Reviewer’s report

Title: Side-View Cinematography for Observing Posterior Chamber Structures in a Closed Eye Cataract Surgery Porcine Model

Version: 1 Date: 3 January 2013

Reviewer: Ryan M Pedrigi

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SUMMARY AND MAJOR COMPULSORY REVISIONS

The authors present a model for viewing how cataract surgery may damage the posterior chamber structures (PCS) of the eye. While such models are important, it is unclear how much more understanding is gleaned from this model versus those already reported. The authors state (or, at least, imply) that their model offers two improvements: a “3-D view” of the PCS and a “closed-eye” approach. The 3-D view is presented in the work by Assia and Apple (1992) and, while the authors cite this study, they never explain why their visualization approach is an improvement to it (this comparison should be given). The second feature of the model, the closed-eye technique, appears to offer the opportunity to retain the IOP spikes that may be imposed during normal cataract surgery – this could be important and it is worth evaluating. However, the authors do not fully explore this point: there is no rigorous assessment of whether increased IOP during surgery actually has an adverse effect on the PCS or at what IOP damage would be expected to occur. Further, while zonular stresses are often mentioned, no quantification is given. Such evaluation would provide more motivation for using this model, thus dramatically improving the study.

Additional points:

1. The authors state that their model offers a “3-D view” of the PCS, but they image these structures with one camera at a single orientation. This approach would only provide a 2-D view because the structures are viewed from a single imaging plane. A 3-D view requires imaging the same structures with at least two camera orientations. The authors need to explain what they mean by 3-D versus 2-D views.

2. (Lines 228 – 230). The zonular fibers are a quite dense network around the lens equator, so this reviewer is not convinced that the trapping of fluorescein beads by this tissue indicates anything about the stresses of the fibers. Again, stress is a quantity that must be rigorously computed. Further, whatever stresses may exist could be more due to the accommodative state of the eye versus those imposed by surgery. Rewording or exclusion of this point is recommended.

3. (Lines 280 – 282). Similar to point 2, it is unclear how the trapping of beads in the zonules indicates a high zonular tension. The authors could provide empirical data quantifying the degree of bead accumulation as a function of IOP. Also, the
authors should indicate the size of the beads and how this compares to the size of bacteria to further support the idea that the zonules act as a filter, which seems to be a bit far-reaching.

MINOR COMPULSORY REVISIONS

4. (Lines 219 – 221). The authors state that “It is noteworthy that imaging of the stress to the zonular fibers during…”. Stress is a mathematical quantity that must be computed, so it cannot be “imaged”. Perhaps the authors mean “deformation”. Rewording is suggested.

5. (Lines 255 – 256). How is the comparison made of IOP elevation tolerance in this model versus whole eyes? This reviewer would expect a higher tolerance in whole eyes. Regardless, a citation is needed.

6. Another limitation of this study is that the eyes are not kept at a physiologic temperature. This point should be noted along with the author’s view of its effects.

DISCRETIONARY REVISIONS

7. (Lines 171 – 174). In the description of the 3 groups of eye sealing techniques, groups 2 and 3 are very similar, except that group 3 uses fresh eyes and allows 30 minutes of eye fixation versus 3. This point could be included to make this description more easily understood.

Level of interest: An article of limited interest

Quality of written English: Needs some language corrections before being published

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