Visual Acuity, Refractive Error, and Endothelial Cell Density Six Months After Descemet Stripping and Automated Endothelial Keratoplasty (DSAEK)

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Abstract

Purpose: To evaluate visual acuity, refractive outcomes, and endothelial cell density 6 months after Descemet stripping and automated endothelial keratoplasty (DSAEK).

Methods: We performed an institutional review board-approved prospective study of a surgical case series of 34 patients at 2 institutions undergoing DSAEK for Fuchs endothelial dystrophy, pseudophakic bullous keratopathy, or aphakic bullous keratopathy with or without simultaneous phacoemulsification and intraocular lens implantation. Clinical outcomes, including best spectacle-corrected visual acuity (BSCVA), spherical equivalent refraction, and refractive astigmatism and topographic or keratometric astigmatism, were assessed at the 6-month postoperative examination and compared with preoperative values with paired Student t tests. The change in endothelial cell density from the eye bank examination to 6 months after transplantation was similarly evaluated.

Results: BSCVA averaged 20/99 preoperatively and 20/42 postoperatively (P < 0.0001). After DSAEK, 30 (88.2%) of 34 patients showed improved BSCVA, and 21 (61.8%) of the 34 patients achieved a BSCVA of 20/40 or better. For patients not undergoing simultaneous phacoemulsification and intraocular lens implantation, a hyperopic shift in refraction of 1.19 ± 1.32 D was noted. Refractive astigmatism, topographic astigmatism, and keratometry showed no statistically significant change. Endothelial cell density of donor corneas averaged 2826 ± 370 cells/mm², whereas the mean postoperative density was 1396 ± 440 cells/mm². This finding corresponded to an average loss of 1426 cells/mm² (50% loss; P = 0.0001). The first half of cases experienced an average cell loss of 1674 cells/mm² (59% loss) compared with 1181 (41% loss) in the second half of cases (P = 0.005). Three (9%) of 34 grafts experienced iatrogenic graft failure and required reoperation with new donor tissue. Also, 9 (27%) of 34 grafts experienced dislocation in the early postoperative period and required repositioning.

Conclusions: In this prospective study of DSAEK for bullous keratopathy and Fuchs endothelial corneal dystrophy, improvement of visual acuity was achieved with only a mild tendency toward hyperopic shift and without significant induced astigmatism. Endothelial cell loss was significant, however, and may be related to surgical experience.