

Analysis of Cases Admitted with Fever with First Time Seizures Within Age Group of 3 to 12 Months

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Abstract: It is essential to exclude underlying meningitis in all children with febrile seizures (FS) either clinically or if uncertain by lumbar puncture (LP) because majority of such cases of meningitis are bacterial in origin and delay in diagnosing meningitis can result in serious neurological morbidity and mortality. This study was conducted with the primary objective of finding out the incidence of acute bacterial meningitis (ABM) and to determine the role of the Cerebrospinal fluid (CSF) in differentiating ABM from first simple febrile seizure (FSFS) in children between 3 and 12 months. During the study period a total of 115 infants and young children between 3 to 12 months were brought consecutively to the Pediatric of Kurnool Medical College, Kurnool, after their first fever-associated-seizure. After applying exclusion criteria and deducing those cases that refused LP, 103 children fulfilled the inclusion criteria and were taken as study group. On CSF analysis 13 turned out to be Meningitis while 10 of them were cases of Acute Bacterial Meningitis (ABM). Among 3 to < 12 months of age a total of 13 cases had meningitis but only 4 (30.8%) presented with meningeal signs and 9 (69.2%) had no meningeal signs. Based on culture, 4(30.7%) were CSF culture positive, whereas 01(7.71%) were blood culture positive and both CSF and blood cultures were positive in 01(7.7%). We recommend to follow 1996 AAP guidelines till Hib/PCV immunization coverage reaches more than 90% as is existing now in united states based on which these guidelines were revised in 2011.

Keywords: Fever with first time seizures, Lumbar Puncture, Meningitis.

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I. Introduction

Fever with seizure is the most common type of seizure in infants and young children. This may be due to febrile seizures or more threatening condition like meningitis [1]. Between 2 and 5% of children experience one or more febrile seizures (FS) by 5 years of age [2]. Probability of bacterial meningitis in children with fever with seizure varies from 0.6% to 6.7% [3]. Febrile seizure is the most common type of childhood seizure disorder, which occurs in an age-specific manner, is associated with a fever of 38.0°C or higher and presents without evidence of any definite causative diseases, such as central nervous system (CNS) infection or metabolic abnormality. Most recently, the AAP (2008) defined FS as a seizure occurring in febrile children between the ages of 6 and 60 months who do not have an intracranial infection, metabolic disturbance, or history of afebrile seizure [4].

FS is defined as an abnormal, sudden, excessive electrical discharge of neurons (gray matter) that propagates down the neuronal processes (white matter) to affect an end organ in a clinically measurable fashion, occurring in infancy or childhood, usually between 3 months and 5 years of age, associated with fever, but without evidence of intracranial infection or defined cause [5]. Meningitis is an inflammatory disease of the leptomeninges, the tissues surrounding the brain and spinal cord. The meninges consist of three parts: the pia, arachnoid, and dura mater. Meningitis reflects inflammation of the arachnoid mater and the cerebrospinal fluid (CSF) in both the subarachnoid space and in the cerebral ventricles [6]. It is essential to exclude underlying meningitis in all children with FS either clinically or if uncertain by lumbar puncture (LP) because majority of such cases of meningitis are bacterial in origin and delay in diagnosing meningitis can result in serious neurological morbidity and mortality [7]. This study was conducted with the primary objective of finding out the incidence of acute bacterial meningitis (ABM) and to determine the role of the Cerebrospinal fluid (CSF) in differentiating ABM from first simple febrile seizure (FSFS) in children between 3 and 12 months.

II. Materials And Methods

The present descriptive, analytical study was conducted retrospectively from April 2015 to March 2016 on infants and young children of 3 to 12 months of age attending the Pediatric emergency services Room (ESR) of Pediatric department, Government General Hospital, Kurnool Medical College, Kurnool. During the study period a total of 115 infants and young children between 3 to 12 months were brought consecutively to the Pediatric of Kurnool Medical College, Kurnool, after their first fever-associated-seizure. After applying

exclusion criteria and deducing those cases that refused LP, 103 children fulfilled the inclusion criteria and were taken as study group.

Inclusion criteria

- 3-12 months of age
- First episode of apparent simple febrile seizures
- Presented to ED within 24 hours of seizures

Exclusion criteria

- Less than 3 months/ more than 12 months
- Previous history of febrile seizures
- Disorders of central nervous system

In these children, a complete history was taken upon hospitalization, and then a physical examination was performed by the duty resident in charge giving special attention to following factors: age, gender, and duration of seizure, postictal drowsiness, lethargy, irritability, vomiting, bulging fontanel, nuchal rigidity, Kernig sign, Brudzinski sign, neurological deficit and prior antibiotic use. LP was performed in all cases. The data was documented in spread excel sheet and transferred to EXCEL software. In collaboration with Biochemistry, Pathology and Microbiology departments, laboratory tests including CBC, X-ray chest, electrolytes, urinalysis, urine culture, blood culture, and lumbar puncture were done. Also CSF tests for sugar, protein, WBC, and CSF culture were carried out in all patients. The child was considered as a case of meningitis if: WBC >5 cells/cu mm, sugar level < 2/3rds of blood glucose, protein >40mg/dl and or positive CSF and blood culture. Statistical analysis of various factors mentioned was carried out by Graph pad software, Fisher’s exact test. P-value of less than 0.05 was considered significant statistically.

III Results

During the study period a total of 6982 children were admitted in the wards of Pediatric Department of this institution. Of these 3520 children presented to the pediatric Emergency Department (PED). Among them apparent FSFS cases were 115 between 3 and 12 months age. On CSF analysis 13 turned out to be Meningitis while 10 of them were cases of Acute Bacterial Meningitis (ABM) (Fig 1).

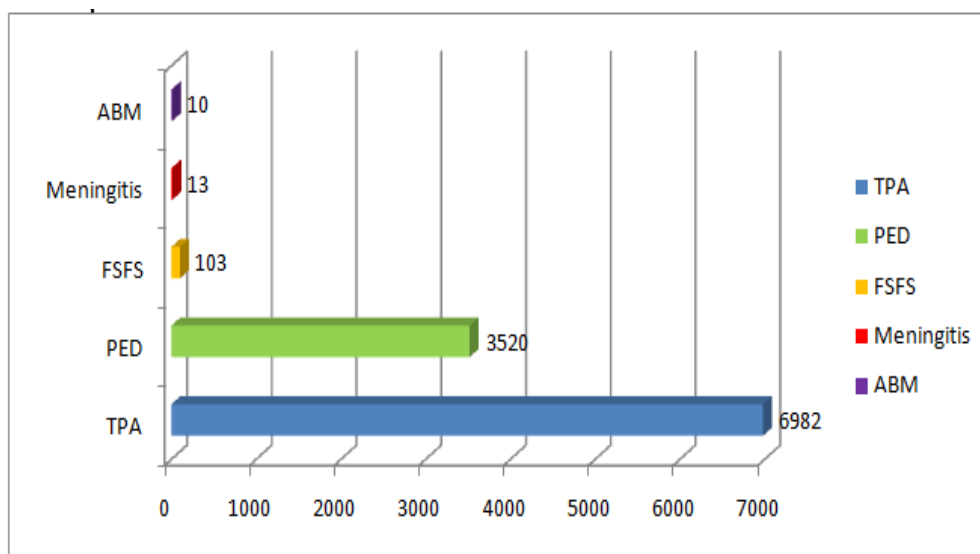


Fig 1: Selection of study population

Various etiological causes of fever in apparent FSFS in our study were: Upper respiratory tract infection, 39 (37.8%), lower respiratory tract infection 22 (21.3%), Gastro enteritis 17 (16.5%), Acute bacterial meningitis 10 (9.7%), Urinary tract infection 4 (3.8%) , Acute otitis media 3 (2.9%), Viral meningitis 03 (2.9%), Dengue 2 (1.9%) and Nonspecific without focus 03 (2.9%)(Table 1).

Table 1: Etiological factors of Fever in apparent FSFS

S.No	Etiology	No. of patients	Percentage
1	Upper Respiratory tract infection	39	37.8%
2	Lower Respiratory tract infection	22	21.3%
3	Gastroenteritis	17	16.5%
4	Acute bacterial meningitis	10	9.7%
5	Urinary tract infection	4	3.8%

6	Acute otitis media	03	2.9%
7	Viral meningitis	03	2.9%
8	Dengue	02	1.9%
9	Nonspecific without focus	03	2.9%
Total		103	100%

Clinical variables like frequency of seizures, along with associated neurological deficits and time of onset of seizures from fever were compared in both meningitis and non-meningitis cases. Among them frequency of seizures of >1 episode (P-value is 0.0139) was more significantly associated with meningitis as shown in Table 2.

Table 2: Comparison of Clinical variables in Meningitis Vs Non meningitis

Variables		Total (n=103)	Meningitis (n=13)	NonMeningitis (n=90)	P value
Frequency of seizure	>1	44(42.7%)	10(76.9%)	34(37.8%)	0.0139
	<1	59(57.3%)	3(23.1%)	56(62.2%)	
Neurological deficit	Yes	0(0%)	0(0%)	0(0%)	-
	No	103(100%)	13(100%)	90(100%)	
Time of onset seizure from fever	<24 H	75(72.8%)	10(76.9%)	65(72.2%)	0.0001
	>24 H	28(27.2%)	3(23.1%)	25(27.8%)	

Among 3 to < 12 months of age a total of 13 cases had meningitis but only 4 (30.8%) presented with meningeal signs and 9 (69.2%) had no meningeal signs. On CSF analysis, 103 children with apparent FSFS revealed a total of 13 cases of meningitis. 10 children had increased neutrophil count, increased protein content and decreased glucose content indicating ABM, 3 had viral meningitis. All the cases of meningitis (N=13) were subjected to CSF and blood culture, based on culture, 4(30.7%) were CSF culture positive, whereas 01(7.71%) were blood culture positive and both CSF and blood cultures were positive in 01(7.7%)(Table 3).

Table 3: Culture positivity of CSF and Blood among ABM cases

Meningitis	CSF culture positive	Blood culture positive	CSF and Blood culture positive
3 to <12 months (n=13)	4(30.7%)	1(7.7%)	01(7.7%)

IV. Discussion

Meningitis is a common presentation in pediatric emergency department. In cases of apparent FSFS, meningitis should always be considered as a differential diagnosis. Lumbar puncture is necessary to rule out meningitis in all children of less than 12 months presenting with apparent FSFS [8,9]. On CSF analysis 13 turned out to be Meningitis while 10 of them were cases of Acute Bacterial Meningitis (ABM) in the present study. Incidence of overall meningitis (12.6%) of our study was similar to those of Owusu-Ofori et al [10](10.2%) and Rana MNet al [11] (10%). ABM incidence (9.7%) was in correlation with those of Heydarianet al [12] (6.25%), Joshi Batajoo et al [9] (4.5%) and Mustafa Ciftci et al[13] (3%). Among them frequency of seizures of >1 episode was more significantly associated with meningitis in this study. Tavasoli A, et al[14] also reported similar results. NahidKhosroshahi et al [15] also revealed that the duration of fever was not a prominent predicting factor for bacterial meningitis in patients with febrile convulsion. In the present study, among 3 to < 12 months age group 13 children had FSFS with meningitis, but meningeal signs were present in 4 (30.7%) cases only and in the remaining 9 (69.3%) children had no meningeal signs. Joshi Batajoo et al [9] also noticed that 30% of children in the age group of 6-12 months had meningitis without meningeal Tavasoli A et al[14] study meningitis was identified in 5% of cases and bacterial meningitis in 2% of cases.

Khosroshahi N et al [15] study showed CSF culture positivity of 40% in children in whom lumbar puncture was performed and were diagnosed with meningitis and none had positive blood culture. In Teach and Geil [16] study out of 243 children with febrile seizures, lumbar puncture was performed only in 66 patients and all CSF cultures were negative. Jai Krishin et al[8], Imroonmoosha et al[17] and Batajoo J et al [9] opened that meningitis was more common in males than females for both age groups with a male: female ratio about 3:1. . . Batra p et al [18] findings showed that females were more commonly affected with meningitis. Similar to our study no statistically significant gender difference was observed by Owusu-Ofori et al[12] and Tinsa et al [10].

Early diagnosis, prompt initiation of therapy and supportive care are important for improving the long term outcome [2,19]. Unfortunately, as seen in the present study, signs of meningitis cannot be used for making an early diagnosis. Altered sensorium and convulsions are late features. Hence a high index of suspicion is necessary to suspect meningitis and perform a lumbar puncture.

Number of studies from developed countries were of the opinion that the risk of ABM presenting solely as apparent FSFS is very low, whatever age are features of seizure. Hence they felt, performing routine

LP in the absence of Meningeal signs is likely to be of low utility in febrile young children presented with first seizure.

V. Conclusion

We are of the opinion that in our country routine LP should be done in all cases of FSFS in age group of 3-12 months, as incidence of ABM high, immunization status is poor and caused by various organisms. We recommend to follow 1996 AAP guidelines till HIB/PCV immunization coverage reaches more than 90% as is existing now in united states based on which these guidelines were revised in 2011.

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