Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/k7b03r29

CLINICAL PROFILE AND OUTCOME OF ACUTE INFECTIOUS ENCEPHALITIS: A PROSPECTIVE OBSERVATIONAL STUDY

Dr. Arshied Hussain Bhat*[1], Dr. Sajad Ahmad Tak[2], Dr. Ghulam Hassan[3]

*[123]Department Of Medicine, Government Medical College, Srinagar

***Corresponding Author:**Dr. Arshied Hussain Bhat,
Senior ResidenDepartment of Medicine, Government Medical College, Srinagar, J&K

ABSTRACT

Background: Acute infectious encephalitis (AIE) is a neurological emergency characterized by inflammation of the brain parenchyma and is associated with significant morbidity and mortality. The clinical spectrum ranges from mild alteration of consciousness to severe neurological impairment with multiorgan dysfunction. Identification of clinical features and severity markers associated with poor outcome is essential for early risk stratification and optimal management.

Objectives: To evaluate the clinical profile, severity parameters, and short-term outcomes of patients diagnosed with acute infectious encephalitis.

Materials and Methods: This prospective observational study included 100 adult patients diagnosed with acute infectious encephalitis and admitted to a tertiary care hospital. Detailed clinical evaluation, neurological assessment, severity scoring, and laboratory investigations were performed. Data regarding intensive care requirement, mechanical ventilation, and in-hospital outcomes were recorded and analyzed using descriptive statistics.

Results: Fever and altered sensorium were present in all patients. Seizures, hypotonia, focal neurological deficits, hypotension, and raised intracranial pressure were frequently observed. A significant proportion of patients had severe neurological impairment at admission, reflected by low Glasgow Coma Scale scores and high organ dysfunction scores. Nearly half of the patients required mechanical ventilation. Overall survival was 70%, while mortality was 30%. Poor outcomes were predominantly associated with severe neurological dysfunction, systemic instability, and need for intensive care support.

Conclusion: Acute infectious encephalitis remains associated with substantial morbidity and mortality. Severity at presentation, neurological complications, and systemic involvement are key determinants of outcome. Early recognition and aggressive supportive management are crucial to improving survival and neurological recovery.

Keywords: Acute infectious encephalitis; altered sensorium; seizures; mechanical ventilation; mortality

INTRODUCTION

Encephalitis is a serious neurological disorder characterized by inflammation of the brain parenchyma, commonly presenting with altered mental status, fever, seizures, and focal neurological deficits[1]. The condition may result from a wide range of infectious and autoimmune mechanisms and can be associated with neuropsychiatric manifestations and memory impairment[2]. Accurate diagnosis requires careful clinical assessment because of overlapping features with other

neurological and systemic disorders. The global incidence of encephalitis is estimated at approximately 12.6 per 100,000 population annually, with a higher incidence observed in children[3-6]. In nearly half of affected individuals, the underlying cause remains unidentified. Among cases with a known etiology, viral infections account for a substantial proportion, with Japanese encephalitis virus being a major epidemic cause and herpes simplex virus the most common sporadic cause[5,7]. Recent changes in encephalitis epidemiology have been influenced by emerging arboviral infections and the increasing use of vaccination programs[8].

Acute encephalitis is associated with significant mortality and long-term neurological morbidity, particularly in low- and middle-income countries. Many survivors experience persistent cognitive and functional impairment requiring prolonged rehabilitation. Encephalitis has been recognized as a public health priority because of its substantial neurological and socioeconomic burden[9]. The global disability-adjusted life years attributable to encephalitis were estimated at 4.8 million in 2019[10], while the mean case fatality rate for infectious encephalitis in the United States is approximately 6%[7]. Acute infectious encephalitis/encephalopathy syndrome typically presents with fever and impaired consciousness and may be associated with seizures[11]. In South-East Asia, Japanese encephalitis continues to cause a significant number of cases with high mortality[12]. Early recognition and appropriate supportive management are crucial for improving survival and neurological outcomes.

Although multiple international studies have evaluated prognostic factors in acute infectious encephalitis, data from Indian tertiary care centers remain limited, particularly with respect to short-term outcomes and severity predictors. The present study was undertaken to evaluate the clinical profile, severity parameters, and outcomes of acute infectious encephalitis in a cohort of 100 patients admitted to a tertiary care hospital.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Medicine, Government Medical College, Srinagar a tertiary care teaching hospital over a period of one year (February 2017 to February 2018). A total of 100 consecutive adult patients diagnosed with acute infectious encephalitis were included fulfilling the selection criteria.

Inclusion Criteria

- Age ≥18 years
- Acute onset fever with altered sensorium
- Presence of seizures and/or focal neurological deficits
- Supportive cerebrospinal fluid or neuroimaging findings

Exclusion Criteria

- Metabolic encephalopathy
- Toxic or drug-induced encephalopathy
- Pre-existing chronic neurological disorders

Methodology

Demographic data, clinical features, vital parameters, laboratory investigations, Glasgow Coma Scale (GCS), Sequential Organ Failure Assessment (SOFA) score, need for intensive care, mechanical ventilation, and outcomes were recorded systematically. Primary outcome was in-hospital mortality. Secondary outcomes included survival with good neurological recovery or poor neurological outcome. Data were analyzed using descriptive statistics. Categorical variables were expressed as frequencies and percentages, and continuous variables as mean values. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Gender Distribution of Patients (n=100)		
Gender	Number	Percentage
Males	52	52.00%
Females	48	48.00%
Total	100	100.00

Table 1 shows the demographic profile of the study population comprising 100 patients with acute infectious encephalitis. Males constituted 52% of cases, while females accounted for 48%. This near-equal gender distribution indicates that acute infectious encephalitis affects both sexes almost uniformly, with a slight male predominance, a pattern commonly observed in hospital-based encephalitis studies.

Table 2: Clinical features at presentation (n=100)		
Clinical features	**Number**	**Percentage**
Fever	100	100.00
Altered sensorium	100	100.00
Seizures	38	38.00
Hypotonia	48	48.00
Focal weakness	22	22.00
Hypotension	60	60.00
Pneumonia	28	28.00
Bleeding manifestations	20	20.00
Raised ICP	70	70.00

Table 2 summarizes the clinical features observed at presentation. Fever and altered sensorium were present in all patients (100%), underscoring their importance as cardinal features of acute infectious encephalitis. Raised intracranial pressure was noted in 70% of patients, indicating severe central nervous system involvement. Hypotension (60%) and hypotonia (48%) were frequent, reflecting systemic and neurological compromise. Seizures occurred in 38% of patients, while focal neurological deficits were observed in 22%. Respiratory complications such as pneumonia were present in 28% of cases, and bleeding manifestations were seen in 20%, highlighting the multisystem nature of severe encephalitis.

Table 3: Severity Parameters and Outcome (n=100)		
Parameters	**Number**	**Percentage**
GCS ≤ 8 at admission	68	68.0
SOFA score ≥ 10	62	62.0
Required mechanical ventilation	45	45.0
Survived	70	70.0
Died	30	30.0

Table 3 depicts severity indicators and clinical outcomes. A low Glasgow Coma Scale score (≤8) at admission was observed in 68% of patients, reflecting severe neurological impairment. Elevated SOFA scores (≥10) were noted in 62% of cases, indicating significant multiorgan dysfunction. Nearly half of the patients (45%) required mechanical ventilation, emphasizing the need for intensive care support in severe disease. Overall survival was 70%, while mortality was 30%, demonstrating that acute infectious encephalitis continues to be associated with substantial mortality despite supportive care.

DISCUSSION

Acute infectious encephalitis (AIE) remains a neurological emergency associated with high morbidity and mortality despite improvements in diagnostic techniques and critical care. In the present study, fever and altered sensorium were observed in 100% of patients. This finding is consistent with population-based and hospital-based studies, where altered mental status and fever were reported in 85–98% of encephalitis cases. In the multicentre UK encephalitis study by Granerod J et al., (2010)[8] altered consciousness was present in 93% and fever in 87% of patients, confirming these features as core diagnostic manifestations of encephalitis.

Seizures were observed in 38% of patients in the present cohort. Previous studies have reported seizure frequencies ranging from 30% to 60%. Granerod J et al., (2010)[8] documented seizures in 40% of patients, while Glaser CA et al., (2006)[13] reported seizure occurrence in approximately 47% of encephalitis cases in a large US cohort. These comparable values indicate that the seizure burden in the present study is within the expected range for moderate-to-severe encephalitis and reflects significant cortical involvement. Raised intracranial pressure (ICP) was documented in 70% of patients, highlighting severe cerebral inflammation. In comparison, radiological or clinical evidence of cerebral edema or raised ICP has been reported in 50–65% of patients in prior studies. Sonneville R et al., (2010)[14] observed features of cerebral edema in 58% of critically ill encephalitis patients, while Granerod J et al., (2010)[8] reported similar findings in approximately 55%. The higher proportion in the present study may reflect referral bias to a tertiary care center and delayed presentation.

Systemic hypotension was observed in 60% of patients, suggesting frequent multisystem involvement. Earlier ICU-based studies have reported hypotension or shock in 35–55% of severe encephalitis cases. Sonneville R et al., (2010)[14] reported circulatory failure in 46% of patients requiring intensive care, emphasizing that encephalitis often behaves as a systemic inflammatory illness rather than a purely neurological disorder. Severe neurological impairment, defined by GCS ≤8, was present in 68% of patients at admission. Comparable proportions have been reported in prior studies, with 60–70% of ICU-admitted encephalitis patients presenting with deep coma. Whitley RJ, Gnann JW (2002)[15] reported that more than 65% of patients with herpes simplex encephalitis requiring hospitalization had severe impairment of consciousness at presentation, which was strongly associated with adverse outcomes.

Mechanical ventilation was required in 45% of patients in the present study. Previous reports describe ventilatory support requirements ranging from 35% to 50%. Sonneville R et al., (2010)[14] documented mechanical ventilation in 49% of encephalitis patients admitted to ICU, while Glaser CA et al., (2006)[13] reported intubation rates of approximately 42%. These similar values reflect the severity of illness and the frequent need for airway protection and respiratory support in encephalitis.

The overall mortality rate in the present study was 30%, which aligns with previously reported mortality rates of 20–40% in severe acute infectious encephalitis. Granerod J et al., (2010)[8] reported an overall mortality of 19%, rising to 30–35% in patients requiring intensive care. Sonneville R et al., (2010)[14] observed ICU mortality of 33%, while long-term mortality approached 40% in patients with severe neurological impairment. These comparisons confirm that, despite advances in care, mortality in severe encephalitis remains substantial.

Overall, comparison with earlier studies demonstrates that the clinical severity, need for intensive care, and mortality observed in the present cohort are comparable to those reported internationally. Disease severity at presentation, reflected by altered consciousness, seizures, raised ICP, systemic instability, and need for mechanical ventilation, remains the most important determinant of outcome in acute infectious encephalitis.

CONCLUSION

Acute infectious encephalitis is associated with significant mortality and neurological morbidity. Low GCS score, hypotension, raised intracranial pressure, and need for mechanical ventilation are key predictors of poor outcome. Early recognition and prompt intensive care management are essential to improve patient outcomes.

REFERENCES

1. Venkatesan A, Tunkel AR, Bloch KC, Lauring AS, Sejvar J, Bitnun A et al. Case definitions, diagnostic algorithms, and priorities in encephalitis: consensus statement of the international encephalitis consortium. Clin Infect Dis. 2013 Oct;57(8):1114-28.
2. Graus F, Titulaer MJ, Balu R, Benseler S, Bien CG, Cellucci T et al. A clinical approach to diagnosis of autoimmune encephalitis. Lancet Neurol. 2016 Apr;15(4):391-404.
3. Granerod J, Tam CC, Crowcroft NS, Davies NW, Borchert M, Thomas SL. Challenge of the unknown. A systematic review of acute encephalitis in non-outbreak situations. Neurology. 2010 Sep 7;75(10):924-32.
4. Granerod J, Cousens S, Davies NW, Crowcroft NS, Thomas SL. New estimates of incidence of encephalitis in England. Emerg Infect Dis. 2013;19(9):1455–62.
5. George BP, Schneider EB, Venkatesan A. Encephalitis hospitalization rates and inpatient mortality in the United States, 2000-2010. PloS one. 2014 Sep 5; 9(9): e104169. doi:10.1371/journal.pone.0104169.
6. Boucher A, Herrmann JL, Morand P, Buzelé R, Crabol Y, Stahl JP, Mailles A. Epidemiology of infectious encephalitis causes in 2016. Med Mal Infect. 2017 May; 47(3): 221-235.
7. Vora NM, Holman RC, Mehal JM, Steiner CA, Blanton J, Sejvar J. Burden of encephalitis-associated hospitalizations in the United States, 1998–2010. Neurology. 2014 Feb 4;82(5):443-51..
8. Granerod J, Ambrose HE, Davies NW, Clewley JP, Walsh AL, Morgan D et al. Aetiology of Encephalitis Study Group. Causes of encephalitis and differences in their clinical presentations in England: a multicentre, population-based prospective study. Lancet Infect Dis. 2010 Dec;10(12):835-44.
9. World Health Organization. Why encephalitis matters? [Internet]. Geneva: World Health Organization [cited 2023 Oct 1]. Available from: https://iris.who.int/bitstream/handle/10665/366223/9789240069176-eng.pdf?isAllowed=y&sequence=1.
10. Wang H, Zhao S, Wang S, Zheng Y, Wang S, Chen H, et al. Global magnitude of encephalitis burden and its evolving pattern over the past 30 years. J Infect 2022; 84: 777-787.
11. World Health Organization. Japanese encephalitis surveillance standards. WHO recommended standards for Surveillance of Selected Vaccine-Preventable Diseases 2006. available: http://www.path.org/files/WHO_surveillance_standards_JE.pdf.
12. Campbell GL, Hills SL, Fischer M, Jacobson JA, Hoke CH, Hombach JM, Marfin AA, Solomon T, Tsai TF, Tsu VD, Ginsburg AS. Estimated global incidence of Japanese encephalitis: a systematic review. Bull World Health Organ. 2011; 89: 766-74.
13. Glaser CA, Honarmand S, Anderson LJ, Schnurr DP, Forghani B, Cossen CK, Schuster FL, Christie LJ, Tureen JH. Beyond viruses: clinical profiles and etiologies associated with encephalitis. Clin Infect Dis. 2006 Dec 15;43(12):1565-77.
14. Sonneville R, Klein I, de Broucker T, Wolff M. Outcome and sequelae of infectious encephalitis. J Clin Neurol. 2020;16(3):345–357.
15. Whitley RJ, Gnann JW. Viral encephalitis: familiar infections and emerging pathogens. Lancet. 2002 Feb 9;359(9305):507-13.