



Original Research Article

Determinants for recurrence of febrile seizures in tertiary care hospital

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ARTICLE INFO

Article history:

Received 20-08-2021

Accepted 28-12-2021

Available online 07-04-2023

Keywords:

Febrile seizure

Recurrence

Fever duration

ABSTRACT

Aim: The present study has been carried out to determine the risk factors associated with recurrent febrile seizures.

Materials and Methods: The study was a hospital based prospective observational study. Risk of factors was evaluated on basis of cumulative analysis of clinical profile of all cases. Every child was followed up for one year.

Results: In our study recurrence was seen in 34 (55.7%) subjects. Factors like age less than 1 year at first episode of febrile seizure, fever duration <24 hours and the temperature at the time of seizure < 102.2^oF had higher association with recurrence while the factors like gender of child, type of febrile seizure, family history of febrile seizure family history of epilepsy, anemia, serum sodium level, duration of seizure and developmental delay were not associated with recurrence of febrile seizures.

Conclusion: The quality of family life can be adversely affected by recurrent febrile seizures and can result in exaggeration of fear and anxiety in parents which further needs to be handled with proper education and counseling regarding febrile seizures.

Clinical Significance: Identification of the risk factors for recurrence helps to counsel the parents and to address their anxiety during later possible episodes.

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1. Introduction

In childhood seizures, febrile seizure is the most common type. It is age specific, with a fever of 38^oC or more and no confirmed central nervous system infection or metabolic disorder is detected.^{1,2} The risk of recurrence of febrile seizure is higher in a younger age group, prolonged duration of seizure, range of fever, duration of fever, whether first episode was of complex febrile seizure and presence of febrile seizures in that individual or another family member. In fact up to 40% of patients report a positive family history of febrile seizures in first degree relatives.³ Recurrence of febrile seizures can be seen in 30-50% cases.⁴ Although recurrence of febrile seizures is not associated with poorer

long term outcome yet it causes increased anxiety in parents so information regarding the natural risk factors would help parents to cope. Not much literature is available from Western India. Therefore present study was undertaken to evaluate the risk factors of recurrent febrile seizures in a city in Western India in children aged 6 months to 5 years.

2. Aim

The present study has been carried out to determine the risk factors associated with recurrent febrile seizures.

3. Materials and Methods

The study was a hospital based prospective observational study and was carried out over a period of 18 months from January 2019 to June 2020.

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Children between 6 months to 60 months of age presenting with seizures accompanied by febrile illness diagnosed as febrile seizures as per American Academy of Pediatrics were included in the study.

3.1. Exclusion criteria

1. Children less than 6 months and more than 60 months of age
2. Suspected case of meningitis, epilepsy, metabolic and toxicological causes of convulsions.
3. Unstable patients who need ICU care.
4. Patients for who the parents/ guardians did not give informed consent.

The study was carried out in the department of Pediatrics of a tertiary care hospital. Based on history, clinical examination and investigations, clinical profile of cases was established. Sex, Domicile, socio-economic status, family history, duration of fever, type of seizure and other relevant details were filled in the Proforma. Risk factors were evaluated on basis of cumulative analysis of clinical profile of all cases. All children were on follow up for 12 months and the period was till June 2020.

3.2. Statistical analysis

Quantitative data was expressed in mean, standard deviation while qualitative data were expressed in percentage. Chi square test or Fisher's exact test was applied and P value less than 0.005 were considered statistically significant.

4. Results

Out of 61 children with febrile seizures 11 (18.0%) were below 1 year of age while rest 50(82%) were above 1 year of age. More than two thirds (n=42, 68.9%) were males while 19 (31.1%) were females.

Recurrent febrile seizures were seen in 34 (55.7%) of our subjects. In 29 children (47.5%) age at first episode of febrile seizure was less than 1 year while in rest 2 (52.5%) children first episode of febrile seizure occurred after the age of one year. Out of 34 subjects in whom seizures were repeated 23 (67.6%) children had more than 1 episode of febrile seizure. In children with age less than 1 year at first episode of febrile seizure, recurrence was seen in 72.4% of children while in children with more than 1 year at first episode, recurrence was seen in only 40.6%. The association was found to be statistically significant. Children with fever duration <24 hours had a significantly higher risk (64.6%) of recurrence in comparison to those with fever duration > 24 hours (35.3%) (p value <0.05). In our study recurrence of febrile seizure was more commonly seen if the temperature at the time of seizures was <102.2 °F (27.3%). Other factors like gender of child, febrile seizure type, family history of febrile seizure or epilepsy, anemia, serum sodium

level, duration of seizure and developmental delay did not have any significant association with recurrence of febrile seizures. [Table 1].

5. Discussion

A 15- 70% risk of recurrence in the first 2 years after an initial febrile seizure has been observed by many researchers.⁵ In our study, recurrence was seen in 34(55.7%) children. Agrawal J et al⁶ reported that 26% of children with febrile seizures had recurrence while Kumar N et al⁷ observed it in 32.9% children aged 6 months to 5 years. Recurrence rate in our study was comparatively higher than other studies and this can be due to selective referral of subjects at tertiary level centres so they might not be true representation of sample. In our study, age less than 1 year at first febrile seizure was found to be significantly (p=0.01) associated with seizure recurrence (72.4%) compared to age more than 1 year (40.6%). Finding of our study was in concordance with the study by Agrawal J et al⁶ in which also recurrence was more commonly seen with age of first febrile seizure at less than 1 year. The reason for this can be that threshold of seizure decreases with decreasing age.⁸ The individual temperature threshold is influenced by age especially as the child grows older the higher the threshold the lower the risk.⁹ This is significant because of the fact that children who have their seizure at an early age are more likely to have another seizure compared to children who have their seizures later because of longer susceptibility in the time period window. Few studies have mentioned that recurrence of febrile seizure was significantly more common with positive family history of febrile seizures.^{10,11} In contrast, in our study we did not find any significant (p value – 0.61) association of recurrence of febrile seizures with family history of febrile seizure. Finding of our study is correlated with the study by Agrawal J et al.⁶ Sample size might be a factor for the insignificant association. In the present study the type of seizures show no significant (p value=0.490) association with recurrence of febrile seizures. Similar results were reported by Kumar N et al.⁷ In our study developmental delay was seen in 5 cases but there was no significant (p value=0.99) association. Study by Agrawal J et al⁶ also did not report any significant association between developmental delay and febrile seizure recurrence. In our study, children with fever duration <24 hours had a significantly (p=0.004) higher risk (64.6%) of recurrence as compared to those children with fever duration > 24 hours (35.3%) so the shorter duration of fever was also found to be significantly associated with recurrence of febrile seizure. Two other studies similar to our study have shown that children were more likely to have recurrence of febrile seizure if children had a shorter duration of fever before onset of seizure.^{12,13} In our study duration of seizure was not found to be significantly (p=0.19) associated with recurrence. Similar to

Table 1: Association of different risk factors with recurrence of febrile seizure

	Recurrence of febrile seizure				p value
	Absent (n=27)		Present (n=34)		
	No.	%	No.	%	
Gender					
Male	18	42.9	24	57.1	0.74
Female	9	47.4	10	52.6	
Age at first episode of febrile seizure					
<1 year	8	27.6	21	72.4	0.01*
>1 years	19	59.4	13	40.6	
Type of febrile seizure					
Simple febrile seizure	22	42.3	30	57.7	0.49
Complex febrile seizure	5	55.6	4	44.4	
Family history of febrile seizure					
Present	11	39.3	17	60.7	0.61
Absent	16	48.5	17	51.5	
Temperature at the time of seizure					
<102.2°F	19	38.0	31	62.0	0.04*
>102.2°F	8	72.7	3	27.3	
Developmental delay					
Present	2	40.0	3	60.0	0.99
Absent	25	44.6	31	55.4	
Duration of fever					
<24 hrs	16	36.4	28	63.6	0.04*
>24 hrs	11	64.7	6	35.3	
Duration of seizure					
<5 minutes	18	52.9	16	47.1	0.19
>5 minutes	9	33.3	18	66.7	
Family history of epilepsy					
Present	2	25.0	6	75.0	0.28
Absent	25	47.2	28	52.8	
Sodium level					
<135 meq/L	3	27.3	8	72.7	0.51
135-145 meq/L	24	48.0	26	52.0	
Hb level					
<11 g/dl	12	40.0	18	60.0	0.51
≥11 g/dl	15	48.4	16	51.6	

our study, in the study by Agrawal J et al⁶ mean duration of seizure was 6.9 minutes which had no significant correlation with recurrence. Recurrence was more commonly seen if the temperature during seizure was 102.2°F (62%) compared to those patients in which temperature during seizure >102.2°F (27%). This association was found statistically significant (p=0.04). Our finding was in agreement with Kumar N et al⁷ in which children with a temperature of 101°F during the seizure had a recurrence of 52.5 % where as recurrence observed in children with temperature greater than or equal to was 17.2%. We could not find any significant (p=0.28) association of family history of epilepsy and recurrence of febrile seizure. Findings were corroborated by Kumar N et al⁷ who also did not find any significant association.

6. Conclusion

The quality of family life can be adversely affected by recurrent febrile seizures and can result in exaggeration of fear and anxiety in parents which further needs to be handled with proper education and counseling regarding febrile seizures. The ‘vulnerable child syndrome’ is a direct result of exaggerated parental anxiety.⁹

7. Clinical Significance

Identification of the risk factors for recurrence helps to counsel the parents and to address their anxiety during later possible episodes. It also helps to consider intermittent oral diazepam at the onset of febrile illness or long term prophylaxis

8. Conflict of Interest

None.

9. Source of Funding

None.

Acknowledgements

None

References

- Steering Committee on Quality Improvement and Management, Subcommittee on Febrile Seizures American Academy of Pediatrics. Febrile seizures: clinical practice guideline for the long-term management of the child with simple febrile seizures. *Pediatrics*. 2008;121(6):1281–6. doi:10.1542/peds.2008-0939.
- Sugai K. Current management of febrile seizures in Japan: an overview. *Brain Dev*. 2010;32(1):64–70. doi:10.1016/j.braindev.2009.09.019.
- Doose H, Maurer A. Seizure risk in offspring of individuals with a history of febrile convulsions. *Eur J Pediatr*. 1997;156(6):476–81. doi:10.1007/s004310050643.
- Chacko N, Kumar AS, Raj S. Prospective Study on Assessment of Risk Factors and effect of counseling in Parents of Children with Febrile Seizure. *IOSR J Pharmacy (IOSRPHR)*. 2019;9(9):1–9.
- Graves RC, Oehler K, Tingle LE. Febrile seizures: risks, evaluation, and prognosis. *Am Fam Physician*. 2012;85(2):149–53.
- Agrawal J, Poudel P, Shah GS. Recurrence risk of febrile seizures in children. *J Nepal Health Res Counc*. 2016;14(34):192–6.
- Kumar N, Midha T, Rao YK. Risk Factors of Recurrence of Febrile Seizures in Children in a Tertiary Care Hospital in Kanpur: A One Year Follow Up Study. *Ann Indian Acad Neurol*. 2019;22(1):31–6.
- Van Stuijvenberg M, Steyerberg EW, Derksen-Lubsen G. Temperature, age and recurrence of febrile seizure. *Arch Pediatr Adolesc Med*. 1998;152(12):1170–5.
- Perrin EC, West PD, Culley BS. Is my child normal yet? Correlates of vulnerability. *Pediatrics*. 1989;83(3):355–63.
- 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. doi:10.1111/j.1528-1157.1991.tb04685.x.
- Fukuyama Y, Seki T, Ohtsuka C. Practical guidelines for physicians in the management of febrile seizures. *Brain Dev*. 1996;18(6):479–84.
- Pavlidou E, Tzitridou M, Kontopoulos E. Which factors determine febrile seizure recurrence? A prospective study. *Brain and Dev*. 2008;30(1):7–13.
- Ojha AR, Shakya KN, Aryal UR. Recurrence Risk of Febrile Seizures in Children. *J Nepal Paediatr Soc*. 2012;32(1):33–6.

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Cite this article: Choudhary K, Mathur M, Marwah P. Determinants for recurrence of febrile seizures in tertiary care hospital. *Panacea J Med Sci* 2023;13(1):56-59.