Providing spectacle independence for a young adult patient with cataract and astigmatism

By Nick Kopsachilis, MD, PhD

CASE HISTORY

A 19-year-old female patient presented with severe posterior subcapsular cataract in both eyes. Her medical history included asthma and irritable bowel syndrome, and her cataract was believed to be induced by the corticosteroids she had been using to manage her health problems.

Visual acuity was 6/18 unaided OD, improving to 6/12 with pinhole, and 6/18 unaided OS, improving to 6/9 with pinhole. Refraction was -3.00 -1.75 x 10° OD and -2.50 -1.50 x 4° OS. The rest of the ophthalmic findings, including OCT scan of the macula, were normal.

We decided to perform cataract surgery with bilateral implantation of the AT LARA toric 929MP IOL (Carl Zeiss Meditec; Jena, Germany). Biometry measurements were obtained with the IOLMaster 700 (Carl Zeiss Meditec; Jena, Germany). Keratometry and higher order aberrations of the cornea were also measured with a Scheimpflug imaging device. In addition, a Dell type questionnaire was completed to assess whether the patient was suitable for the AT LARA lens. IOL power calculation was done using the ZEISS IOL Calculation Service (Figure). The selected IOL powers were 25.50 SE 2.00 cyl OD and 25.50 SE 2.50 cyl OS, which were predicted to result in a postoperative SE that was closest to the target of emmetropia.

The patient underwent bilateral simultaneous cataract surgery under general anaesthesia. Axis alignment reference marks were placed at 0° and 180° preoperatively at the slit lamp, and correct alignment of the IOL was checked intraoperatively using a Mendez gauge.

At 3 weeks after surgery, refraction was -0.25 -0.25 x 178° OD and -0.25 -0.50 x 10° OS. Unaided binocular visual acuity was 6/6 at distance, N12 at 30 cm, and N10 at 60 cm; binocular distance BCVA was 6/5. The patient reported that she was thrilled with her outcome because she could see and read without glasses after surgery.

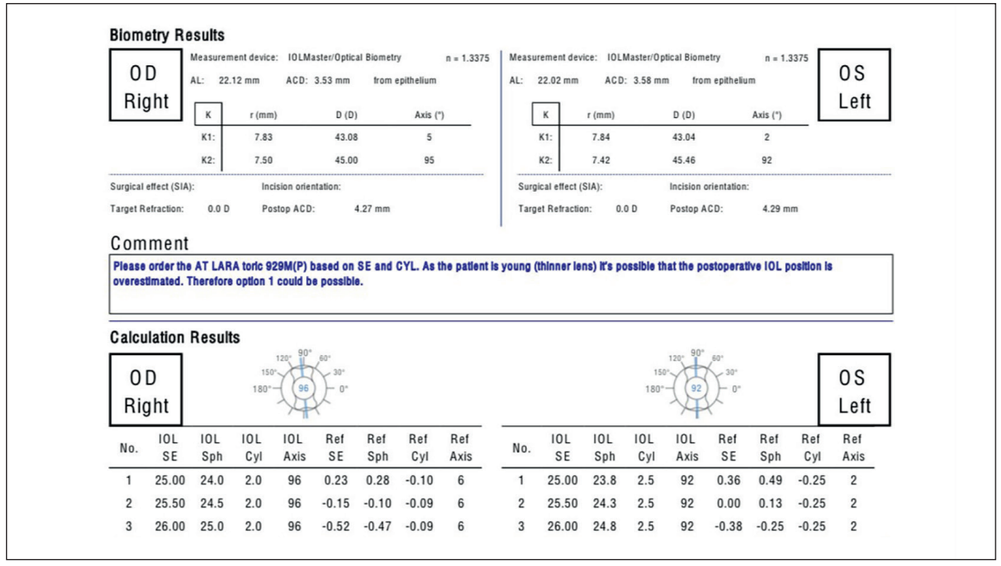
DISCUSSION

The ZEISS portfolio of IOLs encompasses a variety of lens designs that give cataract surgeons the opportunity to meet the range of goals for functional uncorrected vision postoperatively that are encountered in today's patient population. For the typical cataract surgery patient who is older than 60 to 65 years of age, I tend to prefer an AT LISA trifocal IOL (Carl Zeiss Meditec; Jena, Germany) because these patients often are interested in good uncorrected vision for reading at a shorter distance of 30 cm. The patient in this case, however, was a young adult with a priority for good intermediate vision to work at the computer, read on a tablet device, and use her cell phone. Because of its properties, the AT LARA toric 929MP IOL was an excellent choice for this patient.

The AT LARA toric 929MP IOL is a hydrophilic acrylic lens with hydrophobic surface properties. It has an aberration neutral optic with an extended depth of focus design that provides excellent visual acuity over a wide range from far to near intermediate distances and satisfactory near vision for most patients.[1] It also features patented Smooth Microphase Technology that is designed to minimize visual symptoms of halos and glare. In addition, it has advanced chromatic optics for increased contrast sensitivity. For that reason, I believe that the AT LARA may be considered for patients who are interested in presbyopia correction but who have some ocular comorbidity associated with reduced contrast, such as glaucoma, epiretinal membrane, or a history of LASIK, that creates concern about their visual quality outcome using a multifocal IOL.

The AT LARA IOL is also designed to maintain stable outcomes postoperatively. The optic features a 360° anti-PCO ring and square edge design to reduce the rate of posterior capsule opacification. In addition, its plate haptic platform creates four points of contact in the capsular bag. As reported in the peer-review literature and observed in my own clinical experience, this design confers excellent rotational stability that is critical for good visual function with a toric IOL.[2] I implant approximately 500 premium IOLs every year and have never had to perform a secondary procedure to rotate an AT LARA toric IOL.

Preoperatively, I always assess lifestyle, vision preferences, and follow strict guidelines (Holladay Report Interpretation Guideline) in order to achieve the highest quality of care. Furthermore I always ask my patients to complete the New Dell Questionnaire in order to assess their needs and expectations from surgery.



Biometry Results

OD Right

Measurement device: IOLMaster/Optical Biometry n = 1.3375
AL: 22.12 mm ACD: 3.53 mm from epithelium

K	r (mm)	D (D)	Axis (°)
K1:	7.83	43.08	5
K2:	7.50	45.00	95

Surgical effect (SIA): Incision orientation:
Target Refraction: 0.0 D Postop ACD: 4.27 mm

OS Left

Measurement device: IOLMaster/Optical Biometry n = 1.3375
AL: 22.02 mm ACD: 3.58 mm from epithelium

K	r (mm)	D (D)	Axis (°)
K1:	7.84	43.04	2
K2:	7.42	45.46	92

Surgical effect (SIA): Incision orientation:
Target Refraction: 0.0 D Postop ACD: 4.29 mm

Comment

Please order the AT LARA toric 929M(P) based on SE and CYL. As the patient is young (thinner lens) it's possible that the postoperative IOL position is overestimated. Therefore option 1 could be possible.

Calculation Results

OD Right

No.	IOL SE	IOL Sph	IOL Cyl	IOL Axis	Ref SE	Ref Sph	Ref Cyl	Ref Axis
1	25.00	24.0	2.0	96	0.23	0.28	-0.10	6
2	25.50	24.5	2.0	96	-0.15	-0.10	-0.09	6
3	26.00	25.0	2.0	96	-0.52	-0.47	-0.09	6

OS Left

No.	IOL SE	IOL Sph	IOL Cyl	IOL Axis	Ref SE	Ref Sph	Ref Cyl	Ref Axis
1	25.00	23.8	2.5	92	0.36	0.49	-0.25	2
2	25.50	24.3	2.5	92	0.00	0.13	-0.25	2
3	26.00	24.8	2.5	92	-0.38	-0.25	-0.25	2

Figure. A power calculation service from ZEISS uses a proprietary formula that can include measured posterior cornea astigmatism.

Vision outcomes following cataract surgery depend on achieving the desired refractive target. While there are multiple factors determining success, the outcome in this case and the results in a published series show excellent refractive predictability with the AT LARA IOL.[1]

I usually use the IOL power calculation tool integrated in the IOLMaster 700 for surgical planning. For toric IOL cases, the software uses the Barrett Toric formula that provides excellent refractive outcomes because it accounts for posterior corneal curvature and lens position.[3] On the advice of my ZEISS sales representative, I sent the biometry for this young patient to ZEISS for an analysis by the company's power calculation team. This service uses a proprietary formula, also available as Z CALC Online IOL Calculator, that considers posterior cornea curvature values and unique circumstances that can make patients outliers in the general cataract surgery population.

I sometimes use intraoperative digital guidance for toric IOL positioning. It was not available in this case, but through my vast experience with toric IOLs, I have found manual marking at the slit-lamp to be a very reliable method for achieving accurate axis alignment. Patients are instructed to look with the fellow eye at a distant target that is at head height. Using the rotator switch, the slit light of the slit-lamp is turned on to the steep astigmatic meridian in the orthograde position. Then, the two tips of the astigmatic meridian are marked with a marking pen, where the slit light crossed at the limbus 180° away.

CONCLUSION

Cataract surgery patients are a diverse group with respect to their ocular condition and aims for postoperative vision. In all cases, a comprehensive preoperative examination and thorough patient counselling are important to guide surgical decisions and set appropriate patient expectations.

The young adult patient in this case was interested in spectacle independence after cataract surgery, had particular needs for excellent intermediate vision, and required astigmatic correction to achieve the desired outcome. Implantation of the AT LARA toric 929MP IOL proved effective for achieving this patient's satisfaction.

References

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