



INCIDENCE OF CULTURE POSITIVE BACTERIAL MENINGITIS IN CHILDREN OF AGE 6 MONTHS TO 60 MONTHS PRESENTING FEBRILE SEIZURE

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ABSTRACT

INTRODUCTION: Febrile seizures are the most common seizure disorder in children of Age 6 months to 60 months and it is important to differentiate febrile seizure from meningitis to start appropriate management.

AIM- To find out Incidence of Culture Positive Bacterial Meningitis in children of Febrile Seizure.

METHODS & MATERIALS- This was a prospective observational hospital based study conducted at Medical college, Hospital & Research, Tertiary health care Centre in Department of Paediatrics. A total of 55 patients of Febrile Seizure were studied. Informed verbal and written Consent was taken from the parents of the patient or the accompanying person before enrolment into the study.

RESULTS- In present study shows out 55 Children with febrile seizure, Simple febrile seizures were present in 34 (61.82%) children, complex febrile seizure in 4 (7.27%), meningitis in 17 (30.91%). Out of 17 (30.91%) meningitis cases, 2 cases had culture positive bacterial meningitis and 15 had culture negative bacterial meningitis.

CONCLUSION- Acute bacterial meningitis (ABM) should always be considered as a differential diagnosis in children between age 6 months to 60 months who present's with Febrile Seizure.

KEYWORDS : Lumbar puncture, CSF, Acute bacterial meningitis (ABM).

INTRODUCTION -

Febrile Seizure is the most common type of seizure occurring in children [1]. This may be due to febrile seizure or a more ominous condition like meningitis. Seizure is a common presentation for which a child may come to paediatric emergency department. It may occur in up to 10% of children presenting to emergency[2]. The incidence of bacterial meningitis in children of 6 month to 60 month febrile Seizure varies from 0.6% to 6.7% [3]. In children age less than 12 months with febrile seizure usually do not show clinical sign of meningitis [4].

Febrile seizure the most common seizure disorder in childhood, generally have an excellent prognosis in most cases are benign and self limiting [5] but may also signify a serious underlying acute infectious disease such as sepsis or bacterial meningitis. A simple febrile seizure is usually associated with core temperature that increases rapidly to ≥ 39 degree. It is initially generalized & tonic-clonic in nature, lasts a few seconds & rarely up to 15 min. is followed by brief postictal period of drowsiness & occurs only once in 24 hr [6,7]. The term febrile seizure is not intended for use among children with evident central nervous system infections or underlying seizure disorder [8]. In view of this, we thought of conducted a study to find out incidence of bacterial meningitis in children of age 6 months to 60 months presenting febrile seizure and to evaluate culture positive bacterial meningitis and culture negative bacterial meningitis on the basis of CSF culture analysis.

MATERIAL AND METHODS-

This was a prospective observational hospital based study conducted at Medical college, Hospital & Research, Tertiary health care Centre in Department of Paediatrics. Children of age 6 months to 60 months presenting febrile seizure in Hospital was selected for the study. Data was collected from Jul 2011 to Oct 2013 and data was analysed in the same time period.

Informed verbal and written consent was taken from the parents of the patient or the accompanying person before enrolment into the study. This study was approved by Ethics Committee.

Fifty-five (55) children of age 6 months to 60 months presenting with febrile seizure were selected for the study. Children with other known neurological disorders like cerebral palsy, mental retardation, history of meningitis with seizure or on antibiotic for more than 48 hours before reporting to the hospital were excluded from this study. Children was considered as having fever if axillary temperature recorded at the emergency is $> 100.40^{\circ} F$ [8]. Children was considered as having meningitis if the Kerning's and/or Brudzinski's sign was present [6,8]. Inclusion criteria for this study was children having fever, mild grade ($100.5-102.20^{\circ} F$) to high grade ($104.1-106.0^{\circ} F$) with seizure.

Sample size is calculated by formula $N = Z^2 pq$ divided by e^2 . In which **N**: Sample size, **Z**: Confidence level at 95% (Standard value of 1.96), **pq**: variance of population (0.501) and **e**: allowable error (5%).

CSF was cultured on specific media: Trypticase soy agar, Chocolate agar with Polyvitex, Columbia sheep blood agar and Hemoline performance two phase aerobic (bottle). Antibiotics sensitivity testing was done by the Kirby-Bauger Method [9]. All the organisms which were isolated were identified by standard procedures and antibiotic susceptibility testing (AST) was done according to CLSI guidelines [10]. Data regarding results of A/S not available at present.

STATISTICAL ANALYSIS-

Statistical analysis was done by using descriptive and inferential statistics using z-test for single proportion. The software used in the analysis were SPSS 17.0 and Graph Pad Prism 5.0 and $p < 0.05$ was considered as level of significance.

RESULT-

Distribution of children according to their gender shows that 32 (58.18%) of them were males and 23 (41.82%) were females respectively. Mean and SD age of the male children was 20.40±14.61 years and that of female children were 25.56±16.21 years. Among the total 55 cases, Simple febrile seizures were present in 34 (61.82%) children, Complex febrile seizure in 4 (7.27%), Meningitis in 17 (30.91%).

Meningitis were observed to be more in male gender 9 (52.94%) as compared to females 8 (47.05%). Out of 17 (30.91%) meningitis cases, 2 cases had culture positive bacterial meningitis and 15 had culture negative bacterial meningitis. CSF culture growth was present in 3.64% of the children and absent in 96.36% of the children respectively. *The two organism isolated was *Streptococcus pneumoniae*. Gram stain of CSF was negative for all the patients.

Table 1: Clinical history, examination and investigation in the study population

Clinical Findings	Non-Meningitis	Meningitis	Percent age(%)	p-value-
Age				
06 -12Mth (21)	12	09	42.86	S,p<0.05
12-18 Mth (12)	09	03	25.00	S,p<0.05
18-60 Mth (22)	17	05	22.73	NS,p>0.05
Total	55	17	30.91	NS,p>0.05
Sex				
Male (32)	23	09	28.12	NS,p>0.05
Female (23)	15	08	34.78	
Photophobia	00	00	00	
Neck stiffness	00	05	9.09	
Bulging Anterior Fontanel	00	07	12.72	
Kerning's and or Brudzinski's sign[6,9]	00	05	09.09	

Table/Fig-2: Distribution of cases according to the diagnosis.

Clinical diagnosis		N (%)
Febrile Seizure (38)	Simple febrile seizure	34(61.82%)
	Complex febrile seizure	04(7.27%)
Meningitis (17)	Culture Positive	02 (3.63%)
	Culture Negative	15 (27.28%)
	Total	N= 55 (100%)

Table/Fig 3: Showing the summary of various studies of febrile seizure with % CSF Culture growth.

Authors	Place	CSF Culture growth(%)
Laditan AAO et al [12]	Saudi Arabia	3.1%
Joshi BR et al [8]	Kathmandu, Nepal	4.5%
Jai Krishin et al [13]	Islamabad, Pakistan	3.2%
Chinchankar N et al[09]	Pune, India	50%
Mani R et al[11]	Bangalore, India	73.8%
Kala Yadhav ML et al[10]	Bangalore, India	87.5%
PRESENT STUDY	Nashik, India	3.65%

DISCUSSION-

Among the 55 cases, 17 had meningitis showing that almost one third of children presenting in the emergency room with apparent febrile seizure have meningitis. 02 cases had culture positive meningitis while 15 cases had culture negative meningitis based on CSF cell count, CSF Protein level and CSF Sugar level. It was observed that in the younger age group, there was significant probability of having meningitis without signs of meningeal irritation than in older children. Nine children altogether had meningitis without meningeal sign.

Another study done by **Joshi BR et al (2008)** Of the 175 children included, 17% were diagnosed to have meningitis. Cerebrospinal fluid was positive for a bacterial pathogen in 4.5% of the cases. In the age group of 6 months to 12 months, 30% of the children had meningitis as compared to 20 % and 5% in other age groups of 12- 18 months and above 18 months respectively[8].

Acute bacterial meningitis (ABM) is a medical emergency, which warrants early diagnosis and aggressive therapy. Though the common pathogens associated with meningitis are *S. pneumoniae*, *H. influenzae* and *N. meningitidis*, the aetiological agents and their relative frequency may vary in different geographical areas. Some changing trends in the epidemiology of meningitis have also been reported worldwide over the past few decades [11]. In present study there was yield of CSF Culture growth in 2 (3.64%) cases. The organism isolated was ***Streptococcus pneumoniae***.

In a study done by **Laditan AAO et al (1995)** yield of CSF culture growth was 3.1% cases [12]. Another study done by **Joshi BR et al (2008)** found that yield of CSF culture growth were 4.5% cases[8]. Organisms grown were *H. influenzae* in three cases, *Streptococcus pneumoniae* in two cases and *Staphylococcus aureus* in three cases. **Jai Krishin et al (2012)** found yield of CSF culture growth was 4 (3.2%) cases[13]. Present study finding was comparatively similar with the abovementioned studies. ***Streptococcus pneumoniae*** was the predominant organism which was isolated in above mention studies. Relatively high incidences of Pneumococcal infections were noted by Grimwood et al., [14] and Bhat et al., [15].

LIMITATIONS-

However, as the present study sample size was small. A large sample is needed to draw any firm conclusions. Also, this was an observational trial which looked at the clinical and pathological status once and did not follow up patients for a longer duration.

CONCLUSION-

In conclusion, it was found that meningitis is a common clinical diagnosis in the Paediatric emergency department in children who come with apparent febrile seizure, thus meningitis should always be considered as a differential diagnosis.

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