

A case of transverse myelitis post COVID-19 infection in Pakistan

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ABSTRACT

Background. COVID-19 emerged in Wuhan, China and spread rapidly, becoming a global health pandemic. The condition, apart from its typical respiratory presentation, may also cause neurological complications.

Case presentation. A 35-year-old, ex-smoker presented with bilateral lower limb weakness associated with urinary incontinence and constipation following the resolution of a suspected COVID-19 infection. His MRI-Spine showed areas of abnormal densities confirming the diagnosis of transverse myelitis. On the presence of positive SARS-CoV-2 antibodies, COVID-19 was concluded as the pathological trigger for the condition.

He was treated using Methylprednisolone and Plasmapheresis with supportive limb physiotherapy which led to a partial recovery of the patient's disability.

Conclusion. This is the first case of TM associated with COVID-19 in Pakistan and considering the current scenario of a global pandemic, COVID-19 needs to be considered as an important differential for not only TM but other neurological manifestations like encephalitis, neuritis etc.

Keywords: novel coronavirus, neuropathy, myelopathy, SARS-CoV-2, Upper Motor Neuron Lesion, case report

BACKGROUND

The first case of COVID-19 was reported from Wuhan, China in December 2019 after which it quickly spread to almost all corners of the world, ultimately being declared as a Global-Health Pandemic by the World Health Organization. [1]

The disease, apart from the typical respiratory symptoms, also presents with neurological symptoms (headache, dizziness, anosmia) and in time new reports have surfaced defining the neurological complications of COVID-19 including Guillain-Barré syndrome, acute encephalitis, and para/post-infective myelitis. [2] Included within the spectrum of these neurological manifestations is Transverse Myelitis (TM), a condition defined by its typical presentation with band-like symptoms due to inflammation of the spinal cord. [3] Here, we report a case of Transverse Myelitis following COVID-19 in a 35-year-old male as the first case from Pakistan.

CASE PRESENTATION

A 35-year-old male, ex-smoker with 10 pack years and no reported comorbidities, was referred to the Neurology department with insidious bilateral lower limb weakness associated with urinary incontinence and constipation. The patient reported having high-grade fever, mild dry cough and severe body aches that lasted 3 weeks. The patient's PCR for SARS-CoV-2 case out positive and the patient was managed as an outdoor case of COVID-19. This was followed by an acute episode of stabbing, self-limiting lower back pain and tingling sensations down his legs just after the resolution of the viral infection. In the subsequent week, it progressed to weakness and difficulty walking.

In his initial examination, he was vitally stable with blood pressure 110/78 mmHg, pulse 88 beats/min, respiratory rate 16 breaths/min, Temperature 98°F and SpO₂ 95%. Complete neurological examina-

tion demonstrated reduced muscle power in all muscle groups at 4/5 (Medical Research Council Muscle Scale) progressively deteriorating to 2/5, hypertonia, exaggerated deep tendon reflexes, clonus, Babinski's, and Hoffman's sign positive in both lower limbs. Lhermitte's sign was positive.

When the patient was received at the Neurology department, he had already undergone a multitude of tests. His hemogram was within normal limits. Viral Serology for Hepatitis B, Hepatitis C, HIV-I and HIV-II were negative. Liver function tests, renal function tests, TSH levels and clotting profile were not altered. X-Ray chest & spine did not show any abnormality. VDRL was negative. Plain MRI-Spine showed intramedullary abnormal intensity areas at CV5-CV6 to DV9-DV10, predominantly involving the lateral and posterior cord segments. MRI-brain, MR-Angiography and MR-Venography were unremarkable. PCR-EBV, PCR-HSV, PCR-CMV and PCR-HTLV1 were negative. Serum anti-MOG antibodies, anti-AQP4 antibodies, extractable nuclear antigen (ENA) antibodies, antineutrophil cytoplasmic antibodies (ANCA), antiphospholipid antibodies and CSF oligoclonal bands were negative. The CSF-IgG index was normal. Visual evoked potentials were normal. The nerve conduction studies, and Electromyography showed normal sensory and motor study of the sampled nerves and muscles. Under renewed hospital protocols, a screening SARS-CoV-2 PCR and HRCT-Chest did not identify an active COVID-19 infection; however, post infection SARS-CoV-2 Antibodies were positive.



FIGURE 1. Plain MRI-Spine of the patient showed intramedullary abnormal intensity areas at CV5-CV6 to DV9-DV10

The patient had received 5 sessions of Solumedrol (Methylprednisolone) at 1g/day that showed mild improvement. This was followed by 5 sessions of plasmapheresis with supportive lower limb physiotherapy. The patient has partial recovery from 2/5 to 4/5 muscle power (Medical Research Council Muscle Scale) and is ambulatory with support during his follow up. During his admission, the patient had developed a central line associated bloodstream infection (CLABSI) (*Staphylococcus aureus*) for which he was given an extensive course of antibiotics. Foley catheterization and lactulose were used for urinary incontinence and constipation, respectively.

DISCUSSION

Transverse Myelitis (TM) is a heterogeneous non-compressive myelopathy having either an acute or subacute onset with varying degrees of sensory and motor involvement depending on the spinal cord segment affected. [3]

Zhao Y, et.al. was the first to hypothesize that the primary target of SARS-CoV-2 are pneumocytes by the involvement of Angiotensin Converting Enzyme-2 (ACE-2) receptors. [4] ACE-2 receptors are also located in glial cells of the central nervous system, which could indicate a possible means of involvement in neurological manifestations. [5] There are other possible mechanisms that have been proposed in the literature like direct invasion of the nervous system via olfactory bulb, neurological damage due to hypoxic damage following infection and immune mediated damage due to the characteristic 'cytokine storm' in COVID-19. [6] However, the exact mechanism of neurological involvement in COVID-19 still remains obscure. Our case signifies the very need to develop an understanding of these mechanisms.

The management for TM differs on a case-by-case basis, however the standard treatment utilizes corticosteroids (Dexamethasone or Methylprednisolone), plasmapheresis (if therapeutic failure to corticosteroids or with motor involvement) and other immunosuppressive drugs (azathioprine, rituximab, IV immunoglobulins etc.) [7] The very same protocol was followed in our patient however, with the ongoing COVID-19 pandemic, making a decision on giving or not giving immunosuppressants was a difficult and crucial one.

The first case of Transverse Myelitis following COVID-19 was reported in a 66-year-old man in Wuhan, China. [8] The first case of TM following COVID-19 reported to show improvement with steroids and plasmapheresis was reported in a 28-year-old-female. [9] The literature does not report any case of TM following COVID-19 in Pakistan making this the first one, however cases have already been reported in the neighboring India.[10]

The diagnosis of TM in our case was straight-forward as the patient presented with non-selective symmetrical lower limb weakness below a definite segment, associated with bladder and bowel involvement and compatible evidence on MRI for non-compressive myelitis. With confirmation of a preceding COVID-19 infection, improvement on steroids-plus-plasmapheresis and lack of any other cause, it is inferred that this case of para/post-infectious TM was due to SARS-CoV-2.

CONCLUSION

Conclusively, to our knowledge, this is the first case of TM associated with COVID-19 in Pakistan and considering the current scenario of a global

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pandemic, COVID-19 needs to be considered as an important differential for not only TM but other neurological manifestations like encephalitis, neuritis etc. There is a need for understanding the mechanism of development of these neurological manifestations in COVID-19. While standard therapy may be initiated, the risk of immunosuppression needs to be critically assessed. Antiviral therapy may be considered for an active infection.

Informed Consent: An Informed Written consent was taken for the publication of this study in the subject's native language (Urdu).

Ethical Approval: Ethical approval is not required at our institute to publish an anonymous case report.