International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume 4; Issue 6; June 2018; Page No. 100-102

The consequences of Japanese encephalitis in suspected AES cases: A report from Patna medical college & hospital, Patna, Bihar

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Abstract
Acute Encephalitis Syndrome is defined as the acute onset of fever and change in mental status (including symptoms such as confusion, disorientation, coma or inability to talk, and/or new onset of seizures). Japanese Encephalitis is a part of broader spectrum of disease known as Acute Encephalitis Syndrome [AES]. Although symptomatic Japanese Encephalitis is rare, the case fatality rate among those with encephalitis can be as high as 30%. Permanent neurologic or psychiatric sequel can occur in 30% - 50% of those with encephalitis [2]. It usually affects in the younger group of children between 1-15 years but adult JE cases has also been reported.

Aim: The aim of this study was to assess the effect of seasonal pattern of Japanese Encephalitis [JE] cases for the two consecutive years with relation to geographical areas, age, sex, and socio- demographic status of AES suspected patients coming to Patna Medical College & Hospital, Patna.

Material and Method: The study was undertaken between January 2015 to December 2016 for the period of two years. The collected CSF and serum samples of patients suspected with AES reaching from various districts of Bihar and nearby places was carried out in the Department of Microbiology, Patna Medical College, Patna. All samples were analysed for JE specific Ig M antibody by IgM Antibody Captured Enzyme Linked Immunosorbant Assay [MAC ELISA]. All the tests performed by the kits supplied by NIV, Pune. Data so obtained were arranged according to year wise, age-group wise, sex-wise, month- wise, and expressed as percentage and numbers as required.

Result: A total of 83 JE confirmed cases out of 866 cases between January 2015 to December 2016 were collected. Children of age group 1-15 years were more vulnerable but it was found more or less in every age group. Months of September and October were found to be the peak season for JE infection. No relation was found between male and female patients to JE cases.

Conclusion: Rural area was affected more from Japanese Encephalitis than urban areas. It affects low socio economic group of the society especially immune- compromised children to most extent.

Keywords: Bihar, Japanese encephalitis, AES, CSF, ELISA

Introduction

Japanese Encephalitis (JE), is a mosquito-borne arboviral infection caused by Flavivirus, is prevalent in South-East Asia and the western Pacific regions. It was estimated that about 50000 cases of JE and more than 10000 deaths in Asia were reported annually between 1973 and 1990. [3]. Japanese Encephalitis virus causes an important zoonotic vector borne disease first isolated from a human in Japan in 1935. [4]. Humans are "dead end hosts" as the virus cannot be transmitted from one infected person to another [5]. JE not only causes death but also leads to permanent and psychiatric sequel. The case fatality rate varies across regions, ranging from 10% to 30%. [6, 7]. The disease was clinically diagnosed in India for the first time in 1955 in the Southern state of Madras, now Chennai [8]. The disease affects the central nervous system and can cause severe complications, seizures and even death. The case fatality rate of this disease is very high (about 25%) and those who survive may suffer from various degrees of neurological sequel [9] Presently, there is no cure for JE infection, and treatment is mainly supportive. Patients are not infectious, but should avoid further mosquito bites. A number of antiviral agents have been investigated; however; none of these have convincingly been shown to improve the outcome of JE infection. [10]. Japanese Encephalitis viral Infection was found to be widely prevalent compared to other arbovirus tested. These observations appear to be of epidemiologic significance to encephalitis in relation to age, sex, seasonal effects of JE patients in Bihar. Hence we studied yearly geographical distribution of Japanese Encephalitis in Bihar.

Material and Methods

The study was comprised of total of 866 patients for the suspected AES cases coming to Patna Medical College, Patna. The samples of the patients suspected for Acute Encephalitis Syndrome reaching from various districts of Bihar and nearby

places was carried out in the Department of Microbiology, Patna Medical College, Patna from the year January 2015 to December 2016, over a period of two years. Patients having any or few symptoms like fever, headache, seizures, irritability, confusion, body rigidity, altered sensorium etc. were included in the study. A Case Report Form (CRF) was filled with the help of patient's attendant properly (which includes basic details of the patients and clinical symptoms which they are suffering from) and a concerned signature were taken. The collected serum and CSF samples were analysed for JE specific IgM antibody by IgM Antibody Captured Enzyme Linked Immunosorbant Assay [MAC ELISA] using kit from NIV, Pune. The collection, transport and storage of specimen were done according to the standard procedures followed at National Institute of Virology,Pune (NIV Pune) and analysed for the IgM antibody against JE virus through MAC ELISA. Data so obtained were arranged accordingly to year –wise, month-wise, urban and rural distribution, sex-wise, age-group wise, male-female ratio etc. and expressed as percentage or numbers in chart.

Result

The prevalence of JE in AES cases was found more or less throughout the state. Table 1 shows the total suspected AES cases came for testing of JE for the year 2015 and 2016 and the total number of JE positive cases. It also shows the sex-wise distribution of JE which concludes that there is no relation of gender with the JE activity. In the year 2015, total investigated cases were 443 out of which 36 cases were found positive. In the year 2016, total investigated cases were 423 out of which 47 cases were found positive. Table 2 shows the month wise distribution of JE throughout the year from January to December for the two years. It was concluded that the month of September and October is the peak season for JE infection. These months have higher number of suspected cases and positive cases as well. Table 3 shows the age-group wise distribution of JE patients which concludes that children of age-group 0-15 are more vulnerable. Table 4 shows the total population of urban and rural for the suspected AES cases.

Table 1: Suspected AES cases, total positive, negative, male and female in the year 2015 and 2016.

Year	Total Case	Total Positive	Total Negative	Total Male	Total Female
2015	443	36 (8.1%)	407 (91.9%)	22 (61.11%)	14 (38%)
2016	423	47 (11.1%)	376 (88.9%)	24 (51.06%)	23 (48.93%)

Table 2: Month wise distribution of JE positive cases in year 2015 and 2016.

Month	2015	2016
January	00 (0%)	00 (0%)
February	00 (0%)	00 (0%)
March	00 (0%)	00 (0%)
April	00 (0%)	02 (4.2%)
May	00 (0%)	01 (2.1%)
June	00 (0%)	01 (2.1%)
July	00 (%)	04 (8.5%)
August	04 (11.1%)	05 (10.6%)
September	15 (41.6%)	11 (23.4%)
October	14 (38.8%)	11(23.4%)
November	02 (5.5%)	09 (19.1%)
December	01 (2.7%)	03 (6.3%)

Table 3: Age wise distribution of JE positive cases in year 2015 and 2016.

Year	0-5 Year	5-10 Year	10-15 Year	15-20 Year	>20 Years
2015	12 (33.33%)	17 (47.22%)	03 (8.3%)	02 (5.5%)	02 (5.5%)
2016	16 34%)	15 (31.9%)	14 (29.7%)	01 (2.1%)	01 (2.1%)

Table 4: Urban & Rural distribution of JE positive cases in year 2015 and 2016.

Area Wise	2015	2016
Urban	32 (7.2%)	38 (8.9%)
Rural	411 (92.8%)	385 (91.1%)

Discussion

In India, JE is a major problem in children and epidemics are reported from many parts of the country [11]. Growth of population, unhygienicity, intensified rice farming, pig rearing etc. are the key factors for transmission of the disease [4]. The activity of JE was significantly higher in rural population than the urban population and was also higher in low- socio economic group [12]. Our study also revealed that rural areas are more vulnerable than urban areas. In the year 2015, the contribution of rural population was 92.8 % while the urban population contributed only 7.2 %. Whereas in the year 2016, the contribution of rural population was 91.1 % whereas the urban population contributed only 8.9%. Due to circulation of entero-viruses in Bihar, AES cases are reported round the year but post rainy months are the peak season for JE cases. This study shows similarity with that of Ravi *et al* findings [11]. The incidence of JE varied in each month with most of the cases during the monsoon and after the monsoon period [13]. Our study also revealed that in the year 2015, the month of September and October contributed maximum positive cases that is 41.6% and 38.8% respectively. In the year 2016, September and October contributed same number of positive cases that is 23.4%. Children of age- group between 1 -15 years are most affected by JE cases but sensitivity can be seen in any age group and round the year. Children and adolescent are probably directly exposed to the mosquito vector (Culex sp.) bite. Also lack of immunity against JE virus in the younger age group could be responsible for increased incidence of disease in this age-group [13]. Our study also indicates that the children of age group 0 to 15 years of age are more vulnerable. In the year 2015, 88.8% of total positive cases was found from age group 0- 15 years of age. Whereas in the year 2016, 95% of total positive cases was contributed by age group of children between 0 to 15 years of age. It may conclude that adolescent and adults acquire immunity against AES and thus contribution of patients more than 15 years are less.

Conclusion

Realizing the gravity of problem of AES in Bihar state for

envisaging multi-prolonged strategy encompassing preventing (sanitation, safe drinking water, improvement in nutrition etc.), case management (capacity building of medical and paramedical staff, referrals etc.) and rehabitation (physical and social rehabitation of disabled children), measure to address the problems relating JE/AES.

Proper guidelines are required to guide the programme managers at state and district level for better management of the programme by providing information on AES surveillance, JE vaccination, early case detection and speedy referrals of complicated cases to well-equipped hospitals, rehabilitation of disabled children due to AES/JE which can help to reduce mortality and disability in affected children.

To conclude, the etiology panorama of acute encephalitis syndrome varies with geographical location. JE still remains the chief causative agent of AES, although ongoing epidemiological preventive strategies. While viral diagnostics standard protocols for identification of AES and basic CSF based diagnostics into routine clinical care and periodic diagnostic testing can provide valuable etiologic and epidemiologic information.

Acknowledgement

The authors express their heartfelt gratitude and sincere thanks to Dr. S.N. Sinha, Professor and HOD, Department of Microbiology, Patna Medical College, Patna for their active support and cooperation. The authors also sincerely acknowledge all staff of virology unit of department of Microbiology, Patna Medical College, and Patna for their kind support in every aspect.

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