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Safety and efficacy of sequential intracorneal ring segment implantation and crosslinking in pediatric keratoconus

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Purpose: To evaluate the safety and visual outcome of intracorneal ring segment (ICRS) implantation followed by crosslinking in pediatric keratoconus patients.

Design: Retrospective interventional case series

Methods: This retrospective study included pediatric patients (≤ 14 years) with keratoconus and poor corrected distance visual acuity (CDVA) that underwent ICRS implantation and crosslinking (CXL). ICRS were inserted under topical anesthesia after creating a corneal tunnel with an Intralase femtosecond laser. Crosslinking was performed 1 month subsequently. Records were reviewed and data collected preoperatively, at 6 months, at 1 year, 2 years and 4 years postoperatively. Additionally, an 8-year follow-up of a 9-year old patient with ICRS implantation is reported, but is not included into the statistical analysis, since CXL was performed only 7 years later. For this patient ICRS were inserted manually under general anesthesia.

Results: 12 patients (17 eyes; 10 males, 2 females) aged 9-14 years (mean age 12.3 years) received ICRS implantation followed by CXL. Follow-up times ranged from 6 months to 8 years after surgery. At the 6-month follow-up all eyes were evaluated, at the 1-year, the 2-year and the 4-year follow-up 11, 10 and 7 eyes were evaluated, respectively. At the 6-month follow-up, mean CDVA in comparison to preoperative levels improved significantly ($p=0.001$) from 0.300.19logMAR to 0.120.1logMAR, mean uncorrected distance visual acuity (UDVA) also improved significantly from 0.900.50logMAR to 0.430.31logMAR. A significant decrease in both keratometry readings and spherical equivalence (from -4.0D to -1.56D) was also noted after ICRS insertion. At the 1-year, the 2-year and the 4-year follow-up refractive values remained relatively stable in comparison to the 6-month follow-up, except for a minor but significant improvement in cylinder and, at 4 years, in UDVA. The patient with the 8-year follow-up also showed visual improvement and a stable cornea. All patients tolerated the surgery well and no intraoperative or postoperative complications were reported, except for one ring segment that had to be removed after two years due to vascularization and corneal thinning.

Conclusion: ICRS implantation is a safe and effective procedure for visual rehabilitation in children with keratoconus and poor CDVA.

Biography

Elias F Jarade, MD. is the director of the Corneal, External Disease, and Refractive Surgery Services at Beirut Eye Specialist Hospital. Dr. Elias is a graduate of Harvard Medical School with 2 certificates of fellowship in cornea and refractive surgery from the Eye Center and Eye Foundation for Research, and The Massachusetts Eye and Ear Infirmary, Harvard Medical School. Dr. Elias is heavily involved in the practice and research of cornea, cataract, refractive surgery for the past 15 years with main interest in keratoconus. Has to his record more than 50 peer reviewed scientific papers and chapters. Also, presenter and invited faculty in the field of cornea and refractive surgery at international meetings. Board member for the "Journal of Refractive Surgery" "International Journal of Ophthalmology", "International Advisory Board for the Saudi Journal of Ophthalmology", Founder-general secretary of the Emirates Cornea and Refractive Surgery (ECRS) club, Guest editor for the "Journal of Ophthalmology".

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