

Stroke in Young with Coronavirus Disease 2019 (Covid-19), a Case Report during Pandemic

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Abstract

Background: COVID-19 (Coronavirus Disease 2019) infection ranging from mild disease to severe life-threatening acute respiratory distress syndrome (ARDS) and severe pneumonia. Severe infections were reported to have multiple neurological complications in 36% of patients, neurological complications like peripheral neuropathy and encephalitis and cerebrovascular disease are more reported recently.

Recent Updates: Case series at one hospital in New York, five cases of large-vessel stroke in patients younger than 50 years of age, two of them don't have vascular risk factors, their deficits were severe, all patients had elevated C-reactive protein and three had significant elevated D-dimer levels.

Case Presentation: We are reporting a patient who had cerebrovascular complication diagnosed 3 weeks after the onset of respiratory illness, CT brain (computed tomography scan of brain) showed multiple subacute embolic infarcts, the larger one in the left hemisphere, CT angiogram revealed large left ICA (internal carotid artery) and MCA (middle cerebral artery) tandem occlusion, immediate anticoagulation was started low molecular weight heparin to reduce the risk of thrombotic disease.

Conclusion and Future Direction: The apparently high incidence of cerebrovascular disease in patients with COVID-19, with predominantly large vessel disease and markers of a highly prothrombotic state suggest a causal relationship, and the fact that most stroke patients have other risk factors, mean that it is hard to be sure about causation, therefore case control studies are needed.

Keywords: *Stroke; Young; COVID-19; Thrombosis; Anticoagulation*

Introduction

The pandemic of COVID-19, affected millions of people worldwide, with over 300,000 deaths to date [1], the typical symptoms of COVID-19 are fever, cough, anorexia and diarrhea, ranging from mild disease to severe life-threatening acute respiratory distress syndrome (ARDS) and severe pneumonia [2]. Severe infections were reported to have multiple neurological complications in 36% of patients [3], mostly peripheral neuropathy and encephalitis [3,4], also recent literature reported multiple cases series from China, Italy and United states of cerebrovascular complications associated with severe COVID-19 infection [5-7], most neurologic manifestations occurred early in the illness (the median time to hospital admission was 1 - 2 days) [3]. However, cerebrovascular complications occurred later at a median of 10 days after the onset of respiratory illness [7,8], Most patients were older than 60 years, and many had known risk factors for cerebrovascular disease, like hypertension, diabetes, dyslipidemia, and coronary artery disease [5,6,8], younger stroke patients have also been reported, recent case series at one hospital in New York [7], five cases of large-vessel stroke in patients younger than 50 years of age, two of them don't have vascular risk factors, here we report severe cerebrovascular complication, multiple embolic ischemic stroke in young patient without vascular risk factors and who was admitted to the critical care unit with severe respiratory illness (ARDS) that required intubation, the testing RT-PCR (Reverse transcription polymerase chain reaction) was positive on throat swab for COVID-19.

Case Presentation

A 46 years old man, he was previously healthy with no obvious vascular risk factors. On 28th April 2020 he presented to the emergency department with symptoms of fever, cough and shortness of breath for 2 days duration. Chest x ray showed bilateral diffuse infiltrates, the RT-PCR testing was positive on throat swab for COVID-19. He was admitted to the COVID-19 designated ward where he required high-flow oxygen therapy. Five days later, the patient was transferred to critical care unit where he was intubated due to decreased oxygen saturation and breathing difficulty. He was treated with Meropenem, Linezolid and Azithromycin. His course in ICU was complicated by development of sepsis, sputum culture showed *Enterobacter cloacae* and antibiotic was changed according to sensitivity and he required inotropic support. After 3 weeks of admission, respiratory status improved gradually, on the other hand, his consciousness was markedly impaired despite withdrawal from sedation. Upon neurological assessment, he was unresponsive, pupils were sluggish reactive to light, extraocular movement was impaired with gaze deviation to the left, motor examination showed hypotonia all over with no limbs movement to painful stimuli. Reflexes were diminished bilateral, plantar responses were extensor bilateral; his initial NIHSS (National Institutes of Health Stroke Scale) was 37. Brain CT revealed multiple subacute embolic infarcts, the larger one in the left MCA territory and CT angiogram showed large left ICA and MCA tandem occlusion, immediate anticoagulation was started low molecular weight heparin to reduce the risk of recurrent thrombotic disease. Routine stroke workup and laboratory investigations were done within 24 hours, Trans-thoracic echocardiogram was unremarkable, continuous cardiac monitor for 72 hours didn't detect any significant cardiac arrhythmias like atrial fibrillations, serum D-dimer was elevated: 30 mg/L FEU (normal range: 0 - 0.55) and C-reactive protein was high: 163 mg/l (normal range: 0 - 5). After few days, patient showed improvement in his level of consciousness, GCS (The Glasgow Coma Scale): 9/15, moving left upper and lower extremity more than right, repeated NIHSS was 29. He was continued on therapeutic dose of enoxaparin.

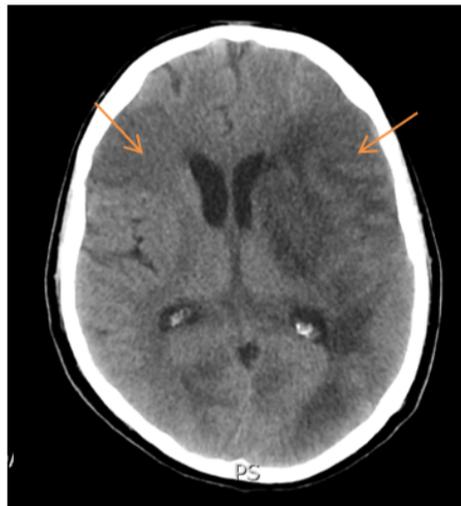


Figure 1: Axial brain CT shows evolution of hypodensity in the left fronto-parietal cortex, and subcortical structures at basal ganglia which represents subacute left MCA (middle cerebral artery) infarct, another incidental right frontal hypodensity was shown as well which represents subacute right MCA (middle cerebral artery) infarct.

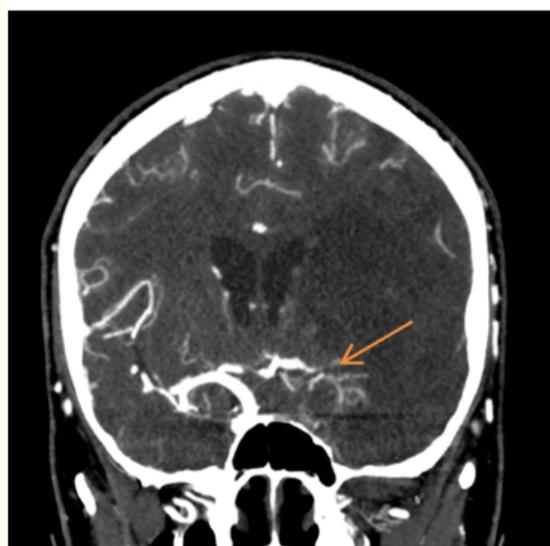


Figure 2: Coronal brain CTA (CT angiogram) shows large left ICA (internal carotid artery) and MCA (middle cerebral artery) tandem occlusion.

Discussion

Neurological complications induced by COVID-19 might be caused directly by the virus or by the body's immune responses to infection; reported case series of young stroke patients and COVID infection suggest that cerebrovascular complications associated with elevated D-dimer and C-reactive protein [3,5], which could explain the hypercoagulability leading to thrombus formation in the vessels, concomitantly, the endothelial dysfunction can potentially lead to vascular complications in the brain as described systemically [5].

The exact underlying mechanism behind these cerebrovascular complications is still to be determined. Severe bacterial or viral infections have been known to cause strokes by increasing the risks for cardioembolic as well as arterio-arterial embolic events [9,10].

In our patient, cerebrovascular complication diagnosed 3 weeks after the onset of respiratory illness, CT brain showed multiple sub-acute embolic infarcts, the larger one in the left hemisphere, CT angiogram revealed large left ICA and MCA tandem occlusion, immediate anticoagulation was started low molecular weight heparin to reduce the risk of thrombotic disease.

Blood D-dimer concentration was raised; it's nearly 30 folds higher than in those who did not have ischemic stroke, which may explain the multiple embolic infarcts.

Patients with severe COVID-19 infection are at risk for cardiac complications, such as arrhythmias, myocardial infarction, heart failure and myocarditis all of which likely contribute to the risk of ischemic stroke [11].

As clinicians we should consider the possibility of acute ischemic stroke in patients with severe COVID-19 infection, so that time-sensitive acute treatment such as thrombolysis or mechanical thrombectomy can be instituted if possible to reduce the burden of long-term disability and mortality.

Conclusion and Future Direction

According to the available evidence, the likely mechanism of stroke could be hypercoagulability leading to thrombus formation in the vessels. Other pathophysiology could be directly related to the infection or hypoxia.

For patients with stroke, clinicians should consider cerebral angiography, intracranial vessel wall imaging, and, if necessary, brain biopsy, looking for vasculitis.

The apparently high incidence of cerebrovascular disease in patients with COVID-19, with predominantly large vessel disease and markers of a highly prothrombotic state, suggest a causal relationship and the fact that most stroke patients have other risk factors, mean that it is hard to be sure about causation, therefore case control studies are needed.

Disclosures

No financial interest of conflict of interest.

Bibliography

1. Dong E., *et al.* "An interactive web-based dashboard to track COVID-19 in real time". *The Lancet Infectious Diseases* 20 (2020): 533-534.
2. Centers for Disease Control and Prevention. "How CDC classifies flu severity" (2020).
3. Mao L., *et al.* "Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China". *JAMA Neurology* 77.6 (2020): 1-9.
4. Varatharaj A., *et al.* "UK-wide surveillance of neurological and neuropsychiatric complications of COVID-19: the first 153 patients". *Social Science Research Network* (2020).
5. Li Y., *et al.* "Acute cerebrovascular disease following COVID-19: a single center, retrospective, observational study" (2020).

6. Lodigiani C., *et al.* "Venous and arterial thromboembolic complications in COVID-19 patients admitted to an academic hospital in Milan, Italy". *Thrombosis Research* 19 (2020): 9-14.
7. Thomas J Oxley., *et al.* "Large-Vessel Stroke as a Presenting Feature of Covid-19 in the Young, NY, USA". *The New England Journal of Medicine* (2020).
8. Beyrouti R., *et al.* "Characteristics of ischaemic stroke associated with COVID-19". *Journal of Neurology, Neurosurgery, and Psychiatry* (2020).
9. Boehme AK., *et al.* "Influenza-like illness as a trigger for ischemic stroke". *Annals of Clinical and Translational Neurology* 5.4 (2018): 456-463.
10. Boehme AK., *et al.* "Stroke risk factors, genetics, and prevention". *Circulation Research* 120.3 (2017): 472-495.
11. Brit Lon MD., *et al.* "Cardiovascular complications in COVID-19". *American Journal of Emergency Medicine* 38.7 (2020): 1504-1507.

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