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LETTER

Studies Utilizing Current Estimated CSF Pressure Equations Should Not Be Conducted and Published [Letter]

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Dear editor

We took interest in the recent article by Qian Wang and colleagues, "Prevalence of Retinal Vein Occlusions and Estimated Cerebrospinal Fluid Pressure: The Kailuan Eye Study."[1] We agree with the authors that CSF pressure, in particular the perioptic subarachnoid space pressure, is likely important in the development of many cases of retinal vein occlusions. However, we were troubled by the methodology employed by the study team. While we appreciate the mention of our study[2] that had found that formulae used to predict CSFP derived from clinical data were unable to accurately estimate CSF pressures, we were surprised that this formula was nonetheless used in the current study.

Even more troubling is that the reference given for the justification of the formula,[3] "eCSFP [mm Hg] = 0.44 * BMI [kg/m2] + 0.16 * DBP [mm Hg] – 0.18 * Age [years]," does not in fact explain its derivation. The Xie study from Critical Care used patient-specific anatomic measurements derived from MRI data in order to estimate CSFP, an important factor that has been excluded from the current study's equation.

CSF pressure is not static. It varies over time as a function of the production and resorption rate of CSF and body posture. A formula that is derived top down from preexisting data (such as BMI and DBP) is far from representing the complexity of CSF dynamics, including CSF pressure. Neither is CSF pressure and composition homogeneous throughout all CSF-containing spaces. Further, even if it could reflect the appropriate CSF pressure in the lumbar spine region, it is purely speculative to assume that this measurement could be extrapolated to the pressure within the subarachnoid space of the optic nerve. Several studies in patients with papilledema as well as normal tension glaucoma demonstrated "comparted" optic nerve sheaths,[4] a finding that cautions even the assumption that the pressure measured at the lumber site reflects the pressure in the perioptic space. Thus, to assume that all CSF spaces connect via a linear continuum can be quite misleading.

In conclusion, we are strongly supportive of research that will further the understanding of the cerebrospinal fluid's role in ophthalmic disease. However, bad data are worse than no data.

We would have expected that the limitations of such a study should have been clearly explained to the reader who may not be familiar with this complex topic, and we discourage the use of unvalidated formulae for CSF and ophthalmic research.

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Disclosure

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