Surgically Induced Astigmatism Assessment

The article “Surgically Induced Astigmatism Assessment: Comparison Between Three Corneal Measuring Devices” by Ofir et al.\(^1\) was effective in demonstrating equivalence between three anterior corneal measuring devices (Lenstar LS900, Haag-Streit, Koeniz, Switzerland; IOLMaster 500, Carl Zeiss Meditec, Dublin, CA; and Atlas topographer, Carl Zeiss Meditec) by assessing the vectorial astigmatism change between postoperative and preoperative astigmatism readings of each device. The findings and introductory statements both deserve some comments.

First, this finding of equivalence in measurements of surgically induced astigmatism (SIA) is most useful given that the parameter known as corneal topographic astigmatism (CorT)\(^2\) was demonstrated to be a more accurate measure of corneal astigmatism using simulated keratometry from the Atlas topographer as used in this study. This is in addition to those automated values of corneal wavefront and paraxial curvature matching and manual keratometry.\(^2\) These findings of this CorT study can be extended to the automated keratometry based on partial coherence interferometry of the IOL-Master and Lenstar given their equivalence with the Atlas topographer.

There is an error in the introductory statement “surgically induced astigmatism (SIA) is added to the preoperative measured corneal astigmatism using vector analysis as part of the toric IOL power calculation.” This is attributed to their reference 23 by Borasio, which on careful reading cannot be found there. In fact, it is the flattening effect\(^3\) that should be added to the preoperative astigmatism for the toric intraocular lens power calculation because as Borasio correctly states, the SIA is composed of two components: flattening and torque. The flattening is the parameter that reduces the astigmatism; the torque “is the ineffective component of the SIA vector that does not reduce the astigmatism at the surgical meridian but changes the orientation of the astigmatism.”\(^3,4\) The torque component of the SIA should take no part in the calculation of the toric power calculation of an intraocular lens, leaving the flattening effect as the relevant parameter for incisional effect.

References appear to be misquoted again in the discussion, where Eydleman et al. (reference 11) is attributed with the statement “the amount of astigmatism to be corrected at the time of surgery must be a vector sum of the preoperative total corneal astigmatism and the SIA.” Neither this statement nor any relation to “total corneal astigmatism” could be found in this article.

It is not an uncommon error on toric calculators for the surgeon’s own SIA required to be entered in the calculation of spherical and toric power of an implant for cataract surgery where astigmatism exists. However, the more accurate parameter to employ in this endeavor is the flattening effect of any incision at the meridian where it is to be placed. The article by Ofir et al. unfortunately follows this erroneous dictum in the introduction and discussion.

REFERENCES


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The author has no financial or proprietary interest in the materials presented herein.

Reply

We thank Dr Alpins for his interest in our article. We appreciate his comments, which highlight the two components of surgically induced astigmatism, and for pointing out a misquoted reference.

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The authors have no financial or proprietary interest in the materials presented herein.

doi:10.3928/1081597X-20150821-02