule. The loss of contrast sensitivity and the glare associated with multifocal IOLs is exacerbated by any capsular opacity. Depending on the individual's complaint and the mesopic and scotopic pupil size, multifocal IOL patients may require a larger capsulotomy than normal. A safe IOL exchange is more difficult once the posterior capsule is opened; therefore, it is important to be sure that the capsule is the problem before proceeding.

No. 4: Cystoid macular edema. Patients who undergo conventional cataract surgery with no risk factors and no capsular breakage have up to a 70% chance of macular thickening on optical coherence tomography (OCT)[6] and a 12% chance of visually significant cystoid macular edema (CME) without the use of a topical NSAID.[7] Additionally, the loss of contrast sensitivity associated with a multifocal IOL is made much worse by CME.[8,9] Once the normal architecture of the retina is lost, visual quality is degraded for life. Snellen visual acuity will improve, but contrast sensitivity will be permanently reduced. The best way to look for CME after cataract surgery is with OCT, which is also an effective preoperative screening tool for epiretinal membranes and lamellar macular holes. Patients will not tolerate multifocal IOLs if they have significant maculopathy. To help prevent CME, we recommend prescribing a topical NSAID four times a day for 3 days preoperatively and continued for 4 to 6 weeks postoperatively.

TAKE-HOME MESSAGE

- The seven Cs are the typical causes of patients' dissatisfaction with their vision after multifocal IOL implantation.
- The basic principles of IOL exchange involve a thorough preoperative evaluation of the position of the patient's IOL, the capsular bag, and the type of lens implanted in the original surgery.

Figure 1. The surgeon used a 30-gauge needle to dissect the anterior capsule off the IOL.

Figure 2. The surgeon used a Sinskey hook to carefully manipulate the multifocal lens out of the bag. Note the distal dilatation of the haptic.

No. 5: Corneal and ocular surface disease. Vision starts with the tear film, the most important refracting surface of the eye. Ocular surface disease is a common problem in presbyopic patients. Even mild disruption of the tear film can greatly affect quality of vision. In a study in which patients without dry eye had undergone bilateral multifocal IOL implantation,[10] significantly improved mesopic and scotopic contrast sensitivity was seen in the eye that received topical cyclosporine compared with the eye that received only an artificial tear. Additionally, these patients were more satisfied with the eye that received topical cyclosporine. When evaluating the tear film, do not neglect the meibomian glands. Oral nutritional supplements such as TheraTears Nutrition (Advanced Vision Research, Woburn, Massachusetts), hot compresses, and topical azithromycin have dramatically improved lid function. A more regular tear film with a more regular ocular surface improves quality of vision.

No. 6: Centration of the IOL relative to the pupil. It is important to check for the centration of the IOL behind the pupil. The pupil and the center of the capsular bag often do not coincide, and if this is the case the lens will appear decentered. In these situations in a symptomatic patient we perform argon laser iridoplasty. We place four spots in the iris midperiphery in the direction we want to pull the pupil. We perform the iridoplasty with 500 mW power and 500 µm diameter spot size for 0.5 second. This procedure is used when a patient complains of glare and halo or when we are going to perform an excimer laser enhancement. The IOL must be centered on the pupil to avoid performing the ablation off the visual axis or off the center of the lens. It is important to remember that, although they are interventional, these procedures may spare a symptomatic patient the need for an IOL exchange.

No. 7: Circumference of the pupil relative to the IOL. This is particularly important in patients who have been implanted with an AcrySof IQ Restor IOL (Alcon Laboratories, Inc., Fort Worth, Texas). If patients complain of poor reading vision with this lens, they require constriction of the pupil to increase the proportion of light passing through the 3.00 or 4.00 D central reading add. This can be accomplished with topical brimonidine or pilocarpine. If the patient complains of poor distance vision, then he or she may benefit from dilation of the pupil to increase the proportion of light passing through the distance-dominated periphery of the lens. This can be achieved either pharmacologically or with 360° midperipheral argon laser iridoplasty.

SURGICAL TECHNIQUE

The basic principles of IOL exchange involve a thorough preoperative evaluation of the position of the patient's IOL, the capsular bag, and the type of lens implanted in the original surgery. The first, and probably most important, step in an IOL exchange is to examine the capsular bag. The surgeon should pay attention to the size of the anterior capsulotomy and the degree to which it covers the posterior chamber IOL. He or she should look for pseudophacodonesis, which would suggest zonular weakness. The surgeon should also evaluate the posterior capsule for tears or previous Nd:YAG capsulotomy, as either will require changes in the surgical technique and dramatically increase the risk of vitreous loss.

The length of time that the IOL has been in the eye also plays a role in the safety and efficacy of IOL exchange. In general, the longer the lens has been in situ, the more difficult it is to replace. We perform specular microscopy preoperatively to evaluate the health of the corneal endothelial cells.

CASE STUDY

A 65-year-old man underwent uneventful sequential bilateral phacoemulsification and implantation of a one-piece AcrySof IQ Restor lens. When we saw him 9 months after surgery, he had developed glaucoma in his right eye with an arcuate scotoma and a nerve fiber layer defect that was not present preoperatively. The eye had also undergone a previous Nd:YAG capsulotomy. He could no longer tolerate multifocal vision in this eye. With these factors in mind, our surgical plan included the potential for lost vitreous and the possibility that the new lens might be placed in the sulcus or the capsular bag. After a lengthy discussion regarding the risks of explanting the lens, the patient requested an IOL exchange. For a video of the procedure, visit http://eyetube.net/series/crst-october-2010-multifocal-iol-exchange/.

At the time of surgery, the patient's pupil was maximally

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dilated. A 2.65-mm incision was created, and a 1.2-mm stab incision was made at the 9-o'clock position. The eye was filled with a cohesive ophthalmic viscosurgical device (OVD). An attempt to open the capsular bag with a dispersive OVD on a blunt viscoelastic cannula was unsuccessful because the capsular bag had shrink-wrapped around the IOL—a common problem. A 30-gauge needle was inserted between the capsular bag and the IOL, and then a dispersive OVD was used to inflate the capsular bag and dissect it away from the lens (Figure 1). The AcrySof IQ Restor IOL has acrylic haptics with a bulbous dilation, which generally encourages adhesion of the capsular bag to the haptic in this area. The surgeon therefore paid special attention to the peripheral insertion of the haptic into the capsular fornix and used a dispersive OVD to open this area. In most cases, viscodissection is helpful. In cases in which the haptic is more fibrosed, it can be cut and left in place after removal of the optic.

At this point, the lens could be removed. A dispersive OVD placed behind the IOL tamponaded the vitreous face in the area of the open capsulotomy. The lens was then peapodded into the anterior chamber and out of the capsular bag (Figure 2). With a one-piece acrylic lens, it is best to lift the lens straight up rather than to rotate it circumferentially. In contrast, with a three-piece lens that has polypropylene haptics, rotation is preferable during IOL exchange.

Next, after the multifocal IOL was in the anterior chamber, a three-piece aspheric monofocal IOL was inserted into the eye beneath it. In our experience, the anterior chamber is more than deep enough to safely allow implantation of a second lens. The replacement lens was placed in the capsular bag and rotated into position.

Inserting the second IOL into the eye before removing the first lens allowed the second lens to tamponade the vitreous face and dramatically reduce the risk of vitreous loss upon removal of the original IOL. A small degree of vitreous loss occurred, but this would have been significantly greater had the monofocal lens not been in place.

Once the monofocal lens was well positioned, the surgeon grasped the multifocal IOL from the side using the Mackool Lens Removal System (Impex, Inc., Staten Island, New York). He used scissors to cut the lens to 90% of its length. Next, he grasped the haptic and rotated half of the lens out of the wound. The lens was then rotated 90º, after which the trailing half of the lens was rotated out of the eye.

Finally, with the haptics of the new lens placed in the sulcus, the surgeon captured the optic behind the capsulotomy to ensure the IOL's centration. The surgeon instilled Miochol-E (acetylcholine chloride; Bausch + Lomb, Rochester, New York) into the eye to make certain that there was no vitreous loss or adhesions.

Postoperatively, an aggressive topical NSAID and corticosteroid therapy regimen was prescribed to reduce the risk of inflammation and CME. The patient had a 2-line improvement in BCVA and, more important, a subjective improvement in his quality of vision.

CONCLUSION

Successfully navigating the seven Cs is an effective way to ensure that multifocal IOL patients are happy with their vision. However, in the rare event that a patient requires an IOL exchange, it is essential to ensure that the surgery is carried out safely. Lens exchange should be an essential part of all refractive cataract surgeons' armamentarium. ■

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