Author Response: Retinal Vein Pulsation Is in Phase with Intracranial Pressure and Not Intraocular Pressure

We appreciate the comments by Jonas et al. concerning our recent paper. It is worth noting that we were unable to measure the shape of the IOP curve; however, in general terms it has a more sine-wave-like shape than intracranial pressure (ICP) curves. ICP curves have a steep rising phase and more gentle but variable downward phase, being derived largely from the large arterial pulse characteristics. It is also worth noting that our ICP recordings measure intracranial cerebrospinal fluid (CSF) pressure and that we have made the assumption that it is transmitted with a similar pulse curve into the optic nerve subarachnoid space. It seems likely that just after diastole, as pressures are rising, the IOP is not rising as quickly as ICP and during this phase the pressure difference between IOP and CSF in the optic nerve subarachnoid space is reduced. From our earlier servo-null tissue pressure measurements in dogs, we know that retrolaminar tissue pressure pulse closely follows the CSF pressure pulse. The translaminal pressure gradient is dependent upon the difference between IOP and retrolaminar tissue pressure. As Jonas et al. postulate, the observed pulse relationship may reduce the energy requirement for retrograde axonal transport up the translaminar pressure cycle. We cannot predict the likely relationship during the downward phase, mainly because the ICP pressure curve varies greatly during this phase.

William Morgan
Christopher Lind
Samuel Kain

References

Citation: Invest Ophthalmol Vis Sci. 2012;53:6880. doi:10.1167/iovs.12-10943