



Case study

Post covid seizure

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ABSTRACT

Introduction: Coronaviruses have been suspected to be associated with neurological manifestations in patients with respiratory tract infections. Corona Virus disease (COVID-19) develop seizures as a consequence of hypoxia, metabolic derangements, organ failure, or even cerebral damage that may happen in people with COVID-19. There is scarce data about the development of seizures after recovery from acute COVID-19 illness, especially in those who have had a mild disease.

Case: A thirty three year old male patient with recent history of mild COVID-19 disease, with no known comorbidities, no history of substance abuse, presented with history of transient loss of consciousness. On examination had no lateralising signs, tongue bite was present. Inflammatory markers were found to be raised. MRI brain showed no significant abnormality. EEG done showed bilateral intermittent slowing.

Conclusion: Post COVID-19 infection, the post-infectious inflammatory response can give rise to many neurological complication, seizure being one among them, as noted in our patient.

Introduction

Coronaviruses have been suspected to be associated with neurological manifestations in patients with respiratory tract infections. Neurotropic and neuroinvasive capabilities of coronaviruses have been described in humans. Upon nasal infection, coronavirus may enter the central nervous system (CNS) through the olfactory bulb, and produce inflammation and demyelination. Once the infection is established, the virus may infiltrate the entire brain parenchyma and cerebrospinal fluid (CSF) in less than seven days. Neurological problems found in patients with acute coronavirus infection include: febrile seizures, convulsions, change in mental status, encephalomyelitis, and encephalitis [1]. In some patients with Corona Virus disease (COVID-19) develop seizures as a consequence of hypoxia, metabolic derangements, organ failure, or even cerebral damage that may happen in people with COVID-19 [1]. There have been case reports stating seizures during acute COVID-19 illness, however, there is scarce data about the development of seizures after recovery from acute COVID-19 illness [2]. Here, we report a case of seizures occurring during the post COVID-19 period.

Case

A 33- year old Indian gentleman, a staff nurse by occupation, presented with an episode of sudden but transient loss of conscious. He had been diagnosed with mild COVID-19 upper respiratory infection in the previous month and had completed a two week home isolation. He was riding on his bike with his wife as pillion when he felt uneasy and stopped by the side of the road. Shortly thereafter the wife witnessed that he lost consciousness and fell to the ground. She further revealed that though he regained consciousness a few minutes after the event, he appeared to remain confused until they arrived at a nearby hospital. He did not have either involuntary movements of limbs or bowel bladder incontinence during the episode. He had no known comorbidities and had no history of substance abuse or any relevant drug history. There was neither history of previous episodes of seizures (not even febrile seizures in childhood) nor a history of recent or past head trauma. On arrival to the hospital examination was noted with a Glasgow coma scale of 15/15, with no meningeal signs and no lateralizing neurological deficits. A right lateral tongue bite mark was noted. Patient was tested negative for COVID-19 on repeat testing.

On evaluation he was found to have a glucometer random blood sugar of 121 mg/dl, serum corrected calcium – 9.9 mg/dL, serum

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Magnesium – 1.9 mg/dL, ABG- no metabolic acidosis, sodium – 143 mmol/L, potassium-4.29 mmol/L, chloride- 102.8 mmol/L, Troponin I-1.0 pg/mL, serum ferritin 144.3 ng/mL, haemoglobin 14.2 g%, total leucocyte counts 11,190 cells/mm³, platelet counts – 2.09 lakhs cells/mm³, **D-dimer- 0.98 microgram/mL**, **CRP-8.40 mg/L**, LDH-270 IU/L, renal and liver function tests – within normal limits. ECG – sinus tachycardia on arrival, repeat ECG showed normal sinus rhythm.

Neuroimaging was done with an initial computed tomography (CT) scan followed by an MRI (Fig. 1) but showed no abnormalities. EEG performed showed bilateral intermittent slowing.(Fig. 2).

The patient was initiated on Levetiracetam 1500 mg per day in three divided doses that is 500 mg three times daily, after discussion with the neurology team. He did not have any further episodes of seizures and was discharged. During the follow up he reported excessive drowsiness, and hence Levetiracetam was reduced to 1000 mg per day and he is since tolerating the same well, with no further seizures in the past three months.

Discussion

Ever since the beginning of this global pandemic of COVID-19 there have been numerous complications noted with diverse presentations, affecting several organ systems in the body. There have been many case reports of patients having seizures during the acute illness of COVID-19 and it has been postulated to be due to the cytokine storm or invasion of the nervous system through cranial nerves or haematogenous spread [3]. It may also be attributed to the angiotensin converting enzyme-2 present in the nervous system and the virus' affinity towards the same which hampers the protective mechanism at the level of the blood brain barrier [4]. There have been cases of patients presenting with status epilepticus, convulsive and non-convulsive [3,5,6] new onset seizures or seizures triggered by COVID-19 [7] and acute symptomatic seizures [4]. There are reports of post-covid neurological complications such as demyelination in Guillain Barre syndrome, myelitis which have been described [4].

However, there are few reports regarding seizures triggered during the post-covid period [3]. The triggering of seizures following acute COVID19 illness in previously healthy individuals is not extensively reported in literature, [1] that it may occur even in patients with no predominant pulmonary findings [3]. Similarly, in the case of the above

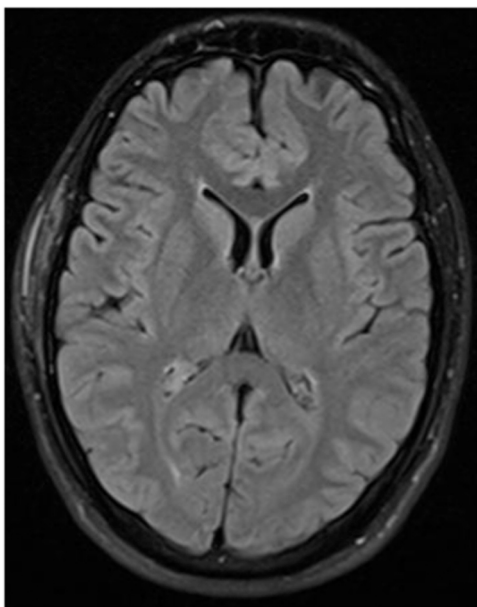


Fig. 1. MRI Brain (T1 weighted image) – no abnormality noted in the brain parenchyma.

patient, there were no hypoxia, during the course of acute illness of COVID-19, however, this patient developed an episode of seizures several days after recovery from the acute infection.

It is also noteworthy that the patient had no structural brain lesion detectable on neuroimaging. Most studies done report structural brain lesions being present, along with demonstrable EEG changes [3,4,8,9]. Most EEGs in COVID patients with seizures have demonstrated sharp wave epileptogenic discharges, however, some patients showed bilateral slowing along with this, similar to our patient [3,8].

The post-covid seizures is hypothesized to be an inflammatory response as inflammatory markers such as CRP was found to be elevated in patients presenting with post-covid neurological complications [3,4]. Multisystem inflammatory syndrome in children (MIS-C), presenting with fever, raised inflammatory markers, and single or multiorgan failure, in the absence of active infection has been well described and seizures have been commonly noted among them [3,10]. Post-viral refractory seizures have also been noted in patients with leukoencephalopathy and microhaemorrhages [9].

We suspect that in our patient, this seizure was the result of a post-infectious inflammatory response as his CRP was elevated, with the patient being normoglycemic, with no dyselectrolytemia, with no structural brain lesion on neuroimaging with EEG showing bilateral intermittent slowing. He was treated with levetiracetam as it has a favourable adverse effect profile and minimal interactions with other drugs [1].

Conclusion

COVID-19, its pathophysiology, its presentations and post-infectious inflammatory responses appear to be ever increasing and its management, ever-evolving. Our case report adds to the current literature on neurological manifestations in the post-acute COVID period in this pandemic. It is also important to note that in patients presenting with seizures, with a post-covid status, the possibility of post-infectious inflammatory seizures be suspected in the absence of hypoxia and structural brain lesions.

Notes on patient consent

An informed written consent has been obtained from the patient.

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CRediT authorship contribution statement

Abhijnya K. Renukprasad: Writing – review & editing, Writing – original draft, Supervision, Software, Project administration, Methodology, Investigation. **Prithvi Basu Roy:** Writing – original draft, Visualization, Methodology, Data curation. **Akshay Rao:** Writing – review & editing, Supervision, Software, Resources, Formal analysis, Conceptualization.

Conflict of interest

No there is no conflict of interest.

Declaration of Competing Interest

We affirm that there are no financial, personal, or professional relationships or circumstances that could be perceived as creating a

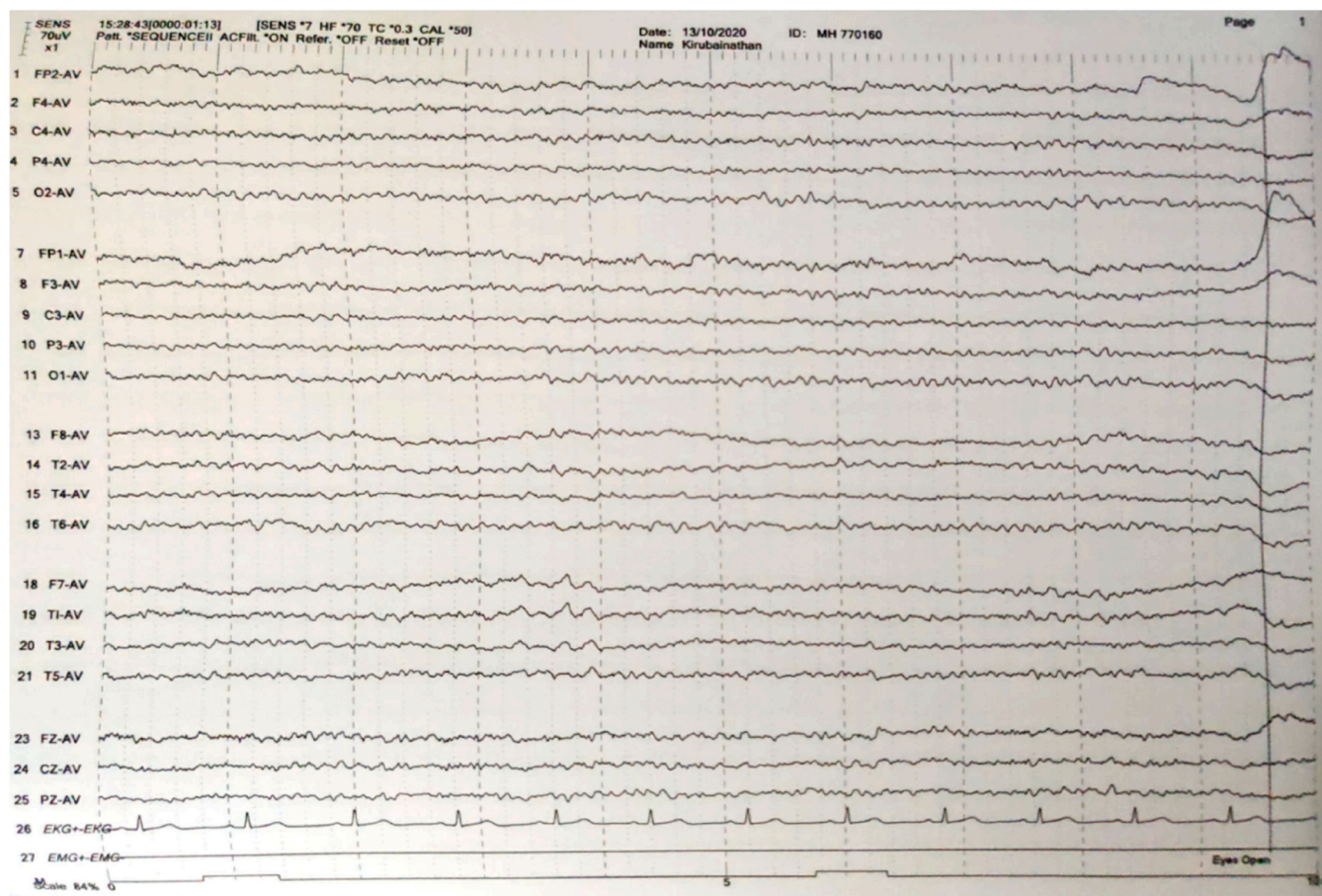


Fig. 2. EEG – Bilateral intermittent slowing of waves.

conflict of interest with regards to the content presented in the aforementioned work.

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We affirm that this declaration of no competing interest is accurate and complete to the best of our knowledge.

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