

عنوان البحث:

**Long-Term Visual, Refractive and Topographic Outcomes of KeraRings Combined with Accelerated Transepithelial Crosslinking for Management of Different Grades of Progressive Keratoconus: A Retrospective Cohort Study**

مكان وتاريخ النشر:

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***Purpose:***

To evaluate long-term visual, refractive, and topographic outcomes of KeraRings intrastromal implantation combined with accelerated transepithelial cross-linking for management of different stages of progressive keratoconus.

***Materials and Methods:*** This retrospective cohort study included 70 eyes of 70 patients with Amsler-Krumeich grades 1 to 4 keratoconus. They were divided into two groups: group-A included 37 eyes with grades 1-2 keratoconus, and group-B included 33 eyes with grades 3-4 keratoconus. Both groups underwent combined Keraring implantation with TCXL treatment. The main outcome measures included the preoperative and postoperative visual acuity, refraction, keratometry readings, and pachymetry.

***Results:*** At postoperative month 60, group-B exhibited significantly higher values of all mean uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), sphere/cylinder/spherical equivalent/defocus equivalent (DEQ), and K1/K2/Kaverages/Kmax parameters compared to that of group A. However, group-A exhibited better stability of postoperative improvements. Keratoconus progression (KCP) was greater in group-B (45.5%) than group-A (10.8%). Two eyes revealed segments' migration while one eye showed tunnel vascularization and opacification with segments' migration.

***Conclusion:*** The diagnostic criteria of preoperative-KCP are not adequate for the diagnosis of postoperative-KCP following ICRS implantation. UDVA and K average posterior seemed to be more sensitive parameters than K max in documenting early postoperative-KCP. We suggest that deterioration of  $UDVA \geq 0.10 \log \text{ MAR}$  and/or  $K \text{ average posterior} \geq 0.25 \text{ D}$  are highly suspicious of post-ring implantation keratoconus progression (PR-KCP). The occurrence of two of the following parameters:  $K_{\max} \geq 0.50 \text{ D}$ ,  $K \text{ average anterior} \geq 0.50 \text{ D}$ ,  $K \text{ average posterior} \geq 0.25 \text{ D}$ , or  $\text{pachymetry} \geq 1.5\% \text{ thinning}$ , is diagnostic of PR-KCP. The occurrence of two or more of the following parameters:  $K_{\max} \geq 0.50 \text{ D}$ ,  $K \text{ average anterior} \geq 0.50 \text{ D}$ ,  $K \text{ average posterior} \geq 0.25 \text{ D}$ ,  $\text{pachymetry} \geq 1.5\% \text{ thinning}$  or  $UDVA \geq 0.10 \log \text{ MAR}$ , is diagnostic of PR-KCP. We also suggest that  $K_{\max} \geq 0.75 \text{ D}$  alone is diagnostic of PR-KCP.