**Background**

Endothelial cell density is used by eye banks as a screening tool to determine suitability for transplant. Eye Bank Association of America standards require post-processing specular microscopy to ensure tissue quality for both DMEK and DSAEK. Surgeons rely on this information to make informed decisions about acceptance of tissue for their recipients. But how useful is this information, really?

**Methods**

A series of sixty donor tissues were prepared for DMEK surgery in an eye bank setting (Figure 1 for diagram of steps). An imaging analysis protocol was carried out according to Figure 2 to two specular microscopic images of the central endothelium were taken both before and after preparation and ECDs evaluated for a total of 345 unique images. Figures 3-5 show standard tissue imaging, analysis of method and tissue storage.

An eye bank technician analyzed each image using a center dot (CD) method and then averaged those values. Images were then masked and provided to the Cornea Image Analysis Reading Center (CIARC) for independent analysis by certified readers using the HAI variable frame (VF) method and a dual grading and adjudication process.1

**Results**

After DMEK preparation 80% (48/60) of post-preparation ECD values fell within a range of ± 300 cells/mm2 using the CD method and 82%(49/60) fell within this range using the VF method.

**Conclusion**

- There was no significant difference in ECD pre and post preparation using either method (VF and CD).
- While the difference was not significant, both methods detected an increase in ECD post-preparation.
- Small significant differences between methods of counting were found (VF was lower than CD).
- Diminished image quality was common in the post-preparation group (Figure 3).

**Clinical Significance**

- In this study, specular microscopy provided limited information about the health of the prepared DMEK graft. Limitations of specular microscopy are related to:
  - Sampling only a relatively small area of the graft.
  - Sampling limitations to the center region of the graft.
  - The inability to obtain a clear image due to the free floating DM which is separated from overlying stroma (Figure 4). Specular images from three different methods and comparing ECD before and after DMEK preparation may aid of tissue quality assessment. Methods such as vital dye staining with trypan blue are currently being explored to give surgeons the most accurate graft information possible. Specular image quality is currently improving with advances in DMEK preparation.

**Reference**


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**Disclosures**

None