

### Spontaneous Spinal Subarachnoid Haemorrhage: A Rare Complication of Dengue Fever

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#### ABSTRACT

A 37-year-old woman presented with a short history of fever and bilateral lower limb weakness. She also had impaired sensory function up to T4 spine level and lax anal tone. Laboratory investigations confirmed dengue infection with mild thrombocytopenia. MRI of the spine showed a spinal subarachnoid haemorrhage from the level of T4 till T9. Despite medical and surgical interventions, her lower limb weakness persists. A high index of suspicion is needed to recognise dengue-related neurological complications. This diagnosis should be considered in any patients from dengue endemic areas presenting with acute febrile illness with atypical neurological manifestations.

**KEYWORDS:** paraplegia, subarachnoid haemorrhage, spine, dengue.

#### INTRODUCTION

Worldwide, only 4-5% of confirmed dengue cases present with neurological symptoms which include headache, seizure, neck stiffness, drowsiness, depressed sensorium, behavioural disorders, delirium, cranial nerves paralysis and rarely, spinal cord involvement [1,2]. Several pathophysiological mechanisms have been implicated including direct central nervous system (CNS) viral entry, metabolic disturbances impairing CNS function, haemorrhage, CNS inflammation and demyelination due to virus-generated autoimmune reactions [2, 3].

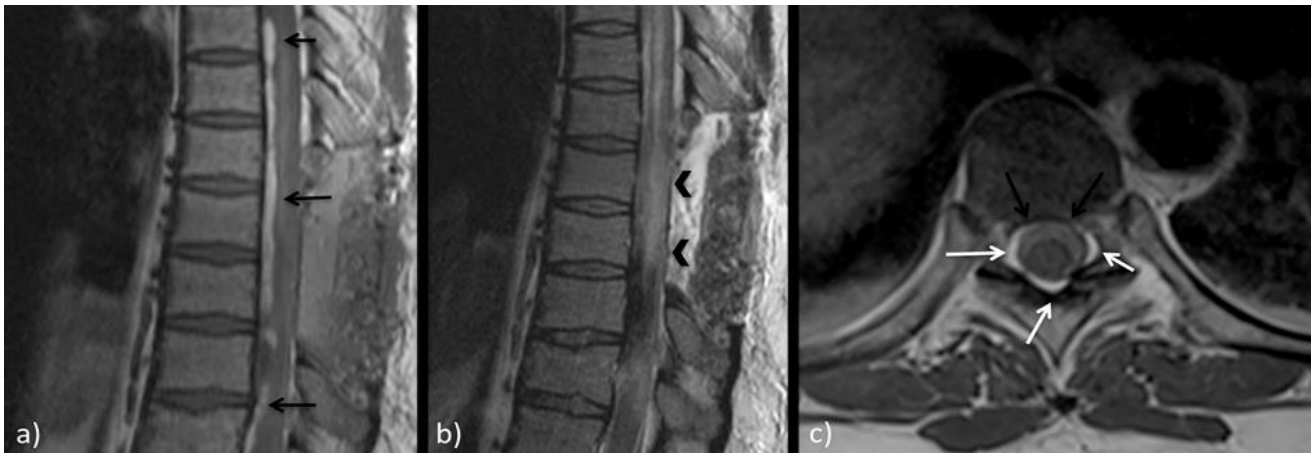
We report a case of dengue infection that presented with acute spinal cord compression due to spontaneous spinal subarachnoid haemorrhage. To the best of our knowledge and from our literature review, there has been no reported case of spinal subarachnoid haemorrhage occurring with dengue before.

#### CASE PRESENTATION

A 37-year-old woman presented with fever of 3 days. On the day of admission (day 4 of illness), she

developed sudden onset bilateral lower limb weakness and altered behavior. There were no seizures, loss of consciousness, urinary or fecal incontinence. On examination, she was febrile and confused. She had bilateral restricted lateral gaze suggestive of bilateral 6th cranial nerve palsy. She was also paraparetic with impaired sensory function up to T4 spine level. Anal tone was lax. The rest of the physical examinations were unremarkable. Prior to this presentation, she was well with no underlying medical problems.

Laboratory investigations on presentation showed leukopenia ( $2.97 \times 10^9/L$ ) and thrombocytopenia ( $80 \times 10^9/L$ ). Prothrombin time was 14 seconds, activated partial thromboplastin time (APTT) 47.5 seconds and international normalized ratio (INR) was 1.1. Renal function showed mild hyponatremia (Na: 133) and hypokalemia (K: 3.1) with normal creatinine. Serum transaminases and creatinine kinase level were elevated. NS-1 antigen taken on day 4 of illness was positive. Dengue IgG and IgM taken at the same time was negative.



**Figure 1** (a) Sagittal T1W FSE demonstrated T1 hyperintense anterior subarachnoid haemorrhage extending from the level of T4 till T9 (black arrow). (b) Sagittal T2 FSE shows T2 hyperintensity (black arrowhead) within the spinal cord which may be cord oedema as a result of compression by the subarachnoid haemorrhage or concurrent transverse myelitis due to dengue. (c) Axial T1W FSE at level of T7 demonstrated intact epidural fat space (white arrow) and the subarachnoid haemorrhage almost encircling the spinal cord (black arrow).

Lumbar puncture was not done as platelet had dropped to  $52 \times 10^9/L$  at day 4 of illness. Dexamethasone was started in view of suspected dengue encephalitis with concurrent transverse myelitis. Intravenous ceftriaxone and acyclovir was also started as empirical meningoencephalitis treatment.

Contrast enhanced CT brain on admission was normal with no meningeal enhancement. MRI of the thoraco-lumbar spine was done revealing a spinal subarachnoid haemorrhage at level of T4 till T9 (Figure 1).

At day 8 of illness (recovery phase) and platelet level of  $91 \times 10^9/L$ , she underwent a non-instrumental spinal laminectomy at T7-T9 level to decompress the spinal cord. After the dural layer was opened, the spinal cord appeared swollen, limiting the intraoperative visualization. Thus, the surgeons were unable to visualize the anterior spinal cord. No organized haematoma was seen at this subdural space. They also did not find any vascular abnormality or tumour. Due to the complexity of the spinal surgery, there was a risk of a dural tear which subsequently may result in CSF leak. Thus, an external lumbar drainage was inserted. This diverted any excess CSF away from the dural tear and promoted healing of the dura. Post-surgery, her platelet level continued to improve to normal level.

Despite surgical decompression, MRI performed 2 days post laminectomy showed persistent

anterior subarachnoid haemorrhage but now at the level T5-T11. There was also patchy intramedullary T2 hyperintensity from C4 to T11 which suggested concurrent transverse myelitis. Post-operatively, external lumbar drainage drained a very small amount of xanthochromic CSF. CSF and blood cultures did not grow anything. The sample amount was inadequate for biochemical analysis and dengue PCR.

She did not develop other dengue-related complications such as plasma leakage or bleeding elsewhere. Platelets recovered to normal level by day 9 of illness. Subsequently, her ophthalmoplegia resolved. However, the paraparesis did not improve. Supportive care was continued and focus was shifted from cure to rehabilitation.

## DISCUSSION

This case illustrated a non-traumatic spontaneous spinal subarachnoid haemorrhage associated with dengue fever in which thrombocytopenia was not severe. To the best of our knowledge and from our literature review, there has been no reported spinal subarachnoid haemorrhage occurring with dengue before. There was only one reported paraparesis secondary to dengue-induced thrombocytopenia epidural hematoma [4] and another that presented with quadriparesis due to cervical hematoma [5]. Both cases had lower degree of thrombocytopenia compared to our case which suggested higher risk of spontaneous spinal haemorrhage at lower platelet levels.

Similar dengue-related neurological presentation had been reported due to dengue-induced myelitis [6], hypokalemia [7], Guillain-Barre syndrome [8-10] and dengue myositis [11]. In our case, we believe that her symptoms resulted from a combination of spinal cord oedema and haemorrhage causing cord compression with concomitant dengue-related encephalitis and transverse myelitis.

Spinal subarachnoid haemorrhage has rarely presented with spinal cord compression due to the diluting and redistributing effect of the CSF. It is commonly associated with trauma, coagulopathy and arteriovenous malformation [12]. MRI cannot rule out vascular malformation as a cause of spinal subarachnoid haemorrhage as it may not be visualised on MRI. Spinal digital subtraction angiogram would be a better modality to assess spinal vascular malformation. However, this procedure requires puncture of the femoral artery which was risky in this case due to the low platelet count.

Spinal subarachnoid haemorrhage may resolve spontaneously if presented without neurological deficit [13]. Surgical laminectomy is only indicated when there are significant signs of spinal cord compression such as in this case [14]. We note that in this case, no organised haematoma was seen intraoperatively. Extensive cord oedema reduced the intraoperative visualisation, resulting in the surgeon being unable to visualise the anterior spinal cord, where the haematoma is. Furthermore, the haemorrhage was in the subarachnoid space which the surgeon did not dissect and explore due to its complexity and adherence to the spinal cord. The purpose of surgery was decompression which was already achieved by laminectomy. This may also explain why the haematoma persisted post-operatively. The shift in its position from T7-T9 to T5-T11 may be due to the dilution effect which spreads the haematoma.

Poor recovery post laminectomy may be due to delay in surgery or dengue-related transverse myelitis which only partially responded to steroids. Delay in surgery may be unavoidable due to the thrombocytopenia and the need to stabilize the patient during the critical phase of dengue.

High index of suspicion is needed to recognise dengue-related neurological complications. This

diagnosis should be considered in any patients from dengue endemic areas presenting as acute febrile illness with atypical neurological manifestations.

## CONCLUSION

Spinal subarachnoid haemorrhage can be a rare presentation of dengue fever. Clinicians need to act fast to identify and manage it in order to prevent irreversible neurological deficit in a previously healthy individual.

## Conflicts of Interest

Authors declare none.

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