

Deep Anterior Lamellar Keratoplasty Versus Penetrating Keratoplasty for Keratoconus: A Clinical Trial

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Abstract

Purpose: To compare deep anterior lamellar keratoplasty (DALK) using the big-bubble technique to penetrating keratoplasty (PK) in patients with keratoconus.

Materials and Methods: In this clinical trial, patients with moderate to advanced keratoconus with poor spectacle-corrected visual acuity and intolerant to contact lens wear were enrolled. DALK was performed using the big-bubble technique, and a full-thickness donor cornea without Descemet membrane was sutured to the recipient bed. PK was performed conventionally with a Hessburg-Barron suction trephine. Three types of suturing were used for both groups. Postoperative refractive errors, best-corrected visual acuity (BCVA), contrast sensitivity function (CSF), and higher order aberrations (HOAs) were compared between the study groups.

Results: The study included 81 eyes of 81 patients. Forty-six eyes underwent DALK from which 4 were excluded because of failure to achieve bare Descemet membrane. Thirty-five eyes received PK. Mean patient age was 26.91 ± 7.9 versus 30.89 ± 10.3 years in the DALK and PK groups, respectively ($P = 0.06$). Mean follow-up period was 22.0 ± 7.9 months in the DALK group and 24.6 ± 3.5 months in the PK group ($P = 0.32$). Mean postoperative spherical equivalent refractive error was -3.23 ± 3.4 diopters in the DALK group versus -2.22 ± 4.6 diopters in the PK group ($P = 0.28$), and mean postoperative BCVA was 0.18 ± 0.08 and 0.15 ± 0.10 logarithm of the minimum angle of resolution, respectively ($P = 0.12$). CSF and total aberrations and HOAs were comparable in the study groups.

Conclusions: DALK is an effective alternative surgical procedure for patients with keratoconus; the outcomes are comparable to PK in terms of refractive errors, BCVA, CSF, and HOAs.