

Case Report

Patient with COVID – 19 infection presenting with acute 6th cranial nerve palsy: A case report

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Abstract:

We present a case of a 55 year old lady, hypertensive and diabetic who was infected with COVID-19 presenting with acute 6th cranial nerve palsy. The patient was diagnosed with COVID-19 on Sept 01 2020. Seven days later she developed double vision and headache. At that point on complete neurological examination including examination of cranial nerves she was found to have 6th cranial nerve (Abducens) palsy with convergent squint. As the patients cranial nerves were all intact initially it is suspected that her 6th nerve palsy was related to the viral illness. She was assessed by ophthalmologist and neurologist. She underwent MRI scan of the brain to look for other causes of 6th nerve palsy and it was unremarkable. After almost one week of continued inpatient management her diplopia improved but she still complained of intermittent diplopia with convergent squint.

Keywords: COVID-19, 6th nerve palsy, Diplopia, Viral Infection.

Introduction:

COVID-19 is a novel disease caused by the virus called SARS-COV-2. Since its outbreak in Wuhan, Hubei province, China, in the late 2019 it has emerged itself as a pandemic and has spread to at least 213 countries and affected more than 32 million people and more than 9 hundred thousand people have died to date¹. COVID-19 is primarily a disease of the respiratory system although it affects other organs which have the ACE 2 receptor. The spike protein of the virus binds to the ACE 2 receptor of the cell in different organs to enter inside the cell and cause the disease process. Lower respiratory tract infection related symptoms including fever, dry cough and dyspnea were reported in the initial case series from Wuhan, China². In addition, headache, dizziness, generalized weakness, vomiting and diarrhea were observed³. The respiratory symptoms of COVID-19 are extremely diverse ranging from minimal symptoms to life threatening hypoxia with ARDS. COVID-19 attacks the vascular endothelium and causes a hypercoagulable state with rise in D-dimer levels and formation of micro and macro thrombus throughout the body⁴. There has been neurological manifestation of the disease most commonly headache, taste and smell dysfunction, dizziness and altered level of consciousness⁵. Few cases of severe neurological manifestations have been reported including acute cerebrovascular injury, seizures,

meningitis/encephalitis, Guillain-Barre syndrome, Miller-Fisher syndrome, Cranial nerve palsies including Oculomotor and Abducens nerve^{5,6}.

Case Report:

A 55 year old lady hailing from Dhaka, Bangladesh, known case of hypertension and diabetes was admitted to the hospital as a diagnosed case of COVID-19 on 10th September 2020. Initially the lady presented with fever and cough, then she had positive RT-PCR test on 10 days PTA. Other family members including her husband, son and daughter were also been suffering from the same illness. She was being treated conservatively at home when suddenly two days before admission she suddenly developed headache followed by double vision. Two days later she visited an Ophthalmologist. On examination the patient was found to have right sided 6th cranial nerve palsy. She had marked diplopia on right lateral gaze and she had a right sided convergent squint with restriction of right lateral gaze. Other cranial nerves were intact. The patient was admitted to the hospital on the same day. On admission she was hemodynamically stable and her SpO₂ was 94%, RR-20br/min, Temperature-98.6^oF. Her initial inflammatory markers were high, CRP- 64mg/L and HRCT chest (Fig1) showed 32% involvement of her lungs with bilateral basal ground glass opacity. She was started on IV Methyl Prednisolone, IV Remdesivir, Subcutaneous Enoxaparin, supplemental Oxygen and other symptomatic management along with her anti-diabetic and anti-hypertensive medications. She was examined by a Neurologist who advised an MRI scan of brain. The MRI scan was unremarkable. After treatment for about a week, gradually her diplopia improved and CRP was 3.8mg/L. RT-PCR was repeated three days after admission and which it came out negative. The patient now had occasional intermittent diplopia with convergent squint persisted. She was later discharged in a clinically stable condition.

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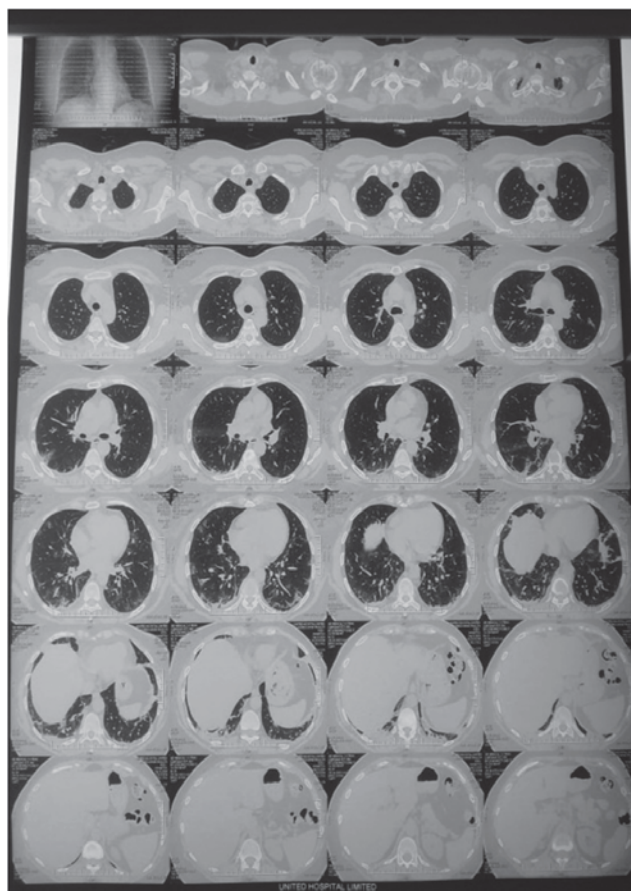


Figure 1

Discussion:

Recent reports of SARS-CoV-2 infections suggest that neurologic symptoms may be due to viral involvement of the central nervous system, because post mortem analysis of infected patients with neurologic symptoms has detected viral nucleic acids in the cerebrospinal fluid and brain tissue⁸. The exact mechanism by which SARS-CoV-2 affects the neurological system is still not fully understood but it has been hypothesized about the possible route of infection in the neurological system. Three potential mechanisms of SARS-CoV-2 invasion into the CNS. (1) CNS entry through the transcranial route, involving infection of the olfactory epithelium, (2) axonal transport and trans-synaptic transfer, including infection of various peripheral nerve terminals and the spread along nerves and (3) viral spread through the bloodstream or lymphatic system⁶. Vonck and colleagues proposed that part of the neurologic spectrum in COVID-19 may be due to direct viral neurological injury or indirect neuroinflammatory and autoimmune mechanisms⁷. Given that the patient had no previous neurological deficits and well controlled diabetes also there were no signs of raised intracranial pressure, injury or stroke, it is probable that her 6th nerve palsy was a manifestation of her COVID-19. Although she needs to be under follow up and repeat MRI to see any changes of her lateral rectus muscle like unilateral atrophy and hyperintensity of the lateral rectus muscle, consistent with denervation of the Abducens nerve.

Treatment is targeted towards controlling the COVID-19 infection and treating the complications that arise from it. Mainstay treatment for COVID-19 still revolves around Oxygen therapy, anticoagulation, steroids and antivirals⁹. Possibly the ray of light at the end of the tunnel are the vaccines that are currently under development. Currently there are 169 vaccines in development, among them 26 are now in the human trial phase¹⁰. Complications arising from COVID-19 must be treated with involvement of a multidisciplinary team, for example this patient with 6th nerve palsy should be followed up by Neurologist, Ophthalmologist, Pulmonologist, Physiotherapist, etc. COVID-19 is still an evolving disease of which we still do not know enough. Taming this disease is still a therapeutic challenge. Therefore every symptom and sign must be handled with caution.

References

1. Coronavirus Update (Live): Cases and Deaths from COVID-19 Virus Pandemic – Worldometer. Available at <https://www.worldometers.info/coronavirus/>.
2. Huang C., Wang Y., Li X., Ren L., Zhao J., Hu Y., et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020; 395:497–506.
3. Shi H., Han X., Jiang N., Cao Y., Alwalid O., Gu J., et al. Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. *Lancet Infect Dis*. 2020;20:425–434
4. Mouhamed YAI, Akiva D, Sargam K, Yasmin A, Lalitha N. The Hypercoagulable State in COVID-19. Incidence, pathophysiology and management. *Thromb Res*. 2020; 194: 101–115.
5. Xiangliang C, Sarah L, Oezguer A.O, Nina N.K, Gereon R.F, Finja S, et al. A systemic review of neurological symptoms and complications of COVID-19. *J Neurol*. 2020; 20 : 1–11.
6. Michelle MF, Andrew JR, Humberto S, Wade R, Steven F, Kara M.C. Acute abducens nerve palsy in a patient with novel coronavirus disease(COVID-19). *J AAPOS*. 2020 doi: 10.1016
7. Baig AM, Khaleeq A, Ali U., Syeda H. Evidence of the COVID-19 virus targeting the CNS: tissue distribution, host-virus interaction, and proposed neurotropic mechanisms. *ACS Chem Neurosci*. 2020;11:995–998
8. Vonck K., Garrez I., De Herdt V. Neurological manifestations and neuro-invasive mechanisms of the severe acute respiratory syndrome coronavirus type 2. *Eur J Neurol*. 2020 doi: 10.1111/ene.14329
9. Yang S, Min Z, Ling Y, Kunkun W, Yiyi Z, Mi Z, et al. COVID-19 treatment: close to a cure? A rapid review of pharmacotherapies for the novel coronavirus (SARS-CoV-2). *Int J Antimicrob Agents*. 2020; 56(2): 106080
10. The push for a COVID-19 vaccine. Available at <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines>