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SPORADIC CASES OF JAPANESE ENCEPHALITIS IN SOUTHERN-EAST RAJASTHAN

Microbiology

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ABSTRACT

BACKGROUND- Japanese encephalitis is a mosquito borne viral encephalitis caused by Japanese encephalitis virus. Japanese encephalitis (JE) virus was first isolated from Japan in 1935. Than it spread worldwide and becoming a major public health problem due to its high epidemic potential and high case fatality rate. In our study, suspected cases of JE were belong to Keshoraipatan village in Bundi district, Rajasthan which is unusual in that area and the state of Rajasthan.

MATERIAL AND METHODS- Serum sample was collected properly from each patient with clinical history of high grade fever, headache, vomiting and altered sensorium. Than these serum samples were tested for qualitative detection of Dengue IgM antibodies by NIV (National Institute of Virology) Dengue IgM Capture ELISA kit. Out of all samples those found negative for Dengue IgM antibodies, a total of 24 samples which had clinical suspicion of JE, were sent to the NIV (National Institute of Virology) lab, Pune for detection of JE IgM antibodies. In NIV lab, the serological identification of JE IgM antibodies was done by JE virus MAC ELISA test.

RESULTS- Out of 24 samples, 8 samples were found positive for JE IgM antibodies. The mean age for positive cases was 39 years. Out of 8 positive cases, 6 were females and 2 were males. Majority of the patients were belong to low socioeconomic group.

CONCLUSION- JE is now a serious public health problem in all over the world and India also. Detection of JE virus specific IgM antibodies in patient's serum indicate recent infection which helps in the early treatment of the disease and prevent severe neuropsychiatric sequelae.

KEYWORDS

Japanese Encephalitis, Culex Mosquitoes, ELISA (Enzymed-Linked Immunosorbent Assay)

INTRODUCTION-

Japanese encephalitis is a mosquito borne viral encephalitis caused by Japanese encephalitis virus. Japanese encephalitis virus is an enveloped, positive-sense single-stranded RNA virus and belongs to the genus *Flavivirus* under the family *Flaviviridae* (1). Japanese Encephalitis (JE) is transmitted by infective bites of female mosquitoes mainly belonging to Culex groups that feed on infected birds and pigs passing the infection to humans living and working in rural areas. JE virus contains three structural proteins – nucleocapsid or core protein (C), non-glycosylated membrane protein (M), and glycosylated envelope protein (E), as well as seven non-structural (NS) proteins – NS1, NS2A, NS2B, NS3,NS4A, NS4B, and NS5 (2).

The incubation period for JE is from 2 to 15 days. JE affects mainly children and young adults. Although most of the infections are mild or asymptomatic, about 50% of patients with encephalitis suffer from permanent neurologic defects and 30% of them die due to the disease (3). Signs develop during the acute encephalitic stage include neck rigidity, cachexia, convulsions and a raised body temperature. Mental retardation is usually developed. Microglial cells of the central nervous system became activate and secrete cytokines, such as interleukin-1 (IL-1) and tumor necrosis factor alpha (TNF-α), which can cause toxic effects in the brain.

JE virus was first isolated from Japan in 1935. Than it spread worldwide and becoming a major public health problem due to its high epidemic potential and high case fatality rate (4). JE virus is one of the most important etiological agent of epidemic and sporadic encephalitis in the tropical regions of Asia, including Japan, China, Taiwan, Korea, Philippines, all of Southeastern Asia and India (5).

In India , JE was first recognized in 1955, in Tamil Nadu . After this, the disease spread to other states and caused a major public health problem in Andhra Pradesh, Assam, Bihar, Goa, Haryana, Karnataka, Kerala, Tamil Nadu, Uttar Pradesh, and West Bengal (6). In our study, suspected cases of JE were belong to Keshoraipatan village in Bundi district, Rajasthan which is unusual in that area and the state of Rajasthan.

MATERIALS AND METHODS-

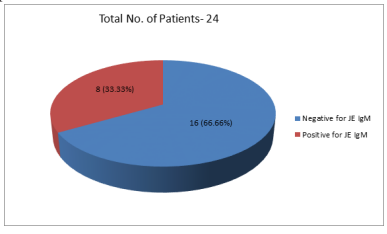
This study was conducted in Microbiology Department, Central laboratory, MBS Hospital, Kota which is a regional laboratory of IDSP (Integrated Disease Surveillance Project). 5 ml of blood sample was collected properly from each patient with clinical history of high grade fever, headache, vomiting and altered sensorium. Patient's demographic data was also recorded. Serum was separated aseptically from the clotted blood. Then these serum samples were tested for qualitative detection of Dengue IgM antibodies by NIV (National Institute of Virology) Dengue IgM Capture ELISA kit. In this test IgM antibodies in the patient's serum were captured by antihuman IgM coated on to the solid surface (wells). In the next step, Dengue antigen was added which bound to captured human IgM in the sample. Unbound antigen was removed during the washing step. In the subsequent step biotinylated flavivirus anti DEN monoclonal antibodies were added followed by Avidin HRP. Subsequently, chromogenic substrate was added. Finally reaction was stopped by adding stop solution. The intensity of color was measured at 450 nm.

Out of all samples those found negative for Dengue IgM antibodies, a total of 24 samples which had clinical suspicion of JE, were sent to the NIV (National Institute of Virology) lab, Pune for detection of JE IgM antibodies. In NIV lab, the serological identification was done by JE virus MAC ELISA test. This test has high sensitivity (96%) and specificity. This technique is based on microplate IgM ELISA which detects virus specific IgM antibody.

RESULTS-

The present study was carried out in Microbiology Department, Central laboratory, MBS Hospital, Kota during the year 2017. Total 24 patients from Keshoraipatan village in Bundi district were included in this study which had clinical suspicion of JE and found negative for Dengue IgM antibody. Among them 16 were females and 8 were males. Out of 24 samples, 8 samples were found positive for JE IgM antibodies (Figure-I). The mean age for positive cases was 39 years. Out of 8 positive cases, 6 were females and 2 were males. Majority of the patients were belong to low socioeconomic group and lived in unhygienic conditions.

After clinical analysis it was reported that out of 24 patients, fever and change in mental status were the most common presentation and were present in all cases, followed by headache (79.16%), neck rigidity (62.5%), unconsciousness (54.1%) and seizure (37.5%) (Table I). Most of the cases were occurred during and after the rainy season. This is mostly due to water logged fields supporting profuse breeding of vector mosquitoes.

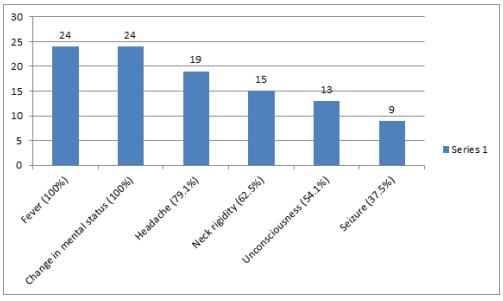


(Figure- I)

Clinical symptom	Cases with the clinical symptom
Fever	24 (100%)
Change in mental status	24 (100%)
Headache	19 (79.1%)
Neck rigidity	15 (62.5%)
Unconsciousness	13 (54.1%)
Seizure	9 (37.5%)

(Table-I)

Total cases with clinical symptoms



(Figure-II)

DISCUSSION-

JE is now a serious public health problem in all over the world and India also. Detection of JE virus specific IgM antibodies in patient's serum indicate recent infection which helps in the early treatment of the disease and prevent severe neuropsychiatric sequelae. The incidence of JE is found high during and after rainy season. This may be due to higher number of Culex mosquitos breed during this season. However sporadic cases can occur all over the year. In our study, out of 24 samples, 8 samples were found positive for JE. All positive cases were belong to Keshavraipatan village in Bundi district, Rajasthan which is unusual in that area. So these are all sporadic cases occured in that area.

CONCLUSION-

Japanese encephalitis is a serious mosquito borne public health problem in all over the world. Environmental and ecological factors are responsible for the spread of JE virus. Early treatment of the disease can prevent severe neuropsychiatric sequelae. So detection of JE virus specific IgM antibody is a very useful tool for it. Control of JE may be possible only after developing a strong surveillance system together with a high-quality immunization program. Implementation of a vaccination program for young children, as well as modified agricultural practices, proper monitoring, vector control and improved living standards can reduce the number of JE cases.

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