

Dengue Viral Infection Complicated by Acute Transverse Myelitis

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Abstract

Background: Dengue is increasingly being recognized as an emerging infectious disease in Southeast Asia, resulting in spectrum of clinical presentations. Neurological complications secondary to dengue are rare and the exact incidence is unknown.

Case report: A 43-year old Chinese male was initially admitted for dengue and then presented after discharge for acute retention of urine and bilateral lower limb weakness. Magnetic Resonance Imaging (MRI) of the spine was reported to have diffusely scattered T2 hyper-intensity seen within the cord with post contrast enhancement, suggestive of transverse myelitis. He was treated with intravenous immunoglobulin and antiviral medications. After rehabilitation, he was eventually discharged with full neurological recovery.

Discussion: Spinal cord is infrequently affected following dengue virus infection, with acute transverse myelitis being a rare manifestation and very few cases reported in the literature. The mechanism of viral transmission and the extent of neuronal injury induced by dengue virus is poorly understood and can occur in either the early (peri-infectious) or late (post-infectious) phases of dengue fever. The important aspect of the initial evaluation and management of acute transverse myelitis is the elimination of potentially treatable causes. Once a demyelinating pathology is identified, appropriate treatments should be initiated early with intravenous immunoglobulin, steroids and supportive management.

Conclusion: Emergency physicians should be aware that acute transverse myelitis in dengue is a rare but potentially debilitating condition, which can be reversed with early diagnosis and management.

Keywords: Acute transverse myelitis; Dengue; Neurological complications

Introduction

Dengue is the most rapidly spreading mosquito-borne viral disease in the world, and is increasingly being recognized as an emerging infectious disease in Southeast Asia, especially in tropical countries like Singapore [1]. The recent epidemiology of dengue in Singapore is characterized by a 5-6 yearly cycles of dengue epidemics. The incidence rates increase within each cycle before collapsing into 1 or 2 lull years [2]. Dengue virus is a member of the *flaviviridae* family and transmitted by *Aedes aegypti* mosquito. Dengue virus is a small single-stranded RNA virus comprising four distinct but antigenically related serotypes (DEN 1 to 4). It results in a spectrum of clinical presentations, ranging from subclinical to fatal manifestations like Dengue Hemorrhagic Fever (DHF) or Dengue Shock Syndrome (DSS).

Neurological complications secondary to dengue are rare and the exact incidence is unknown. Spinal cord is infrequently affected following dengue virus infection, with very few cases reported in the literature till date. We report a case of acute transverse myelitis which is a rare manifestation of dengue infection.

Case Report

A 43-year old Chinese male was initially admitted at the Singapore General Hospital with a 1 week history of fever and petechial rash over the body since the past 2 days. He was diagnosed to have dengue on the basis of a positive dengue serology (Dengue virus IgM antibody) and detection of dengue RNA in the Dengue Virus Polymerase Chain Reaction (PCR). After being discharged from the hospital, he presented to the emergency department the next day with complaints of acute retention of urine and abdominal discomfort. His examination revealed generalized petechial rash but he was afebrile. His urinary bladder was distended with overlying tenderness. A bladder catheter was inserted and he drained urine well. The urine examination was normal. Hence, he was discharged home with an outpatient follow up with urology department.

He presented a day later again with complaints of recurrence of fever, body ache and bilateral lower limb weakness. The lower limb weakness was progressively worsening affecting ambulation and loss of sensation. On examination, he was noted to have flaccid paraparesis of grade 1/5, hypotonia and loss of anal tone. Bilateral Babinski's signs were equivocal and there was no saddle anesthesia. Rest of his neurological examination was normal. Blood tests showed a rising platelet count. He was admitted under care of the neurologist.

Magnetic Resonance Imaging (MRI) of the cervical spine was reported to have non-enhancing patchy areas of T2 prolongation in

the cervical cord from C2 to C7 with possible T2 changes in the visualized upper thoracic cord (Figure 1).



Figure 1: Sagittal T2-weighted magnetic resonance image of cervical spine shows non-enhancing patchy area of T2 prolongation from C2 to C7 (marked by arrows) raising the possibility of transverse myelitis.

These findings raised suspicion of demyelination versus transverse myelitis. MRI of the thoraco-lumbar spine was reported to have scattered T2 hyperintensity within the cord with post-contrast enhancement. MRI of the brain was normal. Hence, he was diagnosed to have Acute Transverse Myelitis secondary to dengue viraemia. Dengue IgM was positive and dengue RNA was detected. Screening for Epstein-Barr Virus (EBV), Enterovirus, Cytomegalovirus (CMV), Syphilis, Varicella zoster, respiratory virus multiplex and blood cultures were negative. The patient's condition deteriorated and hence was admitted to Intensive care Unit (ICU). Lumbar puncture was performed which showed a negative cerebrospinal fluid (CSF) examination. CSF analysis for culture, syphilis, fungal cultures, Acid fast bacilli, toxoplasma was negative. Oligoclonal band was not detected in the CSF.

He was treated with Intravenous Immunoglobulin (IVIG), antiviral medication acyclovir and symptomatic management including initial observation in Intensive Care Unit (ICU) and then in general ward. He was also reviewed by the physiotherapist as an inpatient. After consultation with the infectious disease specialist, methylprednisolone was not given in view of positive dengue viraemia. His condition improved and after rehabilitation, he was eventually discharged with full neurological recovery after a 41-day stay in the hospital.

Discussion

Various neurological complications secondary to dengue viral infection like encephalopathy, encephalitis, seizures and polyneuropathies like Guillain-Barre, Miller-Fisher have been reported [3-6]. But they are rare and the exact incidence is unknown. The pathogenesis of neurological complications is poorly understood, but can be either immune related or related to the neurotropic effects of the virus, direct invasion or systemic effects of the infection [7,8].

Acute transverse myelitis (ATM) can occur following infections such as herpes zoster, EBV, mycoplasma pneumonia, rubella, mumps and psittacosis, and may have normal MRI findings. It is a rare manifestation of dengue, with very few cases reported in the literature till date [9-14].

Spinal cord is infrequently affected following dengue virus infection, with varying neurological manifestations during the para- and post-infectious stages of infection [8,9]. The duration between the onset of dengue and the development of acute transverse myelitis ranged from 2 to 16 days in the previously published reports [10]. The mechanism of viral transmission and the extent of neuronal injury induced by dengue virus is poorly understood. It can occur in either the early (peri-infectious) or late (post-infectious) phases of dengue fever. The development of early neurological symptoms in the peri-infectious phase is attributed to direct viral invasion of the nervous tissue. The late appearance of neurological symptoms is immunologically mediated neural injury. There is a possible relationship of acute flaccid paraparesis with peri-infectious transverse myelitis and spastic paraparesis with post-infectious myelitis [11].

Myelitis secondary to demyelination occur over days to weeks, and the patients may present with sensory, motor and bladder and/or bowel involvements. The important aspect of the initial evaluation and management of ATM is the elimination of potentially treatable causes [12]. In view of positive dengue PCR 1-2 days after acute retention of urine, this may be related to direct invasion by the dengue virus, although it was not detected in CSF. There was clinical suspicion for an infectious myelopathy as he presented with fever and systemic illness; and we must consider the possibility of dengue in endemic areas. Direct invasion of the central nervous system (CNS) by dengue virus can be identified by the isolation of dengue virus infection from CSF [13]. A high IgM/IgG index for dengue virus in the CSF is useful for the diagnosis of a viral infection. When faced with a patient with an acute myelopathy, a magnetic resonance imaging of the spine is invaluable. However, the MRI study of the spinal cord is so variable that it can be negative [14].

Once a demyelinating pathology is identified, appropriate treatments should be initiated early with IVIG, steroids and supportive management. While the time of onset of symptoms may range from hours to days, the time to either partial or complete recovery may require months.

Conclusion

Emergency physicians should be aware that acute transverse myelitis in dengue is a rare but potentially debilitating condition, with variable clinical characteristics on presentation. This can potentially be reversed with early diagnosis and management.

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