OPHTHALMOLOGY WEB

Astigmatism and Cataract Surgery

Featured Article

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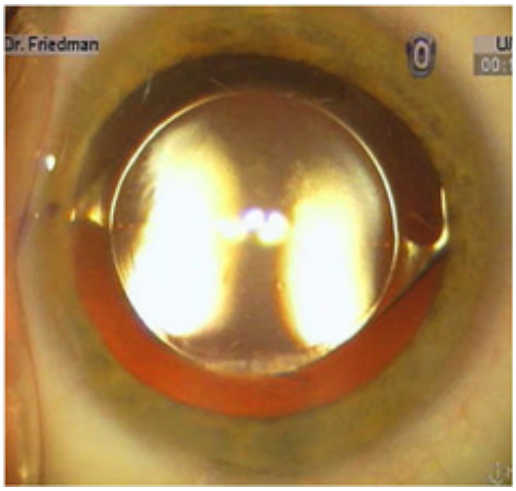

The surgical correction of astigmatism is becoming increasingly more important as we strive to improve visual results in our cataract patients. Management of astigmatism in these patients can be performed intraoperatively or postoperatively. During cataract surgery, the options include incisional corneal techniques such as limbal or corneal relaxing incisions (LRIs/CRIs) or traditional astigmatic keratotomy, and lens based methods, namely toric IOLs. After cataract surgery, astigmatism can be surgically corrected with laser vision correction or one of the aforementioned incisional techniques. This article will review the intraoperative management of corneal astigmatism.

Whichever method is selected, it is extremely important to establish a surgical plan for each patient. This entails obtaining accurate measurements from multiple sources preoperatively. Old refractions may help to confirm preexisting corneal astigmatism, and keratometry and corneal topography measurements should be consistent with respect to the magnitude and orientation of the astigmatism. I like to obtain keratometry data with several devices including manual and auto K readings. The measurements should make sense and be in agreement. If not, additional measurements should be obtained to replace any erroneous values or to confirm that the patient may not be a good candidate for simultaneous correction of astigmatism at the time of cataract surgery. Remember to be cognizant of sources of error and poor data such as dry eye, epithelial basement membrane dystrophy, contact lens warpage, and ectatic disease.

When planning the correction, do not forget to consider the effect of the cataract incision. You should know how much surgically induced astigmatism your wound causes so that this can be taken into account. Once all the numbers have been collected, the desired correction is calculated using various nomograms or online calculators, which exist for both LRIs (www.lricalculator.com) and toric IOLs (www.acrysoftoriccalculator.com).

The advantages of LRIs are that this technique is quick, easy to perform, low tech and low cost, and can be enhanced at the slit-lamp postoperatively. However, the disadvantages are that LRIs are surgeon dependent resulting in some degree of variability and unpredictability. Furthermore, they are contraindicated in ectatic corneal disorders since the results are unpredictable and they may further destabilize the cornea. Complications of this surgery are mostly over- or under-corrections, but also include postop discomfort and/or dry eye, and rarely a corneal perforation during the incision. Corneal pachymetry can be helpful but most surgeons empirically treat at 500-600 microns with a preset diamond or disposable metal blade.

Toric IOLs have the advantage of being precise, predictable, and require no new skills on the part of the surgeon; however, the technology is more costly. An infrequent complication is misalignment or rotation of the IOL, which results in a 3.3% loss of effect per 1 degree of rotation from the correct axis. The two currently available lenses in the United States are the STAAR plate haptic IOL and the Alcon 1-piece loop haptic IOL. The STAAR lens is silicone with a 6.0 mm optic and comes in two sizes with overall lengths of 10.8 mm and 11.2 mm. There are also two available powers, 2 D and 3.5 D, which correct 1.5 D and 2.25 D of astigmatism at the corneal plane, respectively. The newer design with larger fenestrations has improved the rotational stability of the IOL. The Alcon lens is acrylic with a 6 mm optic and 13 mm overall length. It comes in three powers, 1.5 D, 2.25 D, and 3 D, which correct 1 D, 1.5 D, and 2D at the corneal plane, respectively. This traditional loop haptic design has less tendency to rotate (average of < 4 degrees in the FDA trial). There is also an aspheric model available.

For both LRIs and toric IOLs, it is essential to mark the patient's eye in an upright position prior to surgery because the eyes can cyclotort when the patient reclines to the supine position. This allows correct identification of the steep corneal meridian and ensures proper alignment of the astigmatic correction. Numerous markers and gauges are available for this. I simply use a marking pen to place dots at the limbus at the 3, 6, and 9 o'clock positions, and then use a Mendez degree gauge intraoperatively. Another tool that may be beneficial is the ORange from Wavetec. This device enables the surgeon to instantly measure intraoperative refraction and thereby refine the results by adjusting the astigmatic correction if necessary.

We now have a number of options to correct astigmatism at the time of cataract surgery. As these techniques improve and newer modalities evolve, we will be able to offer our patients even better uncorrected visual acuity. This is particularly important as IOL technology advances. Therefore, if you have not yet incorporated these techniques into your surgery, I would encourage you to learn and become adept at one or both.