Materials in the vitreous demonstrated under the operating microscope during cataract surgery and confirmed histologically

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The authors of the materials in the vitreous (MIV) article¹ thank Drs Grzybowski and Kanclerz for their comments.²

Grzybowski and Kanclerz stated that 'the authors claimed that this was the first proof of evidence that some materials move from anterior chamber to anterior vitreous during uneventful phacoemulsification.' The authors are not aware that any other publication has confirmed the nature of these materials. The morphological appearance of the MIV was easily determined under the operating microscope in all cases, with no need for slit illumination, not just the two histologically confirmed cases. In those two cases, the MIV was histologically assessed, and found to be identical to lens material found in the Fluid Management System bags, thus confirming the nature of the MIV.

Grzybowski and Kanclerz stated that they believe that 'the methodology used is questionable'. The methodology described was used only in order to surgically address the fact that the eye had become 'hard' in the two cases mentioned, as per the established management of the 'Acute intraoperative rock-hard eye syndrome' (AIRES)³

Grzybowski and Kanclerz state that the AIRES syndrome is 'not a standard and normal situation during cataract surgery'. The authors agree, but fluid irrigation of various types occurs at all stages in phaco surgery - hydrodissection, phaco itself, irrigation/aspiration of cortex, and later of the viscoelastics. The authors have published on this topic previously.⁴ The fact that lens MIV has now been identified shows that there must be a pathway from the anterior chamber to the posterior segment.

Histologically, the only theoretically possible location of this conduit is via the zonular apparatus. There cannot be 'an additional route of the aqueous into the Berger's space/anterior vitreous'. The authors do not in any way deny that irrigation could have contributed to movement of fluid through this conduit. The cases of AIRES which the authors and their surgical colleagues have encountered over the years, and the high percentage of cases (50.3%) in the MIV study, attest to the presence of this conduit in normal eyes. The histology obtained in the MIV study confirms what surgeons already know, although 'proof' may be too strong a term. It may be much more difficult to isolate pigment, air or viscoelastic from the vitreous, not only because AIRES is rare, but because these types of MIV may disperse or dissolve upon irrigation.

As the images in the MIV article demonstrate, there is a readily identified and distinct morphological difference between different types of MIV. They are quite different from 'concentrations of the cortical vitreous'. Each has different characteristics in shape, colour and light transmission. Though the authors agree that the nature of MIV is ultimately a subjective evaluation, it is based on detailed observation of their presence in thousands of cases over the authors' surgical careers, and formal documentation of hundreds of cases in the MIV study. The authors maintain that to obtain a sample of the anterior vitreous for definitive histological proof without an intraoperative surgical indication would be inappropriate.

REFERENCES

1. Kam AW, Chen TS, Wang SB, et al. Materials in the vitreous during cataract surgery: nature and incidence, with two cases of histological confirmation. *Clin Experiment Ophthalmol* 2016: (in press).

2. Grybowski A, Kanclerz P. Materials in the vitreous during standard cataract surgery: concept not verified yet. *Clin Experiment Ophthalmol* 2016: (in press).
3. Lau OC, Montfort JM, Sim BW, et al. Acute intraoperative rock-hard eye syndrome and its management. *J Cataract Refract Surg* 2014; **40**: 799-804.
4. Wang SB, Quah XM, Amjadi S, et al. Hydropolish: a controlled trial on a technique to eradicate residual cortical lens fibers in phacoemulsification cataract surgery. *Eur J Ophthalmol*; **25**: 571-4.

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