

Incorrect IOL Power

My worst cataract case involves not a complication of surgery but a human error regarding IOL power selection.

BY AN ANONYMOUS CONTRIBUTOR

Editor's note: this case is still pending review by the state board of medicine. Because of its potential value to Cataract & Refractive Surgery Today's readership, it is being published anonymously.

CASE PRESENTATION

When I examined the patient for the first time in the office, she complained of blurry vision and difficulty driving at night because of halos and glare. Another ophthalmologist had previously diagnosed this intelligent, well-educated, 58-year-old woman with cataracts in both eyes. The surgeon had recommended cataract extraction and the implantation of multifocal IOLs, and the patient had educated herself by reading promotional information on IOLs on the Internet. She was socially active in the community and enjoyed playing tennis four to five times per week. In the past, she had successfully functioned with monovision using monofocal soft contact lenses. She had stopped wearing the lenses because of ocular irritation diagnosed by her doctor as being the result of insufficient tears. She was not aware at the time of my examination which eye had been specifically focused for distance or near.

An examination showed a BCVA of 20/40 OU with a hyperopic refractive error of approximately +2.00 +0.50 X 180 bilaterally. Nuclear and cortical cataracts appeared to be entirely responsible for her reduced vision and symptoms. The tear film meniscus was reduced, but there was no corneal staining. I determined her right eye to be dominant. The ocular examination was otherwise normal.

SURGICAL PLANNING

I recommended cataract extraction, and a lengthy discussion of IOL options ensued. I explained the advantages and side effects of multifocal IOLs, including the possibility of halos at night and difficulty reading in dim illumination. We also discussed the unpredictability of reading without glasses with accommodating IOLs. Because the patient had previously functioned so well with monovision, including playing tennis, I recommended that she have cataract surgery on both eyes with a monovision target. She ultimately concurred with this decision. I asked her to call her optometrist to find out which eye she had previously used for distance or reading and to call me back with the answer. I planned to dupli-

OD right	AL: 21.96 mm (*)
	K1: 46.70 D / 7.23 mm (*)
	K2: 47.47 D / 7.11 mm (*)
	R / SE: 7.17 mm (SD = 47.09 mm)(*)
	Cyl.: 0.77 D (*)
Eye Status: phakic	
Hoya FC-60AD	
SF:	1.45
IOL (D)	REF (D)
26.0	-3.11
25.5	-2.73
25.0	-2.36
24.5	-2.00
24.0	-1.64
23.5*	-1.28
23.0	-0.93
Emme. IOL: 21.66	

Figure 1. The IOLMaster (Carl Zeiss Meditec, Inc., Dublin, CA) printout shows the -2.00 D target for the IOL's power instead of the intended plano target for clear uncorrected distance vision.

cate the arrangement with which she had been comfortable in the past, regardless of her ocular dominance.

When I filled out an IOL biometry form, I requested a monofocal IOL power calculation for each eye with a distance and a monovision target of -2.00 D sphere. Once the patient had obtained the monovision information from her optometrist, I planned to select the IOL power that would give her clear uncorrected distance vision in her "distance eye" and crisp near-range vision without correction in her former "reading eye." After a few days, she called and informed me that her right eye had been the distance eye and her left eye had been her monovision reading eye.

SURGICAL COURSE

I performed phacoemulsification on the patient's left eye first and implanted a PCIOL (25.00 D) targeted for -2.00 D sphere. Immediately prior to inserting the lens, I performed my customary "IOL timeout," during which I check the type

STEPS TO ENSURE THE INSERTION OF THE CORRECT IOL

1. Record in the patient's clinical record the type of IOL and target agreed upon preoperatively with the patient.
2. Confirm the type of IOL and the intended refractive target with the patient on the day of surgery.
3. Verify that any special-order IOL has been ordered and is in the OR before anything is done to the patient.
4. Double-check that the proper IOL power calculations have been performed and are in the chart before anything is done to the patient.
5. Perform a final cross-check of the IOL with the IOL calculation sheet and the clinical record before inserting the lens (the author's IOL timeout).

and power of the lens against the clinical record and the IOLMaster printout. The patient did well, and on the first postoperative day, she could read J1 print without correction. Her refractive error measured $-2.25 + 0.50 \times 180$, which gave her 20/20 distance vision. She was happy and eagerly anticipated the surgery on her right eye.

One week later, I performed routine cataract and IOL (24.50 D) surgery on the patient's right eye. My intention was to correct this eye for distance with a plano postoperative distance target. The cataract extraction was uncomplicated. After the IOL timeout, I inserted what I thought was the proper lens to achieve emmetropia.

OUTCOME

On the first postoperative day, the patient had uncorrected distance vision of 20/80 OD with mild corneal edema. She returned 1 week later (while I was out of town) and saw my associate, because she was concerned about the blurred distance vision in her right eye. She still had an uncorrected distance vision of 20/80 OD, and she could be refracted to 20/20 with $-2.25 + 0.75 \times 10$. The ocular examination was otherwise normal, with the IOL properly positioned in the capsular bag. My associate told her that the implanted IOL was too strong.

I saw the patient 3 weeks postoperatively, and the examination was essentially unchanged. I advised her that I had placed an IOL of the wrong power in her right eye. I told the patient that I was uncertain why the problem had occurred but that I would examine my surgical record (which was not with the clinical office chart) and determine the cause. I advised her of the options for correcting her right eye for distance vision, as had been intended.

They included wearing glasses and/or contact lenses as she had before surgery, an IOL exchange, a piggyback IOL, and LASIK.

She rejected the option of glasses or contact lenses. I then recommended LASIK, because it offered a greater chance of achieving the best distance vision in her right eye without correction than an IOL exchange. I explained that there would be no charge to her for either surgical option but that I would like her to wait until at least 6 weeks postoperatively to undergo LASIK in order to allow the cataract incision to heal. I gave her a prescription for spectacles to wear in the meantime and asked her to return in 3 weeks for a reexamination and probable scheduling of LASIK in her right eye shortly thereafter.

THE SOURCE OF THE ERROR

When I obtained the surgical record, I discovered that the IOLMaster calculation printout that I had used showed a refractive target of -2.00 D sphere (Figure 1). During the IOL timeout, I had apparently misread the printed numbers to be 0.00 D, as intended, instead of the -2.00 D marked on the printout. There was no IOLMaster printout in the surgical chart for a plano target. It seemed that my intraoperative misreading of the printout had occurred due to its being placed farther away, at 26 inches, than the focal distance of my natural monovision (-2.00 D sphere) of 16 inches when I performed the IOL timeout. As a result, the -2.00 D probably looked like -0.00 D to me.

LOST FAITH

The patient did not return for her 6-week postoperative examination. When I called, she said that she had lost faith in me due to the IOL error. She advised me that she had gone to another ophthalmologist and had already undergone LASIK to correct the visual acuity of her right eye for distance. She stated that she was doing well visually and was reading and playing tennis without glasses. I apologized for my human error and offered to do whatever I could to assist her.

The patient sent me the bills for her LASIK procedure, which I paid. I reported the mistake as a "wrong operation" code 15 "serious event wrong site surgery" to the state board of medicine.

LESSONS LEARNED

Incorrect IOL power is the most frequent ophthalmic medicolegal complaint (Ophthalmic Mutual Insurance Company 2006 claims data). Twenty-six percent of operated eyes have at least 1.00 D of residual spherical equivalent refractive error without any component of medical error.¹ When the surgeon mistakenly selects the wrong

IOL, however, the patient's vision can be very poor and can require surgical intervention (ie, lens exchange, insertion of a piggyback IOL, or keratorefractive surgery such as PRK or LASIK). Patients are understandably intolerant and angry when the doctor has made an administrative error such as picking the incorrect IOL target. They feel that the surgeon has not been sufficiently concerned about them to get the correction right.

During my 30-year career, I have become aware of various causes of surgeons' insertion of an erroneous IOL. Some have selected the wrong model of IOL, the wrong refractive target, the wrong eye, the wrong patient, or the wrong IOL formula. Others have used an ACIOL calculation instead of the intended PCIOL calculation, the axial length (22 mm) as the targeted IOL power, or a low-minus IOL instead of a low-plus lens as intended. Still others have implanted an IOL that was left in the OR from a previous case that was cancelled. Although some of these medical errors may have originated outside the surgeon's purview, it is his or her responsibility to develop a system to eliminate these errors.

All of these situations probably could have been avoided by having a separate IOL timeout, during which the sur-

geon checked the chosen IOL against the patient's name and operative eye, the clinical chart, the intended model of lens, the agreed-upon refractive target, the IOL formula, the model of IOL, and the proper A-constant. Surgeons should perform this double-check just before inserting the IOL (see *Steps to Ensure the Insertion of the Correct IOL*).

I compulsively perform this sort of check prior to inserting the lens. It therefore appears that I misread the target numbers in this case. I have since adjusted the position of the IOL-related documents that I review so that they are in perfect focus as I sit in the surgical chair next to the patient. Certainly, I have experienced other surgical complications in my career, but this problem is by far the most bothersome, because it was entirely avoidable through better checking. ■

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1. Murphy C, Tuft SJ, Minassian DC. Refractive error and visual outcome after cataract extraction. *J Cataract Refract Surg.* 2002;28(1):62-66.

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