



Research Article

A Study of Occurrence of Acute Encephalitis Syndrome Admitted in PICU and Their Outcome- A Hospital Based Study

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Abstract

Background: Acute encephalitis syndrome (AES) is defined as the acute-onset of fever and a change in mental status, these can include signs and symptoms such as confusion, disorientation, delirium or coma and/or new-onset of seizures. (Simple febrile seizures are not included) in a person of any age at any time of the year. AES is reported mainly from states like Assam, Bihar, Tamil Nadu, Karnataka, Uttar Pradesh attribute to major percentage of cases with over all case fatality rate of 20-25%. The objective of present work was to study the occurrence and outcome of AES cases admitted in PICU

Methods: This study was conducted in children admitted in PICU, Silchar medical college and hospital over a period of 1 year (July 2019 to June 2020). 92 AES cases were admitted over this period. History, clinical features, demography, immunization status and outcome were recorded. Results of blood investigation, CSF analysis and IgM ELISA for HSV, JE, CMV, Dengue, scrub typhus were recorded and analysed.

Results: The percentage of AES in PICU was 7.47% (92/1230). Mean age of the cases was 4.3+/-3.2 years. Male to female ratio was 2.06:1. The percentage of children who presented as AES and were not immunized fully was 91.3%. Most common presentation was seizure. Dysglycemia was present in 15.2% of cases. 6.5% of AES cases were JE positive. Hyponatremia (p value 0.007747) and shock (p value 0.00001) at presentation were associated with increased mortality. Mortality rate of infants were found to be higher than non infants. Behavioural disturbances were found in 20% of follow up cases.

Conclusions: 6.5% of AES cases were JE positive. Hyponatremia at presentation of AES cases are associated with increased risk of mortality, so it need priority care. Prompt identification and treatment of dysglycemia and shock are important in AES cases. General awareness and proper education among people about the immunization and hygienic practices will be beneficial.

Introduction

Acute encephalitis syndrome (AES) is defined as the acute-onset fever and a change in mental status. These can include signs and symptoms

such as confusion, disorientation, delirium or coma and/or new-onset of seizures (simple febrile seizures are not considered) in a person of any age at any time of the year¹. Viruses are the main

contributors to be the cause of AES in India also agents such as bacteria, fungus, parasites, spirochetes, chemical, and toxins have been reported² Other than viral encephalitis, severe form of leptospirosis and toxoplasmosis can also cause AES.

The causative agent of AES differs with time and geographical location, and mainly affects age group under 15 years².

The clinical definition of AES was introduced to make possible the surveillance for Japanese encephalitis (JE).³ Japanese encephalitis is one of the most important forms of epidemic and sporadic encephalitis in the many regions of Asia, including Japan, China, Taiwan, all of Southeastern Asia, and India.⁴

The main etiological agent is Japanese encephalitis virus (JEV). It is a positive sense single stranded flavivirus, with vector *Culex spp.* Mosquitoes^[5,6]

In India JE Virus has been reported from many parts of the country^[7,8]. JE virus was first isolated in humans in Vellore district in Tamil Nadu in 1955^[9]. Big outbreak occurred in the districts of West Bengal in 1973^[10]. Since then, the virus is active in many parts of India and outbreaks have been reported from the states of Bihar, Uttar Pradesh, Assam, Manipur, Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, Haryana, Kerala, West Bengal, Orissa and union territories of Goa and Pondicherry^[11]

While considering North east (NE) part of India, AES was first observed in 1976 in Assam. After that AES has appeared in endemic forms or in sporadic outbreaks^[12]. The Assam state, specially the upper Brahmaputra valley has been experiencing repeated JE episodes during the months of July to October every year^[13]. Other than Assam, JE cases have been reported from other states like Manipur, Nagaland^[14] and Arunachal Pradesh^[15].

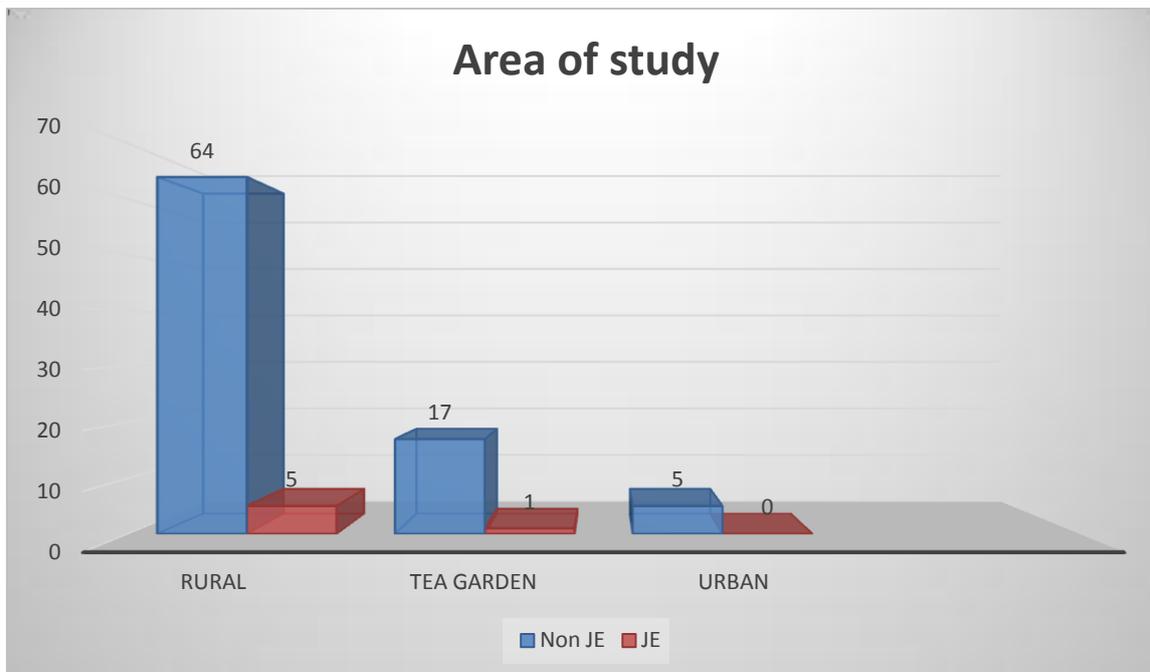
Methods

This is an observational study conducted in PICU of Silchar Medical College in cases admitted over a period of 1 year, from July 2019 to 2020. Study conducted in age group 1 month to 12 years. All the consecutive cases admitted in PICU during the last 1 year were included in the study. Written informed consent was obtained from either parent or guardian. Detailed history was taken and valid factors in history were documented. Demographic factors are also taken into account. Proper clinical examination was done and findings were documented.

Immunization history of the child is noted. Outcome of the disease mainly includes mortality and any sequelae was noted. Blood investigation done includes CBC, electrolytes, peripheral smear, blood sugar were analysed. Neuroimaging was done wherever feasible was analysed and abnormalities were documented. CSF tests done includes cytology, biochemistry, AFB and gram stain. Serum IgM ELISA for JE, HSV, scrub typhus and Dengue were done and analysed. Course of hospital stay of the patient was monitored including the need for inotropes and mechanical ventilation. Medications and supportive care given were analysed. Patients who survived were followed up for any neurological sequelae.

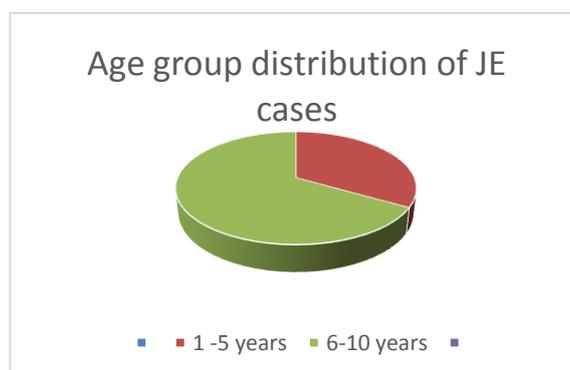
Results

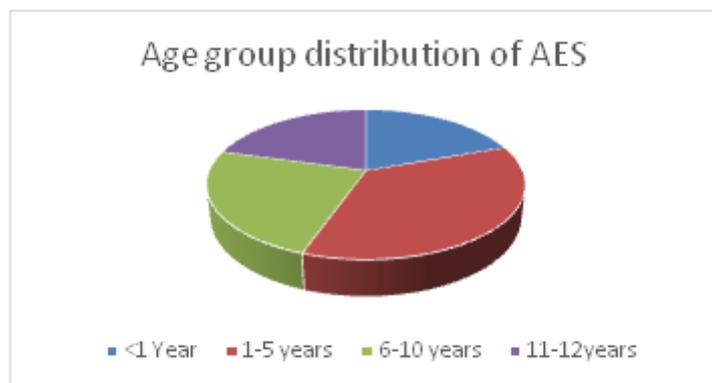
As per the analysis percentage of AES in PICU was 7.47% (92/1230). Male to female ratio of AES patients was 2.06:1. More cases were found in 1-5 yrs age group with mean age being 4.3₋3.2 years. There was statistically significant difference in death among the infants and non infants (p value 0.0086). Most common presentation was seizure with altered consciousness (73.9%). Most patients had normal blood glucose on admission. Dysglycemia was present in 14 patients (15.21%).



Location	Non JE	JE	Total
Rural	64	5	69
Tea garden	17	1	18
Urban	5	0	5
Total	86	6	92

Age group(years)	Non JE(%)	JE(%)	Total
<1year	18	0	18
1-5 years	31	2	33
6-10 years	18	4	22
11-12 years	19	0	19
Total	86	6	92





Risk factors	Group	Death*	Survivors*	P value#
Age	Infants	6	12	0.332995
	Non infants	34	40	
Sex	Male	29	33	0.35926
	Female	11	19	
Seizure	Yes	32	36	0.243558
	No	8	16	
Hypoglycemia	Yes	8	6	0.262664
	No	32	46	
Hyponatremia	Yes	18	10	0.007747
	No	22	42	
Shock	Yes	31	5	0.00001
	No	9	47	
Leucocytosis	Yes	24	37	0.26185
	No	16	15	

*number (percentage).#P value <0.05 significant

Assessment of etiology revealed 6.5% of AES were JE positive.(6/92).No positive malaria cases were found. Those patients presented with shock and required ionotropes had significant mortality (p value 0.00001). The patients who had hyponatremia on admission had significantly high mortality (p value 0.0077). The percentage of AES children who were not immunized at all were 4.3% and 91.3 percentage were not fully immunized as per national immunization schedule. All the JE positive cases were presented in July month. Behavioral disturbances were found in 20% of follow up cases.

Discussion

In this study we analysed the incidence of AES in PICU and their outcome for last 1 year. Total 92 out of 1230 patients admitted in PICU were AES cases (7.47%).Out of 92 AES cases 6 patients were JE positive (6.52%). The remaining cases are grouped under non JE cases 84/92(93.48%).40 out of 92 AES patients died(43.48%).Seizures were

the most common complaints in other studies also.¹⁶

A study conducted in Nepal reported shown 4.7% cases were JE positive¹⁷.In a study conducted in Assam, India, JE positive cases were 33.6%¹⁸.In a study conducted in Patna medical college 65% of JE positive cases were discharged, whereas overall discharge rate of AES was 51%.

In our study the incidence of AES was found more in males compared to females, similar findings were observed in other studies also¹⁹.

The patients presented with hyponatremia had high mortality was observed in our study. In a study done by Misra et al it was found that low sodium level was frequently associated with AES and they had poor outcome²⁰. In our study all the JE cases were found in the month of July, which is in the time period mentioned for recurring cases of JE (July to October)in Assam by Khan SA et al¹³.

High incidence of AES and JE in India is attributed to the large population living near the

irrigated lands, high vector and animal densities including pig farms in endemic areas and socio economic status also. Large number of non immunized children also contributes to the case load. Better awareness, education and proper adherence to vaccination can play major role in controlling this disease.

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