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Zinc supplementation induced seizures in Covid 19 Patients: Case Series

Anusha J[*1], Jayashree V Nagaral[2], Deepak P[3], V. Karthik[1], Sahana GN[2], Raghu N[4] and Manjula MJ[4]

[1]*Post graduate student,* [2]*Assistant Professor,* [3]*Associate Professor,* [4]*Senior Resident,*
Department of Pharmacology, Hassan Institute of Medical Sciences, Sri Chamarajendra Hospital Campus, Krishnaraja Pura, Hassan, Karnataka, India

Abstract

Introduction: Corona virus disease 2019 (COVID-19) started in Wuhan, China. About 36.5% manifest with CNS symptoms like- Acute Ischemic Stroke, Guillain-barre Syndrome, Seizures and Encephalopathy. Since the pandemic has started many newer treatment modalities have been incorporated like antibiotics, antiviral agents and also as an adjuvant therapy with vitamin supplements are being used. Knowing the above treatment modalities various complications was noted and one of the major unpredictable events such as seizures/ convulsions, so to deduce the reason this study was taken up.

Patients studied: COVID isolation ward with history of high grade fever, headache, breathlessness and myalgia for 4 days On the Day 5 of illness (2nd post admission day) they developed first episode of Seizure of General Tonic Clonic Seizures (GTCS). The confirmed COVID-19 - RT PCR positive patients were admitted with history of high grade fever, headache, breathlessness and myalgia for 3-4 days, with the age of the patients being in the range of 40- 55 years, with no past history of seizures/ trauma/ head injury / ear discharge, whose vitals were stable and no neurological deficits found on physical examination done on the day of admission. An initially Empirical antibiotic was started with Tab. Azithromycin 500mg OD-PO for 5days with Cap. Oseltamivir 75mg BD for 3 days followed by supportive medication such as Tab. Cetirizine 10mg, Vitamin supplementation with Tab. Vit C 500mg and Tab. Zinc 50mg were given to the RT PCR positive patients.

Conclusion: The probability of alternative diagnosis is unlikely and low with the background of the pandemic setting. The temporal association positive RT PCR and the onset of seizures coinciding 2 days after onset of symptoms and the mild laboratory changes may be one of the contributory factors to the seizures, with zinc supplementation being the other causative factor suspected to potentiate seizure activity.

Keywords: COVID 19, Seizures, zinc supplementation.

***Correspondence Info:**
Dr. V. Karthik
Hassan Institute of Medical Sciences,
Sri Chamarajendra Hospital Campus,
Krishnaraja Pura, Hassan, Karnataka, India

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1. Introduction

Corona virus disease 2019 (COVID-19) started in Wuhan, China. About 36.5% manifest with CNS symptoms like- Acute Ischemic Stroke, Guillain-barre Syndrome, Seizures and Encephalopathy. [1] Since the pandemic has started many newer treatment modalities have been incorporated like antibiotics, antiviral agents and also as an adjuvant therapy with vitamin supplements are being used. Knowing the above treatment modalities various complications was noted and one of the major unpredictable events such as seizures/ convulsions, so to deduce the reason this study was taken up.

2. Case description

The confirmed COVID-19 - RT PCR positive patients were admitted with history of high grade fever, headache, breathlessness and myalgia for 3-4 days, with the age of the patients being in the range of 40- 55 years, with no past history of seizures/ trauma/ head injury / ear discharge, whose vitals were stable and no neurological deficits found

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3. Course in Hospital

On the Day 5 of illness patients developed first episode of General Tonic Clonic Seizures (GTCS) with 10-15 episodes of seizures were present with each episode lasting more than 30 seconds and associated with H/O loss of consciousness, rolling up of eyes and drooling of saliva. The patients were assessed with CT brain to rule out any pathology in the brain as a cause of seizures and the findings of these imaging studies were found to be normal. The patients were treated with Inj. Phenytoin initially and were found to be non-responsive; hence they were treated with Inj. Sodium valproate and were stabilized. As a part of COVID treatment, patients were receiving zinc, antiviral and antibiotics as mentioned above, after thorough literature search of articles and scientific information, it was inferred that zinc was the offending drug causing seizures, and hence zinc supplementation was stopped in these patients. There were no further episodes of seizures. On day 15 following negative RT-PCR report, patients were discharged once medically stable.

4. Discussion

Chase Matthew Carver *et al* studied that Zinc Selectively Blocks Neurosteroid-Sensitive Extrasynaptic GABA-A Receptors in Hippocampus Zinc selectively inhibits neurosteroid-sensitive tonic current, concluded that they have pathophysiological implications in many brain hyperexcitability conditions, such as seizures, epileptogenesis and conditions with compromised neurovascular unit or Zinc transport pathways in brain.[2] **(Figure 1)** Eberhard *et al*, studied during seizures, inhibition by GABA may be diminished by the zinc released from aberrantly sprouted mossy fiber terminals of granule cells, which are found in many experimental models of epilepsy and in human temporal lobe epilepsy which proved zinc can be a causative factor for epilepsy.[3] Elsas *et al* studied that Zinc inhibits certain subtypes of Nmethyl-D-aspartate (NMDA) and c-aminobutyric acid (GABA) A receptors. By blocking NMDA excitation or GABA inhibition, an excess of zinc may alter the excitability of hippocampal circuits, which contribute to the development of seizures. [4]

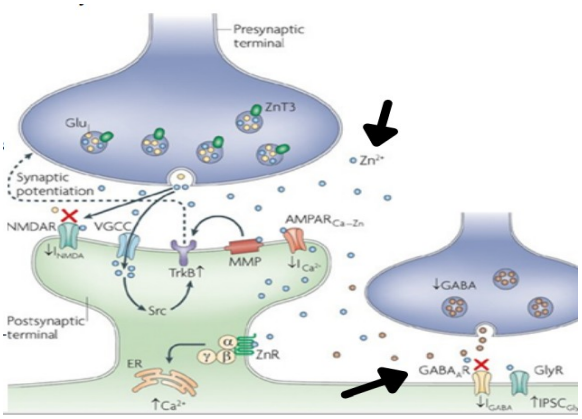

Figure 1: Zinc transport pathways in brain

5. Conclusion

The probability of alternative diagnosis is unlikely and low with the background of the pandemic setting. The temporal association positive RT PCR and the onset of seizures coinciding 2 days after onset of symptoms and the mild laboratory changes may be one of the contributory factors to the seizures, with zinc supplementation being the other causative factor suspected to potentiate seizure activity. There is scientific evidence and an understanding that COVID-19 causes neurological symptoms, hence there may be a chance of occurrence of seizure activity and zinc supplementation as a part of COVID treatment can be contributory towards seizure pathology.

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