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Clinico-etiological profile of children with seizures admitted in a tertiary centre

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Abstract

Background: Seizure is one of the common neurological manifestations and cause of morbidity leading to hospital admission in children. Asserting the causes and types of seizure is vital to management.

Objectives: To identify the clinical profile of children and the characteristics of seizures in them.

Methods: This is a descriptive study of 32 months duration and involved analysis of the patient records including the demographics of the patients who presented with seizure. Also, type and duration of seizure were noted. All necessary investigations were done to explore the cause of seizure. Sample size was calculated using raosoft sample size calculator, and the data were entered in microsoft excel. Statistical analysis was done using statistical package for social sciences version 21.

Results: Out of the 5229 children admitted, 533 (10.2%) were admitted for seizure. Male accounted for 346 (65%) cases. 424 (79.5%) of the children were below five years. Fever was associated with seizure in 407 (75.5%) cases. Generalized tonic clonic seizure was observed in 436 (81%) children. 37 children (7%) presented in status epileptics. A total of 370 (68.6%) patients were diagnosed as febrile seizure, 86 (16%) epilepsy, 15 (2.8%) cerebral palsy, 13 (2.4%) neurocysticercosis, 13 (2.4%) tubercular meningitis, 12 (2.2%) viral meningitis, 11 (2%) pyogenic meningitis. The mean (standard deviation) duration of hospital stay was 3.3 (±2.84) days.

Conclusion: Seizures are common in less than five years of age and febrile seizure is the most common cause of hospital admission. Most of these seizures are generalized in nature.

Key words: Epilepsy, Etiology, Seizure

INTRODUCTION

Seizure is a common cause of hospital admissions in children. In a study done by Idro R et al, seizures were reported in 18.3% incident admissions[1].The incidence is highest in children less than three years of age, with a decreasing frequency in older children. Four to six percent of children below 16 years of age encounterat least an episode of seizure[2].

Identifying the causes of seizure is important in these children as it helps in speculating the cause of seizure in different age groups. Shrestha BM et al in their study found neurocysticercosis as a common cause of seizure in children in Nepal[3]. However there are studies, which has shown febrile seizure as a major cause of seizure in children[4].

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There are limited studies in developing countries that look at the causes and outcome of seizures in children. Most of the studies are focused on afebrile seizures. This study aims to look at the incidence of seizure in children and its causes and outcomes. Moreover, we tend to observe the profile of children and seizure in these populations.

METHODOLOGY

This is a descriptive hospital-based study conducted in the department of Pediatrics, Kathmandu Medical College during the period from 14th August 2012 to 25th April 2015. All the children below 14 years of age and admitted for seizure were enrolled in the study. Sample size was calculated based on the pilot study showing average of 1000 children get admitted per year in the pediatric department. With the allowable error of five percent and response distribution of 50%, a sample size for this study over the study period of four years was 381 (Raosoft sample size calculator).

Information such as age, sex, nature of seizure, additional symptoms (fever, headache runny nose, cough, vomiting, and diarrhea), family history of epilepsy, developmental history was obtained from each patient after admission. In each patient following laboratory tests were obtained: white blood count, C-reactive protein, serum electrolytes and blood sugar. Cerebrospinal fluid (CSF) analysis was done in children less than 12 months and older than five years who presented with fever and seizure. Likewise, neuroimaging (Computerized Tomography scan head or cranial magnetic resonance imaging),were done in patients with afebrile seizures, focal seizures. At the end, duration of hospital stay, final diagnosis was obtained for each. Final outcome was divided into: recovery, left against medical advice (LAMA), death and referral.

Seizures were classified into generalized tonic-clonic (GTC), absence, myoclonic, partial and other seizures types based on the Commission on Epidemiology and Prognosis, 1993 International League Against Epilepsy[5].

RESULTS

During the study period, a total of 5229 children were admitted in the Paediatric ward for various reasons. The results of the study are displayed in tables 1 and 2, and figure 1. Out of these children 533 (10.2%) were admitted for seizure. The mean age (standard deviation) was 3.52 (±3.3) years. Male accounted for 347 (65%) and female for 186 (35%) admissions. 423 (79.5%) of the children were below five years. Fever was associated with seizure in 407 (75.5%). Generalised tonic clonic seizure was observed in 436 (81%) children. 37 (7%) children presented in status epileptics. The mean (standard deviation) duration of hospital stay was 3.3 (± 2.84) days.

Among all the children admitted for seizure during the study period, two deaths occurred; one resulting from tubercular meningitis and the other from pyogenic meningitis. There were two cases who absconded and four left against medical advice.

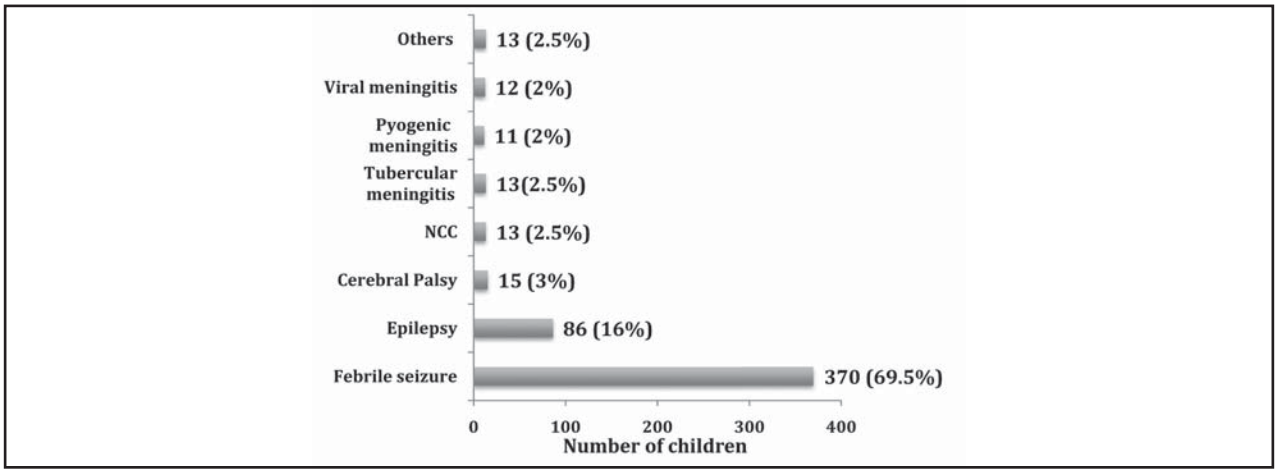

Figure 1: Etiology of seizures

Table 1: Demographic data of children with seizure (N=533)

Variables		Fever present N (%)	Fever absent N(%)
Sex	Male	265 (65)	81 (64)
	Female	142 (35)	45 (36)
Age (years)	<5	360 (89)	63 (50)
	5-10	31 (7)	44 (35)
	>10	16 (4)	19 (15)
Type of seizure	GTCS	350 (86)	87 (69)
	Tonic	0	1
	Clonic	0	1
	Absence	0	1
	Myoclonic	0	1
	Focal	57 (14)	35 (27)

Table 2: Distribution of patients based on age groups (N=533)

Variables		<5years N (%)	5-10 years N (%)	>10 years N (%)
Sex	Male	282 (66.5)	41 (55)	23 (66)
	Female	142 (33.5)	33 (45)	12 (34)
Radio Imaging	Normal	44 (11)	30 (36)	14 (37)
	Abnormal	5 (1)	27 (32)	9 (23)
	Not done	362 (88)	27 (32)	15 (40)
EEG	Normal	12 (3)	10 (13.5)	4 (11)
	Abnormal	41 (10)	21 (28)	11 (31)
	Not done	371 (87)	43 (58.5)	20 (58)
Lumbar puncture	Not done	340 (80.5)	63 (85)	28 (75)
	Normal	77 (18)	3 (4)	3 (9)
	Abnormal	5 (1.5)	8 (11)	6 (16)
Diagnosis	Febrile seizure	371 (83)	0	0
	Epilepsy	41 (9)	30 (54)	15 (51)
	Cerebral palsy	11 (2.5)	4 (7)	0
	Tubercular Meningitis	6 (1.3)	4 (7)	3 (10.1)
	Neurocysticercosis (NCC)	3 (0.6)	8 (14)	2 (8)
	Aseptic meningitis	6 (1.3)	4 (7)	2 (8)
	Pyogenic meningitis	4 (0.9)	3 (5.4)	4 (16)
	Encephalitis	2 (0.4)	2 (3.6)	1 (2.3)
	Brain tumor	1 (0.3)	1 (2)	1 (2.3)
	Neuronal migration disorder	2 (0.4)	0	0
	Hyponatraemia	1 (0.3)	0	1 (2.3)

DISCUSSION

Seizure is one of the important causes of hospital admission in children especially under five years of age. In our study 10.5% of total admission in Pediatrics department is due to seizure related conditions. In a study by Adhikari S et al[6], 12.5% of children who were admitted had seizure as a chief complaint which almost matched with our finding. However, in a similar study by Idro R et al[1], it accounted 18.3% of admissions, which is almost twice the number of our result. This high percentage of the patients is probably due to high incidence of malaria in that area where the study was done. Nevertheless, this clearly demonstrates the burden of neurological diseases in our set up. Majority of the patients in our study were male (65%) which is comparable to study done by Al Sulaiman AA et al[7] where in their study they had 153 males out of 263 children. It is notable that majority (79.5%) of our children who had seizure were below five years of age. This corroborates to the findings of study done by Adhikari S et al[6]. which accounted 57.5% of total admitted children. This result might be because majority of the children in this age group were admitted for febrile seizure.

In our study generalized seizure was the most common type of seizure which accounted 81.7%. Study by Adhikari S[6] and others[8,9] also showed majority of seizures as generalized one. In contrast, the majority of seizures in the study by Kaeranen T et al were focal in nature[10]. This may be because most of the patient in our study group were patients with febrile seizure which predominantly present with generalized feature.

Looking into the causes of seizure in our children, 86% of our children with seizure were associated with infection. This is comparable to the findings by Idro R et al[1] who had 80% of their study population had seizure associated with fever. However, malaria was the commonest cause of fever in their study unlike ours in which febrile seizure was the dominant (68.6%) etiology with second being epilepsy (16%). Adhikari S et al[6] showed that 57.5% of their children had seizure

associated with fever and the most common cause of seizure in them was seizure disorder (33.4%) which was followed by febrile seizures (30.7%). This depicts that the cause of seizure differs from different population in different places. A higher number of children in our study with seizure had associated infection. This is due to larger number of children with febrile seizure in our study.

Ordering investigations such as neuroimaging, lumbar puncture and electroencephalography has always been a contentious issue[8,11]. In our study only 23.3% of children underwent radio imaging of brain. And only 6.9% had positive results. Out of the 6.9% positive results nearly almost all (6%) children were above five years of age. This justifies our decision to ask for the neuroimaging of older children especially older ones, with focal seizure and those without fever. Similarly, only 3.4% of our children underwent lumbar puncture. It was less than one percent of children who were less than five years and had positive test results. Majority of the children who had abnormal results were above five years. Thus it is imperative to rule out central nervous system infection in older children with febrile seizure.

CONCLUSION

Our study in a tertiary care hospital of Kathmandu showed that seizure is one of the major causes of hospital admissions in children, particularly in the under-five children. Febrile seizure is the most common cause of seizure in these children and majority of them have generalized form of seizure.

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