Annals of Clinical and Medical Case Reports

Case Report

ISSN 2639-8109 Volume 6

Transverse Myelitis in a Patient with COVID-19: A Case Report

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Received: 18 Feb 2021
Accepted: 18 Mar 2021
Published: 23 Mar 2021

Keywords:

Transverse myelitis; COVID-19; Plasmapheresis; MRI; Spinal cord

Author's contribution:

All the authors are contribiuted equally to this article and ICMJE criteria.

Citation:

Ashfaq A. Transverse Myelitis in a Patient with COVID-19: A Case Report. Ann Clin Med Case Rep. 2021; V6(5): 1-3.

1. Abstract

1.1. Background: There has been growing evidence of COVID-19 potentially causing a wide range of neurological abnormalities from as mild as anosmia to as serious as stroke. It is important to recognize that amid this pandemic, we have been seeing different manifestations and associations of COVID-19.

1.2. Case presentation: We present a case of a 45 years old female who presented with one day history of pain around the trunk followed by paresis in both lower limbs and urinary retention. MRI revealed features suggestive of transverse myelitis. No probable cause of transverse myelitis was found after extensive workup. Patient was incidentally found to be having COVID-19 PCR positive as a pre-requisite for the procedure of plasmapheresis.

1.3. Conclusion: We concluded that COVID-19 might be the cause of transverse myelitis in this patient. The patient was successfully treated with plasmapheresis. This case drives us at the conclusion that COVID-19 must be suspected in patients presenting with transverse myelitis.

2. Background

COVID-19 has claimed innumerable lives globally. Apart from causing respiratory symptoms, this disease has been associated with many dreaded extrapulmonary manifestations; cardiac, gastrointestinal and neurological. We have a case of middle-aged female who presented with transverse myelitis and was incidentally found to be COVID-19 positive.

Transverse myelitis is a heterogeneous syndrome characterized by acute or subacute spinal cord dysfunction resulting in paresis, a sensory level and autonomic (bladder, bowel, sexual) impairment below the level of lesion. Here we present a case of middle-aged female with no established premorbids experiencing transverse myelitis associated with COVID-19.

3. Case Presentation

A 45 years old female with no established premorbid conditions, presented with one day history of circumferential tightness around her abdomen which gradually caused pain and radiated to both her thighs and legs. This was followed by weakness in both of her lower limbs and urinary retention. The weakness progressed within eight to ten hours. There was no history of fever, respiratory or gastrointestinal symptoms, any antecedent infection, vision changes or altered sensorium.

On examination she was vitally stable with a blood pressure of 110/75 mmHg, pulse 74/min regular, RR 16/min. Neurological examination revealed 1/5 power in both lower limbs proximally and distally, along with spasticity and brisk ankle and knee reflexes. Planters were bilaterally upgoing. Sensory examination revealed decreased sensations below T10 (umbilical region). Rest of her systemic examination and fundoscopy was normal.

Her lab tests including complete blood picture, liver function tests, electrolytes and renal function tests were normal. Chest Xray and electrocardiogram was normal. MRI brain did not show any evi-

dence of demyelinating disease or space occupying lesion. MRI dorsal spine with contrast showed an abnormal long segment signal in thoracic cord extending from C7-T1 through T12 with similar patchy signal in conus medullaris and mild cord expansion and enhancement from T5 till T9 segment (Figure 1 and 2).

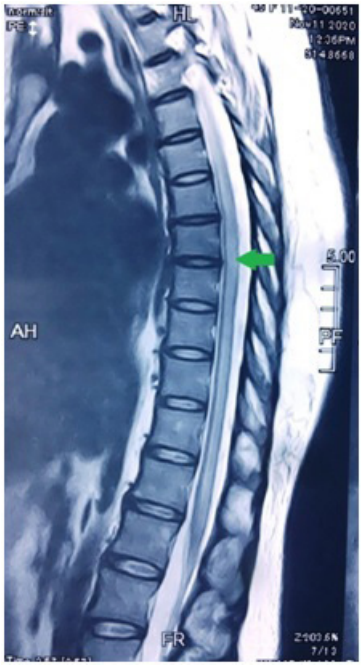

Figure 1

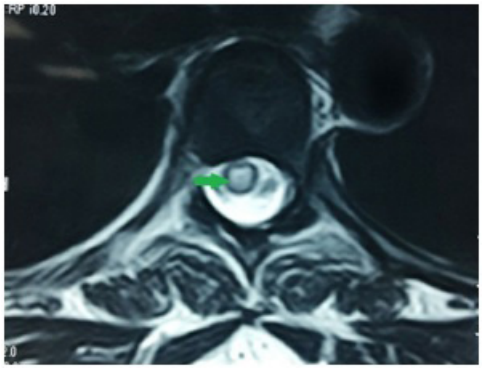

Figure 2

CSF collected from lumbar puncture revealed normal cell count, proteins, glucose and normal IgG index. There were no oligoclonal bands detected. CSF cultures and blood cultures showed no growth.

Furthermore, her ESR, C-reactive protein, thyroid function tests, vitamin B12 levels and ACE levels were normal. Hepatitis B and C serology, anti HIV antibody, anti aquaporin-4 antibodies and ANA were negative. Pan CT scan with contrast showed no evidence of malignancy.

She was given intravenous methylprednisolone 1000 mg for 5 days but there was no improvement in her symptoms. She was then planned to have plasmapheresis. As a prerequisite before any procedure, her COVID-19 PCR was sent, which came out to be positive. This patient did not have any history of fever, respiratory or gastrointestinal symptoms. Her plasmapheresis was started and she underwent five sessions of plasmapheresis on alternate day. She started showing improvement on her third session. After fifth session she had completely recovered. Hence our diagnosis was Para-infectious transverse myelitis associated with COVID-19.

4. Discussion

Patient was finally diagnosed as COVID related transverse myelitis. Two rare entities present in our patient were multi-level spinal cord involvement and improvement with plasmapheresis and not with intravenous steroids.

Transverse myelitis is a heterogenous neurological disease in which there is inflammation of spinal cord usually involving the whole cross section of spinal cord. It is characterized by acute or subacute spinal cord dysfunction causing weakness and numbness of limbs, sensory and motor deficit, and autonomic dysfunction (sexual, bowel and bladder). Its etiologies are acquired demyelinating disorders (multiple sclerosis, neuromyelitis optica, ADEM), systemic inflammatory autoimmune disorders, para-infectious (viral; HIV, HSV, EBV, CMV, VZV, bacterial, fungal and even parasitic), para-neoplastic, drugs and toxins induced and atopy.

Pandemic of COVID-19 emerged from Wuhan city of China in December 2019 and thereby spread throughout the world within a span of few months. It has claimed many lives, and also has caused significant morbidity in patients who develop ischemic stroke or who remain on domiciliary oxygen despite resolution of initial disease.

Exact pathogenesis of acute transverse myelitis secondary to COVID-19 is unknown. Interleukin-6 is also involved in organ damage by causing endothelial damage, activation of complement and coagulation cascade [2, 3]. Cytokine storm is also a pathogenic cause in transverse myelitis [2, 3].

SARS-COV-2 has emerged as a fearful pandemic throughout the world engulfing many lives.

It is also associated with unusual and unexpected pulmonary and extrapulmonary manifestations [2]. Most common presenting symptoms are fever, cough and fatigue but there is also increased incidence of neurological symptoms including anosmia and dysgeusia with COVID-19 infection [1]. It clinically presents as various neurological deficits [2]. Patients usually present with neurological features such as headache, dizziness, anosmia, taste disturbance, ischemic or haemorrhagic strokes, Guillain-barre syndrome or acute transverse myelitis [2, 4-6].

Probable mechanisms of neurological symptoms are described as hypoxic metabolic acidosis or immune mediated neuronal damage induced by viral replication as SARS-COV2 binds to ACE 2 receptors and results in their activation and cause increased blood-brain barrier and immune mediated inflammation [1, 5]. Most likely cause of neurological symptoms is thought to be direct invasion

of SARS-COV2 on the central nervous system during inflammatory response of body [1]. Corona virus can involve central nervous system by hematogenous spread or by neuronal transmission [3].

Improvement of symptoms with steroids indicate transverse myelitis as immune-mediated response [2]. Elevated ferritin levels are associated with severe infection and worse outcomes [1, 2].

COVID-19 should be considered as a differential diagnosis in patients presenting with neurological signs [5, 7, 8]. As patients can also present with loss of consciousness, ataxia, convulsions and status epilepticus, so one should be alert regarding COVID-19 as a cause of transverse myelitis [5]. This pandemic has also caused increased burden of patients with neurological symptoms [9]. Neurologist and physician should be aware of COVID-19 associated neurological presentation [8].

5. Conclusion

There are only a few case reports of transverse myelitis associated with COVID-19. However, keeping in mind that we are still learning about how differently this virus affects every organ system, one should keep COVID-19 as a differential and a suspected cause of causing transverse myelitis.

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