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Case Report

Super refractory status epilepticus as a possible manifestation of COVID-19 disease

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is one of the worst pandemics in history, caused by severe acute respiratory syndrome coronavirus-2, a novel zoonotic coronavirus. COVID-19 disease can present from asymptomatic or mild infection to rapidly progressive, acute respiratory distress syndrome, and death. Neurological presentation is not so uncommon now. Super refractory status epilepticus (SRSE) can be a possible manifestation of COVID-19 disease. Here, we report a patient affected by COVID-19 who presented with SRSE.

Keywords: Super refractory status epilepticus, Epilepsy, Viral infections, Coronavirus disease 2019

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by a novel coronavirus termed as "severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)." The lung is the most commonly affected organ. New-onset seizures and status epilepticus (SE) are infrequently reported among neurological manifestations.[1]

We hereby report a super-refractory SE (SRSE) case in a patient with COVID-19.

CASE REPORT

A 21-year-old girl presented with complaints of fever, altered sensorium, and two episodes of generalized tonic-clonic seizure over 7 days. There was no previous seizure history in the past. Routine and specific investigations at admission were done including a nasal swab for COVID-19 reverse transcription polymerase chain reaction (PCR) that came positive [Table 1]. As herpes simplex virus (HSV) encephalitis is one of the most common causes of new onset super refractory epilepsy, cerebrospinal fluid PCR was sent for HSV-1 and HSV-2 that came negative. Electroencephalography showed intermittent, generalized, sharp, and slow wave discharges with delta-theta slowing of background with intermittent clinical generalized tonic-clonic activity in between. Magnetic resonance imaging brain had T2/fluid attenuated inversion recovery hyperintensities in the bilateral hippocampus [Figure 1].

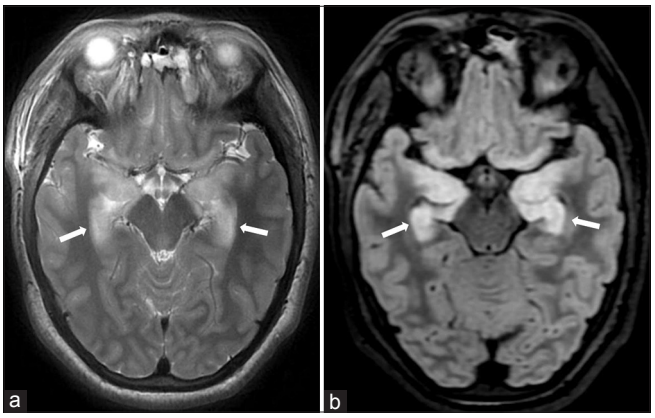

Figure 1: Axial T2-weighted image (a) and fluid attenuated inversion recovery (b) of brain shows hyperintensity in bilateral hippocampus.

There was persistent seizure activity, despite multiple oral and injectable antiepileptic drugs and the ketogenic diet and the patient expired on the 11th day of admission with more than 1 week of persistent seizure activity [Figure 2, Timeline of events].

DISCUSSION

There is increasing evidence of neurological involvement in COVID-19 disease, including new-onset seizures.[2,3] One of the possible explanations for its neuroinvasive property is an expression of Angiotensin-converting enzyme 2 receptors

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Table 1: Summary of investigations done.

Parameters	At admission	Parameters	At admission
Hemoglobin % (g/dL)	10.9	C-reactive protein (mg/dL)	63.4
Total leucocyte count (*10^3/cu.mm)	13100	CSF glucose (mg/dL)	69.9
Platelet count (*10^3/cu.mm)	397	CSF Cells (/cmm)	2
Serum sodium (mEq/L)	128	CSF protein (mg/dL)	47
Serum potassium (mEq/L)	4.82	CSF ADA (U/L)	3.58
Serum urea (mg/dL)	37	Serum creatinine (mg/dL)	1.0
Bilirubin (total/direct/indirect) (mg/dL)	0.4/0.1/0.3	AST/ALT/ALP (U/L)	22/35/59
Serum calcium (ionic) (mEq/L)	1.17	Serum amylase (U/L)	63
Serum magnesium (mg/dL)	1.83	Serum lipase (U/L)	84
Total protein (g/dL)	8.0	Total cholesterol (mg/dL)	178
Total albumin (gm/dL)	3.8	Triglycerides (mg/dL)	979
Prothrombin time (sec)	10.6	HDL (mg/dL)	20
APTT (sec)	25.7	LDL (mg/dL)	100
INR	0.95	Serum magnesium (mg/dL)	1.83
LDH (U/L)	374.8	Free T3 (pg/ml)	2.0
Serum ferritin (ng/L)	226.3	Free T4 (ng/dL)	0.88
Interleukin-6 (IL-6)	0.6	TSH (microU/mL)	0.794
D dimer (micro/ml)	1.92	Autoimmune encephalitis antibodies	Negative
Phosphate (mg/dL)	1.73	USG abdomen	Normal study
Chloride (mmol/L)	99	COVID-19 RT-PCR	Positive
Uric acid (mg/dL)	4.6		

APTT: Activated partial thromboplastin time, INR: International normalized ratio, LDH: Lactate dehydrogenase, CSF: Cerebrospinal fluid, ADA: Adenosine deaminase, ALT: Alanine transaminase, AST: Aspartate transaminase, ALP: Alkaline phosphatase, HDL: High-density lipoprotein, LDL: Low-density lipoprotein, TSH: Thyroid-stimulating hormone, USG: Ultrasonography RT-PCR: Reverse transcription polymerase chain reaction

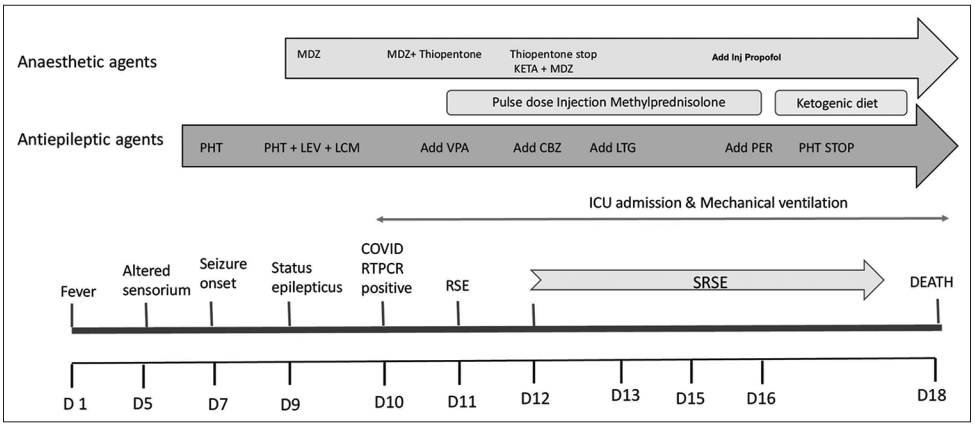

Figure 2: Timeline of patient management. PHT: Phenytoin, LEV: Levetiracetam, LCM: Lacosamide, VPA: Valproic acid, CBZ: Carbamazepine, LTG: Lamotrigine, PER: Perampanel, MDZ: Midazolam, KETA: Ketamine, RSE: Refractory status epilepticus, SRSE: Super refractory status epilepticus, D1-D 18: Day 1-18.

in the brain, particularly in the endothelial cells of cerebral capillaries.[4]

In our case, a young female presented with a new-onset seizure without any comorbidity developing into SRSE despite aggressive management and seizure control, and finally succumbed to death. The largest systemic review discussing the association of SE in COVID-19 disease was published by Dono *et al.* Most of the cases had a good outcome with a resolution of SE, except ten patients who died after a median of 21 days.[5]

With the correlation of symptoms and no other identified cause, we could hypothesize that SARS-CoV-2 could trigger seizures through a neurotropic pathogenic mechanism, and SE can be a neurological manifestation of SARS-CoV-2 infection.

Our case suggests the importance of considering the possible association between SARS-CoV-2 infection in the patients presented with SRSE.

CONCLUSION

We describe the COVID-19 disease presenting with SRSE with poor outcome. However, more research is needed to confirm its causal association.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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