

## MR imaging findings in a neonate with COVID -19 associated encephalitis

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To the editor,

COVID-19 continues to wreak havoc in many parts of the globe. Children with COVID-19 are generally asymptomatic or have milder symptoms compared to adults. Neurological symptoms and neuroimaging abnormalities in children with COVID-19 disease are frequently due to parainfectious immune mediated phenomena or thromboembolic disease and include acute disseminated encephalomyelitis (ADEM), autoimmune encephalitis, Guillian-Barre syndrome, acute flaccid paralysis, myelitis, cranial nerve enhancement, vascular territory infarcts and microhemorrhages (1, 2). There are reports of pediatric and neonatal COVID -19 encephalopathy, but these cases have had normal neuroimaging (3, 4).

We describe a 9-day-old COVID-19 positive boy presenting with seizures with magnetic resonance imaging (MRI) findings of a viral encephalitis. Born at term without complications, the patient presented on day 6 of life. A head CT revealed minimal subdural hematoma attributable to normal parturition. Electroencephalogram (EEG) revealed poor sleep state differentiation without epileptiform discharges, which normalized on follow up. Lumbar puncture on day of admission revealed cerebrospinal fluid (CSF) xanthochromia; RBC 9,825/cumm; TNC 0/cmm; elevated protein (69 mg/dl); and normal glucose (53 mg/dl). CSF meningoencephalitis panel was negative and CSF culture revealed no growth. CSF panel did not include COVID-19.

A nasopharyngeal COVID-19 PCR test performed on day 7 of life due to mild desaturations was positive. The patient's grandmother tested positive for COVID-19. In retrospect, parents had flu like symptoms with loss of taste and smell at that time but were not tested in the acute setting. Brain MRI performed on day 9 of life revealed foci of restricted diffusion in the periventricular white matter and the corpus callosum (Figure 1) with corresponding heterogenous T2-weighted signal, compatible with a viral encephalitis (5). There was no hemorrhage or abnormal enhancement.

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The patient's seizures and hypoxia resolved with anti-epileptics and minimal supplemental oxygen. The patient was discharged with normal vitals and physical exam. Clinical follow-up at 2 months of age was normal.

To the best of our knowledge, this is the first report of intracranial imaging abnormality in a neonate with COVID-19 associated encephalitis (1, 4). COVID-19 infection in our case may have been incidental, but contact with COVID-19 positive family member, absence of another etiology and antenatal risk factors, and clinical and imaging findings of neonatal encephalitis suggests COVID-19 as a cause. The high prevalence of COVID-19 in our population also indicates a lower likelihood of a false positive COVID-19 PCR.

Figure 1. Axial diffusion-weighted images (a-c) of the 9-day-old male at multiple levels showing multiple foci of restricted diffusion in the periventricular and deep white matter and corpus callosum (arrows). Axial T2 weighted image (d) shows corresponding signal abnormality in the deep white matter (arrows). There is no hemorrhage or enhancement associated with these white matter regions of signal abnormality as seen on susceptibility weighted (e) and post contrast T1 weighted (f) images.

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Conflict of Interests:

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None

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None

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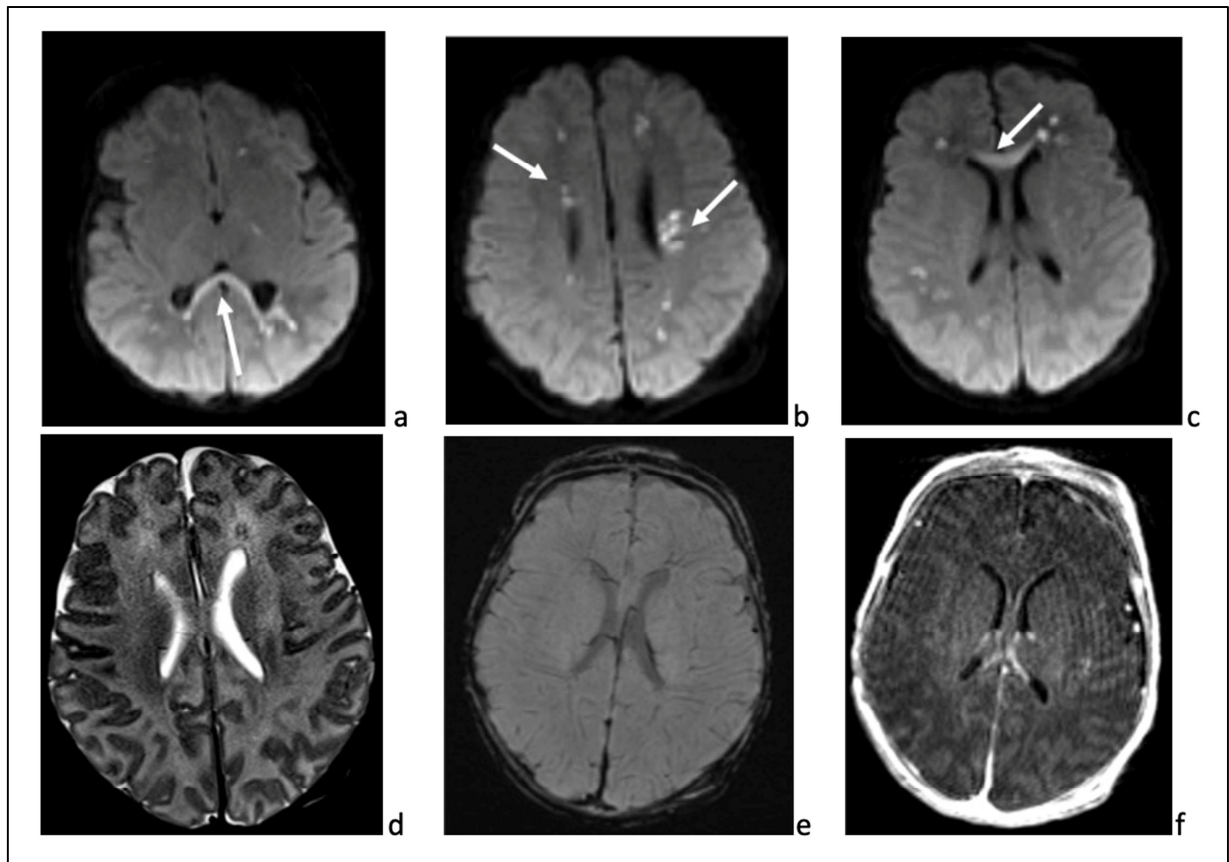


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