

## Isolated unilateral sixth cranial nerve palsy: A rare presentation of dengue fever

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### Abstract

Dengue fever is a common mosquito-borne viral infection endemic in tropical and subtropical countries. Neurological manifestations in dengue infection are relatively uncommon, and include encephalitis, encephalopathy, neuromuscular disorders and neuro-ocular disorders. Cranial mononeuropathy is a rare manifestation of dengue infection. A 40-year-old man was diagnosed with isolated, unilateral sixth cranial nerve palsy complicating dengue infection. The patient was managed accordingly, and full ocular recovery was observed. This was the first reported case of isolated sixth cranial nerve palsy associated with dengue fever in Malaysia. It is important for clinicians to consider dengue as a differential diagnosis in patients presenting with fever and sixth cranial nerve palsy.

### Introduction

Dengue fever is a mosquito-borne viral infection endemic in tropical and subtropical countries.<sup>1</sup> It has four distinct, but closely related, serotypes (DEN-1 to DEN-4).<sup>1,2</sup> Its clinical presentations can vary from asymptomatic to life-threatening infections.<sup>2</sup> The involvement of the central nervous system has been classified as severe dengue in the recent guidelines published by the World Health Organization (WHO).<sup>2</sup> These neurological manifestations can be broadly categorized into encephalitis, neuromuscular, and neuro-ophthalmic complications with possible overlapping in certain cases.<sup>3</sup> To our best knowledge, this was the first reported case of dengue-related unilateral, sixth cranial nerve palsy in Malaysia.

### Case report

A 40-year-old man presented with acute-onset binocular diplopia for 2 days associated with fever for 4 days. No other neurological symptoms or bleeding tendency was observed. Also, no significant past medical illness or recent traveling history was found.

On arrival, his vital signs were stable. He displayed left-sided convergent squint and restriction of lateral gaze, consistent with left sixth cranial nerve palsy (Figure 1). Otherwise, neurological examination of other cranial nerves, visual acuity and fundoscopy examination were unremarkable. No evidence of plasma leakage was observed



**Figure 1.** Neutral position of the patient's eyes showed convergent squint of the left eye

The initial laboratory investigations revealed haemoconcentration (haematocrit, 56%) along with normal white cell counts ( $7 \times 10^9/L$ ) and thrombocytopenia ( $12 \times 10^9/L$ ). His liver function test showed elevated levels of aspartate transaminase (107 IU/L) and alanine transaminase (62 IU/L). His renal profile and chest radiograph were normal. Both dengue non-structural protein 1 (NS-1) antigen and dengue-specific immunoglobulin (IgM) results were positive. Contrast-enhanced computed tomography (CECT) of the brain was performed, and reported as normal. Fasting blood sugar, human immunodeficiency virus (HIV), rapid plasma reagin (RPR), anti-nuclear antibody (ANA), anti-neutrophil cytoplasmic antibody (ANCA), and complement C3 and C4 test results were negative. Lumbar puncture was not carried out due to bleeding risk in the presence of severe thrombocytopenia. Nerve conduction study and electromyography were not performed.

He was diagnosed with dengue fever complicated with isolated left abducens nerve palsy and managed accordingly. His diplopia started to improve on the following day. He was discharged well, and on follow-up visit after 1 month, his convergent squint had completely resolved.

### Discussion

Dengue fever is a global public health problem in endemic countries.<sup>1</sup> The complexity of various manifestations of dengue is attributed to the dynamic and systemic nature of the disease.<sup>2</sup> The ophthalmic complications of dengue infection were once thought to be rare; however, the incidence increased with more reported cases.<sup>3</sup> Most of the literature had identified maculopathy as the most common neuro-ocular complication, whereas less common presentation include retina vasculopathy, optic neuropathy and cranial nerve palsy.<sup>4</sup> Dengue-associated cranial neuropathy, especially abducens nerve, was relatively rare, with only a few reported cases.<sup>5,6</sup> Other cranial neuropathies included facial nerve and oculomotor nerve involvements.<sup>7,8</sup> Visual blurring is the most common presenting eye symptom, while other visual symptoms include conjunctival redness, retro-orbital pain, scotoma, colour vision abnormality and double vision.<sup>4</sup>

The pathogenesis in dengue-related neuro-ophthalmic complication was believed to be immune mediated, although the exact mechanism is not completely understood.<sup>3</sup> The delayed onset of visual symptoms of up to 1-week following dengue infection favours the immune-mediated theory.<sup>3</sup> Our patient presented with convergent squint 2 days

after the onset of dengue fever, and this was consistent with the delayed presentation of ocular manifestation reported previously. Lesions that cause raised intracranial pressure with false localising signs such as tumour and intracranial haemorrhage, demyelinating diseases such as multiple sclerosis, infections such as meningitis and encephalitis, trauma and stroke need to be excluded accordingly.

The management of dengue-related abducens nerve palsy was mainly supportive, with improvement observed in previously reported cases.<sup>5,6</sup> Our patient had improved with expectant management. Similarly, patients with other dengue-associated cranial nerve palsies, such as Bell's palsy or oculomotor nerve palsy, have been reported to improve without any specific therapy such as steroid or intravenous immunoglobulin.<sup>7,8</sup> The overall prognosis for dengue-related ocular complications was good, and complete recovery coincided with improved platelet counts.<sup>3,4</sup>

### Conclusion

With the cumulative number of dengue cases, it is important for clinicians to include dengue fever as one of the differential diagnoses for patients presenting with fever and isolated sixth cranial nerve palsy.

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