Original Research Article

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Clinical profile of children with febrile seizure in a peripheral teaching hospital

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ABSTRACT

Background: Febrile seizure is a common problem in children below 5 years of age. This study was conducted to evaluate the clinical profile of children presenting with febrile seizures and to identify the risk factors for recurrence of febrile seizures in these children in a teaching hospital.

Methods: A matched case-control study was conducted over a year period from November 2017 to November 2018 in the Department of Pediatrics. One hundred patients with febrile seizures admitted, aged 6-60 months were matched with another one hundred children having fever but without seizure with the same age range, attending the same hospital during the same period. Patients with prior episodes of afebrile seizures, abnormal neurodevelopment, on anticonvulsants and not meeting the age criteria were excluded.

Results: The mean age and standard deviation for cases were 25.8±15.19 months and for control was 29.9±18.5 months. Out of which 64% had a febrile seizure for the first time and 36% had recurrent febrile seizures and 64% were males. Simple febrile seizure and complex febrile seizure were observed in 76.7% and 23.3% of patients respectively. The majority of children (71.8%) had a generalized tonic-clonic seizure followed by tonic seizures. Upper respiratory tract infections were the commonest cause of fever in these children. Low temperature at the onset of Febrile Seizure (p=0.001), short duration of fever before the onset of Febrile Seizure (0.026) and atypical Febrile Seizure (p=0.022) were the risk factors for a recurrent febrile seizure.

Conclusions: Febrile Seizure is a common pediatric problem seen in males, observed predominantly in children below the age of two years and simple febrile seizure was the commonest variety. Almost one-third of children with Febrile Seizure are at risk for recurrence at a later date. The risk factors for these recurrences are modest rise in body temperature at the onset of febrile seizure, the onset of seizure within 12 hours of fever and atypical presentation.

Keywords: Complex febrile seizure, Febrile seizure, Recurrence, Simple febrile seizure

INTRODUCTION

A febrile seizure is the most common type of seizures seen in 2-5% of children aged below five years, in which seizure is accompanied by fever, but without evidence of intracranial infection and acute electrolyte imbalance.1 Recurrence of seizure episodes and concern about epilepsy are major parental concerns regarding long term effects of febrile seizure. Attempts to identify factors associated with recurrence have been made. The first episode of febrile seizure below 12 months, complex febrile seizure, family history and temperature below 400C were found associated with the recurrence.² Simple FS have an age range classically described as 6 to 60 months. The peak incidence is usually in the second year of life. FS are prevalent in up to 5% of children, with the overall incidence estimated to be 460/100,000 in the age group of 0-4 years.3 Most FS are simple; however, up to

30% might have some complex features. The risk of recurrence of FS is related to various factors, including a younger age group, prolonged seizure duration, degree of fever, and positive personal and family history of FS. In fact, a positive family history of FS in first-degree relatives is observed in up to 40% of patients.⁴ Gender distribution has been studied in the literature. One previous study found a mild male predominance but this has not been supported by other literature reviews.⁵ Seasonal variation with regard to seizure incidence has not yet been fully understood. Studies have shown that FS tends to occur more in the winter months and is more evening. The the pathophysiological explanations for these observations remain obscure.^{6,7}

METHODS

A matched case-control study was conducted from November 2017 to 30th Nov 2018. All children admitted in the pediatric ward, with a diagnosis of febrile seizures were enrolled as cases. For the purpose of this study, the case definition of a febrile seizure was a convulsive seizure in infants and children, aged between 6 months and 6 years, in association with fever 38°C or higher but without evidence of any definitive causative disease, such as CNS infections and metabolic disorders. They were matched with controls by the same age range, which was having fever but without seizure or past history of any type of seizure, during the same period. Patients with neurological disorders and those with CNS infection were excluded from both cases and control. Data were collected regarding socio-demographic characteristics, child's illness, neonatal history, developmental milestone and family history of FSs or epilepsy. Weight and height were recorded and full neurological examination was done and the axillary temperature was taken for all patients at the time of admission. CBC was done for all patients and PCV values below 33% were considered anemic according to WHO definition.⁸

Statistical analysis

Data were presented in frequency, percentage, mean, standard deviation and odd ratio. The odd ratio is a measurement of risk of certain factors with its 95% confidence interval for the accurate range of risk. The student test (t-test) and chi-square test were used for the significant testing with a p value <0.05 as the level of significance.

RESULTS

During the study period, a total of 100 patients with FSs were identified and were matched to 100 control febrile patients without seizure with the same age range, who admitted the same hospital during the same period of time.

Table 1 shows the characteristics of the study groups. The mean age and standard deviation for cases were 25.8 ± 15.19 months and for control was 29.9 ± 18.5 months. This was statistically not significant (p-value >0.05). Sixty-four percent of cases had FSs for the first time and 36% had recurrent FSs. The mean age and standard deviation for the first FSs were 23.54±12.8 months and recurrent FSs were 29.83±12.5 months. This was statistically not significant (p value >0.05). The majority of the cases were between 12 -24 months with a peak at the age of 18-19 months. Of the characteristics studied, only the mean of temperature found to have a highly statistically significant difference between cases and control (p-value = 0.0001). Furthermore, cases with recurrent FSs have statistically significant lower temperature than those with first febrile seizure (p-value = 0.0001)

Table 1: Characteristic of study group. Case No.=100 Control No.=100 Variable SD Mean SD Mean T test p value Age (months) 25.80 15.95 29.99 18.50 1.715 0.088 Age of first FS (No=64) 23.54 12.8 >0.05 Age of recurrent FS (No=36) 29.83 12.5 >0.05 Height (cm) 82.04 14.09 84.93 14.44 1.407 0.161 4.663 13.45 5.174 Weight (kg) 12.35 1.524 0.129 Temp on admission 39.2 0.7 38.90 0.49 0.0001 Temp of first FS (No=64) 39.75 0.1 0.0001 Temperature of recurrent FS (No=36) 38.24 0.45 0.0001

Table 2 gives risk factors for FSs. In cases, males account for 64%, and female for 36% (male to female ratio 1.7: 1) while in control, there were 56% males and 44% females

(male to female ratio 1.2: 1). Male found to be at risk for developing FSs (OR=1.4, 95% CI: 0.8-2.5, p-value = 0.05). Regarding the cause of fever, respiratory infections were found to be a risk factor for FSs when compared

with control which was similar to other studies 3-7. Thirty-three percent of cases had a positive family history of FSs compared to 13% of control and this found to be a strong risk factor for febrile seizure (OR = 3.3, 95% CI: 1.54 - 7.34, p-value 0.0008). In addition, 17% of cases compared to 7% of control had a positive family history

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Normal

of epilepsy, this also found to be a risk factor for FSs (OR = 2.72, 95% CI: 1.9 - 8.12, p-value = 0.029). Forty-seven cases were anemic compared to 25% of control and this found to be a risk factor for FSs (OR = 2.66, 95% CI: 1.4 - 5.08, p-value = 0.001).

Case Control 95% Confidence Risk factor Odd ratio p value No=100 % No=100 % interval Male 64 64 56 56 Sex 1.4 0.8-2.5 0.05 Female 36 36 44 44 1.54-7.34 Family history of FS 33 33 13 13 3.3 0.0008 Development delay 21 8 8 0.009 21 3.06 1.21-8.4 47 47 25 25 Anaemia **PCV** 2.66 1.4-5.08 0.001

Table 2: Risk factors for febrile seizure.

Table 3: Perinatal risk factors.

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Variable		Case No=100		Control No=100		Odd ratio	95% Confidence interval	p value
		no	%	no	%	Tauo	Confidence interval	
Gestational	Preterm	13	13	9	9	1.51	0.56-4.22	0.366
age	Term	87	87	91	91			
Neonatal	Immediately cried	82	82	89	89	1 70	0.74-4.42	0.160
condition	Delayed cried	18	18	11	11	1.78		
Admission to NICU		26	26	13	13	2.35	1.45-7.85	< 0.05

Table 3 presents the perinatal risk factors for the development of FSs. only the neonatal admission to neonatal care unit had statistical significance (OR = 2.35, 95% CI: 1.45-7.85, p-value <0.05) while Gestational age and neonatal condition after delivery were not found to be of statistical significance (p-value >0.05).

DISCUSSION

In the present study, the majority of cases of FSs occur in the second year of life, peaking at 18-19 months. This is in agreement with the results of other studies. 9-11 FSs are age-dependent and this age should be regarded as critical for developing FSs. The mean age for those with first febrile seizure was 23.5 months; this figure is similar to that found by Ploch of 22.5 months. 12 Males account for 64% of cases with a male to female ratio of 1.7:1. The male sex predominant is well documented in almost all series. 13-17 There was no satisfactory explanation for this sex predominant. 18

Study reveals that children with recurrent febrile seizures have a lower temperature at presentation than those with first febrile seizures (Table 1). 33% of our cases were found to have a family history of FSs and when compared with controls were found to be of statistical significance (p value=0.0008). This finding is in agreement with those

studies that showed strong evidence of positive family history as a risk factor for febrile seizure.^{4,5,13,14} Furthermore, a family history of epilepsy was also found to be a risk factor for FSs (p value 0.029).

This is similar to the result of Fernandez et al, who revealed that the existence of a family history of FSs or epilepsy increases the risk of recurrent FSs.¹⁹ Developmental delay is one of the potential markers for suboptimal brain function, but there is conflicting evidence definitively linking this factor to FSs.13 Respiratory infections as a cause of fever were found to be a risk factor for FSs.). A considerable number of children in our study were anemic, and when compared with control, anemia was found to be a significant risk factor (p-value 0.001). The association between iron deficiency anemia and FSs was studied by many authors; some of them confirm this association, and the others conclude that the risk of FSs occurrence in anemic children seems to be less common than in children who do not suffer from anemia.²⁰⁻²²

CONCLUSION

The simple febrile seizure was the most common type of febrile seizure and febrile seizure predominantly affected children below three years of age. The first episode of febrile seizure occurred in the majority in the age group of 13 to 24 months age group. Recurrence of febrile seizure was common and was significantly associated with the age of the first episode at one year or below. Hence it is recommended that parents of patients with the first episode of a febrile seizure occurring at an age of one year or below should be appropriately counselled regarding seizure recurrence and measures during seizure activity as well as benign nature of the illness; which might reduce parental anxiety during further episodes of febrile seizure.

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Institutional Ethics Committee

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