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Commentary: Can ultrasound contribute to our understanding of postoperative delirium?

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CENTRAL MESSAGE

Additional studies are needed to more confidently understand any link between ultrasound-derived indices of RV dysfunction and potential encephalopathy from cerebral venous congestion.

In this issue of the *Journal*, Beaubien-Souligny and colleagues¹ expand on their previously described theory² that postoperative delirium may be the result of a syndrome that they describe as a “congestive encephalopathy.” That is, these events may be related to cerebral venous congestion that results from right ventricular (RV) dysfunction and its consequence of elevated right-sided venous pressures. This venous congestion can then lead to interstitial edema and increased intracranial pressure, both of which can potentially lead to impaired cerebral function and even a reduction in cerebral blood flow and all its adverse sequelae (eg, cerebral ischemia). This follows similar work by this group examining the impact of elevated venous pressures on other organ dysfunction, including acute kidney injury.³ Along with this, they have extensively studied the means to diagnose the root cause of these various congestive organopathies by using Doppler ultrasonography of the portal vein. Indeed, the presence of portal vein pulsatility appears to be an easy to interrogate and reliable indicator of RV dysfunction.⁴

In attempting to uncover a unifying cause for these various forms of organ dysfunction, they have put forth an interesting potential theory. However, additional studies will be needed to more confidently determine the mechanistic role that these factors may play. Indeed, it is just as easy to consider that this venous congestion may just be epiphenomenal and not at all directly related. That is, those who are “sicker” after surgery or have major significant comorbidities (and who would not agree that significant RV dysfunction is in that category) may simply have

more delirium due to their overall medical conditions and not those directly related to RV dysfunction per se. The complexities of the brain (and other organs) make it challenging to believe that there is one unifying cause (ie, congestive encephalopathy) for the cerebral dysfunction (delirium) that is seen in this setting. This line of investigation certainly warrants pursuing, but this point should be interpreted with balanced caution. These experts have extensive experience with the use of ultrasound to investigate RV dysfunction and its vascular sequelae (ie, portal vein pulsatility⁵), so it is logical for them to look for links between the findings of these readily available tools and other diagnoses. However, just as a “hammer considers everything a nail,” it is logical for ultrasound experts to focus on ultrasound-related etiologies for all the patient’s ills. The evidence is at best indirect and should not detract from other efforts to determine the causes of, and potential solutions for, this seemingly ever-present problem in patients after cardiac surgery.

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