

“Febrile Status Epilepticus in Children- An Experience of a Tertiary Care Center from South India”

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BACKGROUND:

Febrile seizures are the most common neurologic disorder of infants and young children. Febrile status epilepticus (FSE), although rare is often a child's first seizure.

OBJECTIVES:

This study is done to look into factors contributing to recurrence of seizures following febrile status epilepticus in children.

METHODS:

This is a cross sectional study done including all children between age 6 months to 5 years presenting with febrile status epilepticus, were analyzed for comparison between groups with and without recurrence of seizures. Electroencephalography, CSF analysis, MRI Brain and other tests were recorded. Descriptive and inferential statistics were used to analyze data.

RESULTS:

A total of 292 children were presented with febrile seizures, of which 189(65%) have simple febrile seizures, 103(35%) children have complex febrile seizures. 16(5.5%) children presented with febrile status epilepticus (FSE). Mean age of presentation was 22.8 months. Mean duration of hospital stay was 7.6 days. All 16 children survived with no mortality. Three (18.75%) children developed subsequent seizures over one year, among them two have febrile seizure and another have afebrile seizure. No child has recurrent febrile status epilepticus. Two (66.6%) out of three children who had family history of epilepsy developed recurrent seizure ($p < 0.05$). All patients with recurrence had mean duration of first seizure 100 minutes ($p < 0.05$), prolonged duration of hospital stay and required multiple anti-epileptic drugs (AED'S) to control seizure during first episode ($p < 0.05$).

CONCLUSIONS:

Presence of family history of epilepsy, Long seizure duration, prolonged hospital stay and requirement of multiple AED'S at first admission were associated with recurrence. There is no mortality in our study.

Key words

- febrile seizures
 - febrile status epilepticus
 - recurrence
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Date of Submission: 06-07-2019

Date of acceptance: 22-07-2019

I. Introduction

The febrile seizure is one of the common neurological disorders in infancy and childhood, usually occurring between six months and five years of age, associated with fever but without evidence of CNS infection or defined etiology [1]. Most of children have seizures on the first day of fever. Simple febrile seizures are characterized by a single generalized seizure lasting less than 10 to 15 minutes [2]. Complex febrile seizures are focal, prolonged, or recurrent within a 24-hour period [3]. Some children will present with febrile status epilepticus (FSE), as first episode. It is defined as continuous seizures or intermittent seizures without neurologic recovery, lasting for a period of 30 minutes or longer [4]. FSE can develop in up to 5% of children with febrile seizures [5]. In contrast to simple febrile seizures, which have a favorable outcome, FSE can result in cerebral damage, epilepsy [6].

This study was done to look into factors predicting recurrence of seizures in children presenting with febrile status epilepticus.

II. Materials And Methods

Study population, design and protocol:

This is a cross sectional study done in Neurology outpatient department in Niloufer children’s hospital including Children with ages 6 months through 5 years, who presented with FSE as their first ever seizure between August 2016 to July 2017 and are on regular follow up at least once in two months for one year till July 2018.

Patients who have previous history of any seizure irrespective of cause were excluded from the study.

A Febrile Seizure was defined as a provoked seizure where the sole acute provocation was fever (temperature $\geq 38.4^{\circ}\text{C}$, 101.0°F) without prior history of afebrile seizures and/or insult. Patients with evidence of an acute CNS infection were excluded. [7,9] FSE was defined as either one seizure or intermittent seizures without definite recovery lasting more than 30 minutes. [7,8]

Procedure:

Neurologic examination and routine workup for evaluation of fever along with complete hemogram were done.

MRI Brain plain and contrast study, CSF analysis includes cell count, glucose, protein, Gram stain, viral profile and culture and Electroencephalography were done in cases of complex febrile seizures and febrile status epilepticus.

Age, sex, type, duration of seizures, mean duration of hospital stay, number of AED’S required during treatment, mortality were noted during first admission. Subsequently they were followed in Outpatient department at least once in two months for one year. Compliance of drugs, recurrence of seizures were addressed during follow up.

Statistical analysis:

Descriptive and inferential statistics was used to analyze data in the study. The continuous variables such as age, duration of seizures, hospital stay were expressed as mean \pm standard deviation (SD). The categorical variables were expressed in number.

Student t-test (two tailed, independent) is used to find the significance of continuous parameters between two groups of children with and without recurrence of seizures. Chi-square/Fischer’s exact test is used to find significance of categorical parameters between groups. P value < 0.05 was considered to be significant. The statistical software, SPSS version 20 and Microsoft excel were used for analysis of data and generation of tables.

III. Results

A total of 292 children presented with febrile seizures, of which 189(65%) have simple febrile seizures, 103(35%) children have complex febrile seizures. 16(5.5%) children presented with febrile status epilepticus. Lorazepam, Phenytoin, phenobarbitone, valproate, clobazam are the common used anti-epileptic drugs in our acute center.

PROFILE AND OUTCOME OF CHILDREN WITH FSE AT FIRST ADMISSION:

A total of 16 children had FSE. Of them, 12 were male and 4 were female. Mean age of presentation was 22.81 ± 6.55 months.

Focal febrile status epilepticus was the dominant pattern occurring in 11(68.7%) children and generalized pattern is seen in 5(31.3%) children. Mean duration of hospital stay was 7.6 ± 2.9 days. Mean seizure duration was 63.5 ± 22.5 minutes (Table 1).

Of the 16 children, 14(87.5%) required more than one AED for seizure control (Table 2).

MRI brain plain and contrast study, CSF analysis were normal in all patients. EEG was normal in nine (56.2%) patients and focal slowing in five (31%) children and generalized discharges in two (12.5%). All 16 children survived with no mortality.

PROFILE OF PATIENTS WITH RECURRENCE OF SEIZURES:

Among those children who presented with FSE as their first seizure, three (18.7%) children developed subsequent seizures over one year, among them two have febrile seizure and another have afebrile seizure.

All three children with recurrence had mean duration of first seizure 100 minutes (P value 0.0003) and required more number of anti-epileptic drugs (P value 0.03) for control of seizure than children without recurrence. Among them two children required three drugs and another child required two drugs to control seizure during first episode.

Family history of febrile seizure was present in 3(18.7%) children, out of them two(66%) developed recurrent febrile seizure (P value 0.018). children with recurrence had a prolonged hospital stay at first

admission compared to children without recurrence (p value 0.005). Comparison of parameters between children with and without recurrence is shown in table 3.

IV. Discussion

Febrile seizures are common in children younger than 5 years of age with peak incidence at 2nd year with prevalence of 2 to 5% [10]. In our study, simple febrile seizures constituted 65% of febrile seizures and most common among febrile seizures. Febrile status epilepticus occurred in 5.8% of overall febrile seizures. FSE is common cause of Status Epilepticus in children younger than two years of age [11]. The mean age of children presenting with FSE was 22 months in our study.

Focal seizures constitute dominant pattern and present in 68.7% among febrile status epilepticus compared to generalized seizures which is in concordance with another study [12] where focal seizures constituted 2/3rd of cases of FSE.

Febrile status epilepticus almost never stops spontaneously and requires more than one antiepileptic drug for control of seizure. [4,12] In our study 14(87.5%) out of 16 children required at least two drugs for control of seizures and mean number of drugs required during first seizure was more for those with recurrence than those without recurrence which is statistically significant.

Patients with FSE were more likely to have a family history of epilepsy than children who presented with briefer febrile seizures [13]. Our study has shown that family history of epilepsy is common in patients presenting with FSE and also they are more likely to have subsequent seizures.

History of febrile seizures in a first-degree relative is shown to increase recurrence risk following a febrile seizure [14]. In our study we have only one patient with family history of febrile seizure with no recurrence over one year period. This is probably due to less number of patients in the study.

A prospective study done following 44 children with FSE for a period of 28 months had shown that risk of recurrence of both febrile and afebrile seizures increased in those with prior neurologic abnormalities. [15]

Neuroinfections like encephalitis, meningitis predominantly viral illness were known to present as febrile status epilepticus in previous studies[16,17]. MRI Brain and CSF analysis were done to exclude infectious etiology and were normal in our study.

To the best of our knowledge, there is no much literature on duration of hospital stay at first admission. In our study, children with recurrence had prolonged hospital stay at first admission which was statistically significant.

Most of the studies have taken factors associated with recurrence following febrile seizures [12,13,14]. One of the previous studies that are done to study recurrence of febrile seizures following FSE were done by comparing factors between FSE and simple febrile seizures[18]. Our study was focused on predicting factors that can be associated with recurrence of seizures following a first FSE by subgroup analysis of children with and without recurrence which can help in determining factors that can predict recurrence once a child has FSE.

There are Limitations of our study which include less number of study population, genetic studies were not done and one year of follow up.

V. Conclusions

Long seizure duration of more than 100minutes, family history of epilepsy, prolonged hospital stay and requirement of multiple AED'S at first admission were associated with recurrence. There was no mortality in our study. Further randomized and long term follow up studies were needed to validate the findings and to predict factors within FSE group that can assess risk of recurrence of seizures.

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TABLES

Table 1 Characteristics of children with Febrile status epilepticus:

| Variables | Data |
|---|------------|
| Total number of patients | 16(100) |
| Sex, n(%) | |
| Male | 12(75) |
| Female | 4(25) |
| Age of presentation(months) | |
| Mean±SD | 22.81±6.55 |
| Seizure duration(minutes) | |
| Mean±sd | 63.5±22.5 |
| No of AED'S required | |
| Mean±SD | 2.1±0.6 |
| Type of Seizure, n(%) | |
| Focal | 11(68.7) |
| Generalized | 5(31.3) |
| Duration of hospital stay(days) | |
| Mean±SD | 7.6±2.9 |
| Family history of febrile seizure, n(%) | 3(18.7) |

Table 2: Requirement of antiepileptic drugs for seizure control

| No of AED'S needed | No of patients, n(%) |
|--------------------|----------------------|
| one drug | 2(12.5) |
| two drugs | 11(68.7) |
| three drugs | 3(18.7) |

Table 3: Comparison of parameters between children with and without recurrence of seizures.

| Parameters | Without recurrence | With recurrence | P value |
|----------------------------------|--------------------|-----------------|---------------|
| Age of presentation(months) | 23.76± 8.21 | 19.33±3.4 | 0.84393 |
| Males, n(%) | 10(83.3%) | 2(16.6%) | 0.71 |
| Females, n(%) | 1(25%) | 3(75%) | 0.71 |
| Duration of seizure(minutes) | 55.07±15.14 | 100.0±8.16 | 0.0003 |
| No of AED'S | 1.92±0.47 | 2.66±0.47 | 0.03 |
| Duration of hospital stay(days) | 6.76±2.22 | 11.66±2.05 | 0.005 |
| Family history of epilepsy, n(%) | 2(66.6%) | 1(33.3%) | 0.018 |

Dr. P. Ravi Prakash Dr. M. Gopi Srikanth . “Febrile Status Epilepticus in Children- An Experience of a Tertiary Care Center from South India. ” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 7, 2019, pp 20-23.