Endothelial cell loss is not influenced by donor endothelial cell density above 2800 or below 2300 cells/mm² after standardized DMEK

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Introduction
To determine whether high or low donor endothelial cell density (ECD) influences 6-month endothelial cell loss (ECL) after standardized DMEK.

Methods
ECD was measured prospectively in eye bank prepared DMEK grafts prior to implantation and 6 months after implantation. ECL at 6 months was retrospectively reviewed for patients who underwent DMEK for Fuchs endothelial dystrophy using the Devers standardized DMEK technique.

Results
Review of our database showed 19 cases that fit the inclusion criteria and had donors with a pre-resection ECD less than 2300 cells/mm².

- Mean pre-resection ECD was 2228 ± 57
- Mean 6 month ECD was 1637 ± 298
- Endothelial cell loss was 32.5%

A total of 71 cases fit the inclusion criteria and had donors with a pre-resection ECD greater than 2800 cells/mm².

- Mean pre-resection ECD was 3013 ± 148
- Mean 6 month ECD was 2029 ± 516
- Endothelial cell loss was 26.5%

There was no significant difference between the percent endothelial cell loss between the donors with less than 2300 cells/mm² and those with greater than 2800 cells/mm². The 6 month ECD of the group that started with higher cell densities was significantly greater than the group that started with lower cell densities.

Conclusion
There was no difference in percent endothelial cell loss between grafts with pre-implantation endothelial cell densities less than 2300 or greater than 2800 cells/mm². This shows that DMEK surgeons can expect similar levels of endothelial cell loss whether they implant tissue with relatively high or relatively low endothelial cell density. The patients who received donor tissue with higher cell densities, however, had significantly greater 6 month cell density values.

Clinical Significance
We found that our standardized DMEK technique achieved equivalent percent endothelial cell loss at 6-months, whether the donor had fewer than 2300 cells/mm² or more than 2800 cells/mm². This suggests that tissue with lower ECDs does not have a higher propensity to lose endothelial cells as a result of DMEK surgery compared to donor tissues with higher ECDs. Higher donor ECDs, however, confer significantly higher 6 month ECDs. The clinical significance of the difference in 6 month ECD is yet to be determined. Long-term studies of DMEK graft survival are needed.

References

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