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“Intraocular Lens Power Calculation by Ray-Tracing after Myopic Excimer Laser Surgery” by Giacomo Savini, Andrea Bedei, Piero Barboni, Pietro Ducoli, Kenneth J. Hoffer

Intraocular Lens Power Calculation by Ray-Tracing after Myopic Excimer Laser Surgery

PURPOSE

To investigate the refractive outcomes of intraocular lens (IOL) power calculation by ray-tracing after myopic excimer laser surgery.

DESIGN

Prospective, interventional case series.

METHODS

setting: Multicenter study. participants: Twenty-one eyes of 21 patients undergoing phacoemulsification and IOL implantation after myopic laser in situ keratomileusis or photorefractive keratectomy were enrolled. intervention: IOL power calculation was performed using internal software of a Scheimpflug camera combined with a Placido disc corneal topographer (Sirius; CSO). Exact ray-tracing was carried out after the axial length (measured either by immersion ultrasound biometry or partial coherence interferometry), target refraction, and pupil size had been entered. main outcome measures: Median absolute error, mean absolute error, and mean arithmetic error in refraction prediction, that is, the difference between the expected refraction (as calculated by the software) and the actual refraction 1 month after surgery.

RESULTS

The mean postoperative refraction was -0.43 ± 1.08 diopters (D), with a range between -1.28 and 0.85 D. The mean arithmetic error was -0.13 ± 0.49 D. The median and mean absolute errors were $+0.25$ D and 0.36 D, respectively. Also, 71.4% of the eyes were within ± 0.50 D of the predicted refraction, 85.7% were within ± 1.00 D, and 100% within ± 1.50 D.

CONCLUSIONS

Ray-tracing can calculate IOL power accurately in eyes with prior myopic laser in situ keratomileusis and photorefractive keratectomy, with no need for preoperative data.