Guest Editorial

Optical models for intraocular lens planning in keratoconus: A step in the right direction and more to do

This issue of Indian Journal of Ophthalmology carries an interesting article titled, "Preliminary Validation of an Optimized Algorithm for Intraocular Lens Power Calculation in Keratoconus."[1] The paper presents highly descriptive analyses of different parameters that can impact the calculation of intraocular lens (IOL) power using two different eye models. Such studies assist in truly understanding the relative impact of each selection parameter such as anterior corneal radius and posterior corneal radius. However, there are still potential confounders that severely limit the application of such models. The accuracy and repeatability of most tomographers is inferior for keratoconus eyes than for normal eyes.[2] These devices are also not interchangeable for the assessment of keratoconic curvatures.[2] Thus, central corneal curvature is subject to question with increasing grade of disease. Another confounding factor is the inability of the proposed models to account for higher-order corneal aberrations. It has been shown previously that interaction between higher-order corneal aberrometric terms can affect the calculated power of IOL.[3] Since most of the aberrations in keratoconic eyes are due to the cornea, ray tracing could be a better option than using paraxial optics as used in this study.[2] Since ray tracing requires a corneal profile, accuracy of conventional tomographers is again an issue. Here, a new technology based on optical coherence tomography (OCT) may result in improved accuracy in mapping of the keratoconus corneal surfaces such as the anterior and posterior surfaces.[4] OCT tomography has also shed new information on postrefractive surgery eyes, which Scheimpflug imaging currently underestimates, for example, change in spherical aberration of the cornea after low-myopia photorefractive keratectomy was lower when measured with OCT than with Pentacam® (Oculus Optikegrate Gmbh, Germany).[5] Eventually, every model will have to be tested on patients. Currently, there is very limited data available. If the authors of the study[1] test their model prospectively in diseases, it will fully demonstrate the accuracy of their model.

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