



## Case Report

# Acute Transverse Myelitis Associated With Dengue Viral Infection

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## Abstract

**Background:** Acute transverse myelitis is a very rare complication of dengue viral infection. Very few cases have been previously reported.

**Case Presentation:** A 38-year-old man developed acute transverse myelitis 8 days after the onset of a dengue viral infection. Magnetic resonance imaging of spinal cord showed hyper intensity on T2W at T7-T8. Laboratories studies revealed a positive Dengue serology. Treatment with intravenous methyl prednisolone and physiotherapy yielded a partial recovery, followed by complete resolution at 6 month.

**Conclusion:** Acute transverse myelitis is a rare manifestation of dengue infection that can occur in either the peri-infectious or postinfectious phases.

## INTRODUCTION

Dengue fever is the most prevalent arthropod borne disease caused by flavivirus documented since 1779-1780 & has shown 30 fold increase in last 30 years. 4 serotypes of DENV (DEN 1- 4) are transmitted to humans primarily by the bite of *Aedes aegypti* mosquito (No cross immunity). Risk of disease is higher with areas having multiple endemic serotypes. "Asian genotype" DEN 2 and 3 causes severe disease & epidemic DHF. Recurring outbreaks of dengue fever (DF)/DHF have been reported from various states/UTs—Andhra Pradesh, Chandigarh, Delhi, Goa, Haryana, Gujarat, Karnataka, Kerala, Maharashtra, Rajasthan, Uttar Pradesh, Puducherry, Punjab, Tamil Nadu and West Bengal. Current serotype of Rajasthan (Sept.2015) – DEN 3 (10/18) DEN 2 (6/18), DEN 1 (2/18). SAR may

reach 50-70%. The case fatality ratio (CFR – deaths per 100 cases) has declined from 3.3% in 1996 to 0.4% in 2010 and this further declined to 0.3% in 2013. Every year, during the period July–November, an upsurge in the cases of dengue/ DHF has been observed. The disease has a seasonal pattern; the cases peak after the monsoons and are not uniformly distributed throughout the year.

Various neurologic complications of dengue viral infection have been reported, including central and peripheral nervous system involvement. Encephalopathy, encephalitis, generalized and partial seizures mononeuropathy, polyneuropathy, and acute inflammatory demyelinating polyneuropathy have been seen<sup>(1-4)</sup>. However, involvement of spinal cord in association with dengue fever has been occasionally reported.

There have been very few reported cases of acute transverse myelitis in association with dengue infection<sup>(5-8)</sup>.

### CASE REPORT

A 38-year-old man admitted to SMS Hospital Jaipur with an acute onset of fever and headache for 5 days, followed by purpuric rash on both lower extremities for 3 days. On admission his blood count showed a hematocrit of 40%, a total leukocyte count of 3300/mm<sup>3</sup>, a platelet count of 50,000 cells /mm<sup>3</sup> and dengue serology was positive. No bleeding was evident. Next day patient became afebrile but his platelet count fell to 20,000/mm<sup>3</sup>. He was kept under observation. Two days later he developed acute urinary retention followed by sudden onset weakness of both lower limbs. Patient also noticed decrease sensation in lower half of body up to umbilicus.

Neurologic evaluation revealed weakness of lower limbs of grade 0/5 and hypotonia, bilateral plantar were mute, cremasteric absent and lower limb deep tendon reflexes were absent with T10 level sensory deficit, impaired joint position and vibration sense of the lower limbs, and absence of anal sphincter tone. Serologic testing for leptospirosis, scrub typhus, and murine typhus were all unremarkable, and anti-HIV and Venereal Disease Research Laboratories (VDRL) were both nonreactive. Dengue NS1 Antigen was positive along with Dengue serology - positive IgM for Dengue. Magnetic resonance imaging (MRI) of the thoracic spine showed hyper intensity on T2W at the dorsal part of the thoracic spinal cord at the level of T7-T8. CSF analysis showed clear fluid with normal cell count (<5), glucose level was 55 mg/dL, and protein was 63.6mg/dl. The simultaneous serum blood glucose was 110 mg/dL. CSF culture for bacteria and fungus showed negative results. The patient was diagnosed with acute transverse myelitis in neurogenic shock in association with a dengue viral infection and treated with intravenous methyl prednisolone 1g/ day for 3 consecutive days. Ten days after the onset of symptoms, after undergoing

intensive physiotherapy, both lower limbs were graded as 2/5, and sphincter function was normal. Motor function continued to improve, and neurologic recovery was complete after 6 month of follow-up.

### DISCUSSION

Acute transverse myelitis (ATM) is an acute inflammatory disease of the spinal cord, characterized by acute onset of motor, sensory, and autonomic dysfunction. The causes of transverse myelitis are diverse; etiologies implicated include demyelinating conditions, collagen vascular disease, and infectious or postinfectious. Postinfectious myelitis often begins as the patient appears to be recovering from an acute febrile infection, or in the subsequent days or weeks, but an infectious agent cannot be isolated from the nervous system or CSFs. Numerous organisms have been implicated, including Epstein-Barr virus (EBV), cytomegalovirus (CMV), mycoplasma, influenza, measles, varicella, rubeola, and mumps. Rarely Dengue virus can cause infectious or postinfectious transverse myelitis. Many viruses have been associated with an acute myelitis that is infectious in nature rather than postinfectious. Nonetheless, the two processes are often difficult to distinguish. Dengue infection is caused by Flavivirus in the Flaviviridae family and transmitted by the *Aedes aegypti* mosquito. Dengue virus has 4 antigenically related serotypes, resulting in a spectrum of clinical presentations from subclinical to fatal manifestations called dengue hemorrhagic fever and dengue shock syndrome. Diagnosis is confirmed by the isolation of virus from blood during early phase (NS 1) and serological testing for IgM and IgG antibody by ELISA during the postfebrile phase. Differential diagnosis includes bacteremia, leptospirosis, scrub typhus, malaria, and acute HIV infection syndrome. Treatments are aimed at maintaining adequate hydration and managing potentially fatal complications. The duration between the onset of infection and the development of acute transverse myelitis ranged

from 3 to 15 days in the previously reported cases. The neuropathogenesis of the central nervous system involvement in dengue infection has been poorly understood; both direct infection and post infectious immune mediated neural injury have been postulated. The development of neurologic symptoms in close association with the initial dengue infection (peri-infectious) and flaccid paraplegia are attributed to direct viral invasion of the nervous tissue, whereas the late appearance of neurologic disorders (post infectious) and spastic paraplegia are considered immunologically mediated neural injury<sup>(8)</sup>. Direct invasion of the central nervous system by the dengue virus is supported by the isolation of the dengue virus antigen from CSF and spinal cord tissue in the cases of transverse myelitis immediately following dengue infection<sup>(6,7,9)</sup>. A high IgM/IgG index for dengue virus in the CSF is also useful for the diagnosis of a direct viral infection; however, the MRI study of the spinal cord is so variable that it can even provide a negative result<sup>(5)</sup>. Combining the previously reported cases with the present case, it appears that acute transverse myelitis may occur during either the early (peri-infectious) or the late (postinfectious) phases of dengue fever. This suggests the possibility of both direct and postinfectious mechanisms in dengue fever-associated transverse myelitis.

## CONCLUSION

This man developed acute transverse myelitis 8 days after the dengue infection. A direct dengue infection of the spinal cord is likely although the confirmatory tests to demonstrate the presence of the dengue virus or its immunologic response in the central neural tissue were not available. A cause-and-effect relationship between dengue virus infection and acute transverse myelitis is highly probable in this case.

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