Accuracy of Corneal Astigmatism Estimation by Neglecting the Posterior Corneal Surface

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摘要

Abstract

PurposeTo evaluate the accuracy of corneal astigmatism estimation by neglecting the posterior corneal surface measurement.

DesignProspective, observational study.

MethodsThe right eyes of 493 subjects were measured with a rotating Scheimpflug camera (Pentacam; Oculus, Wetzlar, Germany). The keratometric corneal astigmatism (KA) was obtained by using the anterior corneal surface measurement and the keratometric index (1.3375) while neglecting the posterior corneal surface measurement. The Pentacam-derived total corneal astigmatism (PA) was derived by doubled-angle vector analysis of the astigmatisms on both corneal surfaces.

ResultsThe mean arithmetic and absolute estimation errors of the KA magnitude for the PA magnitude were −0.06 ± 0.28 diopters (D) (range, −0.59 to 0.91 D) and 0.24 ± 0.16 D (range, 0 to 0.91 D), respectively. The mean arithmetic and absolute estimation errors of the KA angle for the PA angle were −0.6 degrees ± 12.7 degrees (range, −69.9 degrees to 83.4 degrees) and 7.4 degrees ± 10.3 degrees (range, 0 degrees to 83.4 degrees), respectively. Among all eyes, 142 eyes (28.8%) had either a KA magnitude that differed by > 0.50 D from the PA magnitude or a KA angle that differed by > 10 degrees from the PA angle. For the 282 eyes with a KA magnitude exceeding 1.0 D (that are candidates for intraoperative correction of a preexisting astigmatism during cataract surgery), 29 eyes (10.3%) had either a KA magnitude that differed by > 0.50 D from the PA magnitude or a KA angle that differed by > 10 degrees from the PA angle.

ConclusionsNeglecting the posterior corneal surface measurement may lead to significant deviation in the corneal astigmatism estimation in a proportion of eyes.