Options for a young patient with considerably high, topographically stable, astigmatism

Edited by Marcony R. Santhiago, MD, PhD

A 21-year-old woman was referred for a refractive surgery evaluation. She has no relevant allergies or medical or family history of keratoconus or corneal transplantation. Spectacle dependence is her chief complaint. She occasionally wears contact lenses but wants to have surgery performed. The corrected near visual acuity and the corrected distance visual acuity (CDVA) are 20/20 in both eyes. The manifest refraction is -5.75 -3.25×178 in the right eye and -5.00 -3.50×170 in the left eye. The intraocular pressure and the results from a slitlamp examination and a fundus retinoscopy are normal.

The ultrasound pachymetry shows the central corneal thickness (CCT) to be 505 μm in the right eye and 508 μm in the left eye. Among all devices used to measure the CCT, the thinnest measured point is 504 μm in the right eye and 503 μm in the left eye.

Placido-disk corneal topography shows a high regular symmetric astigmatism that was stable over 1 year of follow up, with an insignificant change in keratometry (K) values (Figure 1). The 5 topographies were obtained at 3-month intervals.

Scheimpflug and dual Scheimpflug tomography (Figures 2, 3, and 4) are normal with no suspicious pattern except a high regular astigmatism. The pachymetry maps show corneas that, although slightly thin, are within normal limits across the diameter.

An excimer laser system predicts a stromal ablation of approximately 127 μm in the right eye and 121 μm in the left eye. For laser in situ keratomileusis (LASIK) with a 110 μm flap thickness, the percentage of tissue altered (PTA) would be 47% in the right eye and 46% in the left eye. The residual stromal bed (RSB) would be 267 μm in the right eye and 272 μm in the left eye. For photorefractive keratectomy (PRK), the PTA would be 25% in the right eye and 24% in the left.

What kind of refractive surgery (if any) would you recommend to this patient? If none, why? Would you consider LASIK with a thin, predictable LASIK flap? What data helped you most in making your decision? Did the stability shown by the Placido disk–based corneal topography over 1 year significantly affect your surgery decision? What are your limits for treating a cornea with high regular symmetric astigmatism? If you recommend proceeding with surgery, was age a significant factor in that decision?

■ A 21-year-old woman with moderately high myopia and high astigmatism is interested in refractive surgery. I am assuming she was out of her contact lenses for all of her evaluations and her refractions have been stable for several years. Of critical importance are that her corneal topographies and tomographies reveal stable, regular, with-the-rule (WTR) astigmatism with no posterior corneal elevation over the past year, and her corneal thicknesses are reasonably normal with a normal distribution pattern.

Although I do not consider her a "perfect" refractive surgery candidate, I would certainly consider the procedure for her. My concerns are her relatively young age, her moderately high myopia, and most important, her high degree of astigmatism. Having said that, her stable refractions and stable (and regular) corneal imaging over the past year suggest she does not have a progressive condition, such as keratoconus. I am more concerned about her postoperative quality of vision, given her moderately high myopia and high astigmatism. In my experience, astigmatism over 3.00 to 3.50 diopters (D) is where the visual results of refractive surgery really begin to tail off. I would have a long discussion with her about the possibility of decreased quality of vision and increased night-vision complaints, such as glare, halos, and starbursts. I would also tell her it might take a little longer than average for her visual results to stabilize after surgery and that she is at higher risk for needing an enhancement procedure to obtain the best results.

If she were still interested, I would perform surface ablation with mitomycin-C (MMC) (0.02% for approximately 15 seconds). I would not perform LASIK, given her moderately high myopia and somewhat thin corneas, which would result in a PTA value of over 40% in both eyes (even with a 100 μm LASIK flap). Given her high astigmatism, it is extremely important that the laser ablation pattern be perfectly aligned with her axis of astigmatism; thus, some type of anatomic registration would be required. Just marking the 3 o'clock and 9 o'clock meridians at the

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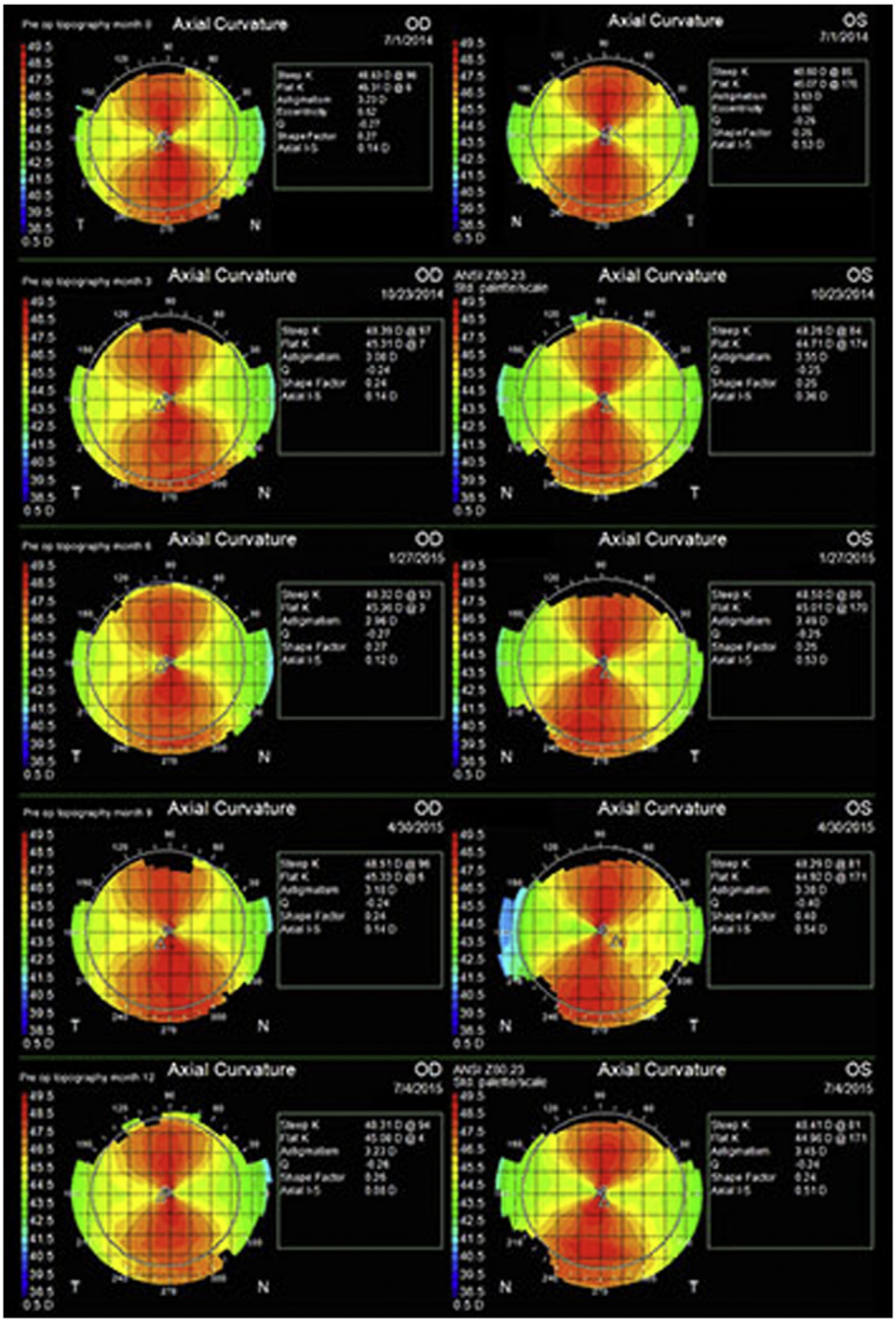

Figure 1. Placido-disk corneal topography in both eyes.

slitlamp immediately preoperatively and then attempting to align the dots under the laser is not very accurate. I would try hard to make sure some sort of anatomic (iris or scleral vessel) registration was performed in her case. Ultimately, I think she would require a little more hand-holding than the average patient but would be extremely happy with the results.

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■ Although it is not common, isolated anterior corneal curvature above 48.0 D is no longer a hallmark of ectasia. In this case, the topographic distribution along the whole surface leads to a congenital astigmatism