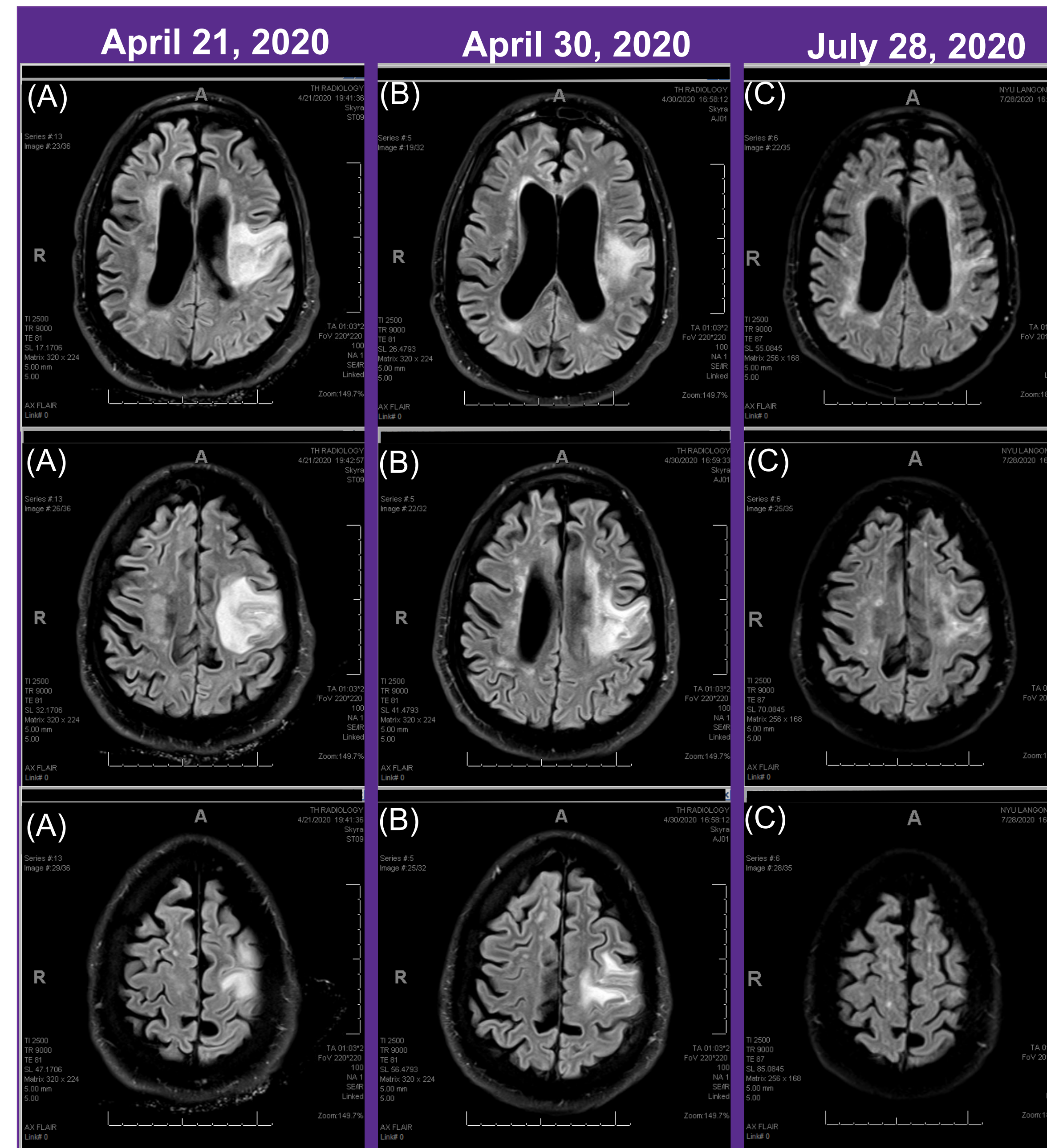


# COVID-19 Induced Hemorrhagic Leukoencephalopathy: A Missed Diagnosis

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## CASE DESCRIPTION

- 39-year-old minimally conscious man with quadriparesis presented to IRF following prolonged hospitalization for hypoxic respiratory failure secondary to COVID-19 pneumonia.
- Initial imaging showed bilateral cortical and subcortical ischemic injury.
- On examination, patient remained minimally conscious with flaccid quadriparesis and significant muscle atrophy.
- Showed inconsistent improvement in arousal and interaction, but no return of motor limb function.
- EMG showed evidence of moderately severe axonal polyneuropathy, yet level inconsistent with clinical quadriplegia – suggesting central etiology.
- Repeat MRI at 3 months showed persistent contrast-enhancing multifocal lesions suggestive of ongoing inflammatory process consistent with COVID-induced necrotizing leukoencephalopathy.



**Figure 1.**  
(A) Initial MRI with restricted diffusion in bilateral dentate nuclei, basal ganglia, and periventricular regions, likely ischemic.  
(B) Repeat MRI with patchy FLAIR hyperintense, contrast enhancement in the periventricular and subcortical white matter, consistent with microhemorrhage.  
(C) MRI 3 months later showing nonexpansile white matter FLAIR hyperintensity and patchy encephalomalacia, areas of microhemorrhage, not present on initial imaging studies; supporting leukoencephalopathy and microhemorrhage associated with severe COVID-19 infection.

## DISCUSSION

- Human coronaviruses have well-documented neurotrophic and neuroinvasive properties. Viral RNA has been identified in the brain parenchyma of human autopsy samples and in the CSF of multiple sclerosis patients.
- During previous outbreaks of the closely related MERS-CoV infection, neurological manifestations have included ADEM, encephalitis, stroke, seizure, and GBS.

## CONCLUSION

- SARS-CoV-2 has been shown to have potentially severe effects on both the central and peripheral nervous systems.
- Accurate diagnosis of these entities is complicated by medical acuity with prolonged ICU stays, multiorgan failure, mechanical ventilation, and sedation. In this case, diagnosis was delayed by 3 months, resulting in a substantial delay to definitive and potentially restorative treatment.
- As SARS-CoV-2 continues to unveil new associated acute and post-infectious pathologies, physicians must be able to incorporate these disease processes into their differential diagnoses, as timely targeted therapies can have a profound impact on function and prognosis.

