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Abstract:

Several studies have shown the extrapulmonary manifestations of COVID-19 disease caused by the SARS-CoV2 virus. Although extrapulmonary manifestation to the heart, kidney, blood, and skin are common, neurological and cerebrovascular manifestations are rare with most of these cases being described in patients who also have the pulmonary manifestation of the disease. Here we present the case of an 18-year-old male with no prior history of respiratory symptoms who presented to the emergency department with altered mental status. Neurology was consulted and the patient was started empirical on ceftriaxone, vancomycin, dexamethasone, and acyclovir for meningoenzephalitis. Urine drug screen, head CT, and brain MRI were negative. EEG revealed mild generalized slowing without epileptiform abnormalities. CSF analysis revealed RBC 2,230 (spun: clear, colorless), WBC 84 (segs 2%, lymphocytes 96%, monocytes 2%), protein 112 mg/dL, glucose 69 mmol/L, and gram stain with no polyps or organisms seen. CSF meningoenzephalitis PCR panel for 14 common pathogens was negative. Due to recent contact with co-workers who tested positive, nasopharyngeal SARS-CoV2 PCR was ordered and it returned positive. This patient was diagnosed with acute aseptic meningoenzephalitis due to COVID-19 and the vancomycin, ceftriaxone and acyclovir were discontinued. Patient's encephalopathy improved and he was discharged home on oral steroids.

Introduction:

In the Summer of 2020, the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) devastated our local community. Initially thought to be isolated to the respiratory system, several studies have shown extrapulmonary manifestations to the heart, kidney, blood, and skin<sup>1</sup>. Neurological and cerebrovascular sequelae have emerged as a rare extrapulmonary manifestation, though the mechanism is currently unknown<sup>2,3,4</sup>. Here we present a neurological manifestation in which SARS-CoV2 was associated with the development of acute encephalitis in an otherwise healthy patient without pulmonary symptoms. These rare neurological complications are a unique presentation and diagnostic challenge in patients infected with SARS-CoV2.

Case Description:

The patient is an 18 year-old male with no past medical history who was brought to the ER by his father due to altered mental status. The patient slept the entire day prior to admission. Family attempted to wake the patient around 4:30 PM when his eyes rolled backwards. He started trembling, vomited, and required assistance with walking. His speech "did not make sense." Two of his co-workers tested positive for COVID-19 in the past week. No history of drug use, cough or shortness of breath was reported. On admission, the patient's temperature was 101.6°F. Patient was AOx1, followed simple commands, made eye contact and was cooperative. No photophobia, phonophobia or headache were noted. Urine drug screen was negative, though synthetic marijuana could not be tested. Our differential diagnoses included systemic infectious or metabolic encephalopathy, aseptic meningoenzephalitis, encephalopathy due to drugs or toxins, and seizure. Neurology was consulted. The patient started empiric treatment for meningoenzephalitis with ceftriaxone, vancomycin, dexamethasone and acyclovir. CSF analysis revealed RBC 2,230 (spun: clear, colorless), WBC 84 (segs 2%, lymphocytes 96%, monocytes 2%), protein 112 mg/dL, glucose 69 mmol/L, and gram stain with no polyps or organisms seen. CSF meningoenzephalitis PCR panel for 14 common pathogens was negative. CBC with differential revealed WBC 13.0 neutrophils 84.9% and lymphocytes 8.2%; all others within normal limits. CMP revealed potassium 3.1 mEq/L, glucose 123 mg/dL, and alkaline phosphatase 126 IU/L. Head CT and MRI Brain and MRA Head/Neck were within normal limits. EEG revealed mild generalized slowing, without epileptiform abnormalities. Nasopharyngeal SARS-CoV2 PCR returned positive. The patient was diagnosed with Acute Aseptic Meningoenzephalitis due to COVID-19. Vancomycin, ceftriaxone and acyclovir were discontinued. The patient's encephalopathy improved and he remained afebrile, and was discharged home on oral steroids.

Discussion:

Our patient presented with altered mental status due to aseptic meningoenzephalitis and positive nasopharyngeal SARS-CoV2 PCR in the absence of respiratory symptoms. He was discharged home two days after admission on oral steroids, with improvement of symptoms and clinical stability. Several case reports have described acute and

post-infectious encephalopathy, headache, stroke, seizure, and peripheral neuropathy secondary to COVID<sup>3,4,5</sup>. Clinicians are advised to complete full meningoencephalitis work-up and COVID testing in patients presenting with similar symptoms. Various mechanisms for neurological symptoms have been proposed, including neuroinflammatory processes and direct tropism for the CNS<sup>6</sup>. Further study is needed to characterize the mechanisms and acute effects of SARS-CoV2 infection on the nervous system and any residual neurological deficits.

#### References:

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