P-ISSN: 2664-3685
E-ISSN: 2664-3693
www.paediatricjournal.com
IJPG 2020; 3(1): 176-179
Received: 26-11-2019
Accepted: 29-12-2019

Dr. Poornima Shankar
Professor, Department of Pediatrics, Kempegowda institute of Medical Sciences, Karnataka, India.

Dr. Meghana Nannapaneni
Post graduate, Department of Pediatrics, Kempegowda institute of Medical Sciences, Karnataka, India

Corresponding Author:
Dr. Poornima Shankar
Professor, Department of Pediatrics, Kempegowda institute of Medical Sciences, Karnataka, India.

A study to assess the risk factors for febrile seizures in a tertiary hospital

Dr. Poornima Shankar and Dr. Meghana Nannapaneni

DOI: https://doi.org/10.33545/26643685.2020.v3.i1c.79

Abstract
Background: Febrile seizures are one of the most common and benign convulsive disorder in childhood and a frequent cause of hospital admission Febrile Seizures (FS) are age-dependent and are rare before the age of 6 months and after 5 years of age, the peak age of onset is 16-18months. To assess the clinical profile in children with febrile seizures and compare these values with febrile children without seizures.
Methods: The study included children admitted with bronchiolitis in between during the period of August 2018 to March 2019 at Department of Pediatrics, kempegowda institute of medical sciences. It is a case-control study. The study group includes 50 cases (febrile seizures) and 50 controls (fever without seizures) aged 6months to 5 years (6 - 60 months) attending the pediatric out-patient department.
Results: 56% of the cases were male (28) and 44% of the cases were female (22). Male: female ratio was 1.27:1. Mean temperature in cases and controls were 102.61±1.31 °F and 101.17±0.86 °F respectively. The difference between the two groups was not statistically significant (p-value >0.05). duration of seizure was <5 minutes in 84% of cases and >5mins in 14% of the cases.
Conclusions: Simple febrile seizure increase the risk of developing epilepsy, but have no adverse effects on behaviour, school performane, or neurocognition. The risk of developing epilepsy is increased further in children with a history of complex febrile seizures. A strong association exists between febrile status epilepticus or febrile seizures characterized by focal symptoms and later development of temporal lobe epilepsy with hippocampal sclerosis.

Keywords: Malnutrition, Simple febrile seizures, Temporal lobe

Introduction
Febrile seizures are classified into three types: simple febrile seizures, complex febrile seizures, and febrile status epilepticus. The National Institutes of Health (NIH) definition of a febrile seizure is "an event in infancy or childhood usually occurring between 3 months and 5 years of age associated with a fever, but without evidence of intracranial infection or defined cause for their seizure", after having excluded children with previous afebrile seizures [1]. While the exact cause of simple febrile seizures is unknown, it is thought to be multifactorial, with both genetic and environmental factors having been shown to contribute to its pathogenesis [2]. Increasingly, a genetic predisposition is found, with febrile seizures occurring in families. In addition, mutations in genetic mutation have been found that account for enhanced susceptibility to febrile seizures [3]. A familial epilepsy syndrome exists (Generalised Epilepsy with Febrile Seizures Plus, in which patients can have classical febrile seizures, febrile seizures that persist beyond 5 years (hence FS+), and/or epilepsy. Similar genetic factors have been identified that are involved in both febrile seizures and GEFS+ [4]. With regards to risk factors, febrile seizures are more frequent in children attending day-care centers, and in those with a first- or second-degree relative with a history of febrile seizures. The risk of another child having febrile seizures is one in five if one sibling is affected, and one in three if both parents and a previous child have had febrile seizures. A positive family history of epilepsy is not consistently associated with increased simple febrile seizure recurrence [5].

Methods
The study included children admitted with fever in between during the period of August 2018 to March 2019 at the Department of Pediatrics. It is a case-control study. A febrile

seizure child was defined as a previously normal child, aging between 6 months and 6 years presenting with a fever associated seizure with the exclusion of any acute neurological illnesses or metabolic abnormalities. Any child presenting with a fever- associated seizure below the age of 18 months has undergone a lumbar puncture to exclude meningitis. If the seizure was a recurrent, a complete physical examination was done to exclude any abnormal neurological signs and identify the underlying cause of fever then appropriate laboratory investigations were done. Children with ages above 18 months were examined for abnormal neurological signs (including signs of meningeal irritation) and for an underlying cause of fever then investigated. Children were observed for a minimum of 24 hours in the hospital with the treatment of the possible underlying cause of fever. Controls: Each case was age-matched to within 6 months to two febrile and two afebrile controls who had never had a seizure. Controls presented to the emergency department within 10 days of the presentation of the febrile seizure child.

Exclusion criteria

- Children with fever associated seizures age less than 6 months or more than 6 years (72month).
- Previous afebrile seizure.
- Known neurologic abnormality (e.g. cerebral palsy).
- Meningitis or encephalitis.
- Suspicious neurological findings after the seizure: loss of consciousness, weakness, and others.
- Refusal of parents or guardians to participate in the study.
- Controls were not included if they had a past history of afebrile or febrile seizures, were neurologically abnormal or parents refuse to participate in the study.

Statistical analysis

The package EPI-INFO version 3.5.3 was used for the analysis of the data and Microsoft Excel was used for data entry as well as to generate graphs, tables, etc. Results were expressed as the mean±standard deviation for continuous variables and as number and proportion (%) for categorical data. Since all data are known to be normally distributed, the parametric tests were used for statistical analyses.

Results

The Study population included 100 patients divided into two groups. Two groups included 50 cases (febrile seizures) and 50 controls (febrile children without seizures) that came to the out-patient department or in-patient. Age and sex do not show statistically significant values >0.005. Family history of seizures shows statistically significant of p-value 0.002 (Table 1).

Table 1: Age and sex distribution.

		Febrile seizur (n=50)	es	Fever without seizures (n=50)	p-value
Sex	Male	28		31	>0.05
	Female	22		19	
Mean age (in months)		22.52±12.40		23.24±15.26	>0.05
Family history					
of febrile seizures		14		0	0.002

In the study population, 60% of the cases (30/50) had an acute respiratory infection, 18% of the cases (9/50) each had AGE and (10/50) Viral fever. 2% of the cases had UTI (1/50). 54% of the controls (27/50) had ARI. 24% of the controls (12/50) had viral fever. 20% of the controls (10/50) had aged. 2% of the controls had UTI (1/50) (Table 2).

Table 2: Diagnosis in cases and controls

Diagnosis	Number of patients	%	Number of patients	%
ARI	30	60%	28	56%
AGE	09	18%	10	20%
Viral fever	10	20%	11	22%
UTI	01	2%	1	2%
Total	50	100%	50	100%

Mean temperature in cases and controls were 102.61±1.31°F and 101.17±0.86°F respectively. The difference between the two groups was not statistically significant (p-value >0.05) (Table 3).

Table 3: Temperature in cases and controls.

	Cases (n=50)	Controls (n=50)
Mean	102.61	101.17
Standard deviation	1.31	0.86

Here, 28% of cases (14/50) had a family history of febrile seizures. In controls, there was no family history of febrile seizures. The difference between the two groups was statistically significant (p-value 0.002) (Table 4).

Table 4: Family history of febrile seizure.

Family H/O febrile seizure	No. of patients	%	No. of patients	%
Present	14	28%	0	0%
Absent	36	72%	50	100%
Total	50	100%	50	100%

Table 5: Duration of seizure

Duration of seizure	No of patients	Percentage
<5 mins	42	84%
5-10mins	07	14%
>10mins	01	01%

Discussion

Childhood seizures occur most commonly in infancy (1- 24 months) with a decreasing incidence throughout the rest of childhood. The American Academy of Neurology guidelines for the evaluation of the first nonfebrile seizure in a child recommends a routine EEG for all children and urgent neuroimaging for children with postictal focal neurologic deficits [6]. However, as much as 30 to 40 percent of people with epilepsy continue to have seizures because available treatments do not completely control their seizures (called intractable or medication- resistant epilepsy). While many forms of epilepsy require lifelong treatment to control the seizures, for some people the seizures eventually go away [7]. The odds of becoming seizure-free are not as good for adults or for children with severe epilepsy syndromes, but it is possible that seizures may decrease or even stop over time. This is more likely if the epilepsy starts in childhood, has been well- controlled by medication, or if the person has had surgery to remove the brain focus of the abnormal cell

firing. Of interest was the high rate of undocumented meningeal irritation signs, particularly in infants (64%) [8]. These infants were more likely to have LP, reflecting that these signs were not considered in that decision. However, young infants and those who presented with a first seizure were more likely to be subjected to an LP [9]. Overall, 75% had LP in contrast to an earlier study in 1977 documenting that 96% of admitted children with febrile seizure had LP.14 Again this reflects the trend of being more selective. The yield of LP remains low as authors had only one child with a positive CSF culture confirming meningitis and 2 with suspected partially treated meningitis. All 3 cases had atypical febrile seizures and other clinical features suggestive of meningitis instead of a simple febrile seizure [10]. Other investigators also concluded that excluding meningitis and encephalitis through careful history, examination, observation, and occasionally LP in children less than 2 years of age is all that is needed. In the present study, the mean age was 22.62±12.45 months. There was no statistical difference between the two groups (p-value >0.05) [11]. A study conducted at Gerard F, *et al*., showed a mean age of 23.8 months [12]. Hirose S *et al*., conducted a case-control study in 2006 involving 52 febrile convulsion children and 52 normal healthy controls. This study showed a mean age of 27.13±15.72 months. In the study population, 54% (27/50) of the cases were male and 46% (23/50) were female. Male: female ratio was 1.17:1. Males are predominantly had febrile seizures when compared with females [13]. A study done by Iwasaki N *et al*., showed that 40% of the cases were female and 60% of the cases were male. In the study population, 70% (28/50 cases) had acute respiratory infection followed by Acute Gastroenteritis (14%) and viral fever (14%) respectively. According to a study conducted by Margareta *et al*., in 2010, acute respiratory infection is the predominant diagnosis [14]. Johnson EW *et al*., found that upper respiratory tract infection is the predominant etiology (24%) followed by pneumonia (16%), urinary tract infection (16%) respectively. It is clear that the degree of rising temperature may be a predisposing factor for the development of seizures. Mean temperature in cases and controls were 101.61±1.31 °F and 101.17±0.86 °F in the present study. The difference between the two groups was not statistically significant (p-value >0.05) [15]. According to the study conducted by Kananura C *et al*., mean temperature in cases and controls were 102°F and 101.4°F respectively [16]. Kugler SL *et al*., in 2009 found that mean temperature in cases and controls were 39.01± 0.56° C and 38.64±0.45° C [17]. Lopes- Cendes *et al*., studied 40 cases of febrile seizures and 40 cases of febrile children in Egypt. They found that 87.5% (35/40 cases) had a family history of febrile convulsion [18-20].

Conclusion

A strong association exists between febrile status epilepticus or febrile seizures characterized by focal symptoms and later development of temporal lobe epilepsy. Clobazam given during a febrile episode may be more effective at reducing the risk of recurrence of febrile seizures (very low-quality evidence). NOTE Diazepam has been associated with increased hyperactivity, lethargy, irritability, and difficulties with speech, activity level, or sleep. We found no clinically important results about intermittent compared with continuous anticonvulsants for treating children with febrile seizures.

References

1. Anonymous. Consensus statement febrile seizures: long-term management of children with fever-associated seizures. Pediatrics. 1980; 66:1009-12.
2. Audenaert D, Van Broeckhoven C, De Jonghe P. Genes and loci involved in febrile seizures and related epilepsy syndromes. Human Mutat. 2006; 27(5):391-401.
3. Baulac S, Gourfinkel-An I, Nabbout R, Huberfeld G, Serratosa J, Leguern E *et al*. Fever, genes, and epilepsy. Lancet Neurol. 2004; 3(7):421-30.
4. Baulac S, Gourfinkel-An I, Picard F, Rosenberg-Bourgin M, Prud'homme JF, Baulac M, *et al*. A second locus for familial generalized epilepsy with febrile seizures plus maps to chromosome 2q21-q33. Am J Human Gene. 1999; 65(4):1078-85.
5. Berg AT, Shinnar S. Unprovoked seizures in children with febrile seizures: short-term outcome. Neurology. 1996; 47(2):562-8.
6. Berg AT, Shinnar S, Shapiro ED, Salomon ME, Crain EF, Hauser WA. Risk factors for a first febrile seizure: a matched case-control study. Epilepsia. 1995; 36(4):334-41.
7. Berkovic SF, Scheffer IE. Febrile seizures: genetics and relationship to other epilepsy syndromes. Curr Opin Neurol. 1998; 11(2):129-34.
8. Bethune P, Gordon K, Dooley J, Camfield C, Camfield P. Which child will have a febrile seizure?. Am J Dis Child. 1993; 147(1):35-9.
9. Arzimanoglou A, Aicardi J, Laplane D. Commission on epidemiology and prognosis, International league against epilepsy. Guideline for epidemiologic studies on epilepsy. Epilepsia. 1993; 34:592-5.
10. Doose H, Maurer A. Seizure risk in offspring of individuals with a history of febrile convulsions. Eur J Pediatr. 1997; 156(6):476-81.
11. Escayg A, MacDonald BT, Meisler MH, Baulac S, Huberfeld G, An-Gourfinkel I, *et al*. Mutations of SCN1A, encoding a neuronal sodium channel, in two families with GEFS+ 2. Nature Gene. 2000; 24(4):343-5.
12. Gérard F, Pereira S, Robaglia-Schlupp A, Genton P, Szepetowski P. Clinical and genetic analysis of a new multigenerational pedigree with GEFS+ (generalized epilepsy with febrile seizures plus). Epilepsia. 2002; 43(6):581-6.
13. Hirose S, Mohney RP, Okada M, Kaneko S, Mitsudome A. The genetics of febrile seizures and related epilepsy syndromes. Brain Devel. 2003; 25(5):304-12.
14. Nakayama J, Arinami T. Molecular genetics of febrile seizures. Epil Res. 2006; 70:190-8.
15. Johnson EW, Dubovsky J, Rich SS, O'Donovan CA, Orr HT, Anderson VE *et al*. Evidence for a novel gene for familial febrile convulsions, FEB2, linked to chromosome 19p in an extended family from the Midwest. Human Mol Gen. 1998; 7(1):63-7.
16. Kananura C, Haug K, Sander T, Runge U, Gu W, Hallmann K, Rebstock J *et al*. A splice-site mutation in GABRG2 associated with childhood absence epilepsy and febrile convulsions. Archiv Neurol. 2002; 59(7):1137-41.

17. Kugler SL, Johnson WG. Genetics of the febrile seizure susceptibility trait. Brain Devel. 1998; 20(5):265-74.
18. Lopes-Cendes I, Scheffer IE, Berkovic SF, Rousseau M, Andermann E, Rouleau GA. A new locus for generalized epilepsy with febrile seizures plus maps to chromosome 2. Am J Human Gene. 2000; 66(2):698-701.
19. Moulard B, Chaigne D, Mouthon D, Buresi C, Guipponi M, Malafosse A. Identification of a new locus for generalized epilepsy with febrile seizures plus (GEFS+) on chromosome 2q24-q33. The Am J Human Gene. 1999; 65(5):1396-400.
20. Nabbout R, Prud'homme JF, Herman A, Feingold J, Brice A, Dulac O, *et al*. A locus for simple pure febrile seizures maps to chromosome 6q22–q24. Brain. 2002; 125(12):2668-80.