Clinico-Etiological Profile of Convulsions In Children Amongst 1 Month To 18 Years of Age

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Abstracts: Objectives:To study the clinico -etiological profile of convulsions in children - 1 month to 18 years of age and to analyze the types of seizures and their categorization according to age and to assess the immediate outcome of these participants. Methods: It was a Prospective observational study. Study Population: All children among 1 month to 18 years of age who presented to paediatric department for the first time with convulsions. Methodology: All participants were thoroughly investigated with complete blood counts (which included total count, platelet count, haemoglobin, differential count), metabolic screening like serum electrolytes, serum calcium, serum glucose, lumbar puncture and CSF analysis, Electroencephalography, CT scan and MRI as and when required. Results: Occurrence of convulsions was highest 89(58.1%) in the age group between 1 month to less than 5 years whereas lowest was found between age 10 – 18 years (15.1%). Conclusion: The incidence of convulsions is highest in the younger age group with generalized tonic clonic seizure being the commonest type. A past history of convulsions may be present in only about one third. Milestones are achieved normally in majority of cases. Sixth and seventh cranial nerves are most commonly involved. About one third have abnormal CT study whereas more than half have abnormal EEG finding. [Prasad M NJIRM 2017; 8(4):91-95]

Key Words: epilepsy, seizure, convulsion, clinical profile

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Introduction: Seizure is a common problem evaluated in pediatric emergency departments[1] which is a paroxysmal, time limited change in motor activity and/or behaviour resulting from abnormal electrical activity in the brain. Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate seizures and by the neurobiological, cognitive, psychological and social consequences of this condition. The clinical diagnosis of epilepsy usually requires the occurrence of at least one unprovoked epileptic seizure with either a second such seizure or enough EEG and clinical information to convincingly demonstrate an enduring predisposition to develop recurrences. Approximately 4-10% of children experience at least 1 seizure (febrile or afebrile) in the 1st 16 years of life. The cumulative lifetime incidence of epilepsy is 3%, and more than half of the cases start in childhood. The annual prevalence is 0.5-1.0%.[2] Thus, the occurrence of a single seizure or of febrile seizures does not necessarily imply the diagnosis of epilepsy.[2]

Epilepsy describes a condition of susceptibility to recurrent seizures. Status epilepticus refers to continuous or recurrent seizure activity lasting longer than 30 minutes without recovery of consciousness.[3] The manifestation of the seizure depends upon the threshold of the brain to manifest a clinical seizure. The age and neurodevelopmental maturity status determine the clinical manifestations and the type of seizure disorders encountered.[4] Although the outlook for most children with symptomatic seizures or those associated with epilepsy is generally good, seizures may signal a potentially serious underlying systemic or central nervous system (CNS) disorder that requires thorough investigation and management.[2] The type of seizure its etiology, manifestations and progression varies from age to age. There are very few epidemiological studies looking at the incidence of seizure from India. The limited data show that the incidence and prevalence rates are surprisingly similar to those in developed countries.

This study was planned in rural tertiary level hospital with the aim to study the clinico-etiological profile of convulsions in children among 1 month to 18 years of age. It also helps in prognostication and outcome.

Methods: The study was a prospective observational study conducted at Sumandeep Vidyapeeth. Subject selection and data collection were initiated after IEC approval. Informed written consent was taken from patients/guardians in English/local language (Gujarati) before examination.

Study was done over period of one year. All children from 1 month to 18 years of age who presented to pediatrics department for the first time with convulsions were included in the study. Cases less than 1 month and more than 18 years of age, who were not willing to participate in study and those who were already enrolled in the study and came for

follow up were excluded from the study. Complete history and clinical examination of all the eligible participants was performed and recorded. All participants were subjected to complete blood counts, metabolic screening like serum electrolytes, serum calcium, serum glucose, lumbar puncture and CSF analysis.

Electroencephalography, CT scan and MRI was done as and when required. Data was analysed for distribution of age group, gender, clinical manifestations and type of seizures.

Result: Total 1889 patients were admitted in department during study period. Among these seizures was seen in 8.1%. Occurrence of convulsions was highest 89 (58.1%) in the age group between 1 month to < 5 years whereas lowest distribution was found between ages 10 – 18 years (15.1%). Mean age of participant was 4.9 years. Total 153 patients were included in the study. Of the 153 cases included in study, 89 (58.17%) were males and 64 (41.83%) were females.

Out of 153 patients, maximum 61 patients (39.8%) belonged to SES III whereas 33 (21.6%) belonged to SES IV, 27 patients (17.6%) belonged to SES II , 25 patients (16.4%) belonged to SES V whereas least patients belonged to SES I , 7 patients (4.6%). (Table-I)

Table I: Distribution according to socio-economic status

Socioeconomic status*	No. of patients	(%)
SES I	7	4.6
SES II	27	17.6
SES III	61	39.8
SES IV	33	21.6
SES V	25	16.4

*Above classification was done according to Modified Kuppuswamy Classification.

GTCS was found in 62 patients (40.5%), tonic being second most common seen in 34 patients (22.2%), followed by secondary generalization found in 16 patients (10.5%), myoclonic in 3.9%, complex partial in 7.2%, clonic in 4.6%, atonic in 3.9%, simple partial in 3.9% and absence seizures in 3.2 %. (Table-II)

Table II: Distribution according to type of convulsion

Type	No. of patients (n= 153)	(%)
GTCS	62	40.6
Tonic	34	22.2
Clonic	7	4.6
Myoclonic	6	3.9
Absence	5	3.2
Atonic	6	3.9
Simple Partial	6	3.9
Complex Partial	11	7.2
Secondary Generalisation	16	10.5

Out of all the symptoms associated with convulsions, fever was present in maximum number of patients i.e. 108 patients (70.6%), followed by altered sensorium in 68 patients (44.4%) whereas headache as a symptom was present in least number of patients i.e. only 14 patients (9.2%).

Table III: Symptoms & Signs associated with convulsions

Symptoms	No. of patients	(%)
Altered Sensorium	68	44.4
Fever	108	70.6
Cough	28	18.3
Headache	14	9.2
Vomiting	43	28.1
Lethargy	24	15.7
Irritability	37	24.2
Ear discharge	18	11.8
Loose stools	19	12.4
Altered sensorium	70	45.8
Meningeal irritation	34	22.2
Neurological deficit	11	7.1

On analysis, past history of convulsions was present in 35 cases (22.87%) out of the total 153 patients enrolled in study. Family history of convulsion was present in 12 patients (7.8%) whereas 141 patients didn't have any prior positive family history of convulsion. Achievement of milestones before development of seizure was also analyzed. The milestones were found to be delayed in 6 patients (3.9%). 147 patients (96.1%) had normal achievement of milestones.

On analyzing distribution of neurological signs in patients who presented with seizures, 45.8% patients had altered sensorium, 22.2% had meningeal irritation

and neurological deficit was present in 7.1% of patients.(Table-III)

Out of 153 patients, 8 (5.2%) had papilledema and 7 (4.5%) had optic atrophy.11 patients (7.2%) had cranial nerve involvement. Most common cranial nerves involved were 6^{th} and 7^{th} cranial nerves. Out of 11 patients who had cranial nerve involvement, 7 patients had upper motor type of lesion whereas 4 had lower motor type. 96 patients were subjected to CSF analysis, out of which 38 patients (24.9%) had abnormal study whereas others had normal CSF analysis.16 patients (42.1%) were found to have pyogenic meningitis, 12 patients (31.6%) had viral meningitis,10 patients (26.3%) had tubercular meningitis. (Table-IV)

Table IV: Distribution of abnormal CSF finding

Etiology of abnormal CSF study	Patients	(%)
Pyogenic Meningitis	16	42.1
Viral Meningitis	12	31.6
Tubercular Meningitis	10	26.3

53 patients were subjected to EEG, 44 had abnormal EEG; 22 patients had generalized pattern, 19 patients had focal pattern and 5 patients had spike and wave pattern. (Table-V)

Table V: Pattern of EEG study in convulsion patients

EEG	No. of patients	(%)
Generalized	22	14.4
Focal	19	12.4
3 Hz Spike and wave pattern	5	3.3

79 cases underwent neuroimaging. Cerebral edema was present in 20.9% patients, hydrocephalus in 19.6%, basal exudates in 9.1%, infarct in 7.9% and other findings like multiple ring enhancing lesions, hemorrhage, bilateral frontal trophy and subdural collection were noted in 14 patients (9.2%). Tuberculoma was seen in 6 patients (3.9%). However it should be highlighted here that many patients had mixed picture on CT scan.

Febrile seizures was commonest cause of convulsions in our study found in 47 patients (30.8%), followed by epilepsy (19.7%), pyogenic meningitis (15%), viral encephalitis (11.1%), TB meningitis (8.5%), cerebral palsy (3.9%), sickle infarct (2.6%), hypocalcemia (2.6%), head injury (2.6%), neurocysticercosis (1.9%), and hypoglycemia (1.3%).

Out of 153 patients, 10 patients (6.54%) had low serum calcium level (< 8.4 mg/dl), whereas others had more than 8.4 mg/dl. Out of 10 patients who had calcium level $\leq$8.4 mg/dl. Out of these, 4 patients presented with seizures.

Out of the total, 125 (81.7%) patients recovered, 13 recovered with deficit (8.5%), 9 (5.9%) either didn't recover or were discharged against medical advice or absconded while 6 patients (3.9%) died. Mortality rate was maximum in head trauma (25%) followed by viral encephalitis (11.7%) and pyogenic meningitis (8.6%).

On analysis of patients with seizure based on age group, significant association was found between diagnosis and age of the patient (p value < 0.001). Significant association was also found between diagnosis and outcome of the patient (p value < 0.001). Most of the patients with febrile seizures recovered whereas patients with cerebral palsy recovered with deficit and most deaths occurred in patients with viral encephalitis.

Discussion: Seizures are the most common pediatric neurologic disorders, occurring in ≈ 10% of children.[2]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 spells and gastro esophageal reflux, can cause events that simulate seizures.[2]The present study was done to know the various etiologies for convulsions in children between the age group of 1 month to 18 years.

Incidence of seizures in particular age groups: Age plays an important role in the etiology of convulsions 0.4 -10% of children suffer at least one seizure in 1st 16 years of life.[2]A study done by Idro et al. stated that 18.3% admissions had seizure as chief complaint at the time of admission,[5] whereas in an another study conducted by Ojha et al. in Indian subcontinent found a frequency of 10.2%.[6]

In our study we found a frequency of 8.1% which is matching the frequency rate of Ojha et al. probably

because there was similarity in geographical and demographic variables. However, our study didn't match with rural epilepsy surveillance program done at uttarakhand which concluded a prevalence rate of seizure 7.5 per lakh. In our study prevalence rate came around 80 per 1000. We recorded the highest incidence of seizures in the age group of 1 month to 5 year 89 (58.1%), followed by 41 (26.8%) in the age group of 5 to 10 years and least between 10 and 18 years, 23(15.1%).

Sex Incidence: In our study incidence of seizure was more in males (58.2%) compared to females (41.8%) and majority of children suffered from febrile convulsions, which was similar to ArzimanoglouA et al study.[7]

Type of seizure: In our study, we observed that the commonest seizure type was GTC 62(40.6%). The remaining 34 (22.2%) patients had tonic seizures, followed by secondary generalization constituting 16 patients (10.5%), followed by myoclonic (3.9%), complex partial (7.2%), clonic (4.6%), atonic (3.9%), simple partial (3.9%), and lastly absence seizures (3.2 %).

Symptoms: Convulsions can be associated with various other symptoms depending on the etiology. In our study, majority of the patients presented with fever (70.6%), altered sensorium (44.4%) and vomiting (28.1%). Irritability (24.2%), Cough (18.3%), lethargy (15.7%) loose stools (12.4%), ear discharge (11.8%) and headache (9.1%) were the other minor symptoms. Guerin R et al. suggested that recurrences are more common when the first seizure occurs early. It was found that recurrence risk was highest for the infants in the first year of life (48%) and lowest for those who were 4 years of age and above. (15%).[7]

Family history of seizures: In our study, 7.8% of total cases had a family history of convulsions. Most cases of seizures appeared to be familial or at least to occur in patients with a strong family history of seizures of various types, thereby supporting the role of genetic factors in the origin of epileptic phenomena in the first 2 years of life. Guerin et al. also suggested that the proportion of positive family history was higher in those with apparently generalized seizures than in those with partial seizures.[7] In our study generalized seizures was present in 81%patients with positive family history.

Developmental history: Developmental history was normal in 96.1% of cases, while 3.9% had delayed developmental milestones. Approximately 25% of children who have recurrent seizures during the first year excluding neonatal and infantile spasms are developmentally and neurologically abnormal at the time of first seizure according to Fenichel GM etal.[8]

Neurological signs: In this study, 45.8 % of the cases presented predominantly with altered sensorium, 22.2 % with meningeal irritation and 7.1 % had neurological deficit on examination. Most cases of febrile convulsions were not associated with any neurological deficit, but some of the unilateral seizures may be followed by a Todd hemiplegic that usually lasts for a few hours but may persist up to several days, the incidence being only 0.4 % as suggested by Guerin R et al.[7]

Conclusion: The incidence of convulsions is highest in the age group of 1 month to 5 years and in males. The commonest type of seizure is generalized tonic clonic (40.6%). The most common cause of convulsion is febrile seizures. Past history of convulsions was present in about one third while only one tenth have a family history of convulsions. Milestones were achieved normally in majority of cases. The common neurological signs were altered sensorium, meningeal irritation and neurological deficit. Sixth and seventh cranial nerves are most commonly involved. About one third have abnormal CT study whereas others have normal CSF analysis. More than half have abnormal EEG finding.

Acknowledgment: Dr Dulari Gandhi Professor & HOD Department of Paediatrics S.B.K.S MIRC Sumandeep Vidyapeeth.

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Conflict of interest: None
Funding: None
Cite this Article as: Prasad M, Prashant M, Rohit B, Kinjal D, Shainy C. Clinico-Etiological Profile of Convulsions In Children Amongst 1 Month To 18 Years of Age. Natl J Integr Res Med 2017; 8(4):91-95