

ASSESSMENT OF PREVALENCE OF VIRAL AETIOLOGICAL AGENTS IN CASES OF ENCEPHALITIS ADMITTED TO A TERTIARY CARE HOSPITAL OF NORTHEAST INDIA

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Abstract

Background: The aim is to assess prevalence of viral aetiological agents in cases of encephalitis admitted to a tertiary care hospital of Northeast India. **Materials and Methods:** Two hundred sixty- three patients of suspected encephalitis of either gender was selected and cerebrospinal fluid (CSF) samples were collected. IgM antibody detection by enzyme- linked immunosorbent assay (ELISA) for JEV, dengue virus (DV) was done. Real- time polymerase chain reaction was done for Herpes simplex virus (HSV), Varicella- zoster virus (VZV), Epstein- Barr virus (EBV), cytomegalovirus (CMV), enterovirus (EV), HHV 6, HHV 7, JEV and parechovirus. **Result:** Out of 263 patients, there were 151 male and 112 female. JEV was detected in 126, scrub typhus in 8, HSV- I in 4, VZV in 1, EBV in 5, HHV- 6 in 1, HHV- 7 in 1, AV in 1 and DEV in 15 patients. The difference was significant (P< 0.05). Clinical manifestations were fever seen in 263, altered sensorium in 247, raised intracranial pressure in 205, vomiting in 120, neck stiffness in 35 and seizure in 124 patients. The difference was significant (P< 0.05). Treatment outcome was mortality seen in 56, recovered and discharged in 47, recovered and disability in 1 and LAMA in 159. The difference was significant (P< 0.05). **Conclusion:** Acute encephalitis syndrome is quite common in patients. High mortality rate was observed in our patients.

INTRODUCTION

Acute encephalitis syndrome (AES) has been a major health problem. It has high morbidity and mortality. AES is defined as a person of any age at any time of year with the acute onset of fever and a change in mental statuses such as confusion, disorientation, coma, or inability to talk and/or new onset of seizures.^[1] The incidence of AES varies in different studies, but the average incidence is between 3.5 and 7.4/100,000 patient-years, the incidence being higher in children.^[2] The aetiology of AES can be broadly grouped under infective (bacteria and viruses) or noninfective category, which can vary widely depending on the geographical location and host factors. In most of the cases, the etiologic agent is not identified, and in diagnosed cases, viruses are the major pathogens.^[3] Although bacteria, viruses and protozoan parasites may cause encephalitis, among these the viruses are the most common and important cause of

encephalitis.^[4] Cases of AES have been reported from many states of India, but the aetiological agent has been identified in only 20%–30% cases. Among all, viral encephalitis that is encountered in India, JE appears to be of greater significance during outbreaks as well as in sporadic cases.^[5] Herpes group of viruses, enterovirus (EV), measles virus (MV), mumps virus (MPV) and Rubella virus (RV) also constitute significant numbers in sporadic and outbreak cases in India.^[6] Considering this, we aimed at assessing prevalence of viral aetiological agents in cases of encephalitis admitted to a tertiary care hospital of Northeast India.

MATERIALS AND METHODS

Two hundred sixty- three patients of suspected encephalitis of either gender after obtaining approval from ethical review committee of the institute were selected and recruited in this prospective observational study. The written valid

consent in their vernacular language was obtained. Inclusion criteria used was fever of <15 days duration with or without altered sensorium, seizures, headache, vomiting, abdominal pain and paralysis.

A thorough examination was carried out. Cerebrospinal fluid (CSF) samples were collected from patients suspected of AES. IgM antibody detection by enzyme-linked immunosorbent assay (ELISA) for JEV, dengue virus (DV) was done in patient CSF using commercial ELISA kits as per manufacturer's instructions. Real-time polymerase chain reaction was done using specific primers and probes for Herpes simplex virus (HSV), Varicella-zoster virus (VZV), Epstein-Barr virus (EBV), cytomegalovirus (CMV), enterovirus (EV), HHV 6, HHV 7, JEV and parechovirus. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table 1: Patients distribution

Total- 263		
Gender	Males	Females
Number	151	112

Table 2: Occurrence of different viruses in positive cases

Virus	Number	P value
JEV	126	0.01
Scrub typhus	8	
HSV- I	4	
HSV- II	0	
VZV	1	
CMV	0	
EBV	5	
HHV 6	1	
HHV 7	1	
EV	0	
AV	1	
PV	0	
DEV	15	

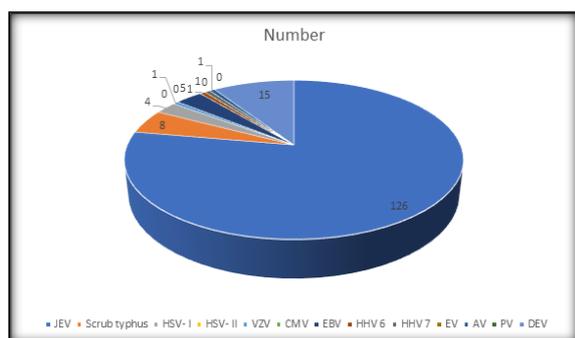


Figure 1: Occurrence of different viruses in positive cases

Table 3: Assessment of clinical manifestations

Clinical manifestations	Number	P value
Fever	263	0.91
Altered sensorium	247	
Raised intracranial	205	

pressure		
vomiting	120	
Neck stiffness	35	
seizure	124	

Table 4: Outcome of treatment

Outcome	Number	P value
Mortality	56	0.01
Recovered and discharged	47	
Recovered and disability	1	
LAMA	159	

Out of 263 patients, there were 151 male and 112 female [Table 1].

JEV was detected in 126, scrub typhus in 8, HSV- I in 4, VZV in 1, EBV in 5, HHV- 6 in 1, HHV- 7 in 1, AV in 1 and DEV in 15 patients. The difference was significant ($P < 0.05$) [Table 2, Figure 1].

Clinical manifestations were fever seen in 263, altered sensorium in 247, raised intracranial pressure in 205, vomiting in 120, neck stiffness in 35 and seizure in 124 patients. The difference was significant ($P < 0.05$) [Table 3].

Treatment outcome was mortality seen in 56, recovered and discharged in 47, recovered and disability in 1 and LAMA in 159. The difference was significant ($P < 0.05$) [Table 4].

DISCUSSION

There is a wide variation in the viral aetiological agents causing CNS infections across the globe and even in the same continent, and a country. For better management of patients, it is important to know the profile of viruses causing AES in the given area so that immediate action can be taken before laboratory results are available.^[7] In India, the actual contribution of viruses to AES is not entirely known because of problems associated with laboratory diagnosis and many disorders of central nervous system (CNS) mimicking AES.^[8] Present study assessed prevalence of viral aetiological agents in cases of encephalitis admitted to a tertiary care hospital of Northeast India.

Out of 263 patients, there were 151 male and 112 female. JEV was detected in 126, scrub typhus in 8, HSV- I in 4, VZV in 1, EBV in 5, HHV- 6 in 1, HHV- 7 in 1, AV in 1 and DEV in 15 patients. Tripathy et al,^[9] studied the clinico-epidemiological features of viral acute encephalitis syndrome (AES) cases and compare them with nonviral AES cases in children from Eastern India. Of 834 of clinically suspected AES cases, viral etiology could be confirmed in 136 (16.3%) cases (herpes simplex virus-1 [HSV-I] was most common). The 5–15 years' age group was most commonly affected (boys > girls). More cases occurred from July to November. The presence of rash and Glasgow Coma Scale <8 at admission was significantly higher in viral AES. During hospitalization, development of shock, ventilatory requirement,

duration of stay, and mortality was significantly higher in viral AES. On neuroimaging, global cerebral injury was common in HSV, Japanese encephalitis, and varicella-virus AES.

Our results showed that clinical manifestations were fever seen in 263, altered sensorium in 247, raised intracranial pressure in 205, vomiting in 120, neck stiffness in 35 and seizure in 124 patients. Tiwari JK et al,^[10] identified the viruses causing AES and develop diagnostic algorithm so as to help in improved diagnosis, treatment, prevention and control. Among 3088 patients, 702 (22.7%) patients were positive for one or more viruses. HSV (261;8.45%) was the most common followed by EBV (173;5.6%), VZV (97;3.1%), CMV (68;2.2%), EV (32;1.03%), MPV (27;0.9%), DV (28;0.9%), MV (19;0.6%) and RV (6;0.2%).

Treatment outcome was mortality seen in 56, recovered and discharged in 47, recovered and disability in 1 and LAMA in 159. Medhi et al,^[11] investigated JE positivity amongst patients admitted with acute encephalitis syndrome (AES). A total of 1707 consecutive non-repetitive hospitalized patients, satisfying the clinical case definition of AES as per the WHO guidelines, were included in the study. Cerebrospinal fluid (CSF) and serum samples were tested for JEV-specific IgM antibodies. Of the 1707 patients admitted, 696 (40.77 %) were diagnosed as JE with male-to-female ratio 1.7:1 and adult to paediatric ratio 2.2:1. Fever (100%), change in mental status (100%), headache (80.02%), neck rigidity (52.01%), unconsciousness (48.99%), seizure (37.64%) and paralysis (11.06%) were the major clinical findings. The majority of cases (94%) were from rural areas. There was a significant association of JE cases with rainy season of the year i.e., June to August.

Studies have shown that in acute febrile encephalopathy or AES, the mortality is higher in viral cases.^[12] This could be because of nonspecific manifestations leading to delayed presentation, no specific treatment for viruses, fulminant course with some viruses, difficulty in establishing diagnosis early leading to delayed treatment, and common occurrence of complications (shock, respiratory failure, and bleeding). Previous studies from India have reported a mortality rate varying from 15% to 40%.^[13]

CONCLUSION

Acute encephalitis syndrome is quite common in patients. High mortality rate was observed in our patients.

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