

## **SUPPLEMENT (COVID19 Updates in Neurocritical Care):**

Associations emerged early between COVID19 and several ABIs including encephalopathy, delirium, encephalitis, Guillain-Barre syndrome, and strokes (ischemic, hemorrhagic, cerebral venous sinus thromboses[CVST]). Initial reports were small-modest sized, retrospective, single-center and with limited controls. The pathobiology of COVID19-related hypercoagulability and cytokine release/inflammation plausibly has neurological consequences. Autopsy reports suggest that direct viral invasion of the brain is rare. Recent multicenter retrospective reports suggest higher mortalities in patients with both COVID-19 and intracranial hemorrhage (ICH) or subarachnoid hemorrhage (SAH), with disparities based on comorbidities and race/ethnicity<sup>1</sup>. Ongoing global/multicenter epidemiological initiatives are vital to identify the incidence of COVID19-related complications, risk factors, and the burden of resource constraints on healthcare delivery for non-COVID19-related ABI.

The Center for Disease Control published 12-cases of CVST with thrombocytopenia in white women 6-15 days after the Ad26.COV2.S vaccine<sup>2</sup>. Eleven had positive heparin-platelet factor 4 antibody ELISA results (eight had subsequent negative functional testing). Headache was a common symptom. American Heart Association/American Stroke Association (AHA/ASA) leadership emphasized the 8-10X higher risk of CVST with COVID19 infection vs post-vaccine<sup>3</sup>. Since asymptomatic vaccine recipients are not tested, definitive associations with PF4 antibodies/thrombosis/thrombocytopenia cannot be established. In cases of CVST, thrombosis-thrombocytopenia-syndrome, or vaccine-induced immune thrombotic-thrombocytopenia, non-heparin anticoagulation is advised.

## Bibliography

1. Ravindra VM,Grandhi R,Delic A,Hohmann S,Shippey E,Tirschwell D,Frontera JA,Yaghi S,Majersik JJ,Anadani M, et al.,Impact of COVID-19 on the hospitalization, treatment, and outcomes of intracerebral and subarachnoid hemorrhage in the United States.*PLoS One*.2021;16:e0248728.
2. See I,Su JR,Lale A,Woo EJ,Guh AY,Shimabukuro TT,Streiff MB,Rao AK,Wheeler AP,Beavers SF, et al.,US case reports of cerebral venous sinus thrombosis with thrombocytopenia after ad26.cov2.s vaccination.*JAMA*. 2021.
3. American Heart Association/American Stroke Association Stroke Council Leadership. Diagnosis and Management of Cerebral Venous Sinus Thrombosis with Vaccine-Induced Thrombotic Thrombocytopenia.*Stroke*.2021.