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Case Report

Internal Medicine Section

Paraparesis as a Rare Complication of Dengue Fever Causing Spontaneous Spinal Subarachnoid Haemorrhage

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ABSTRACT

A smaller number of confirmed dengue cases worldwide present with neurological symptoms such as headache, seizure, neck stiffness, drowsiness, altered sensorium, behavioural disorders, delirium, cranial nerves palsies, and rarely, spinal cord involvement. This report is about a 54-year-old female patient with dengue, who presented with acute spinal cord compression due to spontaneous spinal Subarachnoid Haemorrhage (SAH). She complained of sudden onset of febrile illness associated with headache, myalgia, retro-orbital pain, and low backache for three days, followed by sudden onset paraplegia three days after the onset of the illness. A haemogram was obtained, which showed a platelet count of 60,000/μL. She had antibodies against dengue NS1 and dengue Immunoglobulin M (IgM), but not against dengue IgG. A Magnetic Resonance Imaging (MRI) spine contrast imaging revealed a spinal SAH from the level of T12 to L1, as well as significant cord compression. An MRI of the brain revealed a SAH in the bilateral parieto-occipital region. She underwent an emergency laminectomy and complete haematoma evacuation. Postsurgical period was uneventful with complete recovery of sensation and weakness. In patients from endemic areas of dengue infection who present with fever and spinal cord involvement a high degree of suspicion of this disease should arise and it should always be investigated further for dengue-related neurological complications.

Keywords: Haematoma, Nervous system, Neurological manifestations, Spine

CASE REPORT

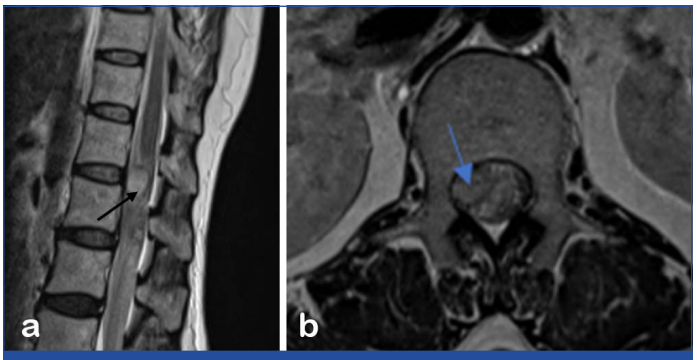
A 54-year-old female presented with a three-day history of acute febrile illness, headache, retroorbital pain, and myalgia. Since the morning, on the day of presentation, she developed sudden onset bilateral lower limb weakness. Additionally, both lower limbs had impaired pain and touch sensation. There was no urine and bowel incontinence with no history of seizure or loss of consciousness.

On examination, her vital signs were normal; however, she was febrile (102°F) and covered in petechial rash over the abdomen, chest, and both lower limbs. Neurological examination revealed bilateral lower limb spastic paraparesis with grade 2/5 power at the ankles, knees, and hips. In both lower limbs, deep tendon reflexes were exaggerated. Bilateral planters were extensors (Babinski positive). At and below the T10 spinal level, she had impaired pain and touch perception. However, there was no bowel or bladder involvement. There was no significant family history for unusual medical condition. Patients' routine laboratory investigations on admission showed thrombocytopenia and dengue serology positive for NS-1 and IgM [Table/Fig-1].

Subsequently, she underwent MRI spine contrast immediately on day 1, which revealed a SAH in the spinal column from T10 to L1 [Table/Fig-2]. Later, when her headache did not resolve, she underwent MRI brain on day 2, which revealed bilateral parieto-occipital subarachnoid haemorrhage [Table/Fig-3]. Based on the MRI spine and brain reports the diagnosis of SAH was arrived at, which was probably due to dengue infection presenting as paraparesis.

Parameters	Result	Reference values
Hb (g/dL)	13.3	12.3-15.3
WBC (/μL)	3100	4000-10000
Platelet Count (/μL)	65000	1,50,000-4,50,000
a PTT (in seconds)	25.1	19.8-26.2
INR	1.1	0.85-1.15
Dengue		
NS-1	Positive	
IgM	Positive	
IgG	Negative	

[Table/Fig-1]: Laboratory investigations on admission to the hospital.

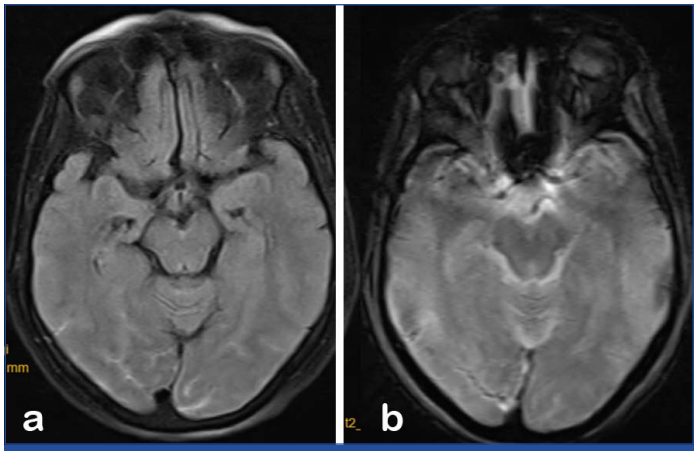


[Table/Fig-2]: a) Sagittal section of MRI spine demonstrated T1 hyperintense anterior subarachnoid hemorrhage extending from T10 to L1 level (black arrow); b) Axial section shows T1 hyperintensity at T10 level suggestive subarachnoid hemorrhage (blue arrow).

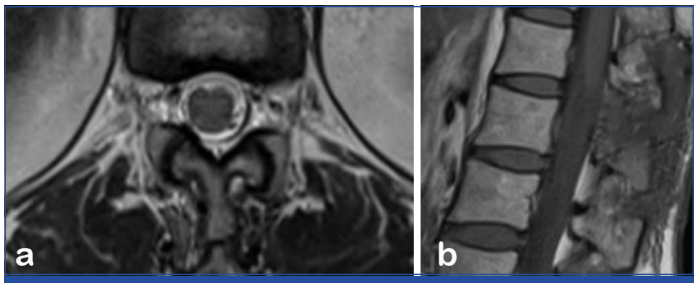
Following that, the patient underwent spinal laminectomy from T10 to L1 and the haematoma was removed to decompress the spinal cord. After six days of surgery, an MRI revealed no SAH and no other abnormal pathology [Table/Fig-4]. By the sixth day of her illness, her platelet count improved to 2.1 lakhs/μL. She received rehabilitative and supportive care. Over the period of time of next two months her paraparesis improved, and the patient gained power of 5/5 in both lower limbs. On neurological examination, her reflexes were normal and both planters were flexors.

DISCUSSION

Dengue fever, a viral infection transmitted by mosquitos that causes a febrile illness, is a common disease in tropical and subtropical countries. Humans are infected with the virus via infected mosquitoes, *Aedes aegypti* and *Aedes albopictus* [1]. The World Health Organisation estimates 390 million dengue virus infections



[Table/Fig-3]: Axial sections of brain reveal; a) Hyperintensity on fluid attenuated in bilateral sulcus of parieto-occipital region; b) Depicts corresponding susceptibility weighted image.



[Table/Fig-4]: Postoperative contrast enhanced imaging. a and b) Axial and sagittal section shows showed complete evacuation of clot.

per year of which 96 million manifests clinically (with any severity of disease). Another study estimated that 3.9 billion people are at risk of dengue infection. It has been stated that 70% of the risk burden falls in Asia, out of the 129 global countries [2,3]. A study by Bhatt S et al., estimated that India contributed 34 of 96 million apparent global dengue infections [3].

Dengue is frequently associated with fever, leukopenia, and thrombocytopenia, and it is usually self-limiting. In severe cases, it can result in vascular leakage and haemorrhagic manifestations that are characteristic of Dengue Haemorrhagic Fever (DHF). Expanded dengue syndrome is when fluid leaks and volume is lost, which causes severe shock, multiple organ failure, and death [4]. Severe dengue kills between 0.5% and 3.5% of people in Asia [1,5].

Only about 4% to 5% of confirmed dengue cases worldwide present with neurological symptoms [6]. During the acute phase, neurological involvement manifests as encephalitis, myelitis, and meningitis – all of which are a result of the virus's direct invasion of the central nervous system [4].

Headache, seizure, neck stiffness, drowsiness, behavioural problems, delirium, cranial nerve palsies, and spinal cord involvement are some of the other symptoms [6,7]. The postinfectious phase may be associated with syndromes such as acute disseminated encephalomyelitis, neuromyelitis optica, optic neuritis, Guillain–Barré syndrome, myelitis, and oculomotor palsy. Encephalitis is the most common neurologic manifestations of them all. Spinal cord injury occurs infrequently during the postinfectious phase of dengue fever [8].

Pathophysiological mechanisms include viral infection of the CNS, metabolic disturbances impairing CNS function, haemorrhage, CNS inflammation, and viral-induced demyelination [7,9]. An acute spinal cord compression, paraparesis, and headache following a SAH in the brain are described in this case of dengue infection.

This report is about a non-traumatic spontaneous spinal and brain SAH associated with DF and thrombocytopenia. Based on the review of the literature, only one previous report of spinal SAH associated with dengue fever has been published [10]. In the report published by Sharif NHM et al., the patient presented with history of fever and altered sensorium for 3 days and later she developed sudden onset bilateral lower limb weakness on day 4 of illness, similar to the index case except altered sensorium. On examination, this patient was confused and had bilateral 6th cranial nerve palsy and sensory level at T4 spinal level. The platelet count was 80,000/μL and dengue NS-1 antigen was positive. On MRI spine, SAH was found at level T4 extending till T9. In this case as well as the index patient, both of them underwent spinal laminectomy and haematoma removal. There is a report on similar dengue-related neurological manifestations in the context of dengue-induced myelitis, Guillain-Barre syndrome, and dengue myositis [11].

In the index case, symptoms were mostly due to combination of spinal cord oedema and haemorrhage, which caused cord compression in this particular instance of the patient. Because of the diluting and redistributing effects of cerebrospinal fluid (CSF), spinal SAH has only rarely been associated with spinal cord compression. Trauma, coagulopathy, and arteriovenous malformation are all known to be associated with this condition [12].

There are currently no proven antiviral treatments that can effectively treat dengue infection. One dengue virus serotype infection results in immunity to that virus for a brief period of time, but not for other serotypes. Most patients receive general supportive therapy, focussing on fluid replacement, intense haematological monitoring, and/or if required, blood transfusion. Supportive care and symptomatic treatment such as antiepileptics for seizures, as well as a cerebral decongestant including mannitol for elevated intracranial pressure in an intensive care unit should be provided. However, a number of vaccine preparations are being looked into. Notably, it is especially important to avoid *Aedes* mosquito bites in dengue-endemic regions [13]. However, the majority of the reported cases with SAH had a delayed diagnosis, which leads to a high mortality rate. In fact, the problem may be controlled if proper dengue care is taken to limit the extent of the problem due to profound thrombocytopenia [14].

If there is no neurological deficit, a SAH in the spine may resolve spontaneously [15]. When there is significant cord compression, as in this case, surgeons will recommend surgical laminectomy [16]. The purpose of the surgery is to decompress the spine, which had already been accomplished by the laminectomy. It is possible that early surgical intervention resulted in a successful recovery following laminectomy.

Dengue virus was previously thought to be non neurotropic [17]. However, neurological symptoms like encephalopathy and aseptic meningitis have become more common in recent years [7,18]. Seizures, SAH, intracranial bleeding, and neuropathies are additional neurological manifestations. Two patients in the present case series had encephalitis but no additional seizures. Three causes can be identified for the CNS manifestations: (a) the virus's direct neurotropic effect; (b) secondary to systemic manifestation; and (c) postinfectious sequelae, including immune-mediated reactions [19]. There is a growing literature on the incidence and outcome of DF associated with atypical CNS manifestations like SAH. Intracranial haemorrhage predicts poor prognosis, significant morbidity and mortality [20]. In a study conducted by Kulkarni R et al., neurological complications were seen in 2.64% of cases of which encephalopathy, encephalitis, and syncope were the commonest manifestations, followed by acute symptomatic seizures, intracranial bleed, and SAH [20]. Even if diagnosed early, it is difficult, if not impossible, for general practitioners to take action because there is still uncertainty in management. This necessitates that healthcare delivery systems revise existing guidelines and develop strict protocols for managing such complications in order to reduce morbidity and mortality globally.

CONCLUSION(S)

When it comes to recognising dengue-related neurological complications, a high index of suspicion is required. Patients from

dengue-endemic areas who present with an acute febrile illness and atypical neurological manifestations should be considered for this diagnosis. Spinal SAH is a rare dengue fever complication. Clinicians must act quickly to diagnose and treat this condition to avoid irreversible neurological damage.

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