

Dengue Fever as A Cause of Acute Disseminated Encephalomyelitis (ADEM)

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Abstract:

Dengue fever is very common in Bangladesh. Every year a large number of urban populations suffer from this viral infection. Various presentations of dengue fever have been documented. Neurological complications in dengue fever are relatively uncommon. Among these, Acute Disseminated Encephalomyelitis (ADEM) has been observed in very few cases. Here we present a case of 13 year old girl suffering from ADEM following dengue fever.

Keyword: Acute Disseminated Encephalomyelitis, Dengue fever, Neurological complication.

Introduction:

Dengue infection is caused by a flavivirus, and the nervous system involvement is seen with the serotypes 2 and 3. Neurologic manifestations occur in 4% to 5% of patients,¹ and it includes encephalopathy, encephalitis, Guillain-Barre syndrome (GBS), myelitis, meningitis, acute disseminated encephalomyelitis (ADEM), facial and ulnar mononeuropathy and stroke, both ischemic and hemorrhagic.^{2,3,4} ADEM following dengue infections is very infrequent, and very few cases have been documented.⁴ ADEM produces multiple inflammatory lesions in the brain and spinal cord, particularly in the white matter. Usually these are found in the subcortical and central white matter and cortical gray-white junction of both cerebral hemispheres, cerebellum, brainstem, and spinal cord, but periventricular white matter and gray matter of the cortex, thalami and basal ganglia may also be involved.⁵

Case Report:

A 13-year-old girl presented with the complaints of fever for 5 days and generalized convulsion for 1 day. Fever was high grade continued in nature without chills & rigor. She complained of severe low backache, headache and retro orbital pain. For last 1 day she became restless and unconscious and developed generalized convulsion several times in a day. Convulsion was preceded by several episodes of vomiting and controlled with diazepam & phenobarbitone after admission into hospital. Later on, patient developed

involuntary movement in the form of myoclonus. On 2nd day after admission fever subsided but she developed hematemesis and melaena. There was no history of recent vaccination.

On examination on the day of admission she was restless, febrile with temperature of 105°F, pulse 100b/min, BP 90/60 mm of Hg. She was mildly plethoric. There was generalized erythematous macular rash which blanched on pressure. Tourniquet test was positive. Neurological examination revealed patient was restless, unconscious and Glasgow Coma Scale (GCS) was 6/15. Pupils were mid-dilated, symmetrical with sluggish reaction to light. There was no papilloedema or retinal haemorrhage on fundoscopy. Signs of meningeal irritation were absent. Other cranial nerves, motor and sensory system could not be examined properly as the patient could not follow vocal command. Other system examination revealed no abnormality. On 25.08.10 investigation findings were, Complete blood count; total WBC count 2300/cumm, total platelet count 1,10,000/cumm, Hb% 11.5g/dl, ESR 10mm in 1st hour and packed cells volume 48.4. Platelet count decreased up to 20,000/cumm on 29.08.10. PBF showed leucopenia with thrombocytopenia. ICT for malaria was negative; serum creatinine was 1.2mg/dl, random blood sugar 5.6mmol/L, serum calcium 1.99mmol/L, alanine aminotransferase (ALT) 70U/L and electrolyte showed mild hyponatremia. Urine routine examination was normal. CSF study showed normal sugar and cell count with raised CSF

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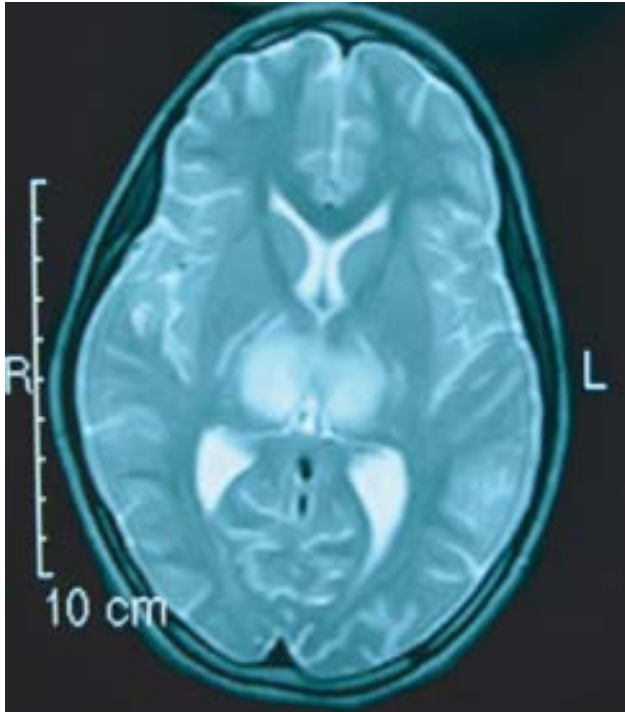


Fig.-1: T2 weighted MRI of brain showing hyper intense signal change in bilateral thalamic region due to demyelination.

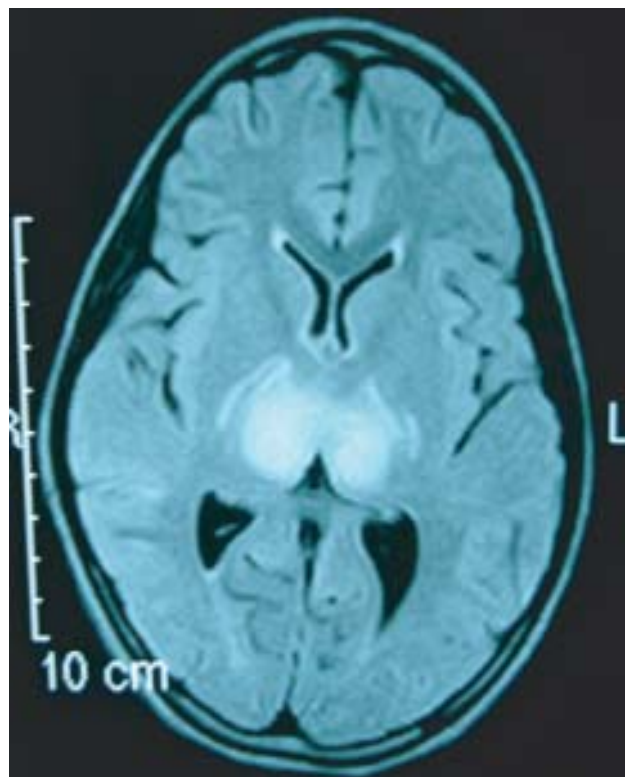


Fig.-2: FLAIR weighted MRI of brain showing hyper intense signal change in bilateral thalamic region due to demyelination.

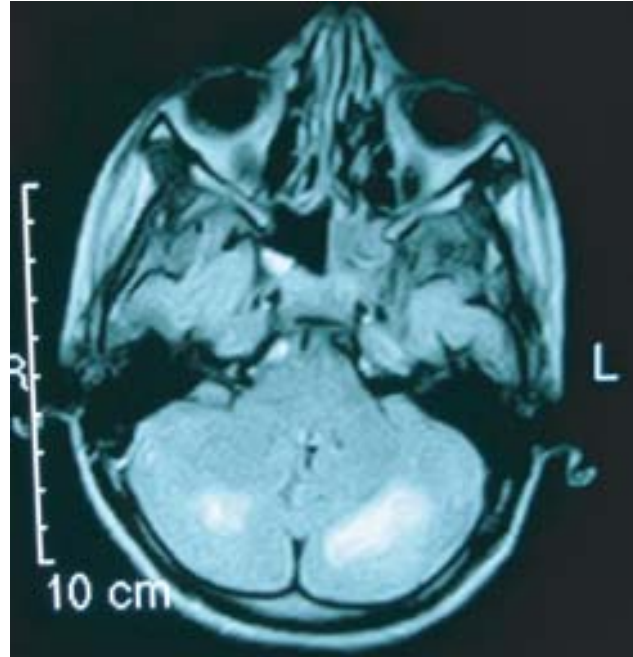


Fig.-3: FLAIR weighted MRI of brain showing hyper intense signal change in bilateral cerebellum due to demyelination.

protein (80mg/dl) while Gram stain and Z-N stain revealed no organism. Chest X-ray was normal. On 28.08.10 IgG anti DEN was negative, IgM anti DEN was positive. Magnetic resonant imaging (MRI) of brain on 31.08.10 revealed T1 hypo & T2/FLAIR hyperintense signal changes in the both thalamic, parietal white matter & cerebellar region (Figure 1,2,3) suggestive of acute disseminated encephalomyelitis (ADEM). RNA of Dengue virus or virus isolation by PCR method was not possible due to lack of investigation facility.

Initially, before doing a MRI of brain, she was treated empirically as a case of encephalitis with antipyretic, intravenous antibiotic, antiviral, anticonvulsant and dexamethasone. After confirmation of ADEM on MRI, we have given injectable methylprednisolone for 3 days and high dose of injectable dexamethasone for another 2 weeks followed by tapering dose of oral prednisolone for further 6 weeks. The patient gradually improved and regained her consciousness on the 8th day after admission. On discharge, the patient was conscious, oriented with residual headache, ataxia and dysarthria. Platelet count and laboratory parameters became normal. At follow up after 2 months, her headache had subsided but mild ataxia and dysarthria were still present.

Discussion:

ADEM is an immune mediated disease of the brain. It usually occurs following a viral infection but may appear following vaccination, bacterial or parasitic infection, or even appear

spontaneously.⁶ The incidence rate is about 8 per 1,000,000 people per year.⁷ Although it occurs in all ages, most reported cases are in children and adolescents, with the average age around 5 to 8 years old. The mortality rate may be as high as 5%.⁷ Viral infections thought to induce ADEM include influenza virus, enterovirus, measles, mumps, rubella, varicella zoster, Epstein Barr virus, cytomegalovirus, herpes simplex virus, hepatitis A, coxsackievirus and rarely dengue; while the bacterial infections include *Mycoplasma pneumoniae*, *Borrelia burgdorferi*, *Leptospira*, and beta-hemolytic *Streptococci*.⁸ The most common vaccine proven to induce ADEM is the rabies vaccine.^{8,9} ADEM has an abrupt onset and a monophasic course. Symptoms usually begin 1–3 weeks after infection or vaccination. Major symptoms include fever, headache, drowsiness, seizures and coma. Additional symptoms include hemiparesis, paraparesis, and cranial nerve palsies.^{8,9}

ADEM following dengue infection is extremely rare. Sundaram et al, have documented an autopsy-confirmed case of ADEM.¹⁰ Recent observations indicate that the clinical profile of dengue is changing, and that neurological manifestations are being reported more frequently. The pathogenesis of neurological manifestations are multiple and includes: neurotrophic effect of the dengue virus, related to the systemic effects of dengue infection, and immune mediated.^{3,4,10} The exact incidence of various neurological complications is uncertain. Demyelinating lesions with or without foci of hemorrhage on MRI are probably pathognomonic of ADEM following dengue infection.¹¹ To the best of our knowledge, this is the first reported case of acute disseminated encephalomyelitis (ADEM) due to dengue fever in our country. Dengue infection is endemic in Bangladesh. In country like Bangladesh, it would be wise to investigate for dengue infection in patients with fever and acute neurological manifestations. This will help in early diagnosis, treatment and proper understanding of the disease process.

Conclusion:

Dengue infection is endemic in Bangladesh. In country like Bangladesh it would be wise to investigate for dengue

infection in patients with fever and acute neurological manifestations. This will help in early diagnosis, treatment and proper understanding of the disease process.

Conflict of Interest : None

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