

Recurrence Risk of Febrile Seizures in Children

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Abstract

Introduction: Febrile seizure is a common paediatric problem. Identifying children with febrile seizure who are at risk for recurrence is important so that special attention can be given to them. The objective of this study was to identify the risk factors for recurrence of febrile seizures in children. **Materials and Methods:** This was a prospective cohort study done at Kathmandu Medical College and Teaching Hospital, Kathmandu, Nepal. This study is a continuation of a previous study which looked at the leucocytosis in peripheral blood of children with febrile seizure. A detailed history including the risk factors for febrile seizure recurrence was obtained from the caregiver during follow up on subsequent days after discharge of children from the hospital who were previously admitted for febrile seizure. All children with febrile seizure belonging to age group of 6 months to 6 years were included in the study. Those with afebrile seizures or on anticonvulsants and those who refused to give consent were excluded. Each child was also examined and investigated for the cause of fever. **Results:** A total of 115 children with febrile seizure admitted for febrile seizure during the study period and all of them were followed up at outpatient department. Males accounted 62% and females 38%. Simple Febrile Seizures were seen in 80% of the cases and complex febrile seizures were seen in 20%. Out of all the cases 68(59%) had symptoms of viral prodrome. 59(51%) had recurrent febrile seizure. Low temperature at onset of Febrile Seizure ($p=0.001$), short duration of fever before onset of Febrile Seizure (0.026) and atypical Febrile Seizure ($p=0.022$) were the risk factors for recurrent febrile seizure. **Conclusion:** Febrile Seizure is a common paediatric problem commonly seen in males. Almost half of children with Febrile Seizure are at risk for recurrence in later date. The risk factors for these recurrences are modest rise in body temperature at the onset of febrile seizure, onset of seizure within 12 hours of fever and atypical presentation.

Key words: Epilepsy, Febrile Seizure, Typical Febrile Seizure, Recurrence

Introduction

Febrile seizure is a seizure which occurs in presence of a clinically recognizable infection with exclusion of central nervous system infection¹.

Febrile Feizure (FS) is a common childhood problem². It is of two types namely simple and complex febrile seizure. Simple febrile seizures are generalized seizures, lasting less than 15 minutes, not recurring within 24 hours, and with no postictal neuro-logical abnormalities. Complex febrile seizures are focal, prolonged or recurrent within 24 hours or associated with post-ictal neurological abnormalities including Todd paresis³.

Febrile seizure can recur. Pavlidou E⁴ et al in their study found 48% had recurrence of febrile seizure. There are controversial data on risk factors for recurrences

and there are debates putting a child on anticonvulsant prophylaxis having recurrences. In this context this study can be a useful to know about the risk factors involved in recurrence of febrile seizure.

This can guide a physician for possible intervention such as putting the child on prophylaxis treatment for seizures. This is important because attack of febrile seizure is a traumatic experience both for the child and the parents. The aim of this study was to identify the risk factors for recurrent febrile seizure

Materials and Methods

This is a prospective cohort study done at Kathmandu Medical College and Teaching Hospital, Sinamangal, Kathmandu, Nepal. It is the continuation of the study which looked for the leucocytosis in peripheral blood in children with febrile seizure⁵. These children

were followed at outpatient department of Paediatrics at Kathmandu Medical College and the study was conducted from July 2008 to July 2009.

All the children who were admitted previously for febrile seizure were asked to follow up within a week of discharge. Children belonging to age 6 months to 6 years were included in the study. Informed consent was taken. Children younger than 6 months and older than 6 years of age, those who had afebrile seizures, those who are on regular anticonvulsants treatment and those who refused to give consent were excluded from the study.

The parents of children were interviewed during the follow up on outpatient department by asking screening questions to verify that the child had not had afebrile seizures. A complete description of the seizure from the parent or, from an eyewitness was taken. Information were asked for about; prenatal and perinatal history of each child, family history of febrile seizure and epilepsy, age during first febrile convulsion (in cases of ≥ 1 recurrences), presence or absence of focal features, duration of the febrile seizure, the duration of fever prior to the seizure and whether repeated episodes within the same febrile illness had occurred or not. Complete physical, developmental and neurologic assessments were conducted in each child. On arrival temperature was taken and the child was investigated for fever as per the decision of treating physician.

Simple febrile seizures are pre-defined as generalized seizures, lasting less than 15 min, not recurring within 24 hours, and with no postictal neurological abnormalities. Similarly complex febrile seizures are focal, prolonged or recurrent within 24 hours or associated with post-ictal neurological abnormalities including Todd paresis³.

Those children who had had a past history of at least one febrile seizure and presently coming with another episode of febrile seizure were regarded as recurrent febrile seizure.

The collected data were entered in excel and analyzed using SPSS 11.5. The results were analyzed by descriptive statistics and Chi square test.

Results

During the study period caretakers of 115 children who were previously admitted for febrile seizure, were interviewed. Males accounted for 62% and females 38%. Simple febrile seizure were seen in 93(80%) and complex febrile seizure in 22(20%). In the study group, 16(14%) had family history of FS and 11(10%) had family history of seizure disorder. There were two patients who had psychomotor retardation and one case had history of birth asphyxia.

Among the causes of fever in the study, 68(59%) had symptoms of viral prodrome, 17(15%) had non-specific febrile illness, 10(9%) had UTI. Acute pharyngotonsillitis, otitis media, dysentery and pneumonia accounted for 5(4%) of total causes of fever. Bacteremia was seen in two children. One child had *Staphylococcus aureus* while *Salmonella species* was isolated in another. There were 10(9%) cases of culture proven UTI. Lumbar puncture was done in seven (6%) but none had meningitis or encephalitis.

Recurrent febrile seizure was found in 59(51%) children and the rest 56 (49%) had febrile seizure for the first time.

As seen in Table 1 there was a statistical association between low temperature at onset of seizure and recurrences of febrile seizures ($p < 0.001$). Similarly, the association of duration of fever (≤ 12 hour) prior to onset of febrile seizure and recurrence was found to be significant ($p = 0.026$). Moreover it was found that complex febrile seizure had a statistically significant association with its recurrence ($p = 0.022$).

Age of the child at the onset of first febrile seizure, sex and family history of epilepsy were not found to be significantly associated risk factors for the recurrence of febrile seizure.

Table 1: Factors associated with FS recurrence

Risk factors	Variables	Number of children (N=115)	Number of children without recurrence (N=56)	Number of children with recurrence (N=59)	p- value
Age	≤ 18 months	45	18	27(60)	0.135
	>18 months	70	38	32(46)	
Sex	Boys	71	36	35(50)	0.584
	Girls	44	20	24(54)	
Family history of FS	Positive	16	5	11(69)	0.132
	Negative	99	51	48(48)	
Family history of epilepsy	Positive	11	5	6(54)	0.821
	Negative	104	51	53(51)	
Temperature	≤ 100 F	52	12	40(77)	<0.001
	>100 F	63	44	19(30)	
Type of FS	Simple	93	50	43(46)	0.022
	Complex	22	6	16(73)	
Duration of fever	≤ 12 hours	67	27	40(60)	0.026
	>12 hours	48	29	19(39)	

In brackets: recurrence risk (%).

Discussion

In our study majority of the children who were admitted for febrile seizures had simple febrile seizure (81%). Millichap JJ⁶ and Mustafic N⁷ in their study also found higher frequency of simple febrile seizure in their studies. Male sex accounted for higher percentage (62%) among the study children. Trainor JL et al⁸ in their study had shown that 64% of study population was males. There are other studies^{9, 10, 11} which had also shown that it is the male children who were predominantly affected.

The most common cause of fever in the study population was viral fever (60%) followed by non specific febrile illness and UTI. Millichap JJ et al⁶. in their study had shown that 35% of cases had fever of viral origin. Similarly the overall viral identification rate in a study done by Srokes MJ et.al¹² was 49%. Likewise 53% of the children had upper respiratory tract infection in a study done by Abuekteish F et.al¹³. In our study we used clinical signs and symptoms to diagnose a child with viral fever. This may be the reason for overestimation of the cases that had viral fever.

In the present study 51% of children with febrile seizure had recurrence. It is comparable to study done by Pavlidou E et al who had showed the recurrence rate of 48% in their study⁴. In our study we found no relation of febrile seizure recurrence with age. Unlike this, other studies^{4, 14, 15, 16} done by different authors have shown that younger age children are prone for the risk of recurrence. This could be because seizure threshold decrease with decreasing age¹⁴.

Several literatures have mentioned that family

history of febrile seizure is a risk factor for recurrent febrile seizure^{10,11}. In contrast, in our study we found no significant association of febrile seizure recurrence with family history of febrile seizure. This result in our study might have been influenced by a small sample size. In our study we found that those children who had modest rise in temperature (fever <100° F) on presentation were more likely to have recurrent seizure ($p < 0.001$). There are several literatures to support this finding^{4,15,17}. The study by Tarkka R et.al. has shown no association of recurrent febrile seizure with low grade fever¹⁸. This finding might be because those children who had recurrent febrile seizure had had the onset of at modest temperatures because they had low threshold for seizure.

This study also has shown that children were more likely to have recurrence of febrile seizure if they had a shorter duration of fever before onset of seizure ($p = 0.026$). Other studies⁴ have also shown similar findings. In addition, this study has shown an increased risk of recurrence of febrile seizure among those who had an atypical presentation. Study by Al-Eissa YA¹⁶ also reported a similar finding.

This study does not show significant relationship between recurrent febrile seizure and family history of seizure disorder or epilepsy. However there are several studies which showed a direct correlation of recurrent febrile seizure with family history of seizure disorder^{18,19,20}. In this study there was only one case having had a history of birth asphyxia and two cases of psychomotor retardation. Knudsen²¹ also reported no increased risk of recurrent febrile seizure with slight psychomotor delay. Zhao F¹¹ et.al. also reported that birth asphyxia is not a risk factor for recurrent febrile seizure.

Conclusion

Febrile seizure is one of the common causes of paediatric hospital admissions. It is common among male children and simple febrile seizure accounts for the majority of the cases. Those children who only had a modest rise in body temperature at the onset of febrile seizure, those who had atypical FS and those children who had an onset of febrile seizure within 12 hours of fever are at high risk of recurrent FS on later date. These findings need further validation with further studies involving large sample size.

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