Covid-Induced Dystonia and Opsoclonus: A Case Report

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Introduction

- Although the SARS-CoV-2 virus (COVID-19) predominantly affects the respiratory system, there has been an increase in the spectrum of neurological manifestations of the disease
- These include but are not limited to myoclonus, tremor, oculomotor disorders, ataxia, akinetic rigid syndrome, catatonia, dystonia, and chorea (1)
- Myoclonus is one of the most common movement disorders associated with the virus and can coincide with opsoclonus, ataxia and occasionally altered mental status (OMAS) (1, 2)
- Dystonia is one of the rarest movement disorders reported during infection with COVID-19, making up only 1-3% of all cases (2, 3)
- Opsoclonus has been seen in COVID-19 patients with more severe disease, often affecting those in the ICU (1, 4)
- Currently, immunotherapy and steroids show benefits early in the disease course in immune-mediated movement disorders like OMAS and dystonia (5, 6)

Case Description

- Patient is a 74-year-old female with a history of CAD and embolic CVA with infarction of the right frontal lobe
- She presented to the ED for generalized weakness and decreased appetite. Concern started when lower extremity weakness prevented her from standing. Additionally, she reports coughing and throat pain for the preceding two weeks.
- Initial exam showed intact coordination and muscle strength but deficits in short-term recall. She experienced word finding difficulties and what family believed to be below baseline cognition.
- 2 days after admission, she experienced opsoclonus expressed as repetitive conjugate eye movements in addition to dystonia. 7 days later, she began to experience both visual and auditory hallucinations.
- Initial workup yielded a positive COVID-19 PCR test, hypokalemia, and hypochloremia. CT and MRI revealed no new abnormalities. ABG showed hypoxia, managed with supplemental oxygen with eventual return to room air. EEG displayed mild diffuse slowing.
- Initial management included electrolyte correction and nutritional support. Valium and benadryl were added for sleep optimization. Her dystonia was initially managed with Trihexyphenidyl but she was unresponsive. Additional management was attempted with a 5 day course of IVIG at 500mg/kg but again she was unresponsive.
- The patient was transferred to a larger academic facility for further treatment.

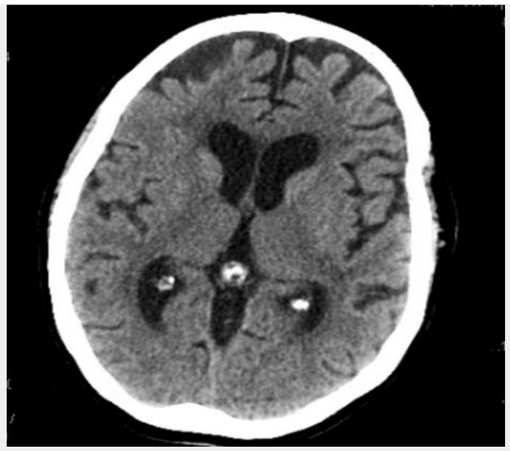

Figure 1: CT head without contrast

Discussion

- COVID-19 induced dystonia is a diagnosis of exclusion and we had to consider her multiple comorbidities, various medication, and prolonged hospital stay as underlying causes of dystonia, opsoclonus, and encephalopathy.
- The temporal relationship between the onset of COVID-19 and the emergence of opsoclonus and dystonia supports the association between the viral infection and the neurological manifestations.
- Dystonia remains one of the rarest reported movement disorders associated with the virus (7). Franke et al., (2021) describe a patient similar to our case, where a 78-year-old experienced upper extremity dystonia along with delirium after a diagnosis of COVID-19.
- Angiotensin-converting enzyme 2 receptors (ACE-2) have been found in the basal ganglia (8). This would allow the virus a direct pathway to bind to the brain structure that controls and modulates movement. There are reports of antibodies against the virus being found in cerebrospinal fluid, supporting direct neural invasion as a possible mechanism for this patient's symptoms (9, 10).
- Opsoclonus is typically due to paraneoplastic syndromes, but in the presence of COVID-19, opsoclonus usually manifests with ataxia and myoclonus (1, 11, 12). This patient was unique in the sense that her opsoclonus presented at the same time as her dystonia in the absence of myoclonus.
- Considering this patient's lack of improvement during her stay, the decision to treat with IVIG was made.

Conclusion

De novo movement disorders due to COVID-19 continue to be a rare manifestation of the disease, and there is limited literature on the topic. Currently, they remain a diagnosis of exclusion, and there is still controversy as to whether COVID-19 is the culprit or if other etiologies are being missed. This case highlights the complexity of diagnosing movement disorders in a patient with multiple comorbidities in the presence of COVID-19 and the need for a comprehensive approach when managing these patients.

Lab Test	Patient Value	Reference Range
Sodium	137	135 - 145 mmol/L
Potassium	2.6	3.5 - 5.0 mmol/L
Chloride	94	98 - 111 mmol/L
WBC Count	4.9	3.8 - 10.6 K/uL
CO2	26	21 - 35 mmol/L
TSH	2.3	0.40 - 7.50 uIU/mL
Vitamin B-12	769	180 - 810 pg/mL
Ammonia	25	18 - 50 umol/L
CPK	35	<178 IU/L
SARS-CoV-2 RT-PCR	Detected	Not Detected

Table 1: Initial Laboratory Tests Upon Admission

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