Acute Necrotizing Rhombencephalitis and Disemminated Thrombosis After SARS-CoV-2 Infection

Sir/Madam,

We present the case of a lady who developed acute necrotizing rhombencephalitis without any supratentorial lesions and pulmonary artery thrombosis and iliac vein thrombosis after severe acute respiratory syndrome from coronavirus 2 (SARS-CoV-2) infection. We provide the serial imaging at 1-month follow-up, which showed persistent diffusion restriction.

A 57-year-old woman presented to our hospital with a history of sudden-onset weakness of the left half of the body with facial deviation to the right 1 day before. It was associated with slurring of speech and imbalance of the right upper limb and lower limb. There was no history of seizures, altered sensorium, vomiting.

The patient had a known case of type 2 diabetes and hypertension on regular treatment. She had a significant history of being diagnosed with SARS-CoV-2 pneumonia 6 weeks before. During that time, she was hospitalized for a month in a different hospital and was on noninvasive ventilation. There were no neurological complaints at that time.

During current admission, the patient was conscious and alert with left hemiplegia, cerebellar dysarthria, and gross ataxia in the right half of the body. During routine blood sampling, a note of hypercoagulability of blood was made (clotting time, <5 seconds; bleeding time, 2 minutes).

Noncontrast computed tomography (CT) of the head revealed hypodensity in the pons and midbrain. Magnetic resonance imaging of the brain revealed T2/fluid-attenuated inversion recovery (FLAIR) hyperintensity in the whole midbrain and pons including both the middle cerebellar peduncles with swelling and patchy diffusion restriction. On gadolinium administration, there was patchy heterogenous enhancement of the lesion (Fig. 1). The rest of the brain including bilateral thalami and cerebral hemispheres was normal.

The possibilities considered were post-COVID necrotizing encephalopathy, chronic lymphocytic inflammation with pontine perivascular enhancement responsive to steroids, primary central nervous system demyelinating disorder, neuro-Behcet disease, central nervous system malignancy, and paraneoplastic encephalopathy.

Contrast-enhanced CT of the chest and abdomen was done to rule out malignancy. Computed tomography of the chest showed ground-glass opacities in both lung fields suggestive of sequelae of viral (SARS-CoV-2) pneumonia. Contrast-enhanced CT showed nonobstructing left pulmonary artery thrombus and right common iliac vein thrombus. She was hemodynamically stable throughout the hospital stay. Hematologic malignancy was ruled out by bone marrow examination. Antiaquaporin antibodies were negative.

Cerebrospinal fluid examination yielded a normal result (4 cells; all lymphocytes; sugar, 118/168 mg/dL; protein, 48 mg/dL). Her blood was sent for SARS-CoV-2 antibodies (total), which yielded a positive result. She was started on pulse steroids (intravenous methyl prednisolone 1 g × 5 days) followed by oral prednisolone 50 mg once daily. Thrombophilic profile was sent, and the patient was started on low-molecular-weight heparin. She was discharged on day 9 of admission on oral steroids and low-molecular-weight heparin. At the time of discharge, there was minimal improvement in ataxia and no significant improvement in power.

At follow-up after a month, the patient had minimal improvement in power (0/5 to 1/5) and significant improvement in ataxia. Repeat CT showed resolution of pulmonary artery thrombus and

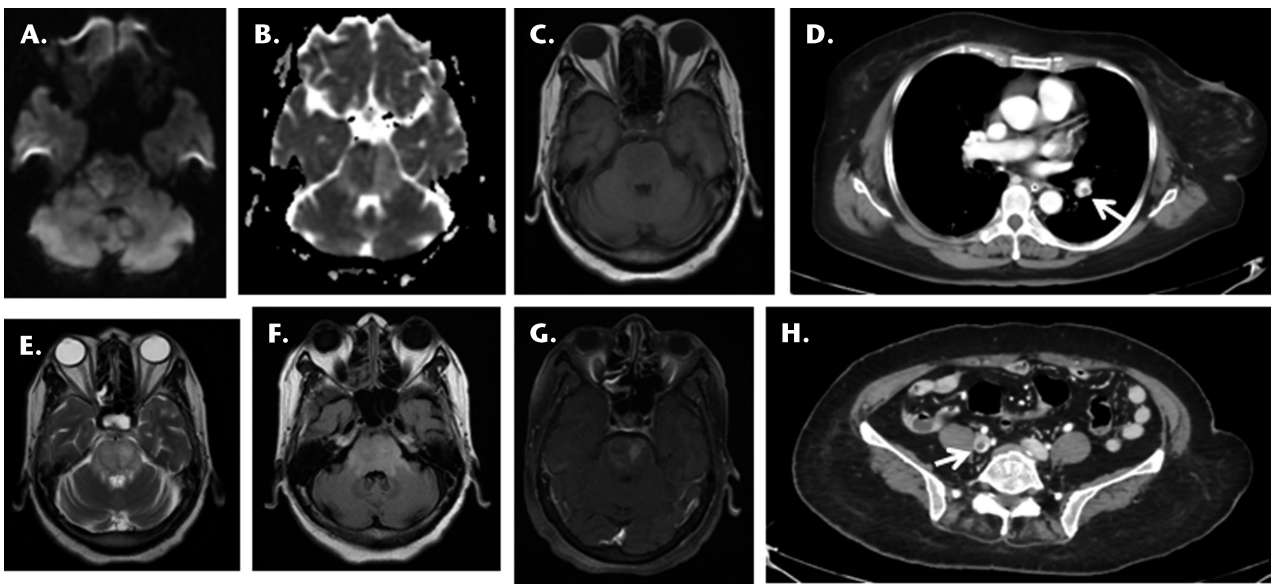

FIGURE 1. Magnetic resonance imaging of the brain during admission revealed patchy diffusion restriction (A) with corresponding hypointensity on ADC (B). There was T1 hypointensity (C) and T2/FLAIR hyperintensity (E and F) in the whole midbrain and pons including both the middle cerebellar peduncles (E, F) with swelling. On gadolinium administration, there was patchy heterogenous enhancement of the lesion (G). Contrast-enhanced CT of the chest revealed nonobstructing thrombus in the left pulmonary artery (D) and right common iliac vein (H).

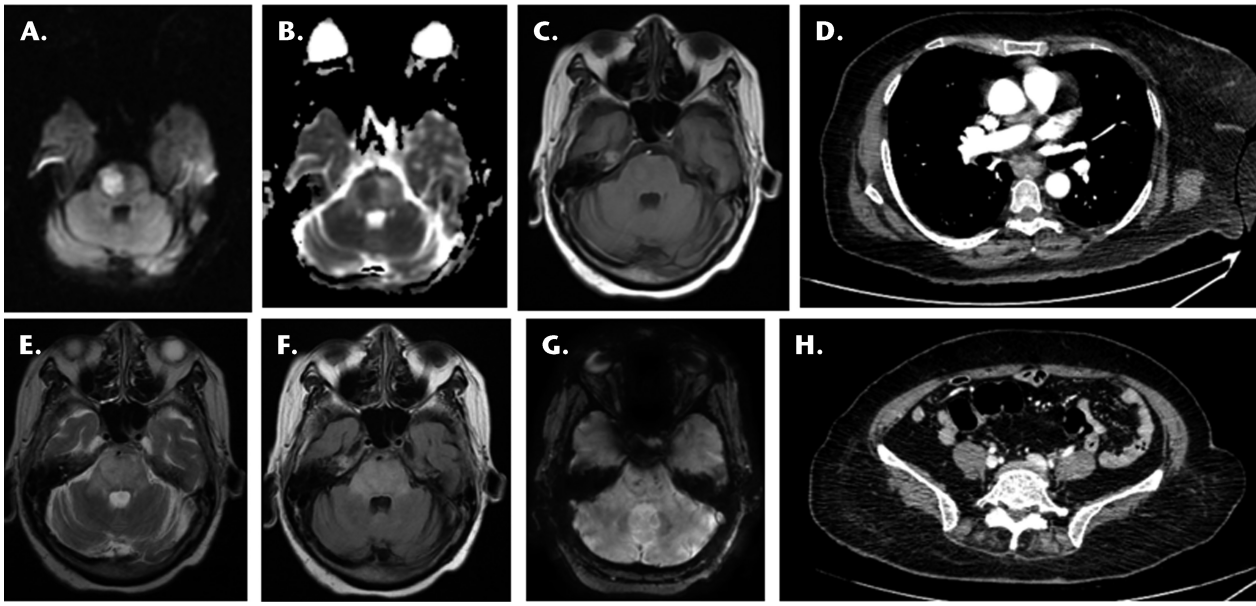

FIGURE 2. Magnetic resonance imaging of the brain showed persistent diffusion restriction in pons (A) with corresponding hypointensity on apparent diffusion coefficient (B). There was a significant reduction in brainstem swelling with persistent signal alteration on T2/FLAIR sequences (E and F). A note of the punctate areas of blooming in gradient imaging was made, suggestive of hemorrhage (G). Contrast-enhanced CT of the chest and abdomen showed resolution of thrombus in the left pulmonary artery (D and F).

iliac vein thrombus. Magnetic resonance imaging of the brain showed a reduction in brainstem swelling with persistent signal alteration on T2/FLAIR sequences. There was persistent diffusion restriction in the pons and appearance of punctate areas of blooming in gradient imaging suggestive of hemorrhage (Fig. 2).

Patients who have recovered from COVID-19 are prone to develop several complications like prothrombotic state and encephalitis.[1,2] This is likely due to hyperinflammatory response.[3] The common sites of the brain affected in post-COVID encephalitis are the bilateral thalami, periventricular area, and corpus callosum.[4,5] Acute hemorrhagic encephalitis confined to the brainstem has not been reported before. Also, it is remarkable that after 1 month, although the edema has subsided, there is persistent diffusion restriction in the pontine lesions.

This case report highlights the diverse presentation of post-COVID encephalitis and underlines the virulence of SARS-CoV-2 infection.

Priyanka Samal, MD, DM
Heramba N. Praharaj, MD, DM
Department of Neurology
Kalinga Hospital Limited
Bhubaneswar, India
priyanka_samal87@yahoo.co.in

Biswajit Mishra, MD
Department of Radiology
Kalinga Hospital Limited
Bhubaneswar, India

Sharmistha Sarangi, DNB
Department of Medicine
Kalinga Hospital Limited
Bhubaneswar, India

On behalf of all authors, the corresponding author states that there is no conflict of interest.
The authors have no funding or conflict of interest to disclose.
Availability of data and material: Yes.

REFERENCES

1. Maramattom BV, Bhattacharjee S. Neurological complications with COVID-19: a contemporaneous review. *Ann Indian Acad Neurol.* 2020; 23(4):468–476.
2. Garg RK. Spectrum of neurological manifestations in COVID-19: a review. *Neurol India*. 2020;68(3):560–572.
3. Avila J, Long B, Holladay D, et al. Thrombotic complications of COVID-19. *Am J Emerg Med*. 2021;39:213–218.
4. Kremer S, Lersy F, Anheim M, et al. Neurologic and neuroimaging findings in patients with COVID-19: a retrospective multicenter study. *Neurology.* 2020;95(13):e1868–e1882.
5. Katal S, Balakrishnan S, Gholamrezanezhad A. Neuroimaging and neurologic findings in COVID-19 and other coronavirus infections: a systematic review in 116 patients. *J Neuroradiol [Internet]*. June 27, 2020. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7320684/. Accessed January 5, 2021.