

The Importance of EEG Abnormalities Detection in Children with Febrile Seizure: A Combined Approach

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Abstract

Background: Febrile seizures (FS) are the common disorder in 3-month- to 6-year-old children, with an incidence varying between 2% and 5%. It is associated with fever, without evidence of intracranial infection or a definite cause. **Subjects and Methods:** Selection of cases of febrile seizure were done according to guidelines definition given by national institute of health consensus (NIH) and the International League against epilepsy. 50 Children with febrile seizure admitted in the pediatric intensive care unit at S. P. Medical College & Hospital were selected for the study. EEG was done with sedation. **Results:** Most common EEG abnormality is slow waves in 35% followed by sharp waves in 30%. Generalized EEG abnormality is seen in 64%. **Conclusion:** Most common epileptiform discharge was of generalized epileptiform activity, and most common EEG abnormality is slow waves.

Keywords: Simple, Complex, Febrile seizures, Electroencephalography.

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Introduction

The febrile seizure is the common disorder with incidence varying between 2% and 5%, and it is common in 3 months to 6 years old children. It is associated with fever, without evidence of intracranial infection or a definite cause.^[1,2] These seizures are classified as simple or complex.^[3] Simple FS is a generalized tonic-clonic seizure of fewer than 10 minutes duration that does not recur within the subsequent 24 hours. Complex FS is defined in case one or more of the following features are present: a focal onset or focal feature during the seizure, prolonged duration of more than 15 minutes, and recurrence during 24 hours.^[4,5] The febrile seizure is classified as simple or complex. The simple febrile seizure is a generalized tonic-clonic seizure of fewer than 10 minutes duration that does not recur within the subsequent 24 hours. The complex febrile seizure is defined in case one or more of the following features at present: a focal onset or focal feature during the seizure, prolonged duration of more than 15 minutes and recurrence during 24 hours. EEG abnormalities in children with febrile seizure vary from 2-86%. EEG abnormalities in children with febrile seizure assessment are difficult as studies varied in the method of selection. The predictor value of EEG for recurrence of febrile seizure or Subsequent development of non-febrile seizure is controversial.^[6-8]

Subjects and Methods

This prospective study was performed on 2 months to 6

years old children. Selection of cases of febrile seizure was done according to guidelines definition given by national institute of health consensus (NIH) and the International league against epilepsy. 50 Children with febrile seizure admitted in the pediatric intensive care unit at S. P. Medical College & Hospital were selected for the study. All children were managed according to a routine protocol including fever reduction or seizure control and other investigations. Then, we recorded the demographic information, history, physical examination, and type of seizure in the patient's questionnaire. The routine investigation was done in all patients. EEG was done with sedation (oral chloral hydrate).

Results

Children with febrile seizure age ranged from 2 months to 6 years of age. These children are admitted in the pediatric intensive care unit at S.P. medical college & hospital at the time of the study. 31 were male and 19 were female. The most common seizure is a generalized tonic-clonic seizure followed by the focal tonic seizure. Least common seizure being generalized tonic seizure [Table 1] 41 children had complex febrile seizure and 9 children had simple febrile seizure [Table 2]. EEG abnormality noted in 33 children with complex febrile seizure and 7 children with the simple febrile seizure. The most common abnormality is slow waves in 35%. Next EEG abnormality being sharp waves in 30%. Spike-wave abnormality seen in 15%. Spike and slow wave in 15%. Spike and sharp wave in 2.5%. Sharp, spike and slow waves have seen 2.5% [Table 3]. Generalized

EEG abnormality is seen in 64%. Unilateral EEG abnormality is seen in 10%. Localized abnormal discharge is seen in 6%. 11 children had the positive family history of febrile seizure. EEG abnormality is seen in 7 children with a family history of febrile seizure.

Table 1: Frequency of Seizure Type.

Seizure type	No. of patients(50)	%
Generalized tonic clonic	32	64%
Focal tonic seizure	6	12%
Complex partial	4	8%
atonic	4	8%
Focal clonic	3	6%
Generalized tonic	1	2%

Table 2: Classification of Febrile Seizure.

Type	No. of patients(50)	%
Complex febrile seizure	41	82%
Simple febrile seizure	9	18%

Table 3: Frequency of Abnormal Discharge In EEG.

Wave	No of patients(40)	%
Slow wave	14	35%
Sharp wave	12	30%
Spike wave	6	15%
Spike & slow wave	6	15%
Spike & sharp wave	1	2.5%
Spike, slow & sharp wave	1	2.5%

Discussion

The febrile seizure is the common disorder with incidence varying between 2% and 5%.^[1] It is associated with fever without evidence of intracranial infection or a definite cause. EEG is most helpful if there is any doubt about whether the febrile seizure has occurred because EEG done on the day of seizure are abnormal in as many as 88% of patients. In our study 31 were male, and 19 were female. Hauser and Annegar Millichap had reported sex ratio between 1.4 to 1 and 1.2 to 1 in children with febrile seizure.^[9] In our study, 41 children had the complex febrile seizure, and 9 children had simple febrile. EEG abnormality noted in 33 children with complex

febrile seizure and 7 children with the simple febrile seizure. The most common abnormality is slow waves seen in 35% followed by the sharp wave in 30% in our study. A review of the published literature suggests that 8.6% of the EEG are abnormal after the febrile seizure.^[10] This variation

may be due to authors different methods, the different definition of EEG abnormality, age, the timing of the EEG and the effect of viral infection on EEG. Generalized EEG abnormality is the common abnormality seen in 64% in our study. 11 patient had the positive family history of febrile seizure. EEG abnormality is seen in 7 patient with a family history of febrile seizure. In a study by Joshi et al., which showed a lower proportion of epileptiform abnormality in the patient with a positive family history of febrile seizure.^[11]

Conclusion

The complex febrile seizure is more common than simple febrile seizure in our study. The generalized tonic-clonic seizure is the most common seizure followed by the focal tonic seizure. Most common EEG Abnormality is slow wave followed by sharp waves. Generalized epileptiform activity is the most common epileptiform discharge.

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