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Four-Stage Procedure for Keratoconus: ICRS Implantation, Corneal Cross-linking, Toric Phakic Intraocular Lens Implantation, and Topography-Guided Photorefractive Keratectomy

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Abstract

PURPOSE: To evaluate a four-stage combined treatment for keratoconus including intrastromal corneal ring segment (ICRS) implantation followed by corneal cross-linking (CXL), toric phakic intraocular lens (IOL) implantation, and topography-guided photorefractive keratectomy (TG-PRK).

METHODS: In this retrospective interventional case series, 11 eyes of 7 patients with progressive keratoconus were treated with a four-stage procedure including the following: Keraring ICRS (Mediphacos Ltda, Belo Horizonte, Brazil) implantation followed by CXL, phakic IOL implantation, and TG-PRK (minimum 6 months between each stage). Minimum follow-up was 12 months after TG-PRK.

RESULTS: Both mean uncorrected distance visual acuity and corrected distance visual acuity (CDVA) improved from 0.025 decimal (20/800 Snellen) and 0.093 decimal (20/215 Snellen) preoperatively to 0.68 decimal (20/30 Snellen) and 0.73 decimal (20/27 Snellen), respectively, after the combined treatment ($P < .0001$). Mean postoperative CDVA of 0.73 decimal (20/27 Snellen) was similar to preoperative contact lens CDVA of 0.72 decimal (20/28 Snellen). Mean manifest refraction spherical equivalent reduced from 16.78 +/- 3.58 to 0.59 +/- 0.89 diopters ($P < .0001$) and mean refractive astigmatism reduced from 5.16 +/- 1.86 to 0.82 +/- 0.28 diopters ($P < .0001$).

CONCLUSIONS: This four-stage procedure appears to be an effective and safe approach for corneal stabilization and improvement of functional vision in patients with keratoconus. Larger case series with a longer follow-up are required to thoroughly evaluate the efficacy, safety, and stability of this combined approach.

Keywords

Keywords Plus: RING SEGMENT IMPLANTATION; TERM-FOLLOW-UP; RIBOFLAVIN; PRK; CXL; ECTASIA; CRETAN; INTACS; LASER

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