Common Criteria Associated with First Episode of Complex Febrile Seizure in Neurologically Normal Children

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Background: Febrile seizures are classified into either simple febrile seizure or complex febrile seizure. Complex febrile seizures are typically associated with certain clinical features.

Objective: To evaluate the criteria associated with complex febrile seizure in neurologically normal children.

Setting: Pediatrics Ward and Clinic, Bahrain Defence Force Hospital, Bahrain.

Design: A Retrospective Study.

Method: One–hundred and five patients had a febrile seizure from 1 March 2017 to 31 March 2018. Ninety-six patients had complex febrile seizures and were included in the study and nine patients were excluded. Criteria for complex febrile seizures and EEG results were obtained using computerized database.

Result: Fifty-six (58%) patients were found to have more than one seizure attack in the first 24 hours of the febrile illness. The seizures lasted for more than fifteen minutes in 22 (23%) patients and 18 (19%) patients had focal seizure. Abnormal EEG was found in 18 (19%) patients.

Conclusion: The most common criterion associated with complex febrile seizure in normal developmental milestone children was the occurrence of more than one seizure attack in the first 24 hours during the period of febrile illness.

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Febrile seizure is the most common type of seizure among the pediatric population. It accounts for 2%-5% of children between the ages of 6 months and 5 years, with an average of 24 months[1,2]. Febrile seizure is one of the benign convulsive conditions in children[3]. Febrile seizures are classified as either simple or complex[4].

Complex febrile seizures are associated with more than one seizure attack within the first 24-hours of febrile illness, duration of more than 15 minutes and focal seizure[4,5]. The majority of patients who presented with first episode of complex febrile seizure were found to have normal EEG[6].

The aim of this study is to evaluate the most common criteria associated with complex febrile seizure in neurologically normal children.

METHOD

One–hundred five patients had febrile seizure from 1 March 2017 to 31 March 2018. Ninety-six patients with complex febrile seizure were included in the study and nine patients were excluded. Seven of the excluded patients were developmentally delayed and two were proven to have central nervous system (CNS) infection by cerebrospinal fluid (CSF) analysis. Criteria for complex febrile seizure and EEG results were obtained using computerized database. The data was compiled on Microsoft Excel and analyzed using the SPSS version 6. The data was obtained from a computerized database. All relevant data was analyzed.

The inclusion criteria were as follows: age between 6 months and 5 years, seizure duration of more than 15 minutes, focal seizure, more than one seizure attack in 24 hours, neurologically normal children and absence of CNS infection. The exclusion criteria were as follows: developmentally delayed child and documented CNS infection.

RESULT

Ninety-six patients with first episode of complex febrile seizure with normal developmental milestone were reviewed from 1 March 2017 to 31 March 2018.

The median age was 2 years. Fifty-one (53%) patients were males and forty-five (47%) patients were females. Fifty-six (58%) patients had more than one seizure attack in the first 24 hours during their febrile illness. The duration of seizure was more than fifteen minutes in 22 (23%) patients. Eighteen

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(19%) patients had a focal seizure, see figure 1. Abnormal EEG was found in 18 (19%) patients. Out of the eighteen abnormal EEG, 10 (10.4%) patients had focal abnormalities. Five (5.2%) patients had generalized epileptiform discharges and three (3.1%) patients had EEG slowing, see figure 2.

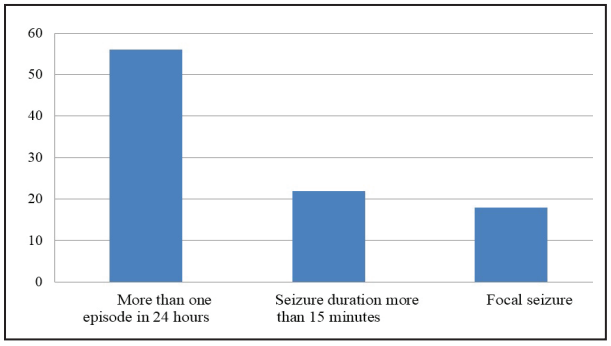

Figure 1: The Most Common Criteria Associated with Complex Febrile Seizure was Having More Than One Episode of Seizure in 24 Hours

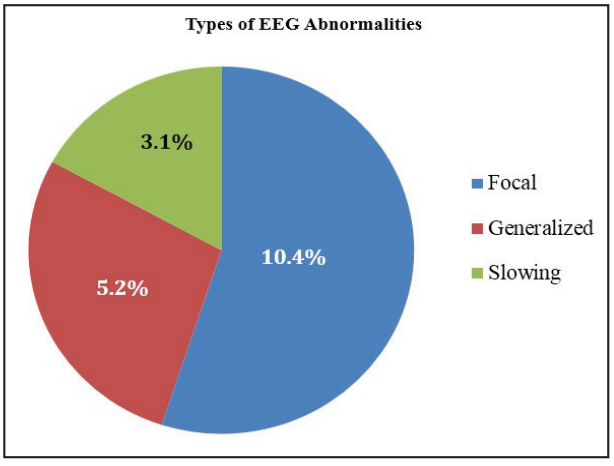

Figure 2: The Most Common Type of EEG Abnormality is Focal Abnormalities

The most common criterion of complex febrile seizure in children with normal developmental milestone is having more than one episode of seizure in 24-hours, which accounts for 56 (58%). The second most common criterion was seizure for more than 15 minutes, which accounts for 22 (23%), see table 1.

Table 1: Demographic Data and Evaluation Criteria of Complex Febrile Seizure

	Number of Patients	Percentage
Total Number of Patients	96	100%
Males	51	53%
Females	45	47%
Median Age of Patients Included	24 Months	
Evaluation Criteria		
More Than One Episode in 24-Hours	56	58%
Seizure Duration of More Than 15 Minutes	22	23%
Focal Seizure	18	19%

Eighteen (19%) patients had abnormal EEG. Ten (10.4%) patients had focal abnormalities and five (5.2%) had generalized epileptiform discharge, see table 2.

Table 2: EEG Result and Types of Abnormality

	Number of Patients	Percentage
EEG Result		
Normal EEG	78	81%
Abnormal EEG	18	19%
Types Of EEG Abnormality		
Focal Abnormalities	10	10.4%
Generalized Epileptiform Discharge	5	5.2%
Slowing Activity	3	3.1%

DISCUSSION

Febrile seizures are considered to be the most common type of seizure in children between 6 months and 5 years[1]. A complex febrile seizure is associated with certain criteria, which includes multiple seizures within 24-hours of febrile illness, duration of more than 15 minutes and focal seizures in the absence of central nervous system infection[4,5,7]. The complex febrile seizure has been associated with low-risk of central nervous system (CNS) infections[8].

In our study, the most common frequent criterion (58%) associated with complex febrile seizure was having more than one seizure attack within 24 hours. Esmail et al reported that 59% of patients had multiple seizures, which is similar to our result[9].

In our study, we found that 81% of patients had normal EEG, similar to Harini et al who found that the majority of patients had normal EEG findings[6]. In this study, the most common abnormal EEG finding was focal epileptiform discharge in 10.4%. Harini et al reported EEG slowing of 14.9% as the most common abnormal EEG finding[6].

Because 81% of EEG were normal, it indicates the limited use of EEG in the initial management of patients with the first attack of complex febrile seizure and normal neurological examination. According to Olson et al, EEG has a limited role in the initial management of children with first attack of complex febrile seizure[10].

The limitations of our study are the relatively small sample size and the retrospective nature of the study, which has its own limitations. Although the sample was small, our final result showed that 58% of patients had more than one seizure attack within 24-hours as compared to 23% of patients who had a seizure attack for more than fifteen minutes and 19% of patients who presented with focal seizures.

The impact of our study could be that children who had more than one seizure attack within 24-hours need to be admitted and children who had focal seizure or an attack lasting more than 15 minutes are less likely to be considered for admission.

The other impact of our study is the reevaluation of EEG for all patients with first attack of complex febrile seizure with normal developmental milestone because our study revealed that the majority of patients had normal EEG in the initial admission.

CONCLUSION

This study revealed that complex febrile seizures mostly occur as more than one seizure attack within the first 24-hours of febrile illness in children with normal developmental milestone. Majority of the of patients were found to have normal EEG study.

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