Pediatric COVID Encephalopathy: A Case Report

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INTRODUCTION

- COVID-19 has many presentations including pneumonia, conjunctivitis, neurologic manifestations, and thromboembolic events.
- Neurological complications due to the virus that have been reported are cerebrovascular disease, Guillain- Barre syndrome, myositis, neuropathies, meningoencephalitis, rhombencephalitis, and acute disseminated encephalomyelitis.
- One presentation is COVID encephalopathy, which is more prevalent in hospitalized patients with risk factors for severe illness such as male sex, neurologic disorders, diabetes, dyslipidemia, cancer, cerebrovascular disease, chronic kidney disease, heart failure, hypertension, and smoking.
- The management for COVID encephalopathy is not outlined very well but some case studies have shown success with glucocorticoids and intravenous immunoglobulin (IVIg).
- Cases of pediatric COVID encephalopathy are not commonly described, nor is the management.
- Here we describe a case of pediatric COVID encephalopathy treated with IVIg and methylprednisolone.

CASE PRESENTATION

- 13-year-old white female with a PMH of epilepsy presented to the emergency department with jerking, sporadic movements
- She was transferred from another hospital where they resulted a comprehensive metabolic panel (CMP), a complete blood count (CBC), glucose serum level, phosphorus serum level, magnesium serum level, acetaminophen serum level, lactate serum level, and a head computed tomography (CT) without intravenous contrast.
- Her parents reported she had not felt well that morning and had one episode of vomiting prior to arrival at the emergency department
- Her parents stated that the jerking, sporadic movements were unlike her typical seizures and that they had been ongoing for several hours
- She tested positive for COVID-19 two weeks prior to the presentation
- The review of systems was limited due to the encephalopathic nature of the patient
- Initially, she was treated with IM Ativan 1 mg and IV Vimpat 100 mg q6h and Haldol 2 mg was given as needed but these only minimally decreased the thrashing. Therefore, the Haldol was increased to 5 mg with success in decreasing the thrashing.
- Overnight she remained encephalopathic with minimal head thrashing behavior, confusion, and incomprehensible speech.
- The following day, a brain MRI with and without contrast, a lumbar puncture, TSH, vitamin B12, folate levels, antinuclear antibody titer, vitamin D1-25 dihydroxy, urinalysis, and urine drug screen were obtained. A panel for autoimmune encephalitis from the CSF and serum was also collected but did not result for several weeks.
- Differentials at this point included autoimmune encephalitis and COVID encephalopathy.
- Treatment of 22 g IVIg and 800 mg methylprednisolone was initiated for 5 days
- She started to recover within a few hours and within 2 days she was completely back to baseline.
- She continues to have no residual symptoms
- The autoimmune panel for serum and CSF was negative for NMDAR1, AMPAR1, AMPAR2, GABABR LGI1, CASPR2 antibodies, ruling out autoimmune encephalitis.

PERTINENT RESULTS

Lab	Result
CBC w/ diff	
WBC count	14,100 cells/µL
Neutrophil %	70.7%
Abs. Neutrophil count	9900 cells/µL
CMP	
Potassium	2.9 mmol/L
Alk. Phos	127 g/dL
Lactate	7 mmol/L
Phosphorus	3.2 mg/dL
Serum Glucose	230 mg/dL
CSF	
Glucose	58 mg/dL
WBC Count	1/mm^2
RBC Count	0/mm^2
Color	Colorless
Clarity	Clear
Escherichia coli K1	Negative
Haemophilus influenzae	Negative
Listeria monocytogenes	Negative
Streptococcus agalactiae	Negative
Streptococcus pneumoniae	Negative
Cytomegalovirus	Negative
Enterovirus	Negative
Herpes simplex viruses 1 and 2	Negative
Human Herpesvirus 6	Negative
Human parechovirus	Negative
Varicella Zoster Virus	Negative
Cryptococcus neoformans/gattii	Negative
TSH	WNL
Thyroxine	WNL
Vitamin B12	1381 pg/mL
Folate	WNL
ANA	Negative
Vitamin D1-25 dihydroxy	105 pg/mL
UA	
Protein	2+
Ketones	1+
Blood	3+
RBC	7
Mucus	Few
Amorphous	Few
UDS	Negative

Imaging	Results
CT head w/ and w/out contrast	Unremarkable and within normal limits
MRI brain w/ and w/out contrast	No acute abnormalities

DISCUSSION

We report a case of COVID encephalopathy within the pediatric population, which has very few cases and no protocol on treatment options. The pathogenesis for COVID brain inflammation and injury should be studied more intensively so we can better understand methods of management. A commonality with the patient we treated and other described patients with COVID encephalopathy were the history of neurological illness. Our patient presented with a history of medication-controlled epilepsy. There were no other risk factors present for severe illness in this patient. She had been asymptomatic prior to encephalopathy, which is inconsistent with the cases of encephalopathy described thus far. It is unclear if this patient would have spontaneously recovered from the encephalopathy without medications or if she would have proceeded to get worse. The risk of morbidity and mortality outweighed the risk of the use of glucocorticoids and IVIg. We are thankful for a prompt recovery of our patient.

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