The Global Impact of the COVID-19 Pandemic on Stroke Care and Mechanical Thrombectomy Volumes

Drs. Raul G. Nogueira and Thanh N. Nguyen discuss findings of their study on how the COVID-19 pandemic affected stroke care in an international sample of patients diagnosed with COVID-19, stroke, and mechanical thrombectomy.

The study published in *International Journal of Stroke* was the largest sample to date reporting on the concomitant diagnoses of stroke and SARS-CoV-2 infection.[1] Can you summarize your goals when initiating and designing this trial?

Our goals were to better understand the relationships between the effect of the COVID-19 pandemic on stroke and mechanical thrombectomy volumes on a global level. We were interested in learning if early regional reports of declines in stroke volume would be representative on a global level and whether such declines would be present in regions with low COVID-19 burden. We were also interested in finding out whether access to hospital care could explain these declines.

How would you summarize the key findings?

There was a global decline in stroke hospitalizations, intracranial hemorrhage admission volumes, and mechanical thrombectomy procedures associated with the first wave of the COVID-19 pandemic.

What factors are most likely to have caused the declines observed in stroke hospitalization, mechanical thrombectomy procedures, and intracranial hemorrhage admission volume when comparing the pandemic months with the months prior, as well as the more pronounced decline when comparing the pandemic months with the 3 months prior than with the same months in 2019?

Several factors likely contribute to the declines observed in stroke hospitalization and mechanical thrombectomy procedures. As cited by many papers, patients who have milder symptoms may be fearful of presenting to the hospital for fear of contracting SARS-CoV-2 infection. As people are maintaining physical distancing, wearing masks, and performing more rigorous hand hygiene, a reduction in exposure to other common viruses that may play a role in triggering vascular events may have also reduced stroke risk.

It is conceivable that the lockdown may have had a protective effect in cerebrovascular events, as people may adopt healthier habits such as better diet and medication compliance. This hypothesis has also been described in the cardiology literature.

Although the past year has seen several studies on the associations between COVID-19 and stroke, yours is unique in that it looked at the extent to which the collateral damage of COVID-19 has affected stroke systems of care globally. What factors contributed to the geographic variations you saw, such as in the reductions of stroke hospitalization and mechanical thrombectomy procedural volume?

The main factor that contributed to the geographic variations was the timing at which the pandemic hit each country or continent. As the pandemic originated

in Wuhan, China, we noted significant declines in stroke hospitalizations and thrombectomy volumes early on in China, mainly in February 2020, which had a similar ripple effect in other neighboring countries such as South Korea, Japan, and Vietnam, which had a low burden of COVID-19.

As the pandemic shifted to Europe, namely Spain and Italy, we then noted early stroke and mechanical thrombectomy declines in these countries in early March. As the pandemic shifted to the outskirts of North America, we later noted stroke or mechanical thrombectomy declines at its nadir in April during this first wave of the pandemic.

If you were to include data on the timing or intensity of social distancing policies and lockdown restrictions in different regions, how might the results be different?

As lockdown and social distancing policies had significant variation within a country or region, we evaluated for the intensity of COVID-19 burden by looking at the peak of new diagnosis of COVID-19 by country. When controlling for these different peaks, our results maintained significance of the decline in stroke hospitalization and mechanical thrombectomy volumes.

What did you learn about the nature of stroke in patients with COVID-19?

In this global data set, of approximately 54,000 patients who were hospitalized with COVID-19, there was a 1.5% rate of stroke. Stroke is common, COVID-19 is common, and the intersection of the two entities was estimated at 1.5%.

How consistent are the trends seen in the study with what you've seen in your personal experience throughout the pandemic?

The trends seen in this global study (particularly the first wave of the pandemic during lockdown) mirror what was seen regionally in the Boston area. It was eerily quiet on the stroke and neurointerventional service not only in the Boston hospital but in many hospitals in the area. As the lockdown eased, there was a gradual return of stroke admissions and large vessel occlusion (LVO) stroke patients to our services.

You have now confirmed a significant global decline in mechanical thrombectomy and stroke admissions during the pandemic, further adding to the devastation COVID-19 has caused. With this knowledge, how do we move forward in terms of both raising patient awareness and ensuring access to and quality of stroke care as we continue through the pandemic?

Raising public awareness with stroke education and access to stroke care is a multipronged approach. It would be important to continue to educate the public via the media on the importance of stroke symptoms and signs and to seek medical care early for treatments that may reverse the patient's stroke symptoms or prevent further stroke events. We also need to reassure the public that every cautionary measure (personal protective equipment, rigorous hand hygiene, testing for COVID-19) is being implemented in the hospital and outpatient care setting to prevent SARS-CoV-2 transmission to new or existing patients.

Neuroscience teams needed to revisit their workflow stroke protocols to ensure that the team members were well protected when evaluating a patient with a stroke code, yet maintain efficiency of stroke workflows in an effort to meet benchmark times without compromising on quality of stroke care.

Hospital administrators and hospital leadership also need to be informed of the importance of maintaining access to emergency stroke care, particularly for life-saving treatments such as mechanical thrombectomy. In the event that a hospital is overwhelmed with COVID-19 patients (as was our hospital in Boston in the first wave), discussions with regional hospitals to help shift patients to other centers regionally could be entertained in order to preserve emergency stroke care access. We need to think of creative solutions to maintain access to vital emergency stroke care or mechanical thrombectomy. For example, repatriation of stroke patients has long been practiced in Dublin. As patients recover postprocedure, one can potentially return the patient to the referring primary stroke center from which they were referred.

If the global decline of stroke hospitalizations was a reflection of the overall decrease in stroke incidence (including patients who were evaluated in the outpatient setting or staying at home with their stroke), this could be interpreted as positive news. Unfortunately, even with this possible decrease in overall incidence, many reports have already noted worse outcomes in patients with COVID-19 and stroke compared to patients without COVID-19.

Now that we're a year into the COVID-19 pandemic, what insights have you gained in terms of stroke preparedness for any future public health crises?

We learned that health care teams are better prepared in stroke codes, triaging patients whether in

the emergency department or outside hospitals for COVID-19–related symptoms and testing. COVID-19 testing is now becoming as innate as ordering a CT of the head for stroke workup.

Recommendations from societal guidelines on stroke preparedness we had made early on in the pandemic may not ring true. For example, we initially advocated for patients with suspected or confirmed COVID-19 to be treated in negative pressure rooms. We have moved away from this model.

Some groups advocated for early intubation of stroke patients with LVO undergoing mechanical thrombectomy who were under investigation for COVID-19 to avoid emergency intubation in the angio suite. We are now learning that the conversion rate to general anesthesia is very low. Moreover, a recently published multicenter study showed a utilization of general anesthesia for thrombectomy in the setting of these new recommendations and this was associated with worse outcomes and higher mortality. ■

1. Nogueira R, Abdalkader M, Qureshi MM, et al. EXPRESS: Global impact of the COVID-19 pandemic on stroke hospitalizations and mechanical thrombectomy volumes. Int J Stroke. Published online January 18, 2021. doi: 10.1177/1747493021991652

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