

**Sir,  
Response to 'Primary surgical posterior capsulotomy during phacovitrectomy'**

We would like to thank Alexander and Luff<sup>1</sup> for their interest in our article.<sup>2</sup> Their described technique for primary surgical capsulotomy during phacovitrectomy is an interesting approach. We find that the ability to remove the anterior hyaloid and visualisation of the fundus during or after phacovitrectomy due to capsular opacification are rarely an issue. When it does later develop, management with Nd:YAG capsulotomy is usually straightforward.

**Conflict of interest**

The authors declare no conflict of interest.

**References**

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*Eye* (2015) **29**, 591; doi:10.1038/eye.2014.304; published online 9 January 2015

**Sir,  
Transient retinal artery occlusion during phacoemulsification cataract surgery**

I read with interest the article by Yusuf *et al*<sup>1</sup> on transient retinal artery occlusion (TRAO) during cataract surgery.

I would like to highlight an avoidable but often overlooked cause of TRAO during cataract surgery. After administration of local anaesthesia, some surgeons or anaesthetists use a Honan balloon or similar device to compress the eye, so as to spread the anaesthetic and reduce the incidence of positive vitreous pressure and its attendant complications.<sup>2</sup> The use of such devices is often poorly documented in the case notes, and if applied incorrectly, they may cause the vitreous pressure to exceed the central retinal artery pressure. This can lead to a total interruption of the blood supply to the retina that only resolves after the globe has decompressed itself with aqueous drainage. Instances of this type of TRAO have been described following intravitreal injections (especially if 0.1 ml or more of fluid is injected), scleral

buckling surgery, and when patients are placed in the prone position during neurosurgical procedures.<sup>3,4</sup> As will all neuronal tissues, if circulation is not restored within a few minutes, irreversible hypoxic damage to the retina will follow. The amount of time the retina can survive with complete interruption to its blood flow is not known and may vary between patients but is thought to be no more than 5 min.<sup>5</sup> A different situation exists in thrombo-embolic central retinal artery occlusions, where there may still be some blood flow, albeit small, as evidenced by delayed filling on fundus fluorescein angiography. In these situations, the retina may survive for several hours.

The judicious use of compressive ocular devices for local anaesthesia requires that clinicians pay due attention to the pressure applied and the duration of compression. The intraocular pressure may, however, be difficult to gauge. As a precautionary measure, clinicians would be well advised to release such devices every 60–90 s to ensure there is adequate circulation to the retina and avoid irreversible ischaemic damage.

**Conflict of interest**

The author declares no conflict of interest.

**References**

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*Eye* (2015) **29**, 591; doi:10.1038/eye.2014.322; published online 16 January 2015

**Sir,  
Reply: Transient retinal artery occlusion during phacoemulsification cataract surgery**

We thank Mr Ahfat<sup>1</sup> for the comments offered in response to our report of a series of patients with transient retinal artery occlusion (TRAO) occurring during phacoemulsification cataract surgery.<sup>2</sup>

Ocular compression devices were not used in any of the patients described in our series. However, we agree that consideration of potential mechanisms that may logically underlie TRAO is important to identify preventative strategies. Conceptually, any peri-operative manoeuvre that elevates intraocular pressure (IOP) above ocular perfusion pressure (OPP) may produce retinal arterial hypoperfusion. This may be 'absolute' if the induced IOP elevation exceeds systolic OPP, or 'relative' if IOP exceeds diastolic OPP—for the duration throughout which the stimulus is applied.

Excessive ocular compression, high infusion pressures, or over-hydration of corneal wounds may all contribute to the risk of TRAO. IOP may exceed 85 mm Hg during nuclear fragment removal depending on flow rates and infusion parameters.<sup>3,4</sup> Newer-generation phacoemulsification technologies can maintain a target IOP<sup>5</sup> and protect OPP.<sup>4</sup> This may reduce the risk of TRAO when compared with phacoemulsification platforms that utilise gravity fluidics or fixed pressure irrigation systems.

Patient factors must be considered when evaluating candidate risk factors for TRAO. High diastolic systemic arterial pressures may be protective, maintaining OPP throughout the cardiac cycle despite peri-operative elevations in IOP. Conversely, carotid artery stenosis is associated with reduced ipsilateral OPP<sup>6</sup> and may risk TRAO in the context of relatively minor fluctuations in IOP.

TRAO may have a permanent impact on post-operative visual function despite technically uncomplicated phacoemulsification cataract surgery.<sup>2</sup> We encourage the clinicians to exclude TRAO in all patients presenting with unexplained post-operative visual loss. Improved detection and reporting of TRAO may enable a prospective case-finding study in which candidate patient risk factors and intra-operative manoeuvres may be identified. In the absence of such a study, associations may be suggested, but cannot be proven.

### Conflict of interest

The authors declare no conflict of interest.

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*Eye* (2015) **29**, 591–592; doi:10.1038/eye.2014.323;  
published online 16 January 2015