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Response to Letter to the Editor

Abhijit V. Lele, MBBS, MD, MS, FNCS^{1,2}, Arraya Watanitanon, MD³, Viharika Lakireddy, MBBS³, Crystalyn Clark-Bell, BS³, Anne Moore, BSN, RVT², Jerry J. Zimmerman, MD, PhD⁴, Randall M. Chesnut, MD², William Armstead, PhD⁵, Monica S. Vavilala, MD⁶

¹Department of Anesthesiology and Pain Medicine, University of Washington, Harborview Medical Center, Seattle, WA.

²Department of Neurological Surgery, University of Washington, Seattle, WA.

³Department of Anesthesiology and Pain Medicine, University of Washington, Seattle, WA.

⁴Department of Pediatrics, Seattle Children's Hospital, University of Washington, Seattle, WA.

⁵Department of Anesthesiology and Critical Care, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA.

⁶Harborview Injury Prevention and Research Center, Department of Anesthesiology and Pain Medicine, Harborview Medical Center, Seattle, WA.

We read with interest the letter to the editor by Tremlett and Kanthimanthan (1) in response to our previously published article (2). The authors raise an important question regarding the utility of screening and continuous estimation of cerebral autoregulation in routine neurocritical care after traumatic brain injury (TBI). As there are no comparative trials of methods that assess cerebral autoregulation, we cannot comment on the utility of techniques that continuously examine cerebral autoregulation versus those that document impairment once a day. Few modalities assess the ability of the cerebral vasculature to adapt to changes in blood pressure and regardless of technique, cerebral autoregulation has been shown to be impaired after TBI by all methods (3–5). Moreover, there may be no need for continuous measurement if a daily signal is sufficient, especially since real time measurements do not result in real time treatments using methods such as PRx, which largely remains a research tool. What is one important distinguishing feature of provocative tests of cerebral autoregulation compared to the PRx method is that the latter passively estimates changes in CBF, whereas tilt tests, (6) pharmacological tests (7) and the transient hyperemic response ratio method (8) directly examine changes in CBF measures in response to changes in pressure and flow stimuli when cerebral metabolic rates and hematocrit remain stable.

While routine assessment for cerebral autoregulation status after pediatric TBI is aspirational and desired based on studies that document poor outcomes (3, 4) with impairment early after TBI, published guidelines for pediatric TBI care (9) do not address this topic. Also, it is unclear what proportion of institutions have the ability to provide testing for cerebral autoregulation status, leading to relatively infrequent use of both transcranial Doppler ultrasound and PRx based approaches. Yet, we agree that gathering cerebral autoregulation data that would allow us to understand the prevalence, and magnitude of impaired cerebral

autoregulation coupled with technological advances that provide a reliable, reproducible, minimally invasive or non-invasive method of testing, may allow us to routinely assess cerebral autoregulation across TBI severity. Unfortunately, despite decades of documentation of impaired cerebral autoregulation after TBI, penetration of this test remains low and is a missed opportunity to further examine and improve outcomes after TBI.

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