



“Clinical Aspects and Outcome in Children Admitted To PICU with Acute Encephalitis in a Tertiary Care Hospital, Dhaka, Bangladesh”

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Abstract: Introduction: Encephalitis is a severe central nervous system infection of the brain parenchyma leading to neurologic dysfunction, such as headaches and altered levels of consciousness. Acute encephalitis is one of the important causes of PICU admission. In most cases causes are unidentified, but causes are thought to be viral in many cases. **Objective:** To assess the clinical aspects and outcome in children admitted to PICU with acute encephalitis. **Methods:** This is a retrospective study conducted in the PICU of Dhaka Shishu (Children) Hospital in cases admitted over a period of one year, from January 2019-December 2019. Age group included was from 2 month to 12 years. All cases admitted with symptoms suggestive of acute encephalitis were included. History and relevant factors were collected from history sheet including clinical examination findings and were analyzed. **Results:** More cases are found in 1-5 years age group with mean age being 3.5±3.3 years. Similarity was seen regarding death in case of infant and older children. Male to female ratio was 1.6:1. Seizure was the most common presentation 34(91.66%) but it has no statistical significance related to mortality. GCS was <8 during presentation in 22(45.83%) cases. Viral analysis done in CSF of 12 patients (25.0%) where Herpes virus was found in 16.6%. Number of patients improved with sequel 68.75% & improved without any sequel 31.25%. Hyponatremia, shock & need of mechanical ventilation was statistically significant regarding mortality. Hyponatremia didn't seem to influence the mortality significantly. **Conclusion:** Hyponatremia being significantly associated with mortality among children with Acute Encephalitis, warrants detailed evaluation to define its association with etiology and appropriate management. Maintaining euvoolemia, prompt identification of shock and appropriate use of inotropes is of utmost importance. Patients presenting with low GCS score & those who need mechanical ventilation high supervision should be provided due to their poor outcome. Diverse and changing etiologies pose a diagnostic challenge and to find out etiology should be emphasized.

Keywords: Acute encephalitis, Hyponatremia, Shock, Outcome, Seizures.

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I. INTRODUCTION

Encephalitis is a severe central nervous system infection of the brain parenchyma leading to

neurologic dysfunction, such as headache and altered level of consciousness [1]. Childhood encephalitis is associated with long-term morbidity

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in up to 50% of the affected patients, but mortality rate improves significantly with early start of treatment [2]. Acute encephalitis is one of the important causes of PICU admission. In most cases causes are unidentified, but causes are thought to be viral in many cases [3]. Causative agent may vary with geographical location and season, and mostly affects children below 15 years [3]. In our country the important viruses related to childhood encephalitis includes Herpes, Cytomegalovirus, Toxoplasma, Dengue and Japanese B encephalitis viruses. Sometimes outbreak also occurs with Nipah virus during winter due to intake of raw date juice contaminated with bat's saliva. Patients of encephalitis present mostly with fever, convulsion and unconsciousness. Complications are mainly seizure, visual disturbance, deafness, motor incoordination and behavioral abnormality. Other complications include hemiplegia, speech disorder, intellectual disability, cerebellar ataxia. Prognostic factors related to the outcome of patients include age, specific cause and severity of clinical illness [4]. HSV is the most common etiological agent where severe sequel is expected [5]. Some literature suggests that infants with acute encephalitis have poorer outcome than older children [6]. Complications of acute encephalitis are many. They include motor incoordination, convulsive disorders, total or partial deafness, and behavioral disturbances. Hyponatremia caused by syndrome of inappropriate secretion of antidiuretic hormone (SIADH) is one of the common dyselectrolytemia found in patients with acute encephalitis [7]. Mortality rate is high with acute encephalitis and may be due to various reasons. Age <2 years, marked elevation in aspartate transaminase, shock and prolong convulsion were associated with increased risks of death or severe neurological deficit [8].

II. METHODS

This is a retrospective study conducted in the PICU of Dhaka Shishu (Children) Hospital in cases admitted over a period of one year, from January 2019-December 2019. Age group included was from 2 month to 12 years. All cases admitted with symptoms suggestive of acute encephalitis were included. History and relevant factors were

collected from history sheet including clinical examination findings and were analyzed.

Outcome which mainly includes the mortality and any complications or sequel was noted. Investigation profile was analyzed which includes mainly complete blood counts, electrolytes, CSF analysis, neuroimaging. Viral analysis was done in CSF, which included PCR for HSV and antibodies for cytomegalovirus and Japanese B encephalitis. Patients treatment, clinical follow up, interventions like mechanical ventilation all were noted. The data were recorded systematically and was analyzed using SPSS (Statistical package for social sciences) windows version 20.0.

III. RESULTS

It was seen that more cases were found in 1-5 years age group with mean age being 3.5 ± 3.3 years. Similarity was seen regarding death in case of infant and older children. Male to female ratio was 1.6:1. Seizure was the most common presentation 34(91.66%) but it has no statistical significance related to mortality. GCS was <8 during presentation in 22(45.83%) cases which is statistically significant regarding mortality. Viral analysis done in CSF of 12 patients (25.0%) where Herpes virus was found in 2(16.6%) cases. Number of patients improved with sequel 68.75% & improved without any sequel 31.25%. The group of patients who had hyponatremia 10(20.83%), the mortality was significantly high (p value 0.0107). Also, need of mechanical ventilation had high mortality (p value 0.001). Hyponatremia did not seem to influence the mortality significantly.

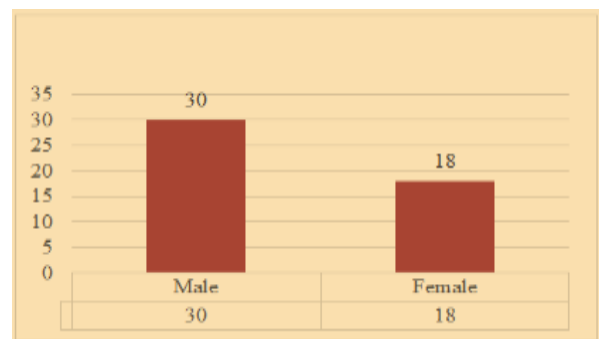


Fig-1: Sex distribution of patients admitted for AE

Table-1: Outcome of patients admitted with acute encephalitis in PICU (N=48)

Factors	Group	Death	Survivors	P value
Age	Less than 1 year	03-(6.25)	05-(10.41)	0.368
	1 to 5 year	09-(18.75)	19-(39.58)	
	More than 5 years	02-(4.16)	10-(20.83)	
Sex	Male	08-(16.66)	22-(45.83)	0.2492
	Female	09-(18.75)	09-(18.75)	
Seizure	Yes	14-(29.16)	30-(62.5)	0.1762
	No	0-(0.00)	04-(8.33)	
GCS	8 or less	13-(27.08)	09-(18.75)	0.0120
	More than 8	01-(2.08)	25-(52.08)	
Shock	Yes	12-(25.0)	08-(16.66)	0.0122
	No	02-(4.16)	26-(54.16)	
Serum Sodium	<135meq/l	06-(12.5)	04-(8.33)	0.0107
	135-145meq/l	07-(14.58)	26-(54.16)	
	>145meq/l	01-(2.08)	04-(8.33)	
Mechanical Ventilation	Yes	14-(29.16)	06-(12.5)	<0.001
	No	0-(0.00)	28-(58.33)	
P value <0.05 significant. GCS- Glasgow coma scale (GCS).				

IV. DISCUSSION

In this study, the factors determining the outcome of patients admitted to PICU with Acute Encephalitis were analyzed. Case fatality is high in children under the age of 15 years [9]. In most of the studies seizures are the common presentation [10]. In our study patients with poor outcome were associated with shock and hyponatremia that is statistically significant. Patients having shock have more mortality compared to those who are hemodynamically stable. Patients admitted with GCS eight or less and patient needed mechanical ventilation had poor outcome in our study. Also, patients presenting with hyponatremia had more mortality. In a study by Misra et al. it was found that hyponatremia was commonly associated with acute encephalitis and also, they had poor outcome [11]. In many cases death happens because of brain swelling caused by severe inflammation [12]. HSV is the only etiological agent identified in present study. Causative agents may vary due to geographic and environmental differences [14-16]. We reported a mortality rate of 29.1%, which is higher than previously reported rates [17, 18]. However, it is difficult to compare these results, as we included all possible causative pathogens in our study, whereas most previous studies solely focused on a specific pathogen, with mortality rates differing for different causes of encephalitis [19-21].

V. CONCLUSION

Hyponatremia being significantly associated with mortality among children with Acute Encephalitis, warrants detailed evaluation to define its association with etiology and appropriate

management. Maintaining euvoemia, prompt identification of shock and appropriate use of inotropes is of utmost importance. Patients presenting with low GCS score & those who need mechanical ventilation high supervision should be provided due to their poor outcome. Varied and changing etiologies pose a diagnostic challenge and to find out etiology should be emphasized.

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