

Original Research Article

Clinical profile and outcome of children admitted with acute encephalitis syndrome

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ABSTRACT

Background: Acute encephalitis syndrome (AES) is an important cause of mortality and morbidity in children. We undertook this study for better understanding of clinical profile and outcome of AES in our settings.

Methods: It was a prospective observational study. We studied 15 patients of AES admitted in a tertiary care hospital from December 2016 to May 2017. For investigating AES cases, WHO case definition was adopted. Clinically a case of AES is defined as fever or recent history of fever with change in mental status (including confusion, disorientation, coma, or inability to talk) and/or new onset of seizures (excluding simple febrile seizures). Other early clinical findings could include an increase in irritability, somnolence or abnormal behavior greater than that seen with usual febrile illness. We evaluated their clinical characteristics and outcomes at the time of discharge.

Results: Fever, altered sensorium, seizures and headache were the most common symptoms observed in this study. Among 15 cases of AES patients, 6 (40%) recovered completely, while 5 (33.33%) cases had neurological sequelae with a wide range of severity varying from mild to severe at the time of discharge, 4 (26.66%) patient died in the hospital.

Conclusions: This study offers a description of the present etiology, clinical presentation and short-term outcome of AES. Use of mechanical ventilation, lower Glasgow coma score, and concurrent seizures are predictors for a poor outcome. Reporting and appropriate workup of all cases would strengthen the AES surveillance and help in reducing the morbidity and mortality due to this disorder.

Keywords: AES, Glasgow coma scale, Neurological sequelae

INTRODUCTION

Viral encephalitis is a globally distributed disease that seriously affects public health, threatening almost half of the world's population.¹ It may be sporadic like herpes simplex encephalitis (HSE), or epidemics such as Japanese B encephalitis (JE). The etiological agents are varied, and physicians treating such children often feel limited by the lack of availability of diagnostic testing for most of these agents. In developed countries, 50–60% of survivors of

viral encephalitis with clear etiologies had a poor prognosis after long-term follow-up.²⁻⁶

At present, pathogen detection for viral encephalitis is not widely used for clinical diagnosis and treatment in India; the diagnosis is largely based on clinical data and auxiliary examination of patients.^{7,8} In addition, research shows that no more than 30–40 % of encephalitis cases can be pathogenically diagnosed, of which Japanese encephalitis (JE) is the most common cause in India.^{9,10} And more than half of pathogenically diagnosed viral

encephalitis had a poor prognosis.¹¹ On the other hand, 10–30 % of patients with clinically diagnosed viral encephalitis also have a poor prognosis. In India except Jammu & Kashmir, Himachal Pradesh, and Uttaranchal, nearly all states have reported Japanese encephalitis.¹² The Northeast part of India has been experiencing recurrent episodes of Japanese Encephalitis with different magnitude from July to October every year.¹³ We conducted a study of the patients admitted for acute encephalitis syndrome from December 2016 to May 2017. This study is done for a better understanding and to determine the clinical profile and outcome of AES in hospitalized children and also to determine the etiology in all cases of AES.

METHODS

Children with AES from 6 months to 12 years of age who were admitted in paediatric intensive care and paediatric wards of LTMGH, Mumbai, India were included in this study from December 2016 to May 2017.

For investigating AES cases, WHO case definition was adopted. Clinically a case of AES is defined as fever or recent history of fever with change in mental status (including confusion, disorientation, coma, or inability to talk) and/or new onset of seizures (excluding simple febrile seizures). Other early clinical findings could include an increase in irritability, somnolence or abnormal behavior greater than that seen with usual febrile illness.^{14,15}

Such patients were excluded if they 1) had other severe disease, such as severe infection other than in the central nervous system, malignancy, brain infarction or cerebral hemorrhage, malaria 2) a diagnosis of delirium or encephalopathy secondary to sepsis, toxins, or metabolic causes.

Basic blood investigations like a complete blood count (including platelet count), blood glucose, serum electrolytes, liver and kidney function tests, blood culture, arterial blood gas were done in all patients with AES. A peripheral smear for malarial parasite and rapid diagnostic tests for malaria and leptospirosis were also done. A neuroimaging study was wherever indicated. CSF analysis was done and CSF viral profile including Japanese encephalitis, Herpes Simplex virus and Chandipura viruses was sent. Data collected in such a way was analyzed and compared.

The outcome of the patients was recorded at the time of discharge. Outcome was defined as recovered completely, recovered with neurological sequelae, and death. Neurological sequelae were defined by the presence of one or more of the following at discharge; impaired consciousness, weakness (mono-paresis, hemiparesis, and quadriplegia), focal or generalized abnormal limb tone (hypertonia and hypotonia), focal or generalized abnormal limb reflexes (hyperreflexia and

hyporeflexia), diagnosis of new onset or recurrent seizures, or new or recurrent extra pyramidal movement disorders.

RESULTS

This study examined 15 patients (11 boys; 73.3 %) with a mean onset age of 5.02 years.

The predominant age group affected was 5 to 11 years and the youngest child affected was 5 months old. Majority of the patients (85%) were from the rural area and belonged to low socioeconomic group (72%). The demographic profile and clinical characteristics of the patients are shown in Table 1.

Table 1: Demographic details of patients.

Characteristic	Value
Age	5.02 years
Male	11 (73.33%)
Female	4 (26.67%)
Lower socioeconomic strata	11 (73.33%)

Investigations are summarized in Table 2. Out of 15 cases of AES, 2 patients had presented with raised intracranial tension and poor GCS, so their CSF examination could not be done. Serum JE IgM ELISA was positive in 2 patients however their CSF was negative for the presence of JE antibodies while the remaining were non-JE. All the samples were found to be negative for HSV 1 and 2 and Chandipura viruses.

Table 2: Clinical profiles of the patients.

Presentation	Value
Mean duration of fever	4.1 days (2-10days)
Altered sensorium-based GCS	<8 4 (26.67%) >8 11 (73.33%)
Abnormal behaviour	4 (26.67%)
Confusion	4 (26.67%)
Seizure	13 (86.66%)

Among 15 cases AES patients, 6 (40%) were recovered completely, while 5 (33.33%) cases had neurological sequelae with a wide range of severity varying from mild to severe at the time of discharge, 4 (26.66%) patient died in the hospital. Out of the 15 children with AES, 13 had presented with seizures. 6 had GTCS (46%), 5 had focal (38%), 1 had myoclonic and 1 had generalized tonic seizure. Amongst these, 10 had recurrent seizures during the hospital stay. Clinical characteristics and investigations of patients with a poor or favorable outcome at discharge are compared in Table 3.

As represented in Table 4, out of 15 cases 3(20%) patients had hospital stay less than 7 days while 12(80%) patients had hospital stay more than 7 days; of these 4 patients had favourable outcome. Out of 11 patients who

had MRI abnormalities 2 patients had favourable outcome. Out of 7 patients those needed mechanical ventilation, maximum number (6 patients) found to have poor outcome. Also 4 patients with GCS less than 8, 3 patients had poor GCS and out of 10 patients with recurrent seizures 3 patients had poor outcome.

As presented in Table 5, those patients who had poor GCS (<8), mean duration of fever was found to be 4.2 days and mean length of stay was 20 days. Also, all patients (100%) had recurrent seizures, MRI abnormalities and need of mechanical ventilation. There was 25% survival among these patients with poor GCS.

Table 3: Parameters during the hospital stay.

Parameter	Value
Patients requiring mechanical ventilation	7 (46.66%)
Recurrent seizure	10 (66.66%)
Length of hospital stay	15.2 days
Outcome survival	10 (66.66%)
Recovery	Complete with Neurological sequelae 6 (40%) 5 (33.33%)
Investigations	
Hemoglobin (g/dl)	10.5
Total leucocyte count (/cmm)	9518.7
Platelet (lacs/cmm)	281533.3
SGOT (IU)	71.1
SGPT (IU)	39.3
CSF cell (/ c mm)	21.2
CSF protein (mg/dl)	37.4
CSF glucose(mg/dl)	47.6
Blood urea(mg/dl)	7.5
Serum creatinine(mg/dl)	0.8
Serum sodium (Meq/l)	138
Serum potassium (Meq/l)	4.3
Serum calcium (mg/dl)	8.3
MRI Abnormality	11 (73.33%)

Table 4: Correlation.

Character		Favourable outcome	Unfavourable outcome
Length of hospital stay (days)	<7	3 (20.00%)	2
	>7	12 (80.00%)	4
MRI Abnormality	Present	11 (73.33%)	2
	Absent	4 (26.67%)	4
Need for mechanical ventilation	Yes	7 (46.66%)	1
	No	8 (53.34%)	8
Poor GCS (<8)	Yes	4 (26.66%)	1
	No	11 (73.33%)	10
Recurrent seizures	Yes	10 (66.66%)	7
	No	5 (33.33%)	4

Table 5: correlation of poor GCS with other parameters.

Parameter	GCS (<8) n=4	GCS (>8) n=11
Duration of fever	4.2 days	3.9 days
Recurrent seizure	4 (100%)	6 (54.54%)
Mean length of stay	20 days	10 days
MRI abnormality	4 (100%)	7 (63.6%)
Mechanical ventilation requirement	4 (100%)	3 (27.27%)
Survival	1 (25%)	10 (90.9%)

DISCUSSION

In our study, children mostly affected were from rural areas (85%) and belonged to low socioeconomic group (72%). This correlated well with the earlier studies where the patients were children of farmers or farm laborers of low socioeconomic group residing in rural areas.^{27,28} This may be due to favorable epidemiological factors like presence of water-logged paddy field supporting profuse breeding of vector mosquitoes, piggeries in close proximity to residence, no use of bed nets and outdoor playing habits of children. JE incidences have been declining sharply in pediatric age group in Taiwan after the vaccination program began in 1967.²⁹ This emphasizes the need of quality coverage of JE mass vaccination program and consequently vaccination campaign should be evaluated for appropriate corrective measures.³⁰ Moreover, continuation of JE vaccination of children in routine immunization in the JE endemic districts should be a public health priority.

Among the clinical presentation, fever, altered sensorium, seizures and headache were the most common symptoms observed in this study. In children similar manifestations were also noted in earlier studies.³¹

In our study, the use of mechanical ventilation, a GCS score below 8, and concurrent seizures were found to be poor prognostic factors of encephalitis. A longer hospital stay and MRI abnormality were also associated with poor outcome. These risk factors have also been identified in various studies. One retrospective study by Ooi et al concludes that low perfusion; GCS score below 8, and convulsions were associated with poor prognosis.³² Another retrospective study done at French over 253 encephalitis cases found similar results.³³ Use of mechanical ventilation, lower Glasgow coma scores (GCS) and concurrent seizures are good predictors of poor outcome in acute encephalitis syndrome. So, we should manage the patient aggressively when these poor prognostic factors are present without wasting golden hours, and this is irrespective of etiology of AES. Children with Glasgow Coma Score less than 8 should preferably be incubated; mechanical ventilation should be provided in case the breathing efforts are not adequate. In our study, 33.33% AES patients had neurological sequelae at the time of discharge, while 26.66% had died in hospital. Mortality was associated with GCS within 3 to 8. Neurological sequelae in AES are the common observation.³⁴ Our study corroborates with the findings A Fowler et al study which indicates sequelae at discharge in 60% of the patients.³⁵

CONCLUSION

This study offers a description of the present etiology, clinical presentation and short-term outcome of AES. Need of mechanical ventilation, lower GCS score, and concurrent seizures are predictors for a poor outcome in these patients. However, the large group of cases with

unknown etiology and the lack of data on long-term outcome all indicate the need for further studies in this field. Reporting and appropriate workup of all cases would strengthen the AES surveillance and go a long way in reducing the morbidity and mortality due to this disorder.

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