Surgical management of a refractive surprise after multifocal toric IOL implantation is rather straightforward. Dealing with the unhappy patient, however, is not so simple, as extensive counseling and postoperative care are often required. When the patient receives proper treatment and one-on-one attention from the surgeon, these cases can be resolved successfully. Below I describe my experience correcting a refractive surprise in a hyperopic woman after uneventful cataract surgery. This case taught me five valuable lessons, which I recount below.

A 47-year-old woman presented for cataract surgery with high hyperopia and astigmatism and very shallow anterior chambers that, in hindsight, probably caused the refractive surprise. Preoperatively, manifest refraction was +2.25 -1.50 X 3º in the right eye and 1.50 D of sphere in the left. Both eyes showed the beginnings of diffuse nuclear sclerosis. Biometry results including axial length, anterior chamber depth, and amount of astigmatism are documented in Figures 1A and 1B. After obtaining several consistent measurements, I decided to implant an IOL with the power measured by the IOLMaster (Carl Zeiss Meditec) and calculated by the company (Figure 1C).

When operating on an eye with a shallow anterior chamber, I always take care to use the correct clear corneal incision architecture, making the cut a bit longer than my typical incision. I also use Rayvisc (Rayner Intraocular Lenses Ltd.), a high-viscosity ophthalmic viscosurgical device (OVD), to deepen the chamber. In this case, surgery was first performed in the patient’s right eye in January 2011. The procedure was uneventful, and a multifocal toric IOL was place without difficulty. After this first surgery, the manifest refraction in the right eye was -2.00 -0.25 X 148º. On slit-lamp examination, the anterior chamber was seen to be shallow and the IOL was visibly placed anterior to the normal position. These findings were also documented with Scheimflug imaging (Pentacam; Oculus Optikgeräte GmbH). When I compared the unoperated and operated eyes, the shallow anterior chamber was clearly visible in each. I was now faced with the difficult decision of how to proceed with the second eye and what IOL to implant.

Cataract surgery in the left eye was performed 1 week later. I again implanted a multifocal toric IOL with the power measured by the IOLMaster device and calculated by the company. Postoperatively, the manifest refraction in the left eye was -2.00 D.

CAPSULOTOMY, SUBSEQUENT LASER ABLATION

To address the refractive surprises in these eyes with shallow anterior chambers, we decided to perform Nd:YAG capsulotomy in both eyes. We thought that this would deepen the chambers and ameliorate the refractive surprise. The refractive result was a slightly myopic refraction in each eye, which was initially satisfactory.

However, over the following year the manifest refraction in the left eye deteriorated to -2.00 D. I decided to correct the residual refraction with LASEK. Three months after this enhancement, the patient achieved excellent distance and near visual acuities. Most important for me, the patient is without complaints.

WHAT WENT WRONG?

Questions and answers that arise from this case are numerous. While presenting this case at the 5th Ljubljana Refractive Surgery today Europe July/August 2012
Surgery meeting in March 2012 in Ljubljana, Slovenia, I heard various suggestions to remedy the refractive surprise. Suggestions included performing some form of vitrectomy to displace the IOL backward, performing laser iridotomy to deepen the anterior chamber, implanting a secondary lens in the anterior chamber, and exchanging the IOL.

Because we noticed no residual astigmatism after surgery, we know that the calculation for the toric component of the IOL was correct and that the lens was placed in the right axis of orientation during surgery. However, the spherical calculation was wrong—or, more precisely, the estimated anterior chamber depth after surgery was not as planned. Possible reasons for this are many, but one could be that the eye was small and the lens capsule contracted. In the right eye, Nd:YAG capsulotomy was enough to correct the residual refractive error; however, the refraction changed in the left eye and we do not know why.

If a similar situation happened in a deeper eye, it would be possible to correct the residual refractive error with a supplementary IOL. In this case, however, this approach was not possible because there was no room in this shallow eye for a second IOL.

**LESSON LEARNED**

I learned four important lessons from this case:

1. Meticulous preoperative measurements are essential for calculation of the correct IOL power.
2. If astigmatism of more than 0.75 D is measured with the IOLMaster, it is best to use a toric multifocal IOL.
3. A shallow anterior chamber requires an experienced cataract surgeon and a scrupulous technique.
4. In the event of myopic shift and shallow anterior chamber after IOL implantation, perform Nd:YAG capsulotomy early after surgery.
5. In cases with a shallow anterior chamber and a residual refractive error after premium IOL implantation and subsequent Nd:YAG capsulotomy, the best option to correct the refractive surprise is laser refractive surgery.

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**TAKE-HOME MESSAGE**

- When operating on an eye with a shallow anterior chamber, consider elongating your typical clear corneal incision length and using a high-viscosity OVD.
- In a deeper eye, a supplementary IOL is a viable option to correct a residual refractive error.