

Refractive Surprise

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CASE PRESENTATION

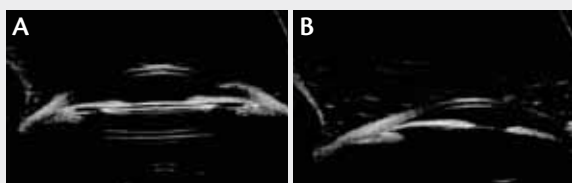


Figure 1. Ultrasound biomicroscopy (UBM) shows the patient's right eye at 1 week postoperatively (A) and her unoperated left eye (B).

A 67-year-old female presented with decreasing vision in both eyes. Slit-lamp biomicroscopy revealed a +2 nuclear sclerotic cataract in her right eye and a +2 to +3 nuclear sclerotic cataract in her left. Her preoperative manifest refractions were +3.50 +0.50 X 176 OD and +2.00 +1.25 X 011 OS.

The patient requested the bilateral implantation of Acrysof Restor IOLs (SN60D3; Alcon Laboratories, Inc., Fort Worth, TX) in hopes of obtaining spectacle independence. Both eyes had similar preoperative manual keratometry and corneal topography readings. Biometry with the IOLMaster (Carl Zeiss Meditec Inc., Dublin, CA) measured axial lengths of 22.24mm OD and 22.57mm OS. Calculated for plano using the Holladay II formula, the IOL powers were consistent with the preoperative measurements and refractions.

She underwent uneventful phacoemulsification with the implantation of a 25.50D Acrysof Restor lens in her right eye. At the 1-week visit, the patient was unhappy with her 20/50- UCVA. Her BCVA was 20/20 OD with the following manifest refraction: -2.25 +0.50 X 167. The IOP measured 13mmHg OD. Although the anterior chamber appeared quite shallow, the IOL was completely within the capsular bag, and the posterior capsule was against the posterior surface of the optic. Figure 1 shows the results of UBM.

How would you manage both of this patient's eyes?

GARRY P. CONDON, MD

Determining the cause of the myopic surprise in this patient is necessary for treating the problem appropriately and managing her fellow eye. As evidenced by the UBM of the patient's unoperated left

eye, she has atypical anterior segment anatomy, particularly considering the fairly average axial length. Her left eye has a remarkably shallow and crowded anterior chamber with an extremely anterior ciliary body and lens. Indeed, on the left, she essentially appears to be in subacute angle closure with prominent apposition of the peripheral iris and cornea. If the patient were not undergoing lens extraction, a laser iridotomy would be indicated at minimum. Cataract extraction, however, is likely to improve the angle-closure problem dramatically. As long as pupillary dilation is deferred until immediately prior to surgery, an iridotomy is not necessarily indicated. Should surgery on the patient's left eye be greatly delayed until the problem with her right eye is rectified, the ophthalmologist should consider performing an iridotomy on her left eye.

Fortunately, UBM analysis shows that the recent cataract surgery has greatly improved the status of the angle in the patient's right eye. Postoperatively, there is a much flatter peripheral iris contour and a better defined angle recess. Nevertheless, the IOL plane is remarkably more anterior than expected, a circumstance that is undoubtedly the cause of the myopic surprise.

With this preoperative anterior segment anatomy, I would have had a serious concern about the possible development of aqueous misdirection (malignant glaucoma) postoperatively. The development of this misdirection process can often be insidious or delayed. In this case, the development of myopia over the first postoperative week is certainly consistent with this diagnosis, despite a normal IOP and a relatively more open anterior chamber angle. The flat iris plane here can be misleading, but the consistent feature in this misdirection process is a more prominent central than peripheral shallowing, as seen here. Prior to the development of full-blown malignant glaucoma, a relative or partial aqueous misdirection with a somewhat shallow anterior chamber and minimally elevated IOP is often the case.

Although one might consider laser iridotomy as a diagnostic maneuver, it is likely to be ineffective in the absence of the peripheral iris bombe typically associ-

ated with pupillary block. The initial therapy for the aqueous misdirection in this patient should include cycloplegia with atropine as well as aqueous suppression with beta-blockers, carbonic anhydrase inhibitors, and alpha-agonists (regardless of the IOP). Immediately following cycloplegia, I would opt for Nd:YAG laser disruption of the peripheral posterior capsule and, more importantly, the vitreous face. These measures and patience usually result in a dramatic improvement with a resolution of the shallow anterior chamber and myopia.

It is worth emphasizing that therapy should continue for several days before one considers vitrectomy surgery, because the resolution of the process can be as delayed as its onset. Once a physiologic anterior chamber depth is achieved, the ophthalmologist should slowly taper cycloplegia with the knowledge that the scenario can happen again at any time. Recurrence usually necessitates pars plana vitrectomy and possibly concurrent zonulotomy and iridotomy to create a definitive communication across the vitreous face into the anterior chamber.

Depending on the clinical course of the patient's first eye, the ophthalmologist should manage the fellow eye with a minimum of perioperative cycloplegia and careful observation. If the patient's first eye required vitrectomy as a definitive treatment, I would consider combining an anterior and immediate vitrectomy with cataract surgery for her second eye.

ROBERT KAUFER, MD

Starting with the operated eye, the only problem remaining is the postoperative refractive error. The main cause is the shallow chamber, seen with UBM in both eyes. It is a case of aqueous misdirection syndrome. A shallow chamber should always raise a red flag and make surgeons take all possible precautions. Although the formula used would be my first choice, I would recommend using more than one in cases of shallow chambers. More important is preparing the patient for this possible complication, which can occur with either a multifocal or monofocal lens. If ever in doubt when calculating the lens power, the surgeon should warn the patient of potential, related complications.

My first step would be to perform an Nd:YAG laser iridotomy with photodisruption of the capsule and Soemmering's ring. This procedure will probably displace the IOL backward and alter the refractive error. If the remaining ametropia were greater than 0.50D, I would use LASIK to fine-tune the result.

Multifocal lenses are demanding in terms of postop-

erative refractive errors. I have had to correct 0.75D of cylinder in patients who received the Acrysof Restor lens, and that change alone can make a four- to five-line improvement. Not only does the quantity of vision improve, but the complaints of nighttime visual disturbances also diminish.

Difficult biometry will again be a problem with the patient's left eye. I would perform an Nd:YAG iridotomy and allow the depth of the chamber to normalize before performing biometry. I would also use other formulas such as the Haigis II and warn the patient that the same complication may happen with her left eye. It will be important to consider the preoperative refraction when calculating the lens power—especially if the available measurement is from a few years ago, before the cataract developed.

“Multifocal lenses are demanding in terms of postoperative refractive errors.”

—Robert Kaufer, MD

IQBAL IKE K. AHMED, MD, FRCS; RICHARD LEE, BSC; AND CHARLES J. PAVLIN, MD

The patient presented with a 2.00D myopic surprise in her right eye 1 week after the implantation (apparently within the capsular bag) of a 25.50D Acrysof Restor single-piece acrylic PCIOL. The differential diagnoses for this presentation include an incorrect IOL power calculation, a mislabeled IOL power, or an abnormal or unexpected anterior effective lens position (ie, anteriorly shifted PCIOL or an anterior micro-ophthalmic eye with a normal appearing posterior segment). An anteriorly positioned PCIOL may be due to the lens' placement in the sulcus, capsular contraction with anterior subluxation, capsular block syndrome, supraciliary effusion with an anterior rotation of the ciliary processes, a large choroidal hemorrhage or effusion, or a malignant glaucoma picture.

It appears that the IOL calculation was precise and used an appropriate formula (Holladay II). Moreover, a mislabeled PCIOL is rare with today's standards of manufacturing quality. This patient has small hyperopic eyes, however, which put her at risk of angle closure and/or malignant glaucoma. UBM analysis of her left eye reveals an obviously shallow anterior chamber with a degree of pupillary block and no apparent

(Courtesy of Iqbal Ike K. Ahmed, MD, FRCSC.)



Figure 2. At the slit lamp, the surgeon performs the IOL push-back technique with a 30-gauge needle.

plateau configuration. The angle appears occludable, and this eye should undergo a prophylactic peripheral laser iridotomy.

UBM analysis of her right eye, 1 week postoperatively, shows a deeper anterior chamber than is present in her unoperated eye. Nevertheless, the chamber in her right eye seems somewhat shallower than one would expect after lens extraction. The angle is open, and the iris profile is straight. There is no capsular block, as the posterior capsule appears to be against the back of the PCIOL. The PCIOL seems to have subtly shifted anteriorly. The ciliary processes also appear to be somewhat rotated anteriorly with closure of the ciliary sulcus. Although difficult to assess, there does not appear to be a supraciliary effusion. This clinical picture is most likely consistent with pseudophakic malignant glaucoma.

Initial treatment would consist of pharmacologic cycloplegia with atropine 1% q.i.d. and aqueous suppressants. The definitive treatment would be to establish a communication through the capsule by means of a peripheral Nd:YAG laser capsulotomy through a widely dilated pupil. Performing a laser hyaloidotomy in conjunction with this procedure could be helpful. Creating a communication between the anterior and posterior segments is critical.

When laser treatment has proven insufficient, we have often successfully reestablished the correct alignment of the middle segment through an IOL push-back technique (Figure 2). At the slit lamp, we pass a 30-gauge needle through a limbal stab incision to push back the IOL and rotate the ciliary processes posteriorly. Subsequently, we inject air into the anterior chamber. In rare circumstances, an iridozonulo-

hyaloidectomy with a vitreous cutter in the OR can create a permanent communication between the anterior chamber and vitreous cavity.

All of these techniques will permit the PCIOL to have a “normal” position and resolve the myopic surprise. ■

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