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Etiology and Clinical Characteristics of Pediatric Acute Encephalitis Syndrome: A Prospective Observational Study

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Abstract: ***Background**: Acute encephalitis syndrome (AES) remains an important public health concern in India, contributing to significant morbidity and mortality in the pediatric age group. Diverse etiology, non-specific presentation, and limitations in diagnostics often hinder early management. **Objectives**: To evaluate the clinical presentation, etiology, laboratory profile, and outcomes of pediatric AES. **Methods**: A prospective observational study was conducted over 9 months at the Department of Pediatrics, G.G. Hospital, Jamnagar. Eighty children aged 1 month–12 years with AES were included. Clinical presentation, etiology, laboratory findings, and outcome predictors were systematically analyzed. **Results**: AES was most common in children aged 1–5 years, with rural predominance. Fever and seizures were the leading clinical features. Viral encephalitis of unknown cause was most frequent, followed by Japanese encephalitis, bacterial meningitis, and tuberculous meningitis. Laboratory analysis showed CSF pleocytosis in most cases, with deranged renal and hepatic functions correlating with poor prognosis. Mortality was associated with GCS <8, raised intracranial pressure, shock, metabolic acidosis, and multiorgan dysfunction. **Conclusion**: AES in children is predominantly viral, but a substantial proportion remain undiagnosed. Identifying early predictors of poor outcome can improve management and survival.*

Keywords: pediatric encephalitis, AES outcomes, viral infections, clinical predictors, rural healthcare

1. Introduction

Acute Encephalitis Syndrome (AES) is a serious public health concern, particularly affecting the paediatric population in many parts of the world. It is characterized by the rapid onset of fever, altered mental status, and often seizures, progressing to coma or death if not promptly managed. The syndrome represents a wide spectrum of infections, non-infectious inflammatory conditions, and toxic-metabolic causes that lead to inflammation of the brain.

In children, AES is especially critical due to their developing neurological systems and vulnerability to rapid deterioration. Although viral infections, such as Japanese encephalitis virus, are common causes, the etiology can vary widely by region and season.

Early diagnosis, supportive care, and targeted treatment are crucial in improving outcomes and minimizing long-term neurological sequelae. Understanding the epidemiology, clinical features, diagnostic challenges, and management strategies of paediatric AES is essential for effective healthcare delivery and reducing mortality and morbidity rates among affected children.

Aims and Objectives

1) To identify the common clinical features of pediatric AES.
2) To determine etiological distribution of AES.
3) To evaluate laboratory findings in AES.
4) To analyze outcome predictors in pediatric AES.

2. Materials and Methods

Study design: Prospective observational study.

Study site: Department of Pediatrics, G.G. Hospital, Jamnagar.

Duration: 9 months.

Sample size: 80 pediatric patients aged 1 month–12 years fulfilling WHO case definition of AES.

Analysis: Clinical profile, etiology, laboratory investigations, and outcomes were assessed. Statistical significance was determined using chi-square tests and p-values (<0.05 significant).

3. Results

Table 1: Clinical Presentation of AES Cases (n=80)

Clinical Feature	No. of Cases	Percentage (%)
Fever	80	100
Seizures	62	77.5
Altered sensorium	55	68.7
Vomiting	32	40
Signs of raised ICT	28	35
Cranial nerve involvement	8	10

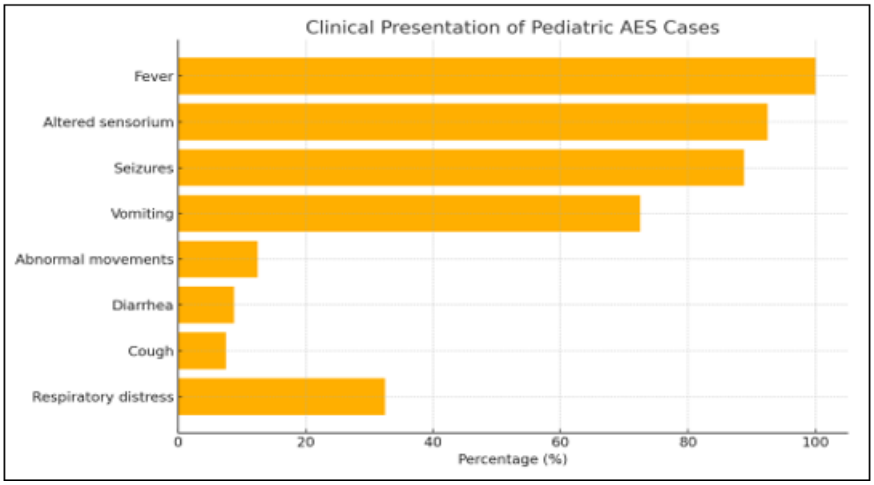


Table 2: Etiology of Pediatric AES (n=80)

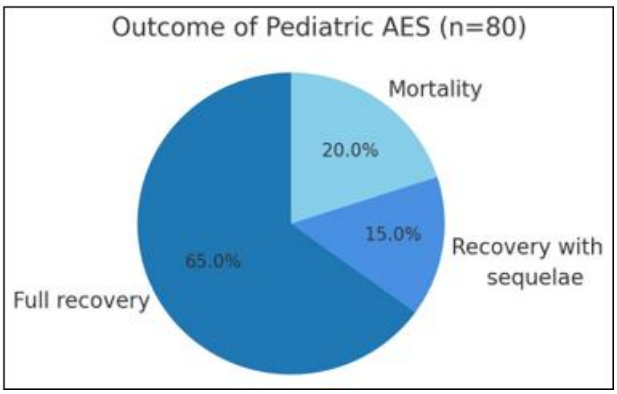
Etiology	Cases	Percentage (%)
Viral (Unspecified)	32	40
Tubercular meningitis	5	6.3
Bacterial meningitis	19	23.8
Chandipura encephalitis	1	1.3
Dengue encephalitis	1	1.3
Autoimmune encephalitis	1	1.3

Table 3: Laboratory Findings in AES Cases

Parameter	Abnormal (%)	Significant Association with Outcome
CSF Pleocytosis	72.5	Yes
Deranged RFT	28.7	Yes
Deranged LFT/Coagulopathy	25	Yes
Acidosis	22.5	Yes
Raised Intracranial Pressure	35	Yes

Table 4: Outcome of Pediatric AES (n=80)

Outcome	Cases	Percentage (%)
Full recovery	52	65
Recovery with sequelae	12	15
Mortality	16	20



4. Discussion

AES continues to be a significant pediatric health challenge, with viral etiologies predominating. The high proportion of cases with unknown etiology reflects limitations of current diagnostic capacity. Similar to other Indian studies, JE remains an important cause though its proportion is declining, while scrub typhus and tuberculosis are emerging. Clinical features like seizures, altered sensorium, and raised ICT are consistent with literature. Mortality in our study (20%) is comparable to reported ranges in Indian cohorts. Poor prognostic indicators include low GCS, shock, metabolic acidosis, and deranged organ functions. Strengthening surveillance, diagnostic facilities, and early supportive care remain crucial to reducing AES burden.

5. Conclusion

AES in children is predominantly viral but with diverse etiologies including JE, TBM, bacterial meningitis, and scrub typhus. Early recognition of poor prognostic factors is

essential to improve outcomes. Strengthening diagnostic capacity and preventive strategies such as vaccination and vector control remain priorities.

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