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Case Report

Dengue virus and Japanese encephalitis virus co-infection: A case report

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ABSTRACT

Dengue and Japanese Encephalitis both are caused by Arboviruses spread by mosquitoes are important causes of mortality and morbidity in India. Very few cases of their co-infection have been reported in endemic countries but these is no case report in paediatric population to the best of our knowledge. We report the case of a 4 years old girl child who presented to us with fever, seizures and subsequently developing altered mental status. Lab and radiological investigations proved Dengue and JE co-infection in this child.

1. Introduction

Dengue and Japanese encephalitis are major causes of morbidity and mortality in tropical and subtropical parts of world including India. It is estimated that there are 390 million dengue infections annually, and recently the number of dengue cases has increased exponentially worldwide.[1] Dengue is endemic in almost all over India (31 states/UTs). All 4 serotypes of Dengue virus have been isolated while JE is endemic in 18 states of India of which include Assam, Bihar, Haryana, Uttar Pradesh, Karnataka, West Bengal & Tamil Nadu report out-breaks almost every year and contribute to 80% cases and deaths. Both being Arboviral diseases (Group B-Flaviviruses) are spread by bite of infected mosquitoes. They cross react with other in serological tests. Dengue virus usually causes classical dengue fever, DHF and DSS, JE virus typically causes encephalitis. In rare instances, Dengue virus may also cause encephalitis mimicking JE. Lab investigations therefore becomes essential for confirmation and discrimination between these two viral infections.

2. Case Report

A 4 year old girl child resident of Faridabad, Haryana presented to us with chief complaints of high grade fever (102°F), not associated with chills and rigors for last 4 days, abnormal body movements with up rolling of eyeballs for last 3 days followed by altered mental status, not recognising parents, not responding, not vocalizing or indicating bowel bladder. This was associated with loose stools and vomiting for last 1 day. There was no history of rash, bleeding from any site, cough or coryza. No history of any limb weakness or any cranial nerve deficit. She had not received any medication in recent past and no history of any Koch's contact. Developmentally normal child with immunization complete for age.

At presentation, GCS was E1V3M4 and respiratory functions and hemodynamic parameters were stable. Neurological examination revealed altered state of

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consciousness, there was no neck rigidity and bilateral pupils were normally reacting to light. No evidence of any weakness and deep tendon reflexes were elicited normally. The Plantar reflex was extensor bilaterally. Rest of the systemic examination was within normal limits. Patient presented with active seizures in casualty which were aborted by Inj. Midazolam and loaded with Inj. Phenytoin subsequent to which she was admitted in PICU. NCCT head done which was unremarkable. The hemogram, Liver & Kidney function tests, CXR and ECG were normal. WIDAL and serology for Hep.B, Hep.C & HIV 1+2 were non reactive. Also peripheral smear was negative for Malarial parasites. Serial hemogram reports are listed in Table 1.

Examination of CSF revealed no cells and normal sugar and proteins. Gram stain and CSF culture showed no organisms. Although NS1 Ag was negative, Dengue serology in serum came out to be positive. Serum and CSF samples sent to NCDC, Delhi also confirmed the IgM antibodies against JE virus. MRI Brain reported T2/FLAIR hyper intensities involving the left thalamus, bilateral cerebral peduncle, temporal lobe, peri-aqueductal gray matter and midbrain and showing restriction on diffusion-likely viral encephalitis as represented in Figure 1.

Patient was given supportive treatment, improved gradually, discharged on oral phenytoin and followed up in OPD. Follow up at 4 weeks showed no extra-pyramidal features.

Table 1: Serialhemogram reports are listed.

Day	1	2	3	4	5
Hb	7.4	8.1	11.5	13.1	13.3
TLC	21700	18800	10400	8200	8200
Platelet count	38000	52000	66000	80000	92000

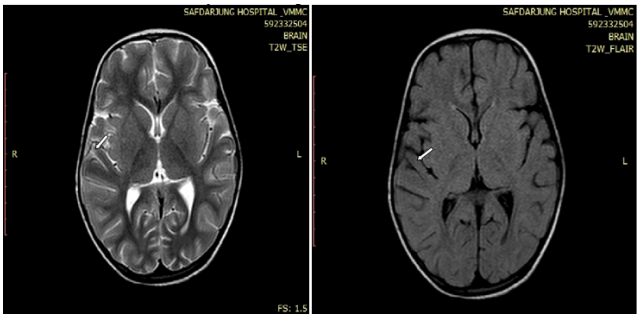

Fig. 1: RI brain of the patient. . MRI Brain reported T2/FLAIR hyper intensities involving the left thalamus, bilateral cerebral peduncle, temporal lobe,peri-aqueductal gray matter and midbrain and showing restriction on diffusion- likely viral encephalitis.

Table 2: Differences in clinical presentations and laboratory investigations between Japanese encephalitis and Dengue encephalitis[2]-

Points	**Japanese encephalitis**	**Dengue encephalitis**
Age	Children	All ages
Season	Rainy monsoon season	During or after rains
Geography	Rural	Semi-urban
Duration of illness	Fever of 2 to 3 days	Fever of 2 to 7 days
Prodromal illness	Sudden onset of fever, chills, headache, myalgia	High fever, severe headache, myalgia, arthralgia, nausea, vomiting, and rash
Clinical features	Rapidly progresses to deep coma focal deficit and seizures	Altered sensorium, focal deficit, and seizures
Blood changes	Leucopenia	Thrombocytopenia
Metabolic / circulatory changes	uncommon	Common (impaired liver and renal functions and shock)
CSF changes	Moderate pleocytosis (predominant lymphocytes), mildly raised protein, and a normal CSF glucose	Usually normal CSF, rarely pleocytosis
Neuroimaging	Signal changes in thalamus and substantia nigra	Variable, but usually Normal
Diagnosis	IgM antibody in serum or CSF	Dengue RNA PCR, IgM positive, NS1 antigen in CSF
Outcome	20-30% patients die	Variable, high mortality without supportive treatment
Sequelae	30% of survivors, many have cognitive or extrapyramidal syndromes	Rarely described

Abbreviations used- NS1 = Non structural protein 1, CSF = Cerebrospinal fluid,
IgM = Immunoglobulin M, PCR = Polymerase chain reaction,
RNA = Ribonucleic acid.

3. Discussion

In our patient the peripheral blood examination revealed features of severe dengue infection where as cerebrospinal fluid and magnetic resonance imaging data suggest diagnosis of Japanese encephalitis. The diagnosis of Japanese encephalitis is confirmed by presence of virus specific IgM antibodies in serum and/ or cerebrospinal fluid or four fold rise of IgG titre in paired sera. Virus can also be identified by polymerase chain reaction. Differences in

clinical presentations and laboratory investigations between Japanese encephalitis and Dengue encephalitis have been presented in Table 2.[2]

A serological cross-reaction between DENV and JEV has been shown in studies to occur in up to 38.5 % patients; however, studies showing co-detection of disease specific IgM in the CSF are few and reveal a variable incidence from 8 to 50 %.[3–5]

The clinical significance of the serological cross reactivity between dengue virus and Japanese encephalitis virus is not exactly known and conflicting reports are available.

Cross-reactivity has been found to be associated with both immune-protection and an aggravated form of a viral disease (dengue or Japanese encephalitis).[2]

4. Conclusion

A possibility of dual infection or a cross reactivity between dengue and Japanese encephalitis needs to be considered if serological evidence of both the infections are present in same patient. But being in the endemic area and clinical features with which patient presents and serological and radiological features a diagnosis of co infection can be easily established.

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6. Conflict of Interest

The authors declare they have no conflict of interest.

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