

Yield of Lumbar Puncture in First Episode of Complex Febrile Seizure

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Abstract

One of the commonest seizures of childhood is febrile seizures. The presentation of these seizures is either simple or complex. Seizures in children aged 6 months to 6 years who previously were normal neurologically/developmentally fit to the diagnosis of febrile seizures. However, seizures remain a common presentation in children with neuro infections. A retrospective study of CSF pleocytosis in the cases with first episode of complex febrile seizures admitted to a tertiary care rural hospital although gave a low yield for ABM, the yield was significantly higher in children aged <1 year. Thus it becomes imperative to evaluate children <1yr having the first episode of complex febrile seizures with lumbar puncture to rule out neuro infections.

Keywords: Complex Febrile Seizure; Acute Bacterial Meningitis; CSF Pleocytosis; Neuro Infections.

Introduction

Febrile seizures are the most common form of childhood seizures, affecting 2% to 5% of all children and usually appearing between 6 months and 6 years of age. Febrile seizures occur in the absence of intracranial infection, metabolic disturbance, or history of afebrile seizures, and are classified as simple or complex.

A complex febrile seizure is more prolonged (>15 min), is focal, and/or reoccurs within 24 hr [1,2]. Current treatment plans vary greatly among emergency centres, which focus more on isolation of the source of fever than detailing a thorough seizure work-up [3].

The possibility that a febrile seizure may be the sole presenting sign of acute bacterial meningitis (ABM) remains a major concern, more so in cases of complex febrile seizures. Few patients who

experienced a febrile seizure had ABM in the absence of other signs or symptoms [4].

This study helps to assess the rate of neuro infections (namely Acute Bacterial Meningitis) on the basis of CSF Pleocytosis, among children who present with first episode of complex febrile seizure and for early recognition of ABM in the absence of clinical symptoms and initiation of treatment.

Review of Literature

In a study by Amir Kimia et al, few patients with febrile seizures have ABM in the absence of other signs or symptoms. LP should be performed on the basis of clinical suspicion and additional signs and symptoms that are suggestive of meningitis [4].

Study by Amiraj et al study revealed 48.6% incidence of acute bacterial meningitis among children (6 months to 5 years) with a first episode of febrile convulsion who were subjected to lumbar puncture based on clinical suspicion. It was also found that high-grade fever, antibiotic use, the higher number of antibiotic doses; low haemoglobin and low blood sugar were found to be significant predictors of meningitis among children aged 6-60 months who presented with a first episode of febrile convulsion [5].

Study by Joshi B R et al, done on cases that

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presented with first episode of fever and seizure between six months to five years of age, showed that there were a total of 28 children in the 6-12 months age group, 31 in 12-18 months and 51 in above 18 months age, among which 16 (14.54%) children were diagnosed to have meningitis [6].

Chin et al reported ABM in as many as 17% of children with febrile status epilepticus, defining convulsive status epilepticus as a seizure or series of seizures without recovery of consciousness between seizures and lasting at least 30 minutes [7].

Study by Offringa et al., reported an increasing likelihood of bacterial meningitis with longer seizure duration [8].

Study by Green et al., reported that a seizure did not occur as the only clinical indicator of meningitis in a large series of patients who had bacterial meningitis [9].

Objectives of Study

- A. To assess the rate of CSF pleocytosis among children who present with their first complex febrile seizure.
- B. To compare the rate of yield of lumbar puncture among children aged <1 year and children aged 1-6yrs.

Materials and Methods

Study Design

Hospital based retrospective study.

Source of Data

The study was conducted over a period of three years (Cases admitted from 01-08-2012 to 31-12-2015) with data of children aged 6 months to 6 years who had their first complex febrile seizure admitted to PICU of MVJ Medical College and Research Hospital.

Method of Collection of Data

Children aged 6 months to 6 years who had their first episode of complex febrile seizure satisfying the inclusion and exclusion criteria were included in the study. The details of these cases were collected from their case sheets at the Medical Records Department.

Inclusion Criteria

1. Children aged 6 months to 6 years.
2. First episode of complex febrile seizure.
3. Seizure semiology fitting the definition of complex febrile seizure.

Exclusion Criteria

1. Prior history of Afebrile/Unprovoked seizures.
2. A known case of Febrile Seizures (simple/complex) on prophylactic treatment.
3. An immunocompromised state.
4. An underlying illness (genetic, metabolic factors and possibly structural brain abnormalities) associated with seizures.
5. Cases of trauma leading to altered consciousness /seizures.

Definitions

Complex Febrile Seizures: A complex febrile seizure is more prolonged (>15 min), is focal, and/or reoccurs within 24 hr [7].

CSF Pleocytosis, suggestive of neuro infections, was taken as neutrophil count of ≥ 1 cells/cumm and/or Lymphocyte count of >5 Cells/cumm.

Statistical Data Analysis

Data was entered systematically in Microsoft Excel. Tabulation and charts were generated using Microsoft Word and Microsoft Excel. Comparisons made using Chi-square test.

Results

Children aged 6months to 6 years who presented to the emergency ward of our hospital with first episode of complex febrile seizures were short listed. Out of which 45 children who were further evaluated with lumbar puncture were eligible for study. Amongst these, 24 were males and 21 were females. Children aged <1yr were 13 in number while 32 children were aged between 1yr and 6yrs. (Graph: 1) (Table: 1)

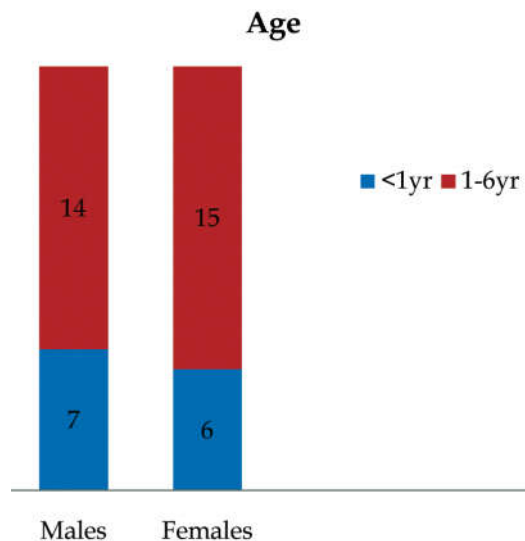
CSF Results

In the 45 cases which were eligible, on further evaluation with lumbar puncture, 20.0% (9cases) of

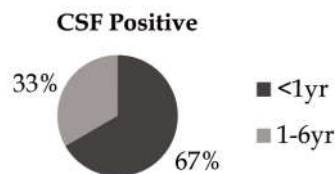
the cases showed CSF pleocytosis. On comparing ages <1 yr and 1-6 yrs, the yield of positive result in <1yr was 46.15% (6 cases) and yield was 9.375000% (3 cases) in ages 1-6 yrs with a p-value of 0.00518, thus making higher yield of lumbar puncture in children <1yr of age, statistically significant.

Table 1:

Age	Cases	Positive	Percentage
<1yr	13	6	46.15
1-6yrs	32	3	9.3750000
Total	45	7	20.00



Graph 1:



Graph 2:

Conclusion

Although the yield of lumbar puncture showing CSF pleocytosis in cases of complex febrile seizures is low, the yield becomes markedly higher in children

aged less than 1 year, which is also statistically significant. Thus, it becomes important to evaluate with lumbar puncture in such children who present with first episode of complex febrile seizure. However, this study is limited by the small sample size.

References

1. American Academy of Pediatrics Steering Committee on Quality Improvement and Management, Subcommittee on Febrile Seizures. Febrile seizures: clinical practice guideline for the long-term management of the child with simple febrile seizures. *Pediatrics*. 2008; 121(6):1281-1286.
2. Syndi Seinfeld, DO, and John M. Pellock. "Recent Research on Febrile Seizures: A Review." *Journal of neurology & neurophysiology* 2013; 4:165:19519. PMC. Web. 21 Sept. 2016.
3. Teng D, Dayan P, Tyler S. Risk of intracranial pathologic conditions requiring emergency intervention after a first complex febrile seizure episode among children. *Pediatrics*. 2006 Feb; 117 (2):304-308.
4. Kimia AA, Capraro AJ, Hummel D, Johnston P, Harper MB. Utility of lumbar puncture for first simple febrile seizure among children 6 to 18 months of age. *Paediatrics* 2009; 123:6-12.
5. Singh A, Silayach J, Gathwala G, Kaushik JS. Predictors of acute bacterial meningitis among children with a first episode of febrile convulsion from Northern India: A prospective study. *Ann Trop Med Public Health* 2014; 7:9-13.
6. Joshi Batajoo R, Rayamajhi A, Mahaseth C. Children with first episode of fever with seizure: Is lumbar puncture necessary? *JNMA J Nepal Med Assoc* 2008; 47:109-12.
7. Chin RF, Neville BG, Scott RC. Meningitis is a common cause of convulsive status epilepticus with fever. *Arch Dis Child*. 2005; 90(1): 66-69.
8. Offringa M, Beishuizen A, Derksen-Lubsen G, Lubsen J. Seizures and fever: can we rule out meningitis on clinical grounds alone? *ClinPediatr (Phila)*. 1992; 31(9): 514-522.
9. Green SM, Rothrock SG, Clem KJ, Zurcher RF, Mellick L. Can seizures be the sole manifestation of meningitis in febrile children? *Pediatrics*. 1993; 92(4):527-534.