Acute Flaccid Myelitis Caused by Japanese Encephalitis Virus: A Rare Association

Sir,

Acute flaccid myelitis (AFM) is a rare clinical entity characterized by acute onset flaccid paralysis involving one or more limbs and involvement of spinal cord grey matter on magnetic resonance imaging (MRI).[1] It is known to be associated with several antecedent viral infections.[2] We report a 13-year-old female with Acute flaccid myelitis caused by Japanese encephalitis virus (JEV). AFM was confirmed with clinical examination, MRI imaging and exclusion of other causes. There have been reports of AFM in association with various viral infections, commonest being the Enterovirus. However, this may be a rare case report of AFM caused by JEV.

A 13 year-old-girl presented with sudden onset weakness of both upper and lower limbs. The weakness which was proximal at the beginning, progressed to involve distal muscles within one hour of onset. Patient had history of upper respiratory tract infection one week prior to this presentation. There was no history suggestive of seizures, altered sensorium or any similar complains in past. The clinical examination revealed flaccid quadriplegia with power of 0/5 in all limbs along with areflexia without any cranial nerve, sensory or bladder and bowel involvement. Rest of the clinical examination was normal. On investigations, MRI brain and spine showed linear intensity involving bilateral anterior horn cells in cervical cord extending from C4-5 to D1-2 vertebrae with subtle patchy enhancement post-contrast [Figure 1a and b] Cerebrospinal fluid (CSF) analysis revealed mild increase in protein at 720 mg/L and 0.030×10^9/mcL cells all of which were lymphocytes. IgM antibody to Japanese encephalitis was detected both in CSF and serum using ELISA (enzyme-linked immunosorbent assay). Rest of the CSF evaluation for other viruses and mycobacterium tuberculosis and neuromyelitis optica antibody were found to be negative. Nerve conduction velocity (NCV) was suggestive of motor axonal polyneuropathy. Electromyography was normal. A CSF Polymerase chain reaction panel for various bacteria and viruses including cytomegalovirus, Herpes simplex, Varicella Zoster, Parecho and enterovirus was found to be negative. Stool examination for poliomyelitis was also found to be negative. A diagnosis of definitive case of AFM was thus made based on CDC definition.[1] Patient was treated IV immunoglobulin, fluoxetine and other supportive measures. The repeat MRI and CSF examination done four weeks later was found to be normal. Patient could be discharged after five weeks with power of 3/5 in lower limbs and 4/5 in upper limbs.

Acute flaccid myelitis is a rare clinical syndrome reported commonly in western countries with few cases reported in India. AFM actually is a subset of acute flaccid paralysis in which cord myelitis is documented, by magnetic resonance imaging (MRI). The exact cause and pathophysiology have not been elucidated till date. However, an autoimmune etiology has been postulated, although the clinical presentation of sudden onset limb weakness and predominant radiological findings involving the gray matter and not the white matter are more suggestive of a neuro-invasion by the culprit viruses. Lack of response to response to various immunosuppressive agents also discredits the autoimmune pathophysiology.[3]

The commonest agent in various case series is believed to be viral infections, of which enteroviruses are the commonest culprits.[2] Poliomyelitis is an important differential

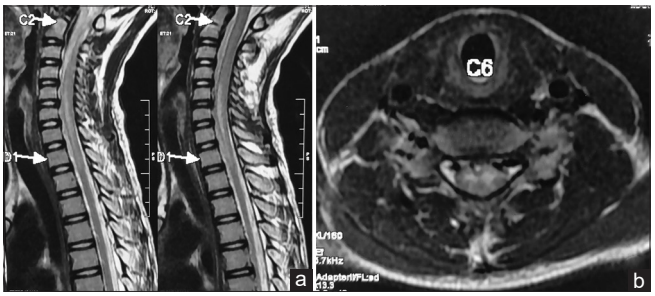

Figure 1: (a) MRI spine showing linear intensity involving bilateral anterior horn cells in cervical cord extending from C4-5 to D1-2 vertebrae. (b) MRI spine axial view showing involvement of anterior horn cells in cervical cord

diagnosis in tropical countries and should be ruled out. Presentation may be highly variable and may involve one or more limbs and cranial nerves.[4] Diagnosis is based on the case definitions by CDC which includes both clinical and laboratory parameters.

The Clinical Criteria includes an illness with onset of acute flaccid limb weakness whereas the Laboratory Criteria for Diagnosis includes

A. Confirmatory Laboratory Evidence: Magnetic resonance image (MRI) showing spinal cord lesion largely restricted to gray matter and spanning one or more vertebral segments
B. Supportive Laboratory Evidence: Cerebrospinal fluid (CSF) with pleocytosis (white blood cell count >5 cells/mm3).

A Probable case is defined as a clinically compatible case with supportive laboratory evidence as mentioned above. A Confirmed or definitive case includes clinically compatible case along with confirmatory laboratory evidence of an MRI showing spinal cord lesion largely restricted to gray matter and spanning one or more spinal segments.[1] Our case was a confirmed case of AFM as per the CDC definition.

The NCV and EMG may be normal in the initial period as the changes in the electrophysiological investigations takes few weeks to develop.[2] NCV may be suggestive of demyelinating polyneuropathy and EMG may show low amplitude and fibrillation pattern.[2] Japanese encephalitis virus (JEV) is an RNA virus and is known to cause encephalopathy, acute flaccid paralysis and Guillain barre syndrome.[5] JEV is an extremely rare cause of AFM. According to the nationwide surveillance report by Sejvar JJ, *et al*. of all the reported and confirmed cases of AFM, JEV was not found to be the causative agent in any case.[2] This is probably the first case report of AFM caused by Japanese encephalitis in India. There is no definitive treatment guidelines and management remains supportive, although available evidence and input from individual experts have suggested use of Immunoglobulin, corticosteroids, plasma exchange and fluoxetine with limited success rates.[6]

Japanese encephalitis is common in Indian subcontinent, however its presentation as AFM is extremely rare. It highlights the challenge clinicians face with clinical presentation of significant overlap with other similar conditions and lack of definitive treatment guidelines. It is imperative to make early diagnosis and identify the causative agent so that preventive and supportive measures may be put in place.

Consent

Consent obtained from the patient.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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