

Reviewer's report

Title: Correlation of Anterior Segment Optical Coherence Tomography Measurements with In Vivo Graft Size Following Descemet Stripping Automated Endothelial Keratoplasty

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Reviewer: Marianne O Price

Reviewer's report:

This is an interesting article describing the use of software to quantify the dimensions of structures in the anterior chamber and the application to the sizing of DSAEK grafts. Following are suggestions for Essential Revisions.

1. The manuscript should state whether the ZAP software is commercially available and if it is, the authors should disclose a financial interest. If it is freeware, the authors should provide the site where it can be downloaded.
2. In the Abstract Conclusions, it is not clear why there is a higher chance of undersizing the EK graft in eyes with larger PCAL based on what has been reported in the Abstract. It would be better to say "This software may help surgeons determine the optimal DSAEK graft size based on preoperative ASOCT measurements of the recipient.
3. Please report how the mean graft thickness in Table 1 was measured.
4. In Results, it would be preferable to report R-squared throughout instead of switching from Rho to R-squared. R-squared is more intuitive because it represents the % of the total variance that is explained.
5. In the model for posterior graft arc length, please specify "recipient" age, sex, etc.
6. How do you explain that model? What does it mean? Why does it matter? Throwing in 4 extra variables did not increase the R-squared value that much over what it was with just trephine diameter. Simply adding in one more variable, recipient corneal curvature, would seem to provide a much better and more intuitive model.
7. Figure 5 can be deleted in the interest of space as it was clear from Methods that the surgeon tended to select graft size based on recipient HWTW.
8. In Table 2 the numbers are reported with too many significant figures. The ASOCT measurements are not accurate to 4 or 5 significant figures. In fact the Bland Altman plots suggest the measurements are accurate to about 0.1mm.
9. In Table 3, all the Ratios should be deleted in the interest of space. It is not intuitive what a correlation with a Ratio means and it is not explained in the text. Putting in too much information can obscure the main points you are trying to make.

10. Discussion, page 8: instead of saying "we are undersizing" in line 18, it would be better to say "the analysis showed we could have used larger grafts in eyes with larger posterior corneal arc lengths". You need to start out the paragraph by providing the rationale for why you think some grafts were undersized. For example, you could say something like: "Most of these grafts were performed for pseudophakic bullous keratopathy, where the recipient endothelium was completely dysfunctional, so replacement of as much endothelium as possible was desirable."

11. The paragraph starting in the middle of page 8 and continuing through page 9 should be rewritten to tighten it up and eliminate redundancy. For example, it says there is is no published information as to the optimal graft size in 2 places.

12. Page 9, line 14, it is important to explain that reference 26 was all Fuchs' dystrophy eyes, in which the central endothelium is dysfunctional but the peripheral endothelium is healthy so larger graft sizes are not needed. Those cases differ from your cases, in which most have dysfunctional peripheral endothelium.

13. Page 9, lines 15 and 16 mention slower subsequent cell loss with DSAEK vs. PK, but do not explain how that may relate to graft size. This should be explained.

14. Page 9, line 24, hyperopic shift is also related to the thickness gradient between the center and periphery of the graft. This should be added.

15. Figure 7 and the first 6 lines on page 10 should be deleted in the interest of space and maintaining focus. You didn't need the software to tell you that the surgeon used larger grafts over time - you already knew that he did. This extraneous information distracts from your main points.

Minor Revision: Tables 2 and 3 need to specify the units of measurement and provide the definitions of all abbreviations.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.