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Letter to the Editor: Incidence of Acute Ischemic Stroke and Rate of Mechanical Thrombectomy During the COVID-19 Pandemic in a Large Tertiary Care Telemedicine Network



LETTER:

The 2019 novel coronavirus disease (COVID-19) pandemic has significantly impacted health care on a global scale. We report the incidence of acute ischemic stroke (AIS) and treatment of large vessel occlusion with mechanical thrombectomy in a large telemedicine university stroke network in Philadelphia, Pennsylvania, during the first 2 months of the pandemic.

AIS is a significant cause of morbidity and mortality in the United States and worldwide. Over the past decade, an increase in stroke awareness and education has led to rapid recognition of stroke symptoms and prompt delivery of medical and endovascular treatment. During the COVID-19 pandemic, implementation of social distancing and public fear have both contributed to fewer visits to emergency departments for acute neurologic symptoms. Moreover, despite efforts to introduce telemedicine visits in primary care practices, the medical management of common stroke risk factors, such as hypertension, diabetes, and hyperlipidemia, is less efficient. We retrospectively investigated important vital metrics related to stroke between March 15 and April 30, 2020, at a tertiary telestroke network at Thomas Jefferson University Hospital and compared these data with the previous 3 years. Key metrics included AIS admissions, telestroke consultations, thrombectomy procedures, and duration from diagnosis to intervention (door to groin time). The aim was to improve the understanding of the effect of the COVID-19 pandemic on stroke frequency and care.

Our outcomes (Table 1) demonstrate a significant decline in AIS admissions by 23% ($P = 0.001$) and telestroke consultations by 48% ($P = 0.001$) compared with previous years. In contrast, mechanical thrombectomy procedures increased by 50% ($P = 0.112$) during the same period. Notably, of all patients undergoing thrombectomy ($n = 24$), 6 were COVID-19-positive, constituting 25% of all patients undergoing thrombectomy, which is significantly higher than the expected frequency (incidence of COVID-19 is 1.1%). Lastly, there was no significant delay in diagnosis to intervention (493 minutes vs. 544 minutes, $P = 0.401$). The precipitous decrease in AIS admissions and telestroke consultations may be a consequence of patients not reporting neurologic manifestations owing to the fear of contracting the virus by visiting the emergency department. Also, social distancing may have contributed to lack of detection of neurologic changes by family members, especially in elderly patients. Such outcomes are consistent with previous reports by the World Stroke Organization (50%–70% decline in AIS admission) and the experience of cardiologists from the United States (38% decrease in cardiac catheterization laboratory ST-segment elevation myocardial infarction activations).^{1,2}

The higher incidence of patients with COVID-19 in the overall stroke group can be supported by recent theories that systemic COVID-19 may contribute to a hyperthrombotic state and increase the risk of AIS.^{3,4} This is additionally supported by the fact that the thrombus burden observed during mechanical thrombectomy is significantly higher than historical controls. Of the 6 patients with COVID-19, 4 had tandem occlusions or multiple arterial occlusions (67%) compared with historical controls in our stroke series of 15%.

National and worldwide efforts to increase preparedness and hospital efficiency during the pandemic are reflected on the overall lack of significant change in diagnosis to treatment time. Therefore, based on the undying efforts of frontline medical personnel, patients with AIS may still be able to receive standard of care for medical and interventional treatment. In our series, despite the need for extra precautions, including COVID-19 rapid testing and personal protective equipment, and the decrease in number of health care staff, we did not observe a significant delay to intervention compared with prior years.

Social distancing during times of a pandemic has proven to be efficient in controlling spread of the virus and flattening the contagion curve. However, public fear and anxiety can affect prompt diagnosis and treatment in acute medical conditions, such as AIS and ST-segment elevation myocardial infarction. To address the public concerns of seeking medical care, an increase in awareness of hospital safety measures toward prevention of nosocomial spread of COVID-19 could be helpful. In addition, recent social media and network campaigns underline the importance of heeding the signs and symptoms of AIS and seeking immediate medical care. Continuous medical training and critical updates on the pandemic and preventive strategies will improve treatment of AIS during this period.

Hospitals are adjusting and allocating resources to manage patients safely without increasing the risk of infection. The American Heart Association/American Stroke Association, Society of Neurointerventional Surgery, and other health organizations have published guidelines to facilitate optimal patient safety and stroke care.^{5,6} Global implementation of telemedicine networks, especially in the treatment of AIS and ST-segment elevation myocardial infarction, are of paramount importance in the prompt diagnosis of patients with these critical conditions, while limiting the need to visit the emergency department. Continuous medical updates and organized efforts at national and international levels are required to succeed in the management of patients with stroke during times of global health crisis.

CRedit AUTHORSHIP CONTRIBUTION STATEMENT

Ahmad Sweid: Conceptualization, Investigation, Formal analysis, Writing - original draft. **Pascal Jabbour:** Formal analysis, Writing - review & editing. **Stavropoula Tjoumakaris:** Conceptualization, Formal analysis, Writing - original draft, Writing - review & editing, Supervision.

Table 1. Frequency of Telestroke Consultations, Acute Ischemic Stroke Admission, and Mechanical Thrombectomy

Variable	2017, 2018, 2019		2020		P Value	Change	% Change
	March 15–April 30*	Total	March 15–April 30	Total			
Telestroke consults	202	616	106	496	0.001†	–96	48
AIS admission	91	219	70	257	0.001†	–21	23
MT procedures	16	31	24	69	0.112	8	50
OTG, minutes	493	16	544	24	0.401	51	10

consults, consultations; AIS, acute ischemic stroke; MT, mechanical thrombectomy; OTG, onset to groin duration.
 *Mean value.
 †Significant value ($P \leq 0.05$).

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