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Original Research Article

Study of Etiology of Convulsions in Children between 1 Month and 5 Years of Age at SKMCH, Muzaffarpur, Bihar

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Abstract

Background: Seizures are a frequent issue that the pediatric emergency room evaluates. The various causes of seizures include brain tumours, idiopathic epilepsy, febrile seizures, CNS infections, metabolic, developmental problems, traumatic brain injury, vascular accidents, and metabolic disorders. The current study sought to determine the cause of convulsions in children between the ages of 1 month and 5 years old who were admitted to the pediatric unit at the SKMCH, Muzaffarpur, Bihar. Children between the ages of 1 month and 5 years who are admitted to a pediatric ward at the Department of Pediatrics, SKMCH, Muzaffarpur, Bihar, were evaluated for the prevalence of convulsions.

Methods: Between January 2022 and June 2022, 100 instances of convulsions in children between the ages of 1 month and 5 years were admitted to the pediatric unit at SKMCH, Muzaffarpur, Bihar. The study involved taking a thorough medical history, performing a physical exam, and conducting pertinent tests, such as complete blood counts, serum electrolytes, serum glucose, serum calcium, CSF analysis, EEG, and neuroimaging (CT/MRI brain) studies. Demographics, clinical presentation, laboratory examinations, EEG, and neuroimaging were all recorded variables.

Results: In our analysis, febrile seizures accounted for 32% of all seizure types. About 24% of cases involved epilepsy (idiopathic or unprovoked), and 33% had symptomatic seizures brought on by different conditions such CNS infections, metabolic disorders, traumatic injuries, and vascular diseases, among others. The remaining 11% were brought about by various other factors.

Conclusion: This hospital-based study sought to understand the cause of convulsions in children between the ages of 1 month and 5 years. Children's seizures might have a variety of underlying pathologies. In our study, febrile seizures were the most frequent cause of convulsions, followed by epilepsy and symptomatic seizures with an infectious aetiology of the CNS, with viral encephalitis being the most frequent.

Keywords: Seizures, Febrile Convulsions, Symptomatic Seizures, EEG, Viral Encephalitis.

Introduction

Seizures are a frequent issue that the paediatric emergency room evaluates. Seizures can have a variety of causes, including epilepsy, idiopathic or unprovoked seizures, febrile convulsions, and symptomatic seizures [1]. The most frequent febrile seizures occur in young children. According to estimates, febrile seizures afflicted 2–4% of all children. Girls are less frequently impacted than boys [2]. Clinical seizures that take place concurrently with a systemic injury or in close chronological proximity to a recognised brain insult are referred to as symptomatic seizures. Acute symptomatic seizures can be brought on by brain tumours, CNS toxicity, metabolic and electrolyte abnormalities, traumatic brain damage, and vascular accidents [1,3].

Acute symptomatic seizures are seen in 5% of children with CNS infections at the time of infection [4]. When two or more unexplained convulsions take place within a period of time that is more than 24 hours apart, epilepsy is a seizure disorder [5]. Because of the high prevalence of CNS diseases, birth traumas, and perinatal birth asphyxia, the prevalence of epilepsy is higher in developing nations [6].

A serious underlying systemic or CNS illness that necessitates prompt stabilisation, resuscitation, pertinent investigations, ongoing monitoring, and treatment may emerge as a seizure. The current study examined the causes of convulsions in children between the ages of one month and five years who were admitted to the pediatric unit at the Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar.

Material and Methods

100 instances of convulsions in children aged 1 month to 5 years who were admitted to the pediatric ward of the Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar between January 2022 and June 2022 were the subject of this study. Whose children less than 1 month and more than 5 years of age seizure cases that went discharge against medical advices. Seizure cases who expired immediately after hospitalization before diagnosis was made. A thorough clinical examination, a full history review, and pertinent investigations including complete blood count, CSF analysis, blood sugar, serum calcium, EEG, and neuroimaging (CT/MRI brain) were all used in this study. Demographics, clinical presentation, laboratory tests such as serum calcium, blood sugar, CSF analysis, EEG, and brain CT/MRI were all recorded as variable factors. There was no statistical analysis performed because the current study was purely descriptive. Percentages were used to express the various facts.

Results

According to Table 1, out of 100 cases, 42% of children aged 1 to 3 years had the highest incidence of convulsions (n=42). Male to female ratio was 1.17:1 as 54 cases (or 54%) were male and 46 cases (or 46%) were female. Generalized tonic-clonic seizures were the most prevalent form. Generalized seizures made up 94 cases (94%) and focal seizures made up 6 instances (6%). In 28% of instances, a positive prior history of convulsions was reported. 12% of people had good ancestry. 9% of children had atypical developmental histories and overall developmental delays.

Table 1: Distribution of variable factors associated with convulsions (N=100)

Variable factors	No. of cases		Total
Age	Male	Female	
1M – 1Y	10	12	22
1Y – 3Y	27	15	42

3Y – 5Y	17	19	36
Type of seizures			
Generalized	94		
Focal	6		
Positive Past History	28		
Positive Family History	12		
Abnormal Development History	9		

According to Table 2, fever predominated among the symptoms in 68% of instances, while vomiting and irritability each made up 25% of cases. Affected sensorium made up 36% of neurological indications, meningeal irritation made up 12%, and localised neurological deficiency made up 5%.

Table 2: Distribution of clinical presentation associated with convulsions (N=100)

Symptoms	No. of cases	Percentage (%)
Fever	68	68%
Vomitings	25	25%
Lethargy	16	16%
Irritability	22	22%
Gastroenteritis	8	8%
Jaundice	2	2%
Neurological signs		
Altered sensorium	36	36%
Focal neurological deficit	5	5%
Meningeal irritation	12	12%

Table 3 displays anomalies in various blood, CSF, EEG, and neuroimaging tests. All convulsion cases had their serum calcium and blood sugar levels checked; of those, 16 cases had low serum calcium levels (8.4 mg/dl) and 5 instances had low serum glucose levels (45 mg/dl). Out of the 56 individuals we examined, 21 (37.5%) had abnormal CSF analyses, such as increased proteins or pleocytosis.

A total of 70 individuals underwent EEG testing, and 29 instances (or 41%) had abnormal EEG abnormalities.

Radio imaging (CT/MRI Brain) was performed in 40 cases, of which 32 (80%) had abnormal CT/MRI findings, such as hydrocephalus in 8 cases (25%) basal exudates in 4 cases (12.5%), Neurogranulomas in 2 cases (6.25%), infarcts in 2 cases (6.25%), edoema in 6 cases (18.75%), and other changes such as HIE, cerebral atrophy, etc. in 10 cases (31.5%).

Table 3: Results of various investigations

Investigations	No. of cases with abnormal findings	Percentage
Serum glucose (<45mg/dl) (N=100)	5	5%
Serum calcium (<8.4mg/dl) (N=100)	16	16%
Abnormal CSF findings (N=56)	21	37.5%
EEG (N=70)	29	41%
Neuroimaging (CT/MRI brain) (N=40)	32	80%

Table 4 displays the distribution of different convulsion aetiologies by age. In our investigation, febrile seizures were the most frequent, accounting for 32 cases (32%); of these, 18 cases (56.25%) involved children aged between one and three years. Epilepsy was the second most frequent etiological component, accounting for 24 cases (24%) and contributing to a total of 56 cases. The remaining 44 instances included symptomatic seizures with a variety of aetiologies, including viral encephalitis (12 cases), pyogenic meningitis (5 cases), TBM (4 cases), other metabolic causes (7 cases), head injuries (2 cases), and ICSOL(NCC) (2 cases). The remaining 11 cases were caused by different other unrelated factors.

Table 4: Etiology of convulsions with age wise distribution

Etiology	Age distribution			Total
	1M – 1Y	1Y – 3 Y	3Y – 5Y	
1. Febrile seizures	6	18	8	32
2. Epilepsy	2	12	10	24
3. Symptomatic seizures	11	10	12	33
(i) Viral encephalitis	-	5	7	12
(ii) Pyogenic Meningitis	4	1	-	5
(iii) Tubercular Meningitis	-	3	1	4
(iv) Hypocalcaemia	3	-	-	3
(v) Hypoglycemia	2	-	-	2
(vi) IEM	2	1	-	3
(vii) Head injury	-	-	2	2
(viii) ICSOL(NCC)	-	-	2	2
4. Others	3	2	6	11

Discussion

Feverish seizures were the most frequent cause of convulsions in the current investigation, accounting for 32 cases (32%) out of which 18 cases (56.25%) occurred in children aged between one and three years, as reported by Bhandari *et al*. Males made up 7/20 cases, making the male to female ratio 1.6:1.

The study by Sehagal H., Bala K, *et al*. similarly revealed a preponderance of convulsions in males [7,8]. Similar results were noted by Ramakrishnan K, Thomas K *et al* [9] who reported that generalised seizures were 94% and focal seizures 6% in the current investigation.

According to our study, CNS infections (21/44) are the most frequent cause of acute symptomatic seizures. Neurocysticercosis 4.4%, Tuberculous Meningitis 9%, Pyogenic Meningitis 11%, Viral Encephalitis 27%, and all metabolic causes 18.2% (like IEM, hypocalcemia, hypoglycemia etc). The main factor contributing to acute symptomatic seizures was infections. The results of our investigation were in line with those of Murthy *et al*. and Richard 1dro *et al*., who found that CNS infections were the most frequent cause of acute symptomatic seizures [10,11].

According to Haungchoo *et al*. and Akpede GO *et al* [3,12]. the age-specific incidence of pyogenic meningitis manifesting as seizure was highest in the first year of life, occurring in 4 out of 5 cases, or 80% of cases.

According to Haung Choo *et al* [3] and Keating JP *et al*, the incidence of acute symptomatic seizures caused by metabolic injury was highest in the age range of 1 month to 1 year [13]. 24% of the patients in our analysis were epileptic or idiopathic. Out

of 24 cases, 21 cases (91%) were generalised, and 22 cases (or 22%) were older than one year. Similar results were found in Riwiza *et al* investigations [14]. In our study, cerebral palsy and mental retardation syndromes with developmental delay were linked to 9% of epileptic cases.

Conclusion

This hospital-based study sought to understand the cause of convulsions in children between the ages of 1 month and 5 years. Children's seizures might have a variety of underlying pathologies. In our study, febrile seizures were the most frequent cause of convulsions, followed by epilepsy and symptomatic seizures with an infectious aetiology of the CNS, with viral encephalitis being the most frequent. The generalised kind of seizures predominated. To determine the origin of convulsions and choose the best course of treatment, a complete history, physical examination, and pertinent investigations are helpful.

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