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Case Report

Posterior reversible encephalopathy syndrome due to COVID-19

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Abstract

Objective: During the late 2019, a group of patients had unexplained chest infections in Wuhan which turned out to be the new pandemic coronavirus disease 2019 (COVID-19). New neurological symptoms have been reported in COVID-19 patients. Posterior reversible encephalopathy syndrome (PRES) is a new neurological finding and is associated or caused by COVID-19.

Case Presentation: A 32-year-old lady, with no medical background had COVID-19 infection and needed mechanical ventilation. After surviving the intensive care, she started to have multiple seizures that required general anesthesia to be aborted. The patient turned out to have PRES.

Conclusion: PRES is a neurological syndrome causing seizures, headaches, and blurred vision. It is usually associated with high blood pressure, renal failure, and other risk factors. The patient in this case had nearly normal blood pressure, but still had a diagnosis of PRES. The new reported neurological symptoms associated with COVID-19 infection need further research and attention from the academic society to predict and prevent the morbidity and mortality of COVID-19 patients.

Keywords: PRES, COVID-19, Seizure

Introduction

Human coronaviruses (HCoVs) are part of coronaviruses cluster (CoVs); which can cause a range of respiratory diseases ranging in severity from simple common cold to more sever pneumonia (1). During late 2019, a group of patients started to have unexplained chest infections in Wuhan, China. After days, the new causative microorganism was identified as a new coronavirus type (nCoV) by multiple laboratories (2).

Although it is mainly a respiratory disease, there have been numerous reports of new clinical findings that develop in coronavirus disease 2019 (COVID-19) patients, not only affecting the lungs but can also cause cardiac, and neurological manifestations.

Patients with COVID-19 are reported to have strokes, seizures, abnormal mental status, and inflammatory brain changes. One of earliest case reports mentioned a COVID-19 Chinese patient with left sided hemiparesis which was due to a stroke with occlusion in a large blood vessel. Other reports also described massive intracranial hemorrhage without prior history of anticoagulation or hypertension (3). One study showed that cerebrovascular pathology was seen in 1.4% of patients, while headache was reported in 13.6% of patients with COVID-19 (4).

Here we present a case of COVID-19 infection that showed typical neuroimaging of posterior reversible encephalopathy syndrome (PRES) with no reported history of any precipitating risk factors mentioned in the literature.

Case Presentation

A 32-year-old lady with no prior medical history came into our emergency department with shortness of breath, cough, and fever. Her initial *arterial blood gas* (ABG) showed PaO2 of 70 mmHg in room air. Her chest CT-scan showed extensive bilateral lungs involvement (Figure 1), and later her COVID-19 PCR came to be positive.

The patient was admitted to the intensive care unit and CPAP was initiated. Her ferritin, LDH, D-dimer, and C-reactive protein were all elevated. Despite all efforts, the condition of the patient deteriorated within 2 days and she needed endotracheal intubation after her ABG results showed PaO2 of 65 mm Hg, with a respiratory rate of 38/min.

She was given multiple medications during her stay, and her blood results and clinical condition improved. She was extubated after 12 days and her Glasgow Coma Scale (GCS) was 15, her blood pressure was normal, and her blood investigations improved.

Unfortunately, within one day in the medical ward the

patient had recurrent seizures which progressed to status epileptics and again she was intubated and admitted to the intensive care unit.

After stabilizing her condition, the CT-scan of her brain showed features suggestive of PRES (Figure 2), and MRI was requested to confirm the diagnosis.

MRI of the brain showed vasogenic edema bilaterally involving occipital lobes, parietal lobes and posterior parts of frontal lobes confirming PRES (Figure 3).

Her vital signs at this point showed mild hypertension of 154/93, heart rate of 90/min, intubated on FiO2 35%, and her ABG showed PaO2 120 mm Hg. She was extubated one day later and started medical management by a neurologist and antiepileptic and antihypertensive management continued until discharge.

Routine blood tests were done daily while she was in ICU. Her WBC ranged from 8.2 * 10^9/L to 30*^9/L, C-reactive protein reached 270, her ferritin peaked at 3799 µg/L, the highest recorded LDH was 1554 IU/L, and D-Dimer ranged between 5 at time of admission and reached to > 35 mg/dL.

The treatment received consisted of the followings: enoxaparin, amlodipine, levetiracetam, hydroxychloroquine, favipiravir, tazocin, and camostat.

We followed the patient throughout her stay in the hospital and it is worth mentioning that the patient had no prior concerning chronic conditions including renal impairment or epilepsy.

She recovered after staying in our hospital for a total of 62 days. She was fully conscious, oriented, and vitally stable. She was discharged on Keppra, and augmentin. She was followed up by internal medicine and neurology.

Discussion

PRES is considered as a neurological syndrome with a spectrum of neurological and radiological characteristics usually due to different factors. The most common presenting signs are headaches, visual disturbances, disturbed consciousness, and occasionally focal neurological deficit (5).

With the fast spread of COVID-19 infection, different neurological symptoms are being reported in which many of them are still not pathologically linked to the infection with coronavirus and need more studies. PRES was reported in a patient with COVID-19 (6) and two more patients who experienced severe COVID-19 infection (7). All these patients reported to have high blood pressure around the time of PRES diagnosis.

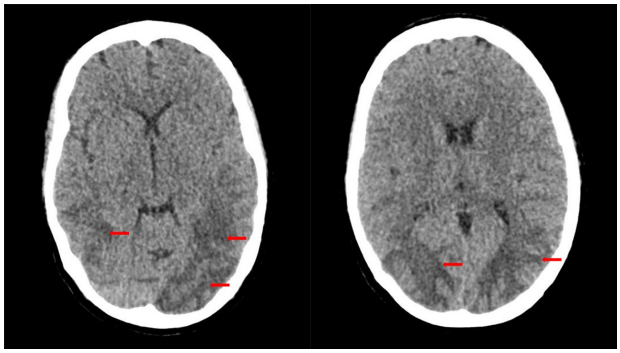

Figure. 2. Brain CT-scan showing areas of hypo attenuation involving predominantly the sub-cortical white matter in both occipital lobes right greater than left (Red arrows).

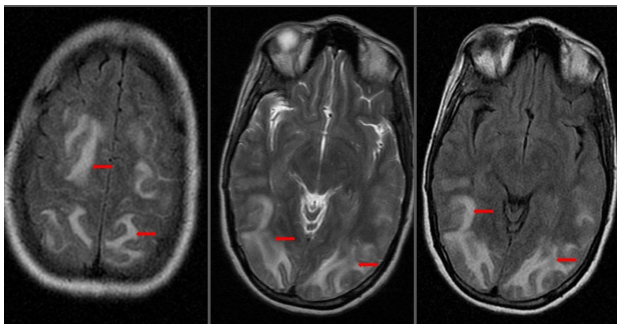

Figure. 3. Brain MRI showing symmetrical cerebral vasogenic edema bilaterally involving the occipital, parietal and posterior parts of frontal lobes (Red Arrows), picture highly indicative of PRES.

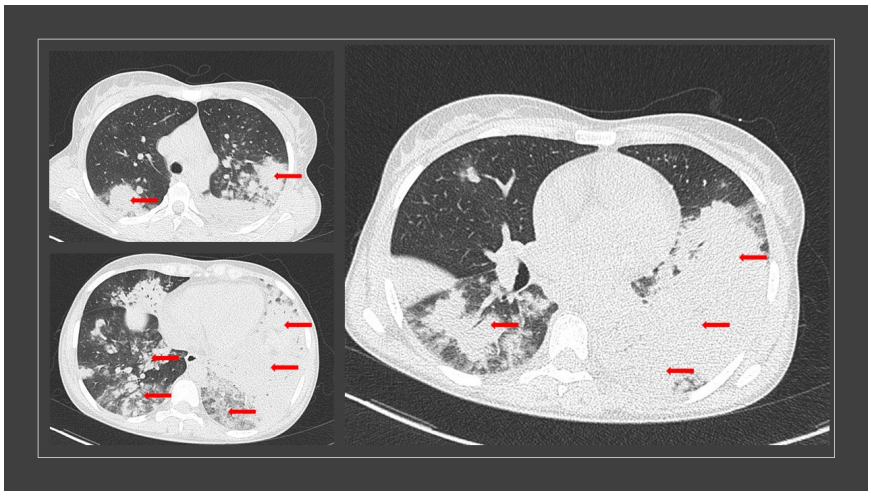

Figure 1. Chest CT-scan showing bilateral ground glass opacities with crazy paving, indicating severe CVOID-19 disease. Red arrows pointing to the extent of involvement.

This report described a young patient with no prior medical history that suffered from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) associated with PRES. Our case gives further evidence of different neurological manifestation that can be associated with COVID-19.

PRES was diagnosed in this patient although she had only mild rise in her blood pressure, which may point to the assumption that patients with COVID-19 may develop PRES with lower blood pressure. Thus, a stricter blood pressure control should be considered when managing those patients.

The cause behind this might be due to cerebral endothelial dysfunction secondary to SARS-CoV-2 and needs further studies and observations to reach a better understanding of risk factors and causes behind such presentations.

Conclusion

The literature is still far away from gripping an edge regarding COVID-19 infection. Although PRES happens in patients with high blood pressure and other risk factors, in patients with COVID-19, it can be manifested with much lower blood pressure and that is something physicians should remember.

Ethical Issues

Patient consent was taken from the patient for publication of this report.

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