

Rehabilitating a Case of Severe CVA in a Young Post COVID Patient: A Case Report

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Abstract

Patient:

A 31-year-old non-smoking female with no past medical history, medications, and history of alcoholism/substance abuse presents with a right middle cerebral artery (MCA) distribution subacute infarct.

Case Description:

The patient presented to the emergency department with an NIH stroke scale of 12 and chief complaint of headache, difficulty speaking, right-sided preferential gaze, and severe left-sided weakness. She had no significant history except for prior COVID-19 infection, which was managed on an outpatient basis. Of note, the patient was not placed on thromboprophylactic therapy after COVID-19 in accordance with current guidelines. Neurology workup revealed an evolving right MCA ischemic stroke. Transcranial doppler was suggestive of paradoxical embolization, but subsequent transesophageal echocardiogram revealed no patent foramen ovale. Further workup was negative for pulmonary arteriovenous malformation, carotid stenosis, and coagulopathy testing was unremarkable. This cryptogenic workup indicates a high suspicion for a COVID-19 related thromboembolic event. Patient was admitted to the rehab unit 17 days later.



Head CT (coronal view) showing right hyperdense MCA and developing cytotoxic edema with complete effacement of the right occipital horn

Background

- COVID-19 causes a hyper-inflammatory state and cytokine storm via the interaction of the virus' spike glycoproteins and angiotensin-converting enzyme-2 (ACE2) receptors, resulting in deleterious vascular endothelial insult.
- There is a clear association between cerebrovascular disease and COVID-19, although whether this association is causal or incidental is unknown.
- In a retrospective cohort study of 47,780 patients, nearly a third of individuals discharged from hospital after COVID-19 had increased rates of multiorgan dysfunction compared with the expected risk in the general. These rates were not confined to the elderly and not uniform across ethnicities.
- The disease is still poorly understood in the context of short and long term complications after hospitalization
- Per 2021 NIH COVID-19 treatment guidelines, there is still insufficient data to safely recommend either for or against the use of thromboprophylaxis after an COVID-19 infection

Hospital Course

- **1/10:** Patient first presented to ED with: severe headache, left sided weakness, slurred speech, right gaze, and left neglect.
 - Patient reports history of COVID-19 infection 3 months prior managed at home
- **1/13:** Patient became lethargic, CT revealed an evolving right MCA infarct with increasing cytotoxic edema and regional mass effect; Cerebral edema managed with IV mannitol
 - **Head CT:** Hyperdense MCA suggesting acute ischemic stroke
 - **MRI Brain without Contrast:** No hemorrhagic transformation
 - **CT Angiography and CT Angiogram:** Partial occlusion of distal M1 and M3 segments with distal emboli
 - **Neck CT Angiography with Contrast:** No significant stenosis or occlusion of extracranial carotid or vertebral arteries
 - **US Lower Extremity Doppler:** No lower Extremity DVT
 - **Transcranial Doppler:** Positive embolus detection test suggestive of patent foramen ovale (PFO)
 - **Transesophageal Echocardiogram:** Ejection Fraction 55-65%, normal size, normal systolic function, negative PFO
 - **Chest XR:** No radiographic evidence of pulmonary embolism
 - **Chest CT Angiogram with Contrast:** No active intrathoracic pathology
 - **Hypercoagulable Profile and Autoimmune Panel:** Values within normal limits
- **1/27:** Admitted to Acute Rehabilitation
 - Significant physical exam: Lower left extremity (LLE) strength grossly 0/5, Lower upper extremity (LUE) strength grossly 0/5, left hemiparesis, ankle clonus ~12 beats, not sustained, spasticity MAS 2 on left knee
 - **Barriers to Care:**
 - Migraine, depression, left neglect, LLE hemiparesis, LUE hemiplegia, impaired proprioception of LLE, decreased activity tolerance and endurance
- **2/16:** Discharged home with outpatient PT, OT, ST services. Family training completed. Discharge equipment: manual wheelchair, small base quad cane, and shower chair

Admit vs Discharge CARE Scores

Functional Activity	Admission Status	Discharge Status
Toilet Hygiene	Dependent (1)	Supervision/Touch (4)
Toilet transfer	Dependent (1)	Supervision/Touch (4)
Eating	Supervision/touch (4)	Independent (6)
Shower/bathing	Dependent (1)	Supervision/Touch (4)
Dressing upper body	Substantial/max (2)	Setup or cleanup (5)
Dressing lower body	Dependent (1)	Partial/Moderate (3)
Transfer to/from bed to chair	Dependent (1)	Supervision/Touch (3)
Wheel 50 ft w/ 2 turns	Substantial/max (2)	Partial/moderate (3)
Wheel 150 ft	Substantial/max (2)	Partial/Moderate (3)
Walk 50 ft w/ 2 turns	Not attempted (88)	Supervision/Touch (4)
Walk 150 ft		Supervision/Touch (4)
Four Steps		Supervision/Touch (4)

Discussion

This case demonstrates the need for increased vigilance and clinical suspicion for thromboembolic events in the post COVID-19 population and illustrates the limitations of current thromboprophylactic guidelines. It also highlights the value of increasing public awareness and health literacy on post-acute COVID-19 syndrome care. Despite being a young patient with no apparent comorbidities and history, she experienced a cerebrovascular accident with initially severe deficits. Even so, the patient showed some promising progress with therapy and was able to be discharged home safely with outpatient therapy.

Functional Change Score After 14 Days

TYPE	ADMISSION TOTAL	INTERIM TOTAL	CHANGE
Self Care	14	29	15
Transfer	15	30	15
Mobility	8	29	21

Conclusion

COVID-19 presents unique challenges even after initial disease has subsided, most fearsome of which is coagulopathy. This poses distinct challenges for rehabilitation and further research into sequelae, prognosis, and antithrombotic therapy is needed to better manage the risk of CVA to prevent future incidents.

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