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Dengue and Japanese Encephalitis among Acute Febrile Encephalopathy Cases of Pediatric age Group Patients of Western Rajasthan

Laxmi Rathore[1], Dr. P. K. Khatri[2], Dr. Archana Bora[3], Dr. Saroj K Meena[1], Suneel Bhooshan[*1]

[1]Senior Demonstrator, [2]Senior Professor, [3]Assistant Professor, Dr S N Medical College, Jodhpur, Rajasthan, India

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***Corresponding author:** Suneel Bhooshan

Abstract **Original Research Article**

Acute febrile encephalopathy is a term commonly used to identify the condition in which altered mental status either accompanies or follows short febrile illness. Japanese encephalitis (JE) and Dengue are arboviral diseases that are common in the tropical countries. Viruses of Flavirdae family are neurotropic like JE virus however; Dengue does not cause neurological diseases. One hundred five patients suspected AFE between age one month to 15 years were enrolled in the study. Out of them 32 (30.48%) cases showed evidence of viral etiologies by serological or molecular methods and in 73 (69.52) case no viral etiology was detected. Out of 32 patients, only 2 (1.90%) cases were positive for IgM Dengue antibodies. All subjects were negative for the IgM antibody of the JE virus. Till date no case of JE have not been reported in Rajasthan but Dengue encephalopathy might be missed as very few reports are available on its prevalence.

Key words: Dengue, Japanese encephalitis, Acute Febrile Encephalopathy.

INTRODUCTION

Encephalopathy is a nonspecific term, which means "disease of the brain" in Greek. Instead, it is a clinical syndrome, with diverse etiopathology affecting various organ systems, extending well beyond the central nervous system (CNS). "Acute febrile encephalopathy" (AFE) is a term commonly used to identify the condition in which altered mental status either accompanies or follows short febrile illness [1, 2].

Japanese encephalitis (JE) and Dengue are arboviral diseases that are common in the tropical countries like India. Viruses of Flavirdae family are neurotropic like JE virus however; Dengue does not cause neurological diseases in dengue has been documented [3].

JEV is the most important cause of viral encephalopathy globally, causing 68,000 cases and 13,000 to 20,000 deaths annually.[4] In India, the largest epidemic outbreak in the last three decades occurred in Gorakhpur, Uttar Pradesh, through November 2005, killing 1344 people [5].

However, dengue is prevalent in tropical and sub-tropic regions. Symptoms of dengue disease vary from mild influenza-like symptoms to a life-threatening condition like Dengue Haemorrhagic Fever or Dengue Shock Syndrome. AFE is a neurological manifestation of Dengue hemorrhagic fever. This occurs due to the direct infiltration of neurons. According to the WHO fact sheet, approximately 50 million people get infected every year by the dengue virus. Dengue is assumed pan-India proportion. Dengue is epidemic mainly in Delhi, Haryana, Gujarat, Rajasthan, Maharashtra, Karnataka, Kerala, and Tamil Nadu [6].

The exact prevalence of AFE due to JE and Dengue is still unknown due to the frequency of epidemic throughout the country, and cases are not diagnosed or reported. Timely diagnosis of viral etiologies plays a major role in the treatment and better outcome.

This study was conducted to access the prevalence of JE and Dengue virus in AFE cases in the paediatric age group from one month to 15 years in Western Rajasthan.

METHODS AND MATERIALS

This study was an cross sectional hospital-based study, conducted in the Department of Microbiology, Dr S. N. Medical College, Jodhpur Rajasthan, from 2018 July to 2020 December. One hundred five patients suspected AFE between age one

month to 15 years were enrolled in the study. Approval of the Institutional ethical committee was obtained before conducting the study. The clinical profile and the haematological investigation were obtained from the case file of the patients by consent of guardians in predesigned proforma.

CSF samples were collected in sterile, leakproof container by lumbar puncture. NIV IgM antibody capture ELISA was performed to detect JE and Dengue viral etiologies according to the manufacturer's instruction.

RESULT

A total of 105 suspected patients of AEF were enrolled in the study after fulfilling the inclusion and exclusion criteria. Out of them 32 (30.48%) cases showed evidence of viral etiologies by serological or molecular methods and in 73 (69.52) case no viral etiology was detected. IgM capture ELISA specific for JE and Dengue was performed on all samples. Out of 32 patients, only 2 (1.90%) cases were positive for IgM Dengue antibodies. All subjects were negative for the IgM antibody of the JE virus (Table:1).

Viral etiology confirmed AFE positive patients (n=2) belonged to the age of 1 month and nine years, respectively. The male patient was one month old, and the female was nine years old. Both the patients were from the rural area. In the clinical profile of these cases, fever was present in both cases with a history of no vomiting, headache or Paresis. The Male patient showed signs of altered Sensorium while female patient did not have any indication of altered Sensorium. CSF biochemistry revealed a significantly high protein level in both cases 201mg/dl and 164 mg/dl respectively, and glucose level was normal. On CSF cytology, pleocytosis was observed with predominant lymphocytes cell type. The prognosis was good as they were discharged in both instances after full recovery from the disease.

Table-1: Distribution of viral etiology

Viral Etiology	No. of cases N, (%)
Dengue IgM	2 (1.9)
Japanese Encephalitis IgM	0(0)
Other Viral etiology detected	29(27.62)
No Viral etiology detected	73 (69.52)
TOTAL	105 (100)

DISCUSSION

Dengue was thought to be non-neurotropic virus however, in recent literature there have been reports of IgM antibody in CSF in patients with encephalopathy. AFE is manifestation of Dengue Haemorrhagic Fever. Dengue encephalopathy is not a very common entity however, the incidence have been reported ranging from 0.5 to 6.2 %. [7] First case of Dengue encephalitis was reported in 1976, [8] since then there have been several case reports, case series and original studies. In this study CSF findings were consistent with the diagnosis of AFE with pleocytosis and raised protein level in both cases.

Patients presented with AFE in our study were age 1 month and 9 years. Our findings were in concordance with National Surveillance in Asia that showed the patients of age group below 1 year and between 4 years to 9 years were at risk of developing the severe disease [9, 10].

In our study the prevalence of dengue was 1.90% which is similar to findings of Kankirawatana *et al*,[11] Kularatne *et al*. [12] and Goel *et al*.. [13] Study conducted by Mishra *at el*. [7] showed evidence of dengue encephalopathy in 11 cases. Solmon *et al*., [14] reported 9 cases of dengue encephalitis, including two cases of confirmed by IgM antibody in CSF. Borawake *et al*. [15] from India also reported a case of dengue encephalopathy by antibody detection in CSF and confirmed it by PCR. Our patients did not have signs of typical dengue fever like retro orbital pain, headache, rashes and vomiting.

Though, JE is the most common etiology reported from India, we did not find any evidence of JE virus among all the suspected AFE patients. This might be due to the geographical distribution of JE. However, we need to be extremely vigilant because the presence of vector has been reported in literature from Western Rajasthan. Due to vector presence, a large population remains at the risk of getting disease.

CONCLUSION

Till date no case of JE have not been reported in Rajasthan but Dengue encephalopathy might be missed as very few reports are available on its prevalence. In an endemic country like India, both JE and Dengue are prevalent; it may not be uncommon for both diseases to be present in the community at the same time. The management of JE and Dengue both is largely supportive. It is important to recognize that dengue virus can also involve the CNS either directly or through immune mediated mechanisms. Our study, suggest that Dengue encephalitis should be considered in the differential diagnosis of fever with altered sensorium especially in countries like India where dengue is rampant. Vector control should be practiced stringently to prevent Japanese encephalitis and Dengue Virus. We recommend conducting further studies as a part of surveillance programme to identify the prevalence of viral etiologies in AFE suspected cases in Western Rajasthan. This will be useful for patient management during admission and treatment.

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