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IMAGING HIGHLIGHT

Dengue haemorrhagic encephalitis: Report of a child from Myanmar with bilateral thalamic involvement

[1]Khine Mi Mi Ko *MRCPCH*, [2]Win Kyawt Khin *MMedSc*, [1]Kyaw Linn *FRCPCH*, [1]Aye Mya Min Aye *MRCPCH*, [1]Chaw Su Hlaing *MRCPCH*, [1]Aye Mu Sann *MRCPCH*, [1]Hnin Wint Wint Aung *MRCPCH* [1]Myo Thiri Swe *MMedSc*, [1]Cho Thair *MRCPCH*, [1]Yi Yi Mar *MBBS*, [1]Nway Nway *MRCPCH*, [1]Phyu Phyu Myint *MBBS*, [1]Ei Hnin Kyu *MRCPCH*

[1]Pediatric Neurology Unit &, [2]Radiology Department, Yangon Children Hospital, Yangon, Myanmar

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INTRODUCTION

Dengue viruses are single-stranded RNA viruses of the *Flavivirus* genus. It is a common viral infection worldwide, especially in tropical regions. Various neurological manifestations such as encephalitis, encephalopathy, meningitis, acute disseminated encephalomyelitis (ADEM) acute viral myositis, Guillain–Barré syndrome and others are increasingly reported. However, acute haemorrhagic encephalitis is a very rare presentation. Currently, there are only few previous case reports.[1-4]

CASE REPORT

This was a 11 year old girl who presented with five days fever and altered sensorium for two days. She had a few episodes of generalized clonic seizures occurred on the fifth day. On presentation, she was drowsy with language difficulty but attempted to say few words which were slurred. The eyes opened to command and there was withdrawal response to pain stimuli. Pupils were equal and reactive to light with no opthalmoplegia. Apart from mild facial diplegia with swallowing difficulties, there was no other cranial nerves abnormalities and no meningism. She was tetraparetic. Liver was palpable at 2cm below the right costal margin. No other systemic manifestations were seen, with some petechial rash over trunk and limbs. She was initially treated as meningoencephalitis, and was given antibiotics and other supportive management. Her conscious level deteriorated to Glasgow Coma Scale score of 3/15 on third day of admission and was intubated for 17 days for respiratory support.

Full blood count showed thrombocytopenia, lowest at 37x 10^9/L on the admission at fifth day of fever, and leucopenia (WBC 2.6 x10^9/L with neutrophil of 32% and lymphocyte 47%), which started to improve on day-7 of illness (Table 1). C-reactive protein, electrolytes, and liver function tests were within normal limit. Coagulation profile were slightly deranged (PT 34 seconds and INR 3) on Day 2 admission and back to normal on Day 4 after receiving few units of blood products. Dengue non-structural protein 1(NS1) antigen test was positive in serum on admission. Cerebrospinal fluid (CSF) analysis showed lymphocytic pleocytosis (lymphocytes 58 cells/cmm) with elevated protein (260 mg/dl) and normal sugar (63mg/dl). Serum IgG/IgM antibodies and CSF PCR for dengue virus were positive.

There was no evidence of systemic causes of encephalopathy such as acute liver failure, hypovolemic shock, and metabolic derangements. CSF and blood PCR for herpes simplex, varicella zoster and Japanese B encephalitis were negative. Tests for malarial parasites, Salmonella and leptospira were also negative.

CT scan of the brain on day 5 of illness (Figure 1) showed ill-defined symmetrical non-enhancing hypodensities in both thalami and pons. Magnetic resonance imaging (MRI) on 4th week of illness (Figure 2, 3) showed findings similar to the initial CT. The lesions in bilateral thalami and pons were hyperintense on T1WI, hyperintense with hypointense rim on T2WI and FLAIR images. On SWI images, the lesions

Address correspondence to: Dr Khine Mi Mi Ko, Consultant Paediatrician, Paediatric Neurology Unit, Yangon Children Hospital, Pyidaungsu Yeiktha Road, Dagon Township, 11191 Yangon, Union of Myanmar. Tel: Mobile: +(95) 9 5013797, E-mail: khinemimiko@gmail.com

Table 1. Investigations of the patient

	Day 2	Day 5 fever (On admission)	Day 7	Day 11	Day 15	Day 22
Hb(g/L)	12.5	13.5	10.6	11.5	11.9	12.6
WBC(10^9/L)	4.7	2.6	3.5	5.5	6.7	9.5
Platelets(10^9/L)	95	37	66	83	90	132
CRP	8	10	6		6.5	
Urea(mmol/L)		5.1		5.8		
Creatinine(mmol/L)		56		55		
ALT(mmol/L)		43	45		38	
PT(sec)			34	10		
INR			3	1.2		
Na(mmol/L)		135	138	137		140
K(mmol/L)		4	3.8	3.7		4,4

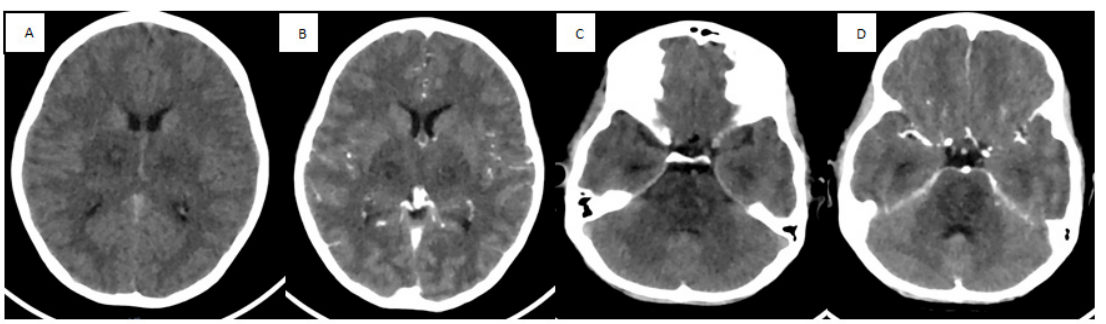

Figure 1. CT on Day 5th of illness showed ill-defined symmetrical non-enhancing hypodensities in both thalami and pons (A, B, C and D)

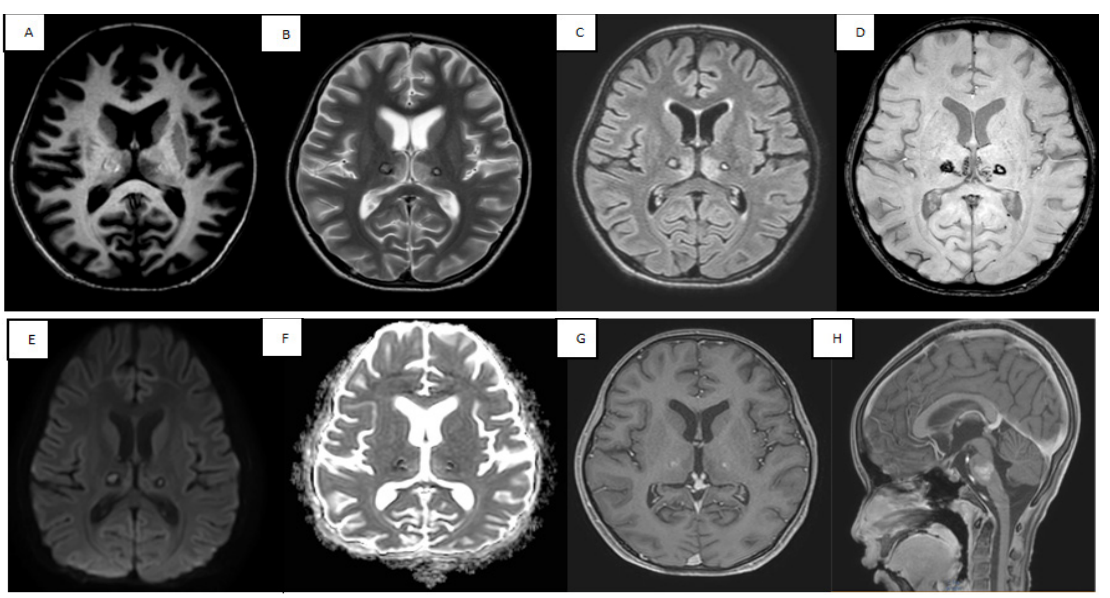

Figure 2. Contrast enhanced MRI brain performed at 4th week of illness (A, B, C,D) showed lesions in both thalami which were hyperintense on T1WI (A), hyperintense lesion with hypointense rim on T2WI(B) and FLAIR(C) . SWI image (D) demonstrated signal drop due to blooming effect, suggestive of hemorrhage. Intense restricted diffusion was seen on DWI and ADC map (E,F). T1 contrast showed no evidence of cerebral venous sinus thrombosis (G,H)

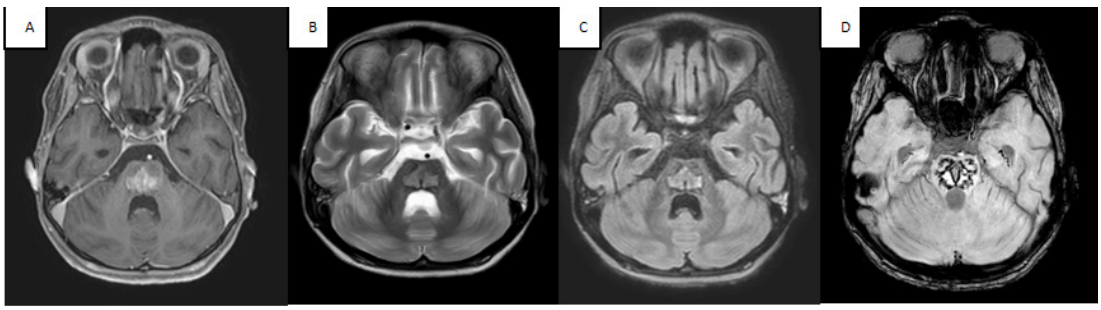

Figure 3. Contrast enhanced MRI brain performed at 4th week of illness showed hyperintense pontine lesion in Axial T1, T2, FLAIR images (A,B,C), signal drop with blooming effect on SWI images (D) .

demonstrated signal drop with blooming effect in keeping with haemorrhage in both thalami and pons. The centre of the lesions showed intense diffusion restriction on DWI and ADC map. T1 contrast images showed no evidence of cerebral venous sinus thrombosis.

Her conscious level gradually improved with supportive treatment over the next two weeks. However; there were some neurological sequelae with limb muscle weakness (GMC grade 3/5), dystonia, tremors and slurred speech. After 3 months, the dystonia and tremors reduced significantly; she spoke more clearly and could walk with support.

DISCUSSION

We believe that our patient has dengue encephalitis. She had an acute febrile illness with hepatomegaly, petechial rash, thrombocytopenia, leucopenia, positive dengue IgG and IgM, NS1 antigen and PCR in the serum all indicating a systemic dengue infection. There was signs of acute cerebral involvement with altered consciousness or personality and seizures, supported by abnormalities of CT and MRI brain. The positive dengue PCR in CSF provide a direct evidence of viral invasion of central nervous system. We could not find any other causes of encephalitis and encephalopathy.

Among the 4 dengue viruses, neurological manifestations are mainly associated with dengue virus type - 2 or 3.[5] Incidence of neurological manifestations occurs in 0.5-6.2% of patients and pathogenesis is still poorly understood. [6]

MRI brain in dengue encephalitis may be normal or show non-specific cerebral oedema.[7] Some cases of dengue encephalitis show features similar to Japanese encephalitis in the form of common involvement of thalami, basal ganglia and brainstem. Similar findings were also reported in other viral encephalitis like influenza A or west nile virus encephalitis.[8,9] Bhoi *et al.* found 9/21 (43%) dengue cases with MRI abnormalities, one third of whom (three patients) had bilateral thalamic lesions.[3] Bilateral thalamic changes were also reported in other dengue case reports.[1,4,10-12] Our case is similar to that by Basir Ahmad *et al*.[1] and Borawake *et el*.[10] , for the bilateral hemorrhagic thalamic involvement.

There were three other paediatric case reports of dengue haemorrhagic encephalitis from India.[13,14] The clinical presentations are quite similar, however; our case has more extensive brain involvement with extensive haemorrhage. Dengue related endothelial dysfunction, thrombocytopenia, platelet dysfunction, and mild coagulopathy may contribute to haemorrhages in the encephalitis.

This is the report of a dengue hemorrhagic encephalitis, highlighting the involvement of both thalamus.

DISCLOSURE

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Conflicts of interest: None

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