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CASE REPORT

Dengue Encephalitis in Children; Rare Presentation of Severe Dengue Fever

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ABSTRACT

Dengue is one of the most commonly encountered arboviral diseases prevalent worldwide. Dengue encephalitis is a rare neurological complication of the dengue virus. Although dengue is viewed as a non-neurotropic virus, it should be considered a differential diagnosis in endemic areas.

This case report highlights the importance of keeping dengue encephalitis as one of the differentials and prompt treatment to prevent the progression of symptoms and long-term neurological sequelae. Moreover, it emphasizes the efficacy of steroid therapy in treating dengue encephalitis.

Key Words: *Double doughnut sign, Hemorrhagic encephalitis, Viral encephalitides, Dengue encephalitis, Dengue fever*

INTRODUCTION

Dengue fever is caused by a virus of the Flaviviridae family having distinct but closely related serotypes (DENV1-4). Its spectrum varies from asymptomatic infection to fatal Dengue hemorrhagic fever and dengue shock syndrome.[1] DENV is thought to be a non-neurotropic virus with the frequency of neurological complications ranging between 0.5-21% in laboratory-confirmed dengue cases in recent years. DENV2 and DENV3 are associated with neurological complications.[2]

We present a case report of two patients diagnosed with dengue encephalitis during an outbreak in Pakistan.

CASE REPORT

A 10-year-old boy presented with high-grade fever for 6 days, altered mentation for 1 day and fits for 5 hours after which he developed severe headache, backache, leg pains, and vomiting with gradual worsening of the level of consciousness followed by intractable generalized tonic clonic (GTC) seizures. His GCS was 6/15, HR: 65/min, RR: 26/min, SpO_2: 97%, Temp: 99.5°F, BP: 90/70, with feeble pulses, cold peripheries, and normal peripheral perfusion. Pupils were mid-dilated and reactive. He had generalized hypertonia and hyperreflexia with bilateral clonus and no meningism. Cranial nerves were intact with normal fundoscopy. Systemic examination was unremarkable. Our differentials included meningoencephalitis, Multisystem Inflammatory Syndrome in Children, cerebral malaria, and dengue encephalitis. He was given multiple anticonvulsants with fluid resuscitation and injectable meropenem, vancomycin, acyclovir, and artemether with inotropes.

His laboratory indices showed positive dengue NS1 antigen, WBC 7.8×10^3/ul (polys 58, lymphocytes 35), Hb 130 g/L and platelets 86×10^3/ul transaminases (ALT 602 U/L, AST 1411 U/L), PT aPTT, cardiac enzymes (AST: 1411U/L, LDH:923U/L, CKMB 105U/L, CPK: 435 U/L) and inflammatory markers were raised

(D dimers: 5837ng/ml, procalcitonin: 31 ng/ml) with raised COVID IgG antibodies (425). ECG showed sinus bradycardia; however, his echocardiography was unremarkable. Renal function tests (RFTS) and malaria ICT were normal.

MRI brain showed bilateral edematous and hypointense thalami on T1WS, and hyperintense on T2WS/FLAIR sequences. edema was present in the posterior limbs of both internal capsules, posterior corona radiata, and semiovale bilaterally with acute lacunar infarct in the right anterior semiovale and subcortical location (fig1), findings consistent with dengue encephalitis.

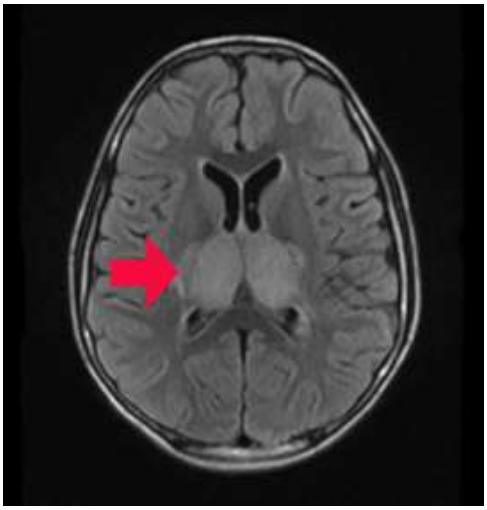

Fig 1: An acute lacunar infarct is seen in the right anterior semiovale and subcortical location

He was given IV methylprednisolone 30 mg/kg/day for 5 days with inotropes, intravenous fluids, and transfusion of fresh frozen plasma. His GCS improved to 10/15 on the 4th day of admission with normal vital signs. Steroids and inotropes were gradually tapered and oral feeding and physiotherapy started. GCS improved to 15/15. He was discharged after 14 days of hospitalization on a tapering dose of oral steroids for 1 week. Follow-up after 1, 2, and 4 weeks showed no residual neurological deficits.

CASE REPORT 2

A 6-year-old boy having epilepsy and Attention Deficit Hyperactive Disorder, developmentally normal, presented with fever and lethargy for the last 6 days. On examination, he was conscious with GCS 15/15 and vitally stable with normal systemic examination. His dengue IgM antibodies were positive, laboratory indices showed TLC: 13.2 x 10^3/ul with 65% neutrophils, Hb 113 g/L HCT 35%, and platelets 52 x 10^3/ul, the rest of the labs were normal. The child was compliant with his anticonvulsant therapy. On 2nd day of admission, he developed focal seizures initially on the left side of his body progressing to generalized seizures needing increasing doses of Intravenous antiepileptics. His GCS dropped to 11/15 with HR: 94/min, RR: 28/min SpO_2: 96%, Temp: 98°F, BP: 105/70, and BSR:109 mg/dl with normal hemodynamics. He had mid-dilated reactive pupils bilaterally, generalized hypertonia, signs of meningeal irritation, and brisk reflexes in the left upper and lower limbs with clonus and Babinski sign. Cranial nerves examination and fundoscopy were normal. He was given Inj. meropenem, vancomycin, Acyclovir, I/M artemether. His platelet count reduced to 46 × 10 3 /ul, HCT 35%. LFTs, RFTs and serum electrolytes were normal.

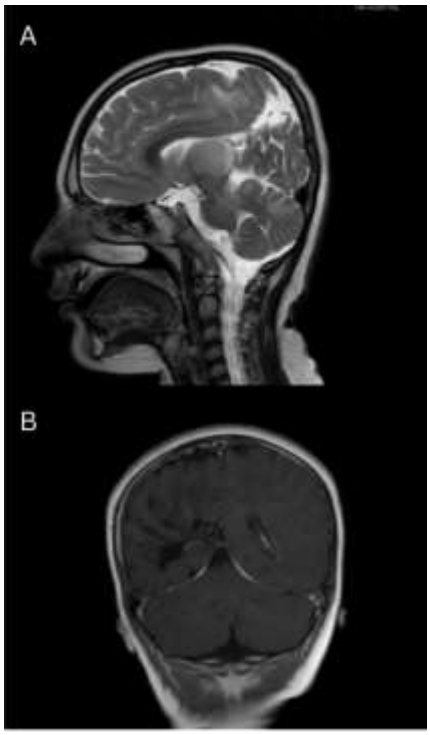

Fig 2: Areas of T2W1/FLAIR hyperintensities were noted as well in bilateral centrum semiovale, periventricular deep white matter, and posterior limbs of both internal capsules, with right high parietotemporo-occipital old ischemic insult

MRI brain with contrast showed bilateral swollen thalami and T2W1/FLAIR had hyperintense signals showing micro-hemorrhage in the right thalamus and bilateral cerebellar hemispheres. Similar hyperintensities were noted in bilateral semiovale, periventricular deep white matter, and posterior limbs of both internal capsules (fig *2*)

The child was commenced on Inj. methylprednisolone 1 mg/kg/dose, 8 hourly for 5 days. He had no active bleeding episode. His GCS improved to 15/15 on the 4th day of admission. He was able to walk with a slight limp on his left side, mild hypotonia, and persisting upper motor neuron signs in his left upper and lower limbs. He was discharged after 10 days on a tapering dose of oral steroids over the next 2 weeks and advised physiotherapy. His residual neurological deficits were reduced over the next few weeks and completely resolved in the next 6 months following treatment.

DISCUSSION

The neurological complications associated with the dengue virus include encephalitis, meningitis, myelitis, stroke, encephalopathy resulting from metabolic derangements, stroke, paralysis, optic neuritis resulting from autoimmune reactions, acute disseminated encephalomyelitis (ADEM) and Guillain-Barré Syndrome.[3] Dengue hemorrhagic encephalitis is even rare and there are only a few reported cases among children as in 2 cases reported so far in children by Jagadishkumar et al and Ko et al, in 4 and 11-year-old children respectively.[4,5]

A few cases of dengue encephalitis show MRI brain features similar to Japanese encephalitis, and other viral encephalitides like influenza A or West Nile virus encephalitis commonly involving basal ganglia, thalami, and brainstem hence considered as differentials.[4] The criteria set for dengue encephalitis include 1) fever 2) acute signs of cerebral involvement 3) presence of anti-dengue IgM antibodies or dengue genomic material in the serum and/or CSF, and 4) exclusion of other related causes of encephalopathy and viral encephalitis.[3]

MRI brain is deemed the preferred investigation for dengue-related CNS involvement. Although an MRI brain in dengue encephalitis may be normal, it has a supportive role in verifying the diagnosis of neurotropism caused by the dengue virus.[4,6,7]

The predominant areas affected by dengue encephalitis are the thalami, basal ganglia, cerebral cortex, white matter, and the cerebellum with hemorrhagic foci. Diffuse cerebral edema, symmetrical bilateral FLAIR, and T2 hyperintensities in thalami displaying diffusion restriction and the distinctive “Dengue double doughnut sign” on diffuse weighted imaging, which is unique for dengue encephalitis considering it a diagnostic hallmark of dengue encephalitis are the most common findings that have been reported. Other lesions affecting the pons, medulla, cerebral hemisphere, centrum semiovale, and corpus callosum exhibit heterogeneous or peripheral enhancement after contrast administration.[2,4,5,8,9] The treatment of dengue fever is mostly supportive and symptomatic. However, Studies support the beneficial effect of using corticosteroids in dengue-related neurological complications.[7,10,11]

With the growing endemicity of dengue fever, consideration of dengue encephalitis as a differential diagnosis should be preferred in patients presenting with fever and neurological symptoms and the efficacy of steroid therapy is proven in alleviating dengue-related neurological manifestations.

Conflict of interest: Nil

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