Case Report:

COVID-19 WITH NEUROLOGICAL MANIFESTATIONS

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ABSTRACT:
COVID-19 has been presenting with a wide spectrum of manifestations including neurological ones. We encountered three patients who presented with neurological symptoms at our set up (COVID WING Farooq Hospital, West Wood branch, Lahore). One patient presented with altered behavior and was found to have infarcts in basal ganglia with no risk factors already present. The second patient presented initially with respiratory symptoms and developed post-COVID-19 cranial nerve palsies and right hemiparesis. The third patient developed generalized tonic-clonic seizures. All these patients tested positive for COVID-19 on PCR. The first two patients refused treatment but the third one recovered fully and was discharged.

Key Words: COVID-19, Seizures, PCR

CASE PRESENTATION:

CASE 1:

Our first case was a 47 years old man who presented with recent onset of irrelevant talk, behavioral changes, emotional disturbances, and abulia. On neurological examination, he had sensory disturbances albeit no motor weakness was observed and there were no cranial nerve palsy. His right plantar was reflex upgoing and upper limb reflexes were exaggerated. Further workup revealed that he was IgM positive for COVID-19. His X-ray chest, high-resolution CT scan of the chest, fasting lipid profile, 4 vessels carotid doppler, echocardiography, and ECG were unremarkable and all other biochemical parameters were within normal limits apart from D dimers which were raised significantly. On plain CT scan brain, he was found to have multiple basal ganglia infarcts of new-onset and a right thalamic infarct as well. There were no significant vascular risk factors for stroke (no history of diabetes mellitus, hypertension, ischemic heart disease, smoking), and his coagulation profile except D-dimers was normal as well.

The patient was counseled regarding further workup of causes of secondary stroke and MRI scan of the brain but he refused further workup and treatment citing social issues and was discharged against medical advice on high dose aspirin (300MG), rosuvastatin (20MG), and rivaroxaban (15MG). A diagnosis of COVID-19 hypercoagulability leading to stroke was made.

CASE 2:

Our second case was a young 32 years old gentleman who tested positive for COVID-19 and had respiratory symptoms and recovered well with the use of steroids and supplemental oxygen. Two weeks later, he presented with left-sided facial and orbital swelling, ophthalmoplegia, left third, fourth, and sixth nerve palsies, and right-sided hemiparesis. Further workup revealed pansinusitis involving maxillary, ethmoidal, and sphenoid sinuses. CT scan and MRI brain plain reported similar findings along with left temporal lobe infarct. The patient tested strongly positive for IgM and IgG antibodies even three weeks after being PCR positive. The lumbar puncture examination was unremarkable. A diagnosis of left orbital cellulitis due to pansinusitis complicated by cavernous sinus thrombosis and intracranial infection was made and the

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patient was started on broad-spectrum antibiotics meropenem, (2G BD vancomycin1G BD), steroids (dexamethasone 2cc 8 hourly) and clexane (40mg s/c BD) and started showing improvement in neurological status. This patient is currently under treatment. The sequelae represent bacterial co-infection with COVID-19 with intracranial extension and neurological deterioration. The patient's family was counseled regarding sphenoid sinus exploration with FESS (functional endoscopic sinus surgery) but they refused.

CASE 3:

Our third case was a 55 years old gentleman who presented with full-blown acute respiratory distress syndrome complicated by COVID-19. Oxygen demand at the time of admission was 15 liters which gradually increased to 25 liters on the face mask. In addition, the patient showed neurological deterioration and developed generalized tonic-clonic seizures and all signs of meningeal irritation were positive on examination. CT scan brain and lumbar puncture couldn't be performed as the patient were on very high oxygen demand and so was empirically treated with broad-spectrum antibiotics and COVID.19 ARDS was managed with high dose methylprednisolone (60mg BD), tocilizumab (400 mg 2 doses 12 hours apart, low molecular weight heparin (Clexane) (60 mg s/c BD) and non-invasive ventilation (CPAP). For seizures, he was given phenytoin and midazolam later changed to levetiracetam, patient was discharged after 3 weeks in a healthy condition fully recovered from COVID-19 pneumonia and meningitis.

In addition to these three patients, many of our patients during the COVID-19 infection developed behavioral disturbances suggestive of COVID-19 encephalopathy which gradually resolved as treatment progressed.

The purpose of these 3 cases is to highlight the various neurological manifestations that developed either as a result of COVID-19 or were encountered during its treatment at our center and calls for attention for treating physicians. Whilst steroids and tocilizumab have an important role in the treatment of COVID-19 pneumonia and ARDS, these cause significant immunosuppression and increase the risk of not only bacterial and fungal infections of the lungs but Central Nervous System (CNS) as well. Treatment should be patient-centered and one should weigh the risks versus benefits while treating each case.

DISCUSSION:

COVID-19 belongs to the family of coronavirus. It primarily affects the respiratory system causing pneumonia and acute respiratory distress syndrome (ARDS). However, the number of cases showing CNS involvement is increasing.[1] As seen in previous studies that CNS infections do occur with severe acute respiratory syndrome (SARS-CoV) outbreak in 2003.[2] Since COVID-19 also belongs to the same family of coronavirus, some of its features can be attributed to the SARS-CoV. Various mechanisms have been proposed regarding the access of viruses to CNS. It is believed that the virus can reach the CNS through the hematogenous spread, directly through the cribriform plate or via the olfactory nerve.[3,4] Mao et al carried out a case series study and found that 24.8% of patients in their study presented with CNS symptoms, among which one died.[5] Another case report by Guan et al showed 13.6% of patients presented with headaches.[6] Similarly, case series by Thomas et al revealed ischemic stroke in 5 patients.[7] This incidence of ischemic stroke was reported to be 23% in the case series by Helms et al.[8] They further reported confusion and agitation their his case series.

Elderly patients or patients with comorbidities are more prone to develop CNS infections.[9] The CNS features vary from non-specific symptoms such as headache and dizziness to more specific symptoms e.g. altered behavior and consciousness, delirium, and seizures. The patients we treated at our hospital showed

infarct, cranial nerve palsy, and encephalitis. The treatment we offered had to be tailored according to every patient's requirements.

Although there are numerous studies regarding the CNS and COVID-19 relation, this field is mostly unexplored. We need more data and evidence to be conclusive about it.

AUTHOR'S CONTRIBUTION:

OF: Conceived and planned
AS: Collection of data
MK: Data analysis
AA: Writing of manuscript
AM: Editing

REFERENCES:

1. Karimi N, Sharifi Razavi A, Rouhani N. Frequent convulsive seizures in an adult patient with COVID-19: a case report. Iran Red Crescent Med J. 2020 Mar 28;22(3):e102828.
2. Asadi-Pooya AA, Simani L. Central nervous system manifestations of COVID-19: A systematic review. J Neurol Sci. 2020 Apr 11:116832.
3. Sohal S, Mossammat M. COVID-19 Presenting with Seizures. IDCases. 2020 May 1:e00782.
4. Carod-Artal FJ. Complicaciones neurológicas por coronavirus y COVID-19. Rev Neurol. 2020;70:311-22.
5. Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, Chang J, Hong C, Zhou Y, Wang D, Miao X. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. JAMA neurology. 2020 Jun 1;77(6):683-90.
6. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DS, Du B. Clinical characteristics of coronavirus disease 2019 in China. N Engl. J Med. 2020 Apr 30;382(18):1708-20.
7. Thomas J, Oxley JM, Majidi S. Large-Vessel Stroke as a Presenting Feature of Covid-19 in the Young. N Engl. J Med. 2020 May 22;382(20):e60.
8. Helms J, Kremer S, Merdji H, Clere-Jehl R, Schenck M, Kummerlen C, Collange O, Boulay C, Fafi-Kremer S, Ohana M, Anheim M. Neurologic features in severe SARS-CoV-2 infection. N Engl J Med. 2020 Jun 4;382(23)2268-70.
9. Filatov A, Sharma P, Hindi F, Espinosa PS. Neurological complications of coronavirus disease (COVID-19): encephalopathy. Cureus. 2020 Mar;12(3): e7352.