

A Study on Clinico-Epidemiological Profile and Outcome of Acute Meningoencephalitis in Children from Age One Month to 12 Yrs: A Study from Tamilnadu, India.

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Abstract

Background

Meningoencephalitis is a diagnosis made from clinical symptoms and signs along with CSF analysis. Mortality rate has come down and decreased to 40%. Eventhough mortality rate has decreased, incidence rate remains the same and is still a major cause of death.

Objective

To assess the influence of epidemiological status of the children and an outcome of meningoencephalitis in children aged one month to 12 years at PICU (Paediatric Intensive care unit), Coimbatore Medical College and Hospital, Coimbatore during Nov 2016 to Aug 2017.

Results

The most common age group is one month to 3 years predominantly males. The most common symptoms in our study is fever and altered sensorium. Most children received prehospital treatment in the form of IV fluids and oxygen therapy. 94% (59 children) had increased cell count and elevated CSF protein, 16% (10 children) cloudy CSF appearance, 13% (8 children) have CSF PMN predominate. 6% (4 children) had positive viral markers - dengue encephalitis(2), Japanese encephalitis(2), 6% (4 children) positive gene expert- TB meningitis, 2% (1 children) bacterial growth (*S pneumonia*), 35 (2 children) increased open pressure when doing CSF analysis. 100% of babies with increased opening pressure follow up MRI or CT shows abnormal finding. It shows very highly correlated with viral marker positivity children had hearing impairment.

Conclusion

Predominant age group involved was between 1 month to 3 yrs, indicates immaturity of blood brain barrier. Viral infections Dengue followed by Japanese Encephalitis were more common. CSF opening pressure and gross physical abnormality acts as an important prognostic indicator for outcome in children with acute CNS infection. Poor Glasscow Coma Scale (GCS) and resistant seizures indicated the grave prognosis.

Key words: Meningoencephalitis, Clinicoepidemiology, Children

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I. Introduction

Meningoencephalitis is an inflammatory process involving both the brain parenchyma and meninges. Meningoencephalitis primarily affects infants and children leading to increase in morbidity and adverse outcome like neurological damage. Acute Meningoencephalitis is characterized by acute onset of fever and change in mental status such as confusion, disorientation or inability to talk and or coma, headache, vomiting, FND (Focal Neurological deficit), new onset of seizure occurs in a person, any age of from one month to 12 yrs and any time in a-year. Most common causative agents are streptococcus al pneumonia, H. influenza and Neisseria meningitis and viral agents like HSV (Herpes simplex Virus), Enterovirus, varicella, JE (Japanese encephalitis), Dengue, and HIV.¹

Diagnosis of meningoencephalitis is made from clinical symptoms and signs along with CSF analysis. Risk factor includes skipping of vaccines, age, community settings (children in boarding school and day care speciality), use of antibiotics and vaccines. Mortality rate has decreased to 40%, though reduced, incidence rate remaining same and injudicious use of antibiotics at suboptimal doses and in appropriate antibiotics still is the major cause of death with mortality rate above 30%.^{2,3}

II. Materials And Methods

Type of study

Study Placed : Descriptive study
PICU (Paediatric Intensive care unit) in Coimbatore Medical College and Hospital, Coimbatore.

Study Population : Children admitted in PICU fulfilling inclusion criteria

Study Period : Nov 2016 to Aug 2017
(10 months)

Sample size : Non probability sample - Time bound sample technique (Nov 2016 to Aug 2017)

SELECTION CRITERIA:

A. INCLUSION CRITERIA:

1. All paediatric patients who are admitted in PICU aged one month to 12 yrs, with symptom features of meningitis like fever, headache, vomiting, nuchal rigidity
2. All paediatric patients who admitted in PICU one month to 12 yrs, with symptom features of encephalitis like altered sensorium, seizures, focal neurological deficit.
3. Combination of both of the above features.

B. EXCLUSION CRITERIA

1. Dyselectrolytemia
2. Cerebral malaria
3. Intra cranial space occupying lesion (ICSOL)
4. "Reyes" syndrome
5. Enteric fever
6. Hepatic encephalopathy

MANEUVER

The study is undertaken in the department of paediatrics, Government Coimbatore medical college and hospital, during study period from Nov 2016 to Aug 2017. All paediatrics patients who will present to us with features of Meningoencephalitis will be registered for this study .Clinical data about age, sex, address, developmental history, immunisation status, pre hospital admission and treatment, exanthematous fever, any contact history of TB, recent travel, migration history are recorded. Symptoms like fever, headache, vomiting, seizure, altered sensorium, focal neurological defect with pre hospital treatment like oxygen, I.V.Fluids, Antibiotics, Anti convulsions are noted.

Condition on arrival at PICU CMCH hospital are recorded like AVPU, GCS Score, ICP, ABC(Airway, Breathing, Circulation) and seizures. Investigations include CBC, RFT, Sr.Electolytes,LFT, and CSF analysis (appearance, opening pressure, cell gene expert done) , imaging like MRI/CT and EEG . Outcome and complication in the follow up of one month are analysed in this study.

III. Observation And Results

Our study is to assess clinicoepidemiological profile and outcome of Meningoencephalitis in children aged 1month to 12years in Coimbatore Medical College Hospital.We collected all data and entered in proforma for statistical analysis. Frequency are expressed in percentage. The difference in quantities, variable groups were assessed by means of unpaired test. The Chi square test was used to assess categorical variables between groups.A p value of <0.05 using a two tailed test was taken significant for all statistical tests.All data were analyzed with a statistical software package(SPSS.Version 16.0 for windows).Totally 63 patients who fulfilled the inclusions criteria were registered.

Table-1 Age profile

AGE	MALE	(%)	FEMALE	(%)	TOTAL	(%)
1Mon -3 Yrs	12	19	14	22	26	41
3-5 Yrs	14	22	5	8	19	30
5-12 Yrs	11	17	7	11	18	29
Total	37		26		63	

In our study out of 63 children,41%(26 children) are aged between 1month to 3yrs,30%(19 children) are aged between 3 to 5yrs and 29%(18 children) aged between 5 to 12yrs.Hence the most common age group is one month to 3yrs.

Table-2 Gender profile

GENDER	No	%
Male	37	59
Female	26	41
Total	63	

Males are more commonly affected than females.

Table -3 Resident Profile

RESIDENT	No	%
Urban	31	49
Semiurban	18	29
Rural	14	22
Total	63	

Urban children are more affected by meningoencephalitis followed by semiurban children

Table-4 Symptom analysis

Symptom	No	%
Fever	63	100
Headache	24	38
Vomiting	55	87
Seizure	55	87
Altered Sensorium	59	94
Focal Neurological Deficit	5	8

Fever followed by altered sensorium are the predominant symptom presentation in children with meningoencephalitis.

Table – 5 Abnormal features

Prevalence Of Abnormalities	No	%
AVPU Scale	61	97
GCS Score	61	97
ICT Increased intracranial Tension	4	6
Seizures	14	22

Almost all cases had abnormal AVPU and GCS scores.

Table-6 Outcome Profile

OUTCOME	N	%
Death	2	3
Alive	61	97
Total	63	

Two children died out of 63 children included in our study

IV. Discussion

This study was conducted to study the clinic-epidemiological profile and outcome of acute meningoencephalitis in children aged one month to 12 years and the association between the CSF analysis and outcome, complication of acute meningoencephalitis.

In our study about Gender distribution males are more common than females with Males 59% (37 children) and Females 41%(26children). **Abhishek Royet,al.**⁴ conducted in West Bengal and **FarzanaK.Beig**⁵conducted at Uttar Pradesh , both of the above studies support my study which also have a male predominance. The male predominance may be due to outdoor life activity,playing and agricultural field work.

Age distribution one month to 3 yrs age are more common age 41% (26 children) 3-5 yrs 30% (19 children) 5-12 yrs 29% (18 children) **Ritumoni Sonowal** et.al., conducted in the department of pediatrics Assam Medical college, **Abishek Roy** et.al.,⁴ conducted in West Bengal showed the same age distribution which supports our study.

In our study regarding residence, Urban children are most commonly affected 49% (31 children) , Semi Urban 29% (18 children) and Rural 22% (14 children) .So most commonly urban children are affected by meningoencephalitis,

Clinical history about ANC issue prevalence is 30%(8 children),developmental delay 5%(3 children),partially immunized 3%(2children),previous hospital admission 19%(12 children),previous conduct history 16%(10 children),trauma history 2%(1 children) and recent travel history 5%(3 children).

In our study clinical symptoms at the time of admission fever is 100%(63 children), altere sensorium 94%(59 children), headache 38%(24 children), FND only 8%(5 children).So most common symptom at the time of admission is fever and altered sensorium.

Abishek Roy et al.,⁴ conducted a study in West Bengal and Farzana K. Beig⁵ conducted a study at Uttar Pradesh, both of the above studies support my study. They also have a most common symptom is fever and altered sensorium.

Before arrival at our hospital 76% (48 children) were treated with oxygen therapy, 79% (50 children) had IV fluids and 70% (44 children) had been treated with antibiotics only 14% (9 children). So pre hospital treatment with IV fluid therapy and oxygen therapy was revived by most of the children. Antiviral therapy was the least that was given to the children. Most common etiological organisms are viral but most of the children had not received early antiviral coverage.

When children were admitted at PICU, AVPU Scale, GCS, ABC and increased ICP, seizure activity were recorded. In our study 97% (61 children) have AVPU Scale and low GCS score 79% (50 children) ABC abnormality 22% (14 children) have seizure at the time of admission. Only 6% (4 children) had increased ICP. So most common abnormal finding when get in PICU admission is low GCS score 79% [50 children] ABC abnormality 22% [14 children] have seizure at the time admission. Only 6% (4 children) had increased ICP. So most common abnormal finding we get in PICU admission is low GCS and AVPU Scale abnormality, least is ICP seizures.

Regarding clinical investigations CSF appears cloudy in 67% (10 children), increased opening pressure 3% (2 children), cell count predominance 94% (59 children). Ritumonisoni Sonowal et al.⁶ conducted in the Department of Paediatrics, Assam Medical College supports our study with similar value they also had.

Viral markers 6% (4 children) and bacterial growth 2% (1 child). Abishek Roy et al. conducted in West Bengal and Farzana K. Beig⁵ conducted at Uttar Pradesh. Both of the above studies did not support my study because bacteria and viral identification was done by CSF culture and sensitivity and growth of the bacteria by culture plate. PCR method or IgM ELISA was not used in this study. Compared to PCR and IgM ELISA yielding power of culture and sensitivity is low.

Regarding imaging abnormality MRI had 21% (13 children), CT had 13% (8 children), EEG abnormality 19% (12 children) in children of Meningoencephalitis. Abishek Roy et al. conducted in West Bengal support our study.

Out of 63 children, 2 children died (3% death), 61 children (97%) are alive. Death rate is decreased compared to Abishek Roy et al.⁴ conducted in West Bengal and Farzana K. Beig⁵ conducted at Uttar Pradesh. This is due to early referral to higher tertiary centres and appropriate antibiotics, antiviral and antiedema measures given to reduce mortality.

V. Conclusion

- Predominant age group involved was between 1 month to 3 yrs, indicates immaturity of blood brain barrier.
- Viral infections were the most common etiology. Dengue virus followed by Japanese Encephalitis.
- CSF opening pressure and gross physical abnormality acts as an important prognostic indicator for outcome in children with acute CNS infection.
- Poor GCS and resistant seizures indicated the grave prognosis.

VI. Limitations Of The Study

Most common cause of meningo encephalitis viral in origin for detection of viral etiological factor IgM Eliza, Nuclear Method and PCR is a investigation of choice that give a high yielding powder CSF culture sensitive for detecting viral etiology not give a much yielding.

Auto immune encephalitis one of the most common etiology of acute meningo encephalitis we can't ruled out acute meningo encephalitis.

In our study after discharge one month follow we evaluate the hearing abnormality and MRI / CT abnormality. This one month is not enough long follow up need for meningo encephalitis sequelae like neurological defects, psychosocial behavior hearing and vision abnormality.

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