

CLINICO-ETIOLOGICAL PROFILE OF CONVULSIONS IN CHILDREN AMONG ONE MONTH TO 18 YEARS OF AGE AT TERTIARY CARE CENTER JAIPUR, RAJASTHAN

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ABSTRACT

Objectives: The objectives of this were to study the clinico-etiological profile of convulsions in children aged 1 month to 18 years, to analyze the types of seizures and their categorization according to age, cause, type, and symptoms and signs associated with convulsion.

Methods: This was a cross-sectional hospital-based observational study conducted in the Department of Pediatrics, SPMCHI hospital, SMS Medical College, Jaipur, India for a period of January 2019–November 2020 on subjects of age group from 1 month to 18 years. All participants were thoroughly examined by complete history taking and investigated with complete blood counts, metabolic screening, lumbar puncture and CSF analysis, electroencephalography, CT scan, and MRI as and when required.

Results: Occurrence of convulsions was more in male gender (60.5%), with highest 226 (56.5%) in the age group between 1 month and <5 years, whereas lowest was found between age 10 and 18 years 59 (14.9%).

Conclusion: The incidence of convulsions was highest in the younger age group, with generalized tonic-clonic seizure being the most common type. Febrile convulsion was the most common etiology. About one-third had abnormal MRI finding, whereas more than two-third of performed patients had abnormal EEG finding.

Keywords: Epilepsy, Seizure, Convulsion, Clinical profile.

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INTRODUCTION

A seizure is an impermanent occurrence of signs or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. When the seizure is associated with motor components, then they are known as convulsions. Epilepsy is a condition characterized by recurrent (two or more) unprovoked seizures occurring 24 h apart [1]. Seizure episodes contribute to about 1 % of admissions in pediatric emergencies and approximately 4–10% of children have seizure episodes during the first 16 years of life [2]. Infections remain the primary cause of seizure episodes in developing nations [3].

Epilepsy is defined by International League against Epilepsy (1993) as a condition characterized by recurrent (two or more) epileptic seizures, unprovoked by any immediate identified cause [4]. In most of the studies, febrile seizures were reported to be the most common type seen in the pediatric population and account for the majority of seizures seen in children younger than 5 years of age [5,6]. Central nervous system (CNS) infections are the leading cause of seizures and acquired epilepsy in the developing world [3,7].

Proper diagnosis and management are always difficult in a child with seizure. This cross-sectional observational study was, therefore, conducted in a tertiary level hospital in Jaipur to study the clinico-etiological profile of convulsions in children from 1 month to 18 years of age.

METHODS

This study was a cross-sectional observational study, conducted at the Department of Pediatrics, SPMCHI hospital, SMS Medical College, Jaipur, Rajasthan. Subject selection and data collection were initiated only after approval from the Ethics Committee and Research Review Board of the institute. Written informed consent was taken from patients/guardians in English/local language (Hindi) before the examination. The study

period was from January 2019 to November 2020. All children from 1 month to 18 years of age who presented to the emergency of the pediatrics department for the 1st time with convulsions were included in the study. The cases that were not willing to participate in study were excluded out from the study.

Complete history was taken from all the patients; clinical examination as well as laboratory investigations of all the eligible participants were performed and recorded. Electroencephalography, CT scan, and MRI were done as and when required. Data were analyzed for distribution of age group, gender, clinical manifestations, and type of seizures. The data analysis was computer-based and SPSS-22 was used for analysis.

RESULTS

Children admitted to the pediatric department during study period were analyzed, 400 children fulfilling the inclusion criteria were included in this study and subjected to analysis.

Out of these 400 patients, 242 were male (60.5%), while 158 were female (39.5%) (Table 1). Two hundred twenty-six patients were in between 1 month and 5 years of age, 115 patients were in between 6 and 10 years of age, while 59 patients were in between 11 and 18 years of age. (Table 1).

Most of the cases, in our study, were of GTCS (159 cases) followed by 85 cases of tonic seizures. Forty-one patients had focal to bilateral tonic-clonic, 22 clonic, 24 focal seizures with impaired consciousness, 20 myoclonic seizures, 18 focal awareness, 17 atonic, and 14 non-motor (absence) seizures (Fig. 1).

Maximum 161 cases had febrile seizure, 97 meningitis/CNS infection, 56 idiopathic epilepsy, 40 cerebral palsy, 11 neurocysticercosis, 16 metabolic causes, 15 cases had viral encephalitis, and four cases had traumatic brain injury in our study (Fig. 2).

Maximum 282 patients had fever followed by 177 altered sensorium, 116 vomiting, 95 irritability, 85 meningeal irritations, 75 cough, 62 lethargy, 45 loose stool, 42 ear discharge, 38 headache, and 27 patients had neurological deficit (Fig. 3)

Out of 400 patients, CSF examination was performed in 248 (62%) cases. Out of these 248 patients, 97 (39.1%) had abnormal findings, while 151 patients had normal findings. Forty-one patients had pyogenic meningitis, 33 patients had viral meningitis, and 23 patients had tubercular meningitis (Fig. 4).

One hundred thirty-eight patients were subjected to EEG, 112 patients with abnormal findings in EEG, 58 patients had the generalized pattern, 42 patients had focal pattern, and 12 patients had 3 Hz spike and wave pattern (Fig. 5). Out of 400 patients, neuroimaging was performed in 210 (52.5%) cases. Out of these 210 patients, 156 had abnormal findings, while 54 patients had normal findings.

DISCUSSION

Seizures are not only the cause of high morbidity and mortality in children but also are the reasons of physical, mental, and financial distress for their parents. Seizure is a transient occurrence of signs

and, or symptoms due to abnormal excessive or synchronous neuronal activity in the brain [8]. It is one of the most common childhood neurological illnesses occurring in 4–6/1000 children in the general population [2]. 5–10% of children suffer at least one episode of seizure in the first 16 years of life. After determining the type of the seizure, the next goal is to determine the cause of the seizure, which can be done by history and physical examination in the majority. In addition, other laboratory tests, EEGs, and neuroradiological examinations may be required. Most seizures in children are provoked by somatic disorders originating outside the brain, such as high fever, infection, syncope, head trauma, or hypoxia. Less than one-third of seizures in children are caused by epilepsy, a condition, in which seizures are triggered recurrently from within the brain. Other events, such as breath-holding

Table 1: Distribution of patients on the basis of gender and age

	Number of cases	Percentage
Gender		
Male	242	60.5
Female	158	39.5
Age group		
1 month–5 years	226	56.5
6–10 years	115	28.8
11–18 years	59	14.7

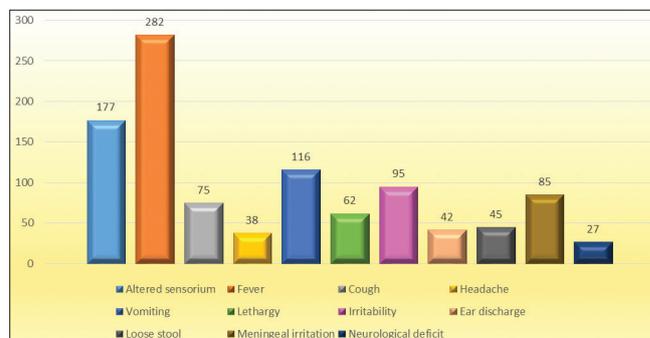


Fig. 3: Distribution of patients based on signs and symptoms of convulsions

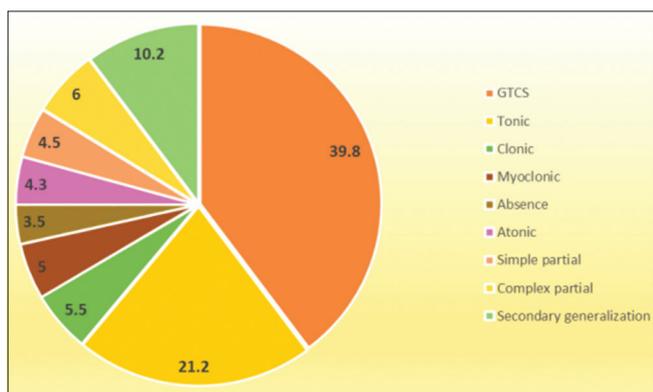


Fig. 1: Distribution of patients based on type of convulsions

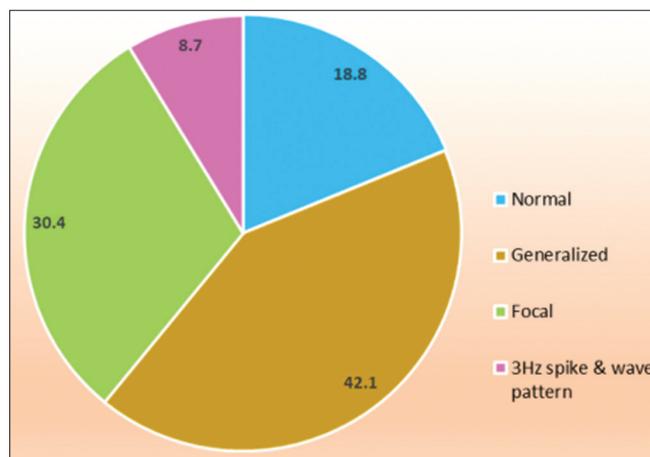


Fig. 4: Distribution based on CSF analysis findings

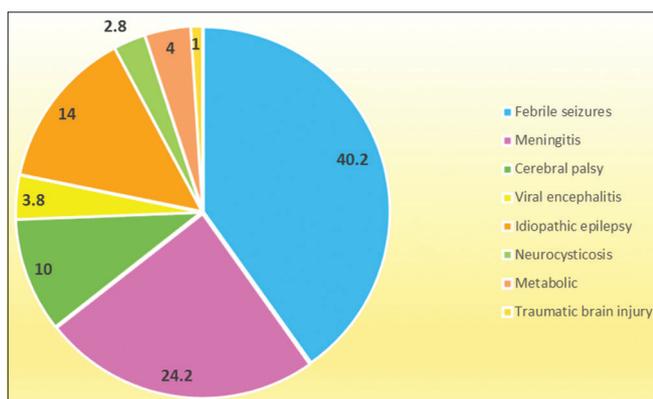


Fig. 2: Distribution of patients based on etiology

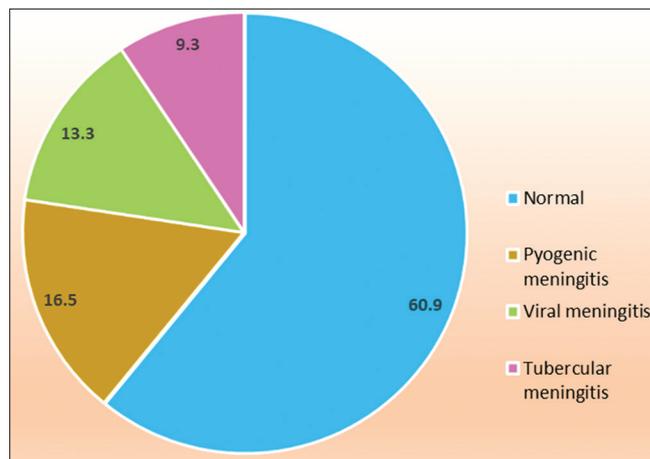


Fig. 5: Distribution based on EEG findings

spells and gastroesophageal reflux, can cause events that simulate seizures [2]. The present study was conducted to know the various etiologies for convulsions in children between the age group of 1 month and 18 years.

In our study, 400 patients with first episode of the seizures were included in the study. These patients were in between 1 month and 18 years of age. Out of these 400 patients, 242 were the male, while 158 were the female. It shows male dominance of our study and male: female ratio of this study was 1.53:1. A similar study conducted by Prasad *et al.* [9] in 2017 who found the incidence of seizure was more in the males (58.2%) compared to the females (41.8%). Another similar study conducted by Alakkodan [10], in 2018, in which there were 112 males and 106 females with male-to-female ratio of 1.05:1.

This study showed high prevalence of seizure disorders in the early life. We found maximum patients in age group 1 month to 5 years. Two hundred twenty-six (56.5%) patients were in between 1 month and 5 years of age followed by 115 (28.7%) patients of 6–10 years of age, while only 59 (14.75%) patients were between 11 and 18 years of age. Studies conducted by Prasad *et al.* [9], in 2017, and Alakkodan [10], in 2018, found similar results as they also recorded the highest incidence of seizures in the age group of 1 month to 5 year.

We observed most common seizure type which was GTCS 159 (39.8%) and the least seizure type was absence seizure 14 (3.5%). Similar results were found in studies conducted by Prasad *et al.* [9], in 2017, and Rai *et al.* [11], in 2019. Maximum 161 (40.2%) cases of febrile seizure were found in this study followed by 97 (24.2%) CNS infection (meningitis), 56 (14%) idiopathic epilepsy, 40 (10%) cerebral palsy, 16 (4%) metabolic cause, 15 (3.8%) viral encephalitis, 11 (2.8%) neurocysticercosis, and 4 (1%) cases had traumatic brain injury. Our results correlated with the studies conducted by Hirtz *et al.* [12], in 2000, and Rai *et al.* [11], in 2019.

The most common symptom in our study was fever. Maximum 282 (70.5%) patients had fever followed by 177 (44.3%) altered sensorium, 116 (29%) vomiting, 95 (23.8%) irritability, 85 (21.3%) meningeal irritation, 75 (18.7%) cough, 62 (15.5%) lethargy, 45 (11.2%) loose stool, 42 (10.5%) ear discharge, 38 (9.5%) headache, and 27 (6.8%) patients had neurological deficit. Similar results were found in studies conducted by Prasad *et al.* [9], in 2017, and Rai *et al.* [11], in 2019.

We performed a CSF examination in 248 (62%) patients. Out of these 248 patients, 97 (39.1%) had abnormal findings, while 151 (60.9%) patients had normal findings. Maximum 41 (10.25%) patients had pyogenic meningitis, 33 (8.25%) patients had viral meningitis, and 23 (5.75%) patients had tubercular meningitis. A similar study conducted by Prasad *et al.* [9], in 2017, showed that febrile seizures were the most common cause of convulsions. A study by Alakkodan [10] found different results, as they found that CNS infections (viral encephalitis) were the most common cause of seizures in their study.

In this study, EEG was performed in 138 (34.5%) cases. Out of these, 112 patients showed abnormal findings in EEG. In abnormal EEG, 58 (14.5%) patients had the generalized patterns, 42 (10.5%) patients had the focal patterns, and 12 (3%) patients had 3 Hz spike and wave patterns. Similar study conducted by Prasad *et al.* [9], in 2017, did EEG in 53 patients, out of which 44 had abnormal EEG, 22 patients had generalized pattern, 19 patients had the focal patterns, and five patients had spike and wave patterns.

CONCLUSION

Generalized tonic-clonic seizures were the far most common type of all seizures. Febrile seizures were the most common etiological reasons followed by epilepsy, cerebral palsy, and CNS infections especially in context of a developing country and regional considerations. Being

a developing nation, strict measures to prevent infection through interventions at home and community can reduce the occurrence of seizures in children, thus preventing long-term neurological sequelae in children. CSF analysis, neuroimaging, and EEG have the most important role in the diagnosis of seizures; however, we suggest that a good clinical evaluation should be ensured before advising these investigations especially CT scans, where exposure of pediatric patients to radiation and its effects are still an area of study. We suggest a long-term follow-up study in patients with seizures regarding their neurobehavioral outcomes.

Limitations

It was a single-center study. Better analysis of results could have been achieved with a multi-centric study with larger sample size. It is suggested that more attention should be paid to genetic and metabolic disorders. The facilities should be provided for diagnosis of these diseases in referral centers such as our center.

AUTHORS' CONTRIBUTIONS

All the authors contributed in preparing the final manuscript.

CONFLICTS OF INTEREST

None.

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