

ASTIGMATISM MANAGEMENT DURING CATARACT SURGERY



Studies analyzed both the correction of low preoperative corneal cylinder and the management of astigmatism in highly myopic eyes.

BY ALANNA NATTIS, DO, AND ERIC ROSENBERG, DO, MSE

COMPARISON OF SURGICAL METHODS FOR THE CORRECTION OF LOW AMOUNTS OF CORNEAL ASTIGMATISM DURING CATARACT SURGERY

Schallhorn S, Schallhorn J¹

Industry support for this study:

Both authors disclosed relationships with industry

ABSTRACT SUMMARY

This retrospective analysis of 40,289 eyes compared methods of managing corneal astigmatism during cataract surgery in eyes with low amounts (0.75–1.50 D) of corneal astigmatism. The eyes were divided into three groups: those that received a toric IOL, those that received a nontoric monofocal IOL and either limbal relaxing incisions (LRIs) or astigmatic keratotomy (AK; LRI/AK group), and those that received a nontoric IOL and no astigmatism correction (uncorrected group). Data

were further stratified according to the magnitude of preoperative corneal astigmatism (≥ 0.75 D to < 1.00 D, ≥ 1.00 D to < 1.25 D, and ≥ 1.25 D to ≤ 1.50 D). A multivariable model was used to assess the effect of the procedure type on outcomes.

Greater than 77% of eyes that received a toric IOL had 0.50 D or less of residual manifest astigmatism regardless of the amount of preoperative corneal astigmatism. For eyes with 0.75 D to less than 1.00 D of preoperative corneal astigmatism, compared with toric IOLs, the odds of not achieving 0.50 D or less of manifest astigmatism increased 2.83 times in the LRI/AK group and 5.72 times in the uncorrected group. For eyes with 1.00 D to less than 1.25 D of preoperative corneal astigmatism, compared with toric IOLs, the odds of not achieving 0.50 D or less of manifest astigmatism increased 3.9 times in the LRI/

AK group and 7.64 times in the uncorrected group. For eyes with greater than or equal to 1.25 D of preoperative corneal astigmatism, compared with toric IOLs, the odds of not achieving 0.50 D or less of manifest astigmatism increased 4.7 times for the LRI/AK group and 10.27 times for the uncorrected group.

DISCUSSION

Residual astigmatism can negatively affect visual outcomes and patient satisfaction after cataract surgery.¹⁻⁷ Low levels of corneal astigmatism can make the peri- and/or postoperative management of refractive error challenging.

In this analysis and in other studies, toric IOLs were the most effective way of correcting high amounts (> 1.50 D) of preoperative corneal astigmatism.¹⁻⁵ The published literature is mixed, however, on the most effective method of addressing refractive error during cataract surgery when the amount of preoperative corneal astigmatism is low (0.75–1.50 D).¹⁻³ There are numerous strategies for managing astigmatism during or after cataract surgery. The retrospective analysis by Schallhorn and Schallhorn highlighted the strong positive effect that toric IOL implantation had on postoperative refractive error, even when the magnitude of preoperative astigmatism was low.¹

This well-powered study offers strong support for the use of toric IOLs in patients with low degrees of preoperative corneal astigmatism.

STUDY IN BRIEF

- ▶ A large retrospective analysis compared methods of managing corneal astigmatism during cataract surgery in eyes with a low amount (0.75–1.50 D) of preoperative corneal astigmatism. Toric IOLs provided the most accurate and consistent astigmatism correction regardless of the magnitude or axis of preoperative corneal astigmatism.

WHY IT MATTERS

There is a paucity of published guidance on the efficacy of toric IOLs in eyes with low levels of preoperative corneal astigmatism. This well-powered study demonstrated a clear benefit to toric IOLs compared with limbal relaxing incisions and astigmatic keratotomy in these eyes.

CLINICAL OUTCOMES OF PLATE-HAPTIC DIFFRACTIVE MULTIFOCAL TORIC IOL IN CATARACT EYES WITH LONG AXIAL LENGTH AND CORNEAL ASTIGMATISM

Xu Z, Wang J, Shi C, et al⁴

Industry support for this study: None

ABSTRACT SUMMARY

This prospective study evaluated the outcomes of 18 patients (36 eyes) with a long axial length and corneal astigmatism who underwent cataract surgery with a plate-haptic diffractive multifocal toric IOL (AT LISA toric 909M, Carl Zeiss Meditec). Patients' visual acuity (near, intermediate, distance), contrast sensitivity, and satisfaction as well as the IOL's rotational stability were assessed over the course of 3 months.

The mean preoperative axial length was 27.31 ±2.20 mm, and the mean true corneal astigmatism was -1.75 ±0.77 D (range, -0.80 to -3.73 D). The mean preoperative manifest sphere was -6.66 ±5.37 D, and the mean preoperative manifest cylinder was -1.88 ±1.11 D. The mean IOL cylinder power used was 1.98 ±0.91 D (range, 1.00–4.00 D).

Postoperatively, the mean manifest sphere and cylinder had decreased to 0.13 ±0.23 D and -0.29 ±0.32 D, respectively (*P* < .05). These values had not changed significantly at 3 months. Patients' average postoperative uncorrected distance visual acuity and uncorrected near visual acuity were 0.40 ±0.1 logMAR and 0.19 ±0.16 logMAR, respectively.

IOL stability was very good; 91.7%, 94.4%, and 91.7% of patients showed IOL rotation angles below 5° at 1 week, 1 month, and 3 months, respectively. During the postoperative period, significant IOL rotation requiring surgical intervention was noted in only one patient.

No statistically significant changes in contrast sensitivity function at any spatial frequency were observed at 1 week, 1 month, or 3 months. The Visual Function Index score

was used to assess visual quality at 3 months postoperatively. Patient satisfaction levels for vision were 88.9%, 83.3%, and 66.7% for distance, intermediate, and near, respectively. Additionally, 88.9% of patients required no spectacles for far or intermediate distance, and 66.7% of patients did not wear spectacles for near vision tasks. Regarding dysphotopsias, 61.1% of patients said they did not have halo or glare disturbances, and 77.8% reported not experiencing starburst-like visual disturbances. When asked, 94.4% of patients stated that they would choose the same IOL again and would recommend the IOL and cataract surgery to their family and friends.

DISCUSSION

Patients' visual function and level of satisfaction continue to improve with advances in IOL design.⁴⁻⁷ Refractive surprises and toric IOL rotation, however, remain concerns in highly myopic eyes due to anatomic factors such as long axial length, increased anterior chamber depth, and a large capsular bag.⁴⁻⁷

Xu and colleagues found that the AT LISA toric 909M IOL provided excellent contrast sensitivity and stable, predictable refractive and astigmatic correction in this patient population. The plate-haptic design might have been one reason for the IOL's stability, but compatibility between the capsular bag and IOL size also warrant consideration.⁴⁻⁷ ■

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STUDY IN BRIEF

► A prospective study demonstrated the efficacy and quality of a plate-haptic design multifocal toric IOL (AT LISA toric 909M, Carl Zeiss Meditec) for eyes that had a long axial length.

WHY IT MATTERS

High myopia has been estimated to affect nearly 1 billion people worldwide, and the global prevalence of myopia and high myopia is growing.⁸ It can be challenging to correct astigmatism and presbyopia and to achieve good contrast sensitivity and quality of vision in highly myopic eyes. Ocular anatomy, moreover, can compromise the rotational stability of the IOL.

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