

In Reply: Incidence, Characteristics, and Outcomes of Large Vessel Stroke in COVID-19 Cohort: An International Multicenter Study

To the Editor:

We thank authors¹ for their interest in our work,² and for raising important points about the etiopathogenesis of acute ischemic stroke (AIS) in COVID-19.

The majority of the patients in our study presented to the emergency room (ER) with strokes and were found to have COVID-19 on testing as per hospital protocols at this time in the pandemic. While the authors astutely point out that the temporal relationship in absolute terms cannot be confirmed, the rapidity with which testing is performed on arrival is such that it can be safely assumed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection preceded acute ischemic stroke (AIS) in most cases. It is commonly accepted that AIS and even perhaps large vessel occlusion (LVO) were missed in patients on ventilators for whom proper neurological assessment was not possible and thus we do mention this fact in the limitations section of our study.³ This study does not capture the average lag time between SARS-CoV-2 infection and onset of AIS, which is another attribute that eludes the medical community, particularly in those who are symptomatic until the time of a stroke.

We agree with authors that the complete pathophysiology of COVID-19 and AIS is not understood. As longer-term neurological follow-up of COVID-19 patients becomes available, it is increasingly clear that manifestations are myriad, including memory loss, dementia, fatigue, and many others.⁴ We expect that this will become even clearer as more follow-up becomes available.


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Disclosures

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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REFERENCES

1. Mass-Ramirez SM, Lozada-Martínez ID, Agrawal A, et al. Letter: incidence, characteristics and outcomes of large vessel stroke in COVID-19 cohort: an international multicenter study [published online ahead of print: 2021]. *Neurosurgery*. doi: 10.1093/neuros/nyab243.
2. Khandelwal P, Al-Mufti F, Tiwari A, et al. Incidence, characteristics, and outcomes of large vessel stroke in COVID-19 cohort: an international multicenter study [published online ahead of print: March 18, 2021]. *Neurosurgery*. doi: 10.1093/neuros/nyab111.
3. Tiwari A, Berekashvili K, Vulkanov V, et al. Etiologic subtypes of ischemic stroke in SARS-CoV-2 patients in a cohort of New York City hospitals. *Front Neurol*. 2020;11:1004.
4. Pleasure SJ, Green AJ, Josephson SA. The spectrum of neurologic disease in the severe acute respiratory syndrome coronavirus 2 pandemic infection. *JAMA Neurol*. 2020;77(6):679-680.

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