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Eye-Bank Precut versus Surgeon-Cut Tissue Graft for Descemet Stripping Automated Endothelial Keratoplasty (DSAEK): A Systematic Review and Meta-Analysis

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INTRODUCTION

Advances in eye banking expertise have increased the availability of precut tissue, making DSAEK surgery more accessible. In addition to decreasing the surgeon time in the operating room and avoiding tissue loss during surgeon preparation, precut tissues can be assessed for graft thickness and endothelial health, which is limited in the surgical theatre. Eye bank technicians need to be meticulously trained in both the safe preparation and testing of grafts to ensure that they are optimal for survival and ECC. It has been highlighted that exposure to the dextran solution in the storage and transport of EBP tissue may result in disruptions of the exposed stromal surface leading to a decrease in adhesion force. Several comparative studies have assessed the outcomes of EBP and SC tissue grafts in patients undergoing DSAEK. This is the first systematic review and meta-analysis to evaluate the effectiveness of this preparation.

AIM

To compare the outcomes of eye-bank precut versus surgeon-cut tissue grafts in patients undergoing Descemet Stripping Automated Endothelial Keratoplasty (DSAEK).

METHOD

A systematic review and meta-analysis were performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines. Electronic information was searched to identify comparative studies of eye bank precut versus surgeon-cut tissue grafts for DSAEK. Endothelial cell loss, rebubbling rate, and best-corrected visual acuity (BCVA) were the primary outcome measures. Secondary outcome measures included postoperative corneal thickness, complications, and cost. Fixed-effects modelling was used for the analysis.

RESULTS

- Six studies enrolling 548 graft patients who underwent DSAEK were identified.
- Although endothelial cell loss was not significantly different between the groups at 6 months postoperatively (Mean Difference [MD]=-0.29, P=0.97), there was a significant difference in endothelial cell loss at 1 year (MD=-4.53, P=0.02), favoring the eye-bank group.
- Similarly, there was a statistically significant difference in the postoperative BCVA (MD=-0.01, P=0.007), favoring the eye bank precut group.
- There was no significant difference between the eye-bank precut and surgeon-cut graft groups in terms of the rebubbling rate (Odds Ratio [OR]=1.70, P=0.25) and graft failure rate (OR=1.04, P=0.97).
- Similarly, no statistically significant difference was noted in postoperative corneal thickness and complications, including increased intraocular pressure and the development of Irvine-Gass Syndrome. The cost analysis demonstrated lower surgical expenses for surgeon-cut tissue grafts.

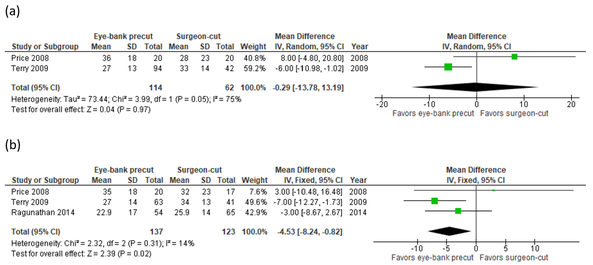


Figure 1. Forest plot for the mean difference of eye-bank precut versus surgeon-cut tissue graft for Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) - Endothelial Cell Loss (cells/mm²): (a) 6 months (b) 1 year. There was no statistically significant difference in the endothelial cell loss (cells/mm²) at 6 months of both groups. However, there was a statistically significant difference found in the endothelial cell loss (cells/mm²) at 1 year favouring the eye-bank precut group.

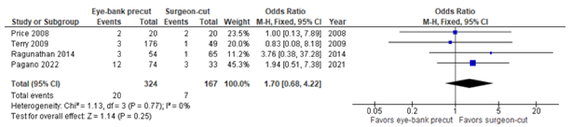


Figure 2. Forest plot for the odds ratio of eye-bank precut versus surgeon-cut tissue graft for Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) - Rebubbling Rate. There was no statistically significant difference in the rebubbling rate of both groups.

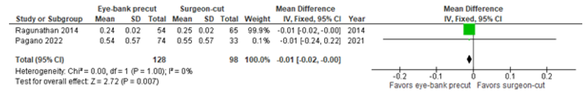


Figure 3. Forest plot for the mean difference of eye-bank precut versus surgeon-cut tissue graft for Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) - Postoperative best corrected visual acuity (BCVA) [logMAR]. There was a statistically significant difference in the postoperative BSCVA favoring the eye-bank precut group.

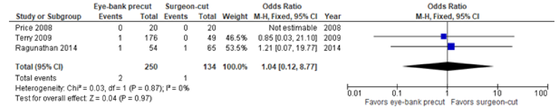


Figure 4. Forest plot for the odds ratio of eye-bank precut versus surgeon-cut tissue graft for Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) - Graft Failure Rate. There was no statistically significant difference in the graft failure rate of both groups.

CONCLUSION

The eye bank is an excellent alternative to surgeon-cut grafts for patients undergoing DSAEK, as it yields a similar rebubbling rate and improved endothelial cell loss.

CONTACT INFORMATION