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COVID-19 Presenting with Seizures

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ABSTRACT

This case report examines a male with no previous history of seizures initially admitting to the medical service later upgraded to ICU after respiratory failure developing multiple episodes of seizures. Laboratory values on admission, neurological investigations, as well as review of current literature on COVID-19 encephalitis is provided.

Introduction

COVID 19 is caused by the SARS CoV-2 Virus. Typical presentation includes upper respiratory symptoms including cough, rhinorrhea, dyspnea which can progress to respiratory failure requiring intubation [1]. Elevation of CRP, LDH, and lymphopenia are typically observed [1]. However, the SARS COV-2 virus can result in a wide variety of neurological presentations including seizures that have only been recently documented [2]. There are multiple proposed mechanisms of CNS involvement including retrograde movement from the olfactory nerve, entry into CNS via circulating lymphocytes or entry via permeable blood brain barrier [2,3]. In addition to use of anti-epileptics therapy with mannitol has been documented in decreasing cerebral edema [3]. Future therapies including the role of direct antiviral agents lopinavir/ritonavir, immunomodulators tocilizumab in combating the cytokine storm and treating/preventing encephalopathy in COVID-19 patients should be investigated further.

Case

A 72 year old man with history of hypertension, coronary artery disease with stent, diabetes type 2, end stage kidney disease on hemodialysis presented with complaints of weakness and lightheadedness after experiencing a hypoglycemic episode. Initially admitted to the medical floor the patient shortly developed worsening respiratory status with increased work of breathing and altered mental status requiring intubation and transfer to the intensive care unit. Initial ABG showed a pH of 7.13, PaO2 of 68 mmHg and PCO2 of 78 mmHg. BNP was elevated at 541 pg/mL. Troponin was elevated at 0.11 ng/mL and peaked at 0.35 ng/mL. Suspicion for COVID 19 was raised after finding abnormal labs typically seen in COVID 19 patients [1]: elevated CRP at 61 mg/L, LDH of 230 U/L, lymphopenia noticed at 0.5 k/cmm with leukopenia at 4000k/cmm. A chest x-ray on admission was negative. Patient was started on oseltamivir however was discontinued when Influenza tested negative Two sets of blood cultures were negative for bacterial growth.

The patient became hypotensive requiring norepinephrine via central line. A real time PCR for SARS COV-2 was positive. Hydroxychloroquine and azithromycin was started in addition to antimicrobials of vancomycin and piperacillin tazobactam. CT head showed chronic microvascular ischemic changes but did not show any acute changes infarct or hemorrhage. CT chest showed bibasilar opacities along with right lower lobe consolidation. On day 3 of admission, patient was noted to have multiple episodes of tonic colonic movements of his upper and lower extremities that lasted for many minutes before abating with versed 4 mg IV push. Versed drip was started. A loading dose of levetiracetam was given followed by maintenance dose dosed renally. 24 h EEG showed six left temporal seizures and left temporal sharp waves which were epileptogenic. For the next 2 days patient was observed having tonic movements of his upper extremities 2-3 times daily. Valproate was added to the antiseizure regimen. On hospital day 5 of admission a code blue was called after patient became

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pulseless. Unfortunately, ROSC could not be achieved and the patient passed.

Discussion

Seizures in COVID 19 patients have been first documented by Moriguchi et al. [2]

Prior to admission, the patient had no known history of seizures and family denied any additional history of seizures. The first noted seizure was on hospital day 2. Blood glucose levels recorded before and after the seizure episodes did not show hypoglycemia. Additionally, the patient was off his home oral sulfonylureas for multiple days and underwent dialysis sessions making it less likely that the continued effects of oral hypoglycemic agents was the cause of his seizures. The patient was persistently febrile throughout admission possibly related to the cytokine storm so frequently seen in COVID 19. Lumbar puncture would have been a useful diagnostic tool, unfortunately however the patient died before lumbar puncture could be arranged. Additionally the amount of viral particles in CSF may be insufficient for detection [3]. Herpes encephalitis appeared less likely as there were no findings on CT head suggestive of such. The findings of lateral ventriculitis in the hippocampus documented by Takseshi and Colleagues (2020) was not seen in this patient [2]. MRI brain was not completed due the patient being too unstable for transport.

Although exact mechanism by which SARS COV-2 causes encephalitis is currently unknown for certain, it is believed that the virus can move via retrograde from the olfactory nerve or other cranial nerves into the CNS [2,3]. Hematogenous spread of viral particles into the CNS via circulating lymphocytes is another possible mechanism [2]. In addition to viral infection, host immune response causing a cytokine storm leading to damage in the blood brain barrier and increased leukocyte migration may be another mechanism in causing encephalitis [2].

Many different viral infections can cause neurological symptoms [2]. As our understanding of COVID-19 progresses, the possibility of encephalitis and seizures is becoming more accepted clinically, but currently has limited documentation in the literature [2–4]. This case report adds to the literature the increasing neurological manifestations presented in COVID-19. Use of mannitol to decrease cerebral edema has been reported in one case report which improved patient's consciousness [3]. Additionally, identifying if there are any reoccurring changes on CT/MRI imaging or CSF fluid analysis that can be pathognomonic in diagnosis would be helpful going forward.

Conclusion

COVID-19 can cause neurological manifestations such as the onset of seizures and alerted mental status. In patients who have new onset seizures and altered mental status along with typical COVID-19 clinical symptoms testing for the SARS COV-2 virus should be conducted.

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Declaration of Competing Interest

No conflicts of interests

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