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Study of Acute Febrile Encephalopathy among Children in Tertiary Care Centre

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ABSTRACT

Background: Acute febrile encephalopathy (AFE) in children is a medical emergency and could be a manifestation of many systemic and central nervous system pathologies. The clinical features of AFE are nonspecific and etiological spectrum variable depending on the studied population. **Methods:** A prospective, observational study was carried out including children aged between 1 month and 12 years with AFE admitted to the Pediatric Intensive Care Unit of a tertiary care hospital in B.J medical college. The primary objective was to assess the clinical presentation and etiology of AFE while the secondary objectives were to correlate the clinical and etiological findings and to determine the risk factors associated with mortality. **Results:** Out of the ninety children with AFE included in this study, male: female ratio was 1.2:1; most of them were aged between 1 and 5 years and came with a history of < 7 day (82.2%). All of them had altered sensorium, about 2/3rd had seizures and 47.8% having a Glasgow Coma Score (GCS) <8. Etiology remained elusive in about 40% of the cases, and viral infections were the most common among the ones with an identifiable cause. **Conclusion:** AFE, though a rare diagnosis in children, is associated with significant morbidity and high mortality in a developing country like India.

Keywords: Central nervous system infection, children, encephalitis, encephalopathy, mortality, seizure.

INTRODUCTION

Encephalopathy is a nonspecific term, meaning "disease of the brain" in Greek. It is rather a clinical syndrome, with diverse etiopathologies encompassing various organ systems, extending well beyond central nervous system (CNS). A child presenting with fever, altered cognition or personality, and altered sensorium and/or seizure is labeled as acute febrile encephalopathy (AFE); it is a medical emergency as well as a diagnostic and therapeutic challenge for the pediatrician. A subset of such patients with evidence of inflammation of brain parenchyma, either infectious or noninfectious, is called as encephalitis. The nonspecific nature of clinical features further makes the clinical prediction of possible etiology very difficult in cases of AFE; which in turn, may lead to a delay in institution of appropriate therapy. This prospective, observational study was carried out in the Department of Pediatrics of a tertiary care hospital.

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Aims and Objectives:

The primary objective was to assess the clinical presentation and etiology of AFE in children between 1 month and 12 years while the secondary objectives were to correlate the clinical and etiological findings and to determine the factors associated with mortality.

MATERIALS AND METHODS

Children between 1 month and 12 years of age admitted to the Pediatric Intensive Care Unit (PICU) during the study period (April 2018 to May2019) were included once they satisfied the case definition of AFE and did not meet the exclusion criteria. Informed written consent was taken.

Inclusion criteria:

AFE was defined as acute onset (≤14 days) fever with altered state of consciousness lasting for ≥12 h and/or seizure.

Exclusion criteria:

The duration of illness >14 days at presentation, known chronic systemic illness including neurodevelopmental delay, malignancy, and immunosuppressive therapy.

Children with metabolic encephalopathy, dyselectrolytemia, evidence of demyelination in neuroimaging, intracranial space occupying lesion, febrile seizure, endocrinal encephalopathy and stroke, if subsequently diagnosed after investigation, were also excluded from the study.

Patient's demographic data and detailed history were recorded. Special mention was made to prodrome of the upper respiratory illness, flu-like illness or diarrhea; animal bite or recent vaccination; recent history of contact with a person having measles, chickenpox or mumps, recent history of travel, or any occurrence of similar illness in the neighborhood. Assessment of socioeconomic status was done according to the modified Kuppuswamy scale. Clinical examination included vital parameters, anthropometry, general physical examination, and a detailed systemic examination with special emphasis on neurological examination. The nutritional status assessment was done according to IAP classification. Clinical level of consciousness was assessed by modified Glasgow Coma Score (GCS).A diagnosis of raised intracranial tension was made when two or more of the following were present: hypertension, bradycardia, irregular respiration, abnormal tonic posturing, bulging, and no pulsatile anterior fontanel when they are open, presence of crack-pot sign, and papilledema on direct ophthalmoscopy when fontanel are closed.

Investigation:

Complete blood count, blood culture, random blood sugar, kidney function test, serum electrolytes, liver function test, malaria antigen test and peripheral smear (thin and thick) for malaria, NS1 antigen, and IgM antibody for dengue, serum IgM antibody for Japanese encephalitis (JE); CSF examination for biochemistry (protein, sugar), cytology, Gram stain, bacterial culture, Mantoux test, chest X-ray, neuroimaging ,ultrasonography [USG] of brain, contrast-enhanced computed tomography [CECT] of the brain and magnetic resonance imaging [MRI] of brain). Predefined criteria were used in the etiologic diagnosis of AFE.

All the children received treatment based on standard management guidelines depending on the presumptive/established diagnosis, and they were assessed for morbidity/complications during hospital.

Data were collected on structured Performa and analyzed.

RESULTS

Total admissions in PICU were 924

Cases of AFE were 90 which accounts for 9.74% of total PICU admissions.

Baseline clinicoepidemiological profile:

Age n sex wise distibution:

Age	Male	Female	Total (N) (%)
1 Month-1year	10	5	15(16.6)
1-5 Years	21	15	36(40)
5-10 Years	16	9	25(27.7)
>10 Years	8	6	14(15.5)

Mean Days of Hospitalization

Mean Duration Of Illness	N (%)
1-3 Days	31(34%)
4-7 Days	43(48%)
8-14 Day	16(18%)

There was a slight male preponderance (male: female = 1.2:1) and majority of the patients belonged to the age group of 1 and 5 years (40%); most of the patients (82%) had presented within 1st week of illness.

Demographic Data:

1)Socioeconomic Status	N (%)
Upper	0
Upper-Middle	21(23.3)
Lower-Middle	28(31.2)
Upper-Lower	31(34.4)
Lower	10(11.1)

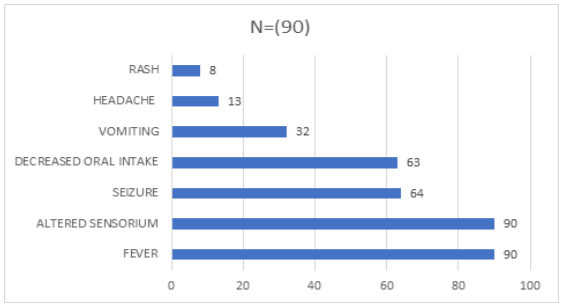
2)Nutritional Staus	N (%)
Normal	11(12.2)
Grade 1	14(15.5)
Grade 2	16(17.7)
Grade 3	31(34.4)
Grade 4	18(20)

3)Immunization Status	N (%)
Immunized	27(30)
Partially Immunized	42(46.6)
Unimmunized	21(23.3)

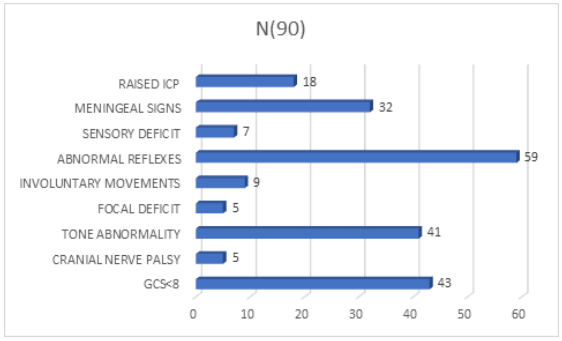
Etiology:

Etiology	N (%)
Viral	21(23.3)
Measels	1(4.7)
HSV	3(14.3)
DENGUE	11(12.2)
H1N1	3(14.3)
JE	2(4.7)
HIV	1(9.5)
Pyogenic meningitis (csf positive)	13(14.4)
E. Coli	3(23)
Klebsiella	3(23)
Staphylococcus	3(23)
Pseudomonas	2(15.3)
Culture negative	2(15.3)
Tubercular meningitis	8(8.9)
Cerebral malaria	8(8.9)
Enteric fever	5(5.6)
Inconclusive	35(38)

Symptoms

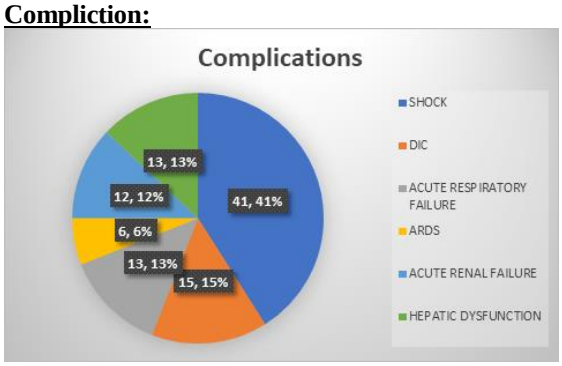


Sign

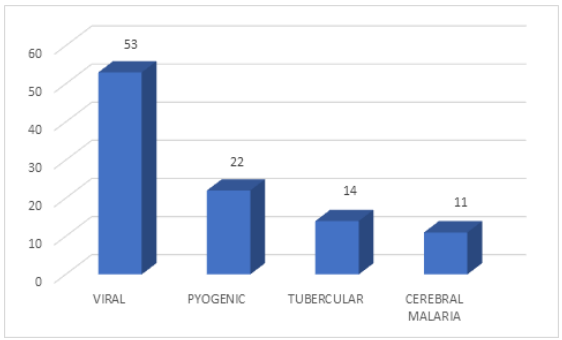


Fever (90) and altered sensorium (90), which are diagnostic criteria for AFE, seizure (64), and decreased oral intake (63) were the major complaints, while abnormal reflexes and tone abnormalities were the most common abnormality on clinical examination present in around 59 and 41 of cases, respectively.

Compliction:



Mortality:



Among the cases with an established cause, maximum was of viral etiology (53%) followed by pyogenic meningitis (22%) while malaria and CNS TB were found in only 14% case.

DISCUSSION

In this hospital-based prospective study, we analyzed clinical features, etiology, and outcome of 90 children admitted in PICU with AFE. Cases of AFE were 90 which accounts for 9.74% of total PICU admissions

There was a slight male preponderance (male: female = 1.2:1) and majority of the patients belonged to the age group of 1 and 5 years (40%); most of the patients (82%) had presented within 1st week of illness. The previous Indian studies have almost always demonstrated a male preponderance, and the most commonly affected age group has also remained the same.

Most cases are from upper-lower socio-economicstatus (34.4%) followed by lower-middle class (31.2%) and 42% case were partially immunized.

After fever (100%) and altered sensorium (100%), which are diagnostic criteria for AFE, seizure (71.1%), and refusal to feed (70%) were the major complaints, while abnormal reflexes and tone abnormalities were the most common abnormality on clinical examination present in around 65% and 45% of cases, respectively.

Among the cases with an established cause, maximum was of viral etiology (23.3%) followed by pyogenic meningitis (14.4%) while malaria and CNS TB were found in only 8.9% cases each. The almost similar pattern of distribution of etiological diagnosis was in a recent study from central India.

Most common complication was shock (41%) followed by DIC (15%).Viral (53%)and pyogenic meningitis (22%) were common cause of mortality in this study.

CONCLUSION

AFE, though a rare diagnosis in children, is associated with significant morbidity and high mortality, particularly in a developing country like India. With no availability of many pathogen-specific microbiological investigations, etiological agent may remain elusive in a considerable proportion of cases. Nevertheless, many cases being viral in origin, where no specific treatment is available or highly effective, early institution of aggressive supportive care may be able to decrease mortality and long-term morbidity.

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