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Recurrence Risk of Febrile Seizures in Children

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ABSTRACT

Background: 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.

Methods: This prospective hospital based study was conducted from July 2013 to August 2014 'among children of 6 months to 6 years of age at Bishweshwar Prasad Koirala Institute of Health Sciences (BPKIHS), Nepal. Children meeting the selection criteria were enrolled in study. Clinical, investigation, treatment and outcome parameters were analyzed.

Results: A total of 92 children with febrile seizure were enrolled in study. Males accounted for 70% and females 30%. Simple febrile seizure was present in 48% and complex febrile seizures were seen in 52%. Recurrence of seizure was seen in one third of cases. Loss of consciousness was most common post-ictal phenomenon followed by confusion and lethargy. Upper respiratory infection was the most common precipitating factor. Generalized Tonic Clonic Seizure was the most common seizure type present in 79% of cases. Significant risk factors for recurrence occurred in males (p=0.088), age less than 1 year (p=0.003). Most of the recurrence occurred within one year of first seizure.

Conclusions: Febrile Seizure is common in males. Almost one third of children with febrile seizure are at risk for recurrence. The significant risk factors for recurrences are male gender and age <1year.

Keywords: Epilepsy; febrile seizure; recurrence

INTRODUCTION

Febrile seizure is a seizure which occurs in presence of a clinically recognizable infection with exclusion of central nervous system infection.[1] Febrile seizure (FS) is a common childhood problem.[2] It presents as simple and complex febrile seizure. Simple febrile seizures are generalized seizures, lasting less than 15 minutes, not recurring within 24 hours, and with no post-ictal neurological abnormalities. Complex febrile seizures are focal, prolonged or recurrent within 24 hours or associated with postictal neurological abnormalities including Todd paresis.[3] Febrile seizure can recur. Pavlidou et al in their study found 48% had recurrence of febrile seizure.[4] There are different observations in regard to recurrence. In the study done by Ojha AR et al showed 51% recurrence risk in children with febrile seizure without any relationship with age.[5]

Many researchers have showed that febrile seizure has significant family histories.[6] A positive family history of febrile seizures points to the importance of genetic factors and common environmental exposures.[7] According to Farrell et al, most recurrences occur within one year of the initial seizure.[8] There are variable observation 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

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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 in eastern part of Nepal.

METHODS

This was a descriptive prospective study conducted over a period of one year, from January 2014 to December 2014 at Department of Paediatrics and Adolescent medicine, BPKIHS. Children from the age of 6 months to 6 years were included and those who had afebrile seizures, on regular anticonvulsants treatment and who refused to give consent were excluded. All the children admitted with diagnosis of febrile seizure, who met the above inclusion and exclusion criteria were taken as the study cohort. The parents of children were interviewed during admission 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.

Simple febrile seizures was 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 was pre-defined as focal, prolonged or recurrent within 24 hours or associated with post-ictal neurological abnormalities including Todd paresis[3]. Those children who had had a past history of at least one febrile seizure and presently had come with another episode of febrile seizure were regarded as recurrent febrile seizure.

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 was recorded in a pre designed proforma. 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. All the investigation reports were recorded. The collected data was entered in excel and analyzed using SPSS 14. The results were analysed by descriptive statistics and Chi square test and Mann-Whitney U test.

RESULTS

During our study period a total of 92 children with febrile seizure who fulfilled the selection criteria were enrolled. Males accounted for 70% and females 30% of total population enrolled. Simple febrile seizure was present in 48% and complex febrile seizure was seen in 52%. In the study group, 9 (10%) had family history of febrile seizures. There were seven patients who had developmental delay. Most common precipitating factor for febrile seizure was upper respiratory infection followed by gastrointestinal infections.

As seen in table 1 and 2 recurrence of seizure was seen in 26% of cases contributing to one third of cases. Loss of consciousness was most common postictal phenomenon followed by confusion and lethargies. Generalized Tonic Clonic Seizure (GTCS) was the most common seizure present in 79% of cases. Mean duration of seizure was 6.9 minutes. Typical and atypical seizure was almost equally present among the children.

Table 1. Baseline characteristics of children with febrile seizure.

Characteristics	Number (n=92) (%)
Sex	
Male	64(69.57)
Female	28(30.43)
Seizure recurrence	
No	68(73.91)
Yes	24(26.09)
Developmental history	
Normal	85(92.39)
Abnormal	7(7.61)
Family history	
No	83(90.22)
Yes	9(9.78)
Treatment history	
No	85(92.39)
Yes	7(7.61)
Diagnosis	
Typical	44(47.83)
Atypical	48(52.17)

Table 2. Baseline characteristics of children with febrile seizure

Characteristics	Number (%)n=92

Postictal Phenomenon	
Lethargy	7(10.29)
Confusion	10(14.71)
Loss of consciousness	50(73.53)
Todd's palsy	1(1.47)
Precipitating factors	
URT infection	36(46.75)
LRT infection	11(14.29)
UTI	3(3.90)
GI infection	18(23.38)
Others	9(11.69)
Type of seizure	
GTCS	72(78.26)
Simple partial	10(10.87)
Complex partial	10(10.87)

In table 3 mean age of presentation of seizure was 19 months with seizure lasting for 6-7 min and with 1-2 seizures per episode of fever and seizure occurring on 2nd febrile day.

Table 3. Clinical parameters of the of children with febrile seizure

Characteristics	Mean±SD
Age at first seizure(months)	19.33 ± 15.15
Duration of seizure(min)	6.86 ± 5.20
Seizure after how many hours of fever	25.22 ± 33.21
No. of seizure during each episode	1.58 ± 0.92
GCS at admission	13.5 ± 1.82

As shown in table 4, significant risk factors for recurrence of febrile seizure was male sex (p=0.088) and age<1year (p=0.003). Most of the recurrence occurred within one year of first seizure. Duration of fever prior to onset of seizure, duration of seizure at the onset of first febrile seizure and family history of seizure were not found to be significantly associated risk factors for the recurrence of febrile seizure.

Table 4. Association of different factors with recurrence of febrile seizure.

Variables	Category	Recurrence	Non recurrence	P-value
Age at first seizure		16.6±15.4	20.3±15.0	0.04
Sex	Male	20	44	0.088
	Female	4	24	
Duration of seizure		6.9±6.4	6.8±4.7	0.8
Fever duration followed by seizure	25th percentile	5	6	0.30
	Median	11	12	
	75th percentile	30	36	
Type of seizure	GTCS	19	53	0.8
	Simple partial	3	7	
	Complex partial	2	8	
Family history	No	21	62	0.6
	Yes	3	6	
History of prophylaxis	No	18	67	0.001
	Yes	6	1	
Diagnosis	Typical	9	35	0.239
	Atypical	15	33	

DISCUSSION

In our study children admitted for febrile seizures had simple febrile seizure and complex febrile seizure in equal proportion. Two studies have found higher frequency of simple febrile seizure.[9,10] Male sex accounted for higher percentage (69%)among the study children. Another study had shown that 64% of study population were males which were comparable to our study.[11] There are other studies which had also shown that it is the male children who were predominantly affected.[12,13]

The most common cause of fever in the study population was URTI (46.7%) which most of the time is of viral origin which is followed by GI infection. Another study has shown that 35% of cases had fever of viral origin.[6] Similarly the overall viral identification rate in a study was 49%.[7] Likewise 53% of the children had upper respiratory tract infection in a study which is comparable to our study.[8] In our study we used clinical signs and symptoms to diagnose a child with viral fever.

In the present study 26% of children with febrile seizure had recurrence. A study had showed the recurrence rate of 48% in their study. This is probably because we have not followed up children with first episode of febrile seizure. In our study we found significant relation of febrile seizure recurrence with age that age <1 year are more prone to recurrence of febrile seizures. These children had significant risk of recurrence. This compares with other studies[4,6,14,15] done by different authors which have shown that younger age children are prone for the risk of recurrence. This could be because seizure threshold decrease with decreasing age.[14] Mean duration of seizure was 6.9 minutes which had no significant correlation with recurrence. In addition, this study has shown no relation with risk of recurrence of febrile seizure among those who had an atypical presentation. In contrast another study reported a significant risk of recurrence in atypical presentation.[15]

A study has mentioned that positive family history of febrile seizure is a risk factor for recurrent febrile seizure.[7,13] In contrast, in our study we found no significant association of febrile seizure recurrence with family history of febrile seizure which is consistent with the result of metaanalytical review.[6] This result might have been influenced by a small sample size. In this study there was seven cases having developmental abnormality but there was no significant correlation with febrile seizure recurrence. A study done to find out recurrence risk after first febrile seizure also reported no increased risk of recurrent febrile seizure with slight psychomotor delay.[16] A study done in China also reported that birth asphyxia is not a risk factor for recurrent febrile seizure.[13]

Two studies have shown that children were more likely to have recurrence of febrile seizure if they had a shorter duration of fever before onset of seizure which is not consistent to our study.[4,5]

In our study prophylaxis group had more recurrence of seizure compared to non prophylaxis group in contrast to the study done to find out indications for intermittent diazepam prophylaxis in febrile seizures which showed recurrence rates higher in the prophylaxis group.[17] It may be because our study prophylaxis group included more cases of developmental abnormalities.

CONCLUSION

Febrile seizure is one of the common causes of paediatric hospital admissions. Febrile Seizure is common in males and GTCS accounts for the majority of the cases. Almost one third of children with febrile seizure are at risk for recurrence. The significant risk factors for recurrences are male gender and age <1year. These findings need further validation with further studies involving large sample size with long term follow-up.

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REFERENCES

1. Hitrz DG, Nelson KB. The natural history of febrile seizures. Annu Rev Med. 1983;34(1):453-71.

2. Østergaard JR. Febrile seizures. Acta Paediatr. 2009;98(5):771-3.

3. Singhi PD, Srinivas M. Febrile seizures. Indian Paediatrics. 2001;38:733-40.

4. Pavlidou E, Tzitiridou M, Kontopoulos E, PanteliadisCP. Which factors determine febrile seizure recurrence? A prospective study. Brain and Development. 2008;30(1):7-

13.

5. Ojha AR, Shakya KN, Aryal UR. Recurrence Risk of Febrile Seizures in Children. Journal of Nepal Paediatric Society. 2012;32(1):33-6.

6. Berg AT, Shinnar S, Hauser WA, Leventhal JM. Predictors of recurrent febrile seizures: a metaanalytic review. J Pediater. 1990;116(3):329-37.

7. FukuyamaY, SekiT, Ohtsuka C, Miura H, Hara M. Practical guidelines for physicians in the management of febrile seizures. Brain Dev. 1996;18(6):479-84.

8. Farrell K, Goldman RD. The management of febrile seizures. BCMJ. 2011;53(6):268-73.

9. Millichap JJ, Millichap JG. Method of investigation and management of infections causing febrile seizures. Paediatr Neurol. 2008;39(6):381-6.

10. Mustafić N, Tahirovi ć H, Trnovcević J, Kapidzić A. Clinical characteristics at onset of first febrile convulsions. Acta Med Croatica. 2008;62(5):511-5.

11. Trainor JL, Hampers LC, Krug SE, Listernick R. Children with first time simple febrile seizures are at low risk of serious bacterial illness. Acad Emerg Med. 2001;8(8):781-7.

12. Bessisso MS, Elsaid MF, Almula NA, Kadomi NK, Zeidan SH, Azzam SB, et al. Recurrent risk after a first febrile convulsion. Saudi Med Journal. 2001;22(3):254-8.

13. Zhao F, Emoto SE, Lavine L, Nelson KB, Wang CC, Li SC, et al. Risk factors for febrile seizures in the People's Republic of China: a case control study. Epilepsia. 1991;32(4):510-4.

14. Van Stuijvenberg M, Steyerberg EW, Derksen-Lubsen G, Moll HA. Temperature, age and recurrence of febrile seizure. Arch Pediatr Adolesc Med. 1998;152(12):1170-5.

15. Al-Eissa YA. Febrile seizures: rate and risk factors for recurrence. J Child Neurol. 1995;10(4):315-9.

16. Knudsen FU. Recurrence risk after first febrile seizure and effect of short term diazepam prophylaxis. Arch Dis Child. 1985;60(11):1045-9.

17. Pavlidou E, Tzitiridou M, Ramantani G, Panteliadis C. Indications for intermittent diazepam prophylaxis in febrile seizures. Klin Padiatr. 2005;218(5):264-9.