Original Article

A Study on Clinico-Radiological Profile of Children Presenting with Seizure in a Tertiary Care Hospital in Nepal: A Cross-Sectional Study

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Abstract

Objective: To study the clinico-radiological profile of children presenting with seizure in a tertiary care hospital in Nepal.

Methods: This was a prospective cross-sectional study. Children presenting with seizures were included in the study. The children of either sex and aged 0-16 years were included in the study. Neuroimaging of all the children was done by computed tomography (CT) of head. Number of lesions were counted in CT scan of head and labeled as single or multiple. The findings were reported in the form GTCS, partial seizure and others.

Results: Out of the total 168 children with seizures, 138 (82.1%) had GTCS and 30 (17.3%) had partial seizures. GTCS was slightly higher among male children (82.7%) compared to females (81.2%). However, partial seizure was slightly lower among male children (17.3%) compared to females (18.8%). The percentage of GTCS and partial seizures was 80% and 20% in vesicular stage respectively. The percentage of GTCS and partial seizures was 89.5% and 10.5% in who fever was present. On CT scan, the percentage of GTCS and partial seizure was 86.3% and 13.7% respectively in whom NCC was found.

Conclusion: The study showed that seizure is one of the major causes of hospital admissions in children, particularly in the children. Febrile seizure is the most common cause of seizure in children and majority of them have generalized form of seizure. Seizure control with single drug, seizure without recurrence and idiopathic seizure are favorable prognostic factors.

Keywords: Seizure, Clinical, Generalized tonic-clonic seizure, Partial seizure.

INTRODUCTION

Seizure is one of the common causes of childhood hospitalization with significant mortality and morbidity. Seizure is a paroxysmal alteration in neurologic function resulting from abnormal excessive neuronal electrical activity. Epilepsy is
a chronic condition characterized by recurrent seizures unprovoked by an acute systemic or neurologic insult. An epileptic seizure is a clinical manifestation of abnormal, excessive neuronal activity arising in the grey matter of the cerebral cortex\(^1\).

The incidence of epilepsy is approximately 0.3 to 0.5\% and prevalence of epilepsy estimated as 5 to 10 persons per 1000. It is age dependant and higher in children and elderly persons than in young adults\(^2\).

There is limited data regarding acute seizure episodes from the developing countries. A study was conducted by Adhikari et al\(^3\) to find the common etiology of seizure and classify seizure types in various age groups presenting to tertiary centre in western Nepal. Out of the total 551 patients admitted, 53.5\% presented with fever, 57.5\% were less than 5 years of age. Generalized tonic-clonic seizure (GTCS) was the most common seizure type. Abnormal brain images were in 45.9\% patients.

The present cross-sectional study was designed to study the clinico-radiological profile of children presenting with seizure in a tertiary care hospital in Nepal.

**MATERIAL AND METHODS**

This was a prospective cross-sectional study conducted in a tertiary care hospital in western Nepal over a period of two years. Children presenting with seizures were included in the study. The children of either sex and aged 0-16 years were included in the study. The study was approved by the Ethical Committee of the Institute. The consent was taken from mother/father/guardian before including in the study.

Neuroimaging of all the children was done by computed tomography (CT) of head. Number of lesions were counted in CT scan of head and labeled as single or multiple. The findings were reported in the form GTCS, partial seizure and others. Complete blood count, Mantoux test, ESR, X-ray chest and gastric aspirate for AFB were done in all patients to rule out tubercular infection of brain which may have CT finding mimicking NCC.

All the data was recorded in a pre-designed proforma.

**Statistical Analysis**

The results are presented in frequencies and percentages. The Chi-square test was used to assess the associations between categorical/dichotomous variables. The p-value<0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

**RESULTS**

Out of the total 168 children with seizures, 138 (82.1\%) had GTCS and 30 (17.3\%) had partial seizures. GTCS was slightly higher among male children (82.7\%) compared to females (81.2\%). However, partial seizure was slightly lower among male children (17.3\%) compared to females (18.8\%). There was no significant (p>0.05) association between gender and type of seizures. GTCS was more common among the children of age 5-8 years and partial seizure was more common among the children of age 9-12 years with no significant (p>0.05) association. There was no significant (p>0.05) association between religion and type of seizures. GTCS was higher than partial seizure in whom Mantoux test was positive with insignificant (p>0.05) association. The positivity of gastric aspirate for AFB was low (Table-1). The percentage of GTCS and partial seizures was 80\% and 20\% in vesicular stage respectively. However, the percentage of GTCS and partial seizures was 69.2\% and 30.8\% in calcified stage respectively. The percentage of GTCS was found to be higher in whom phenytoin drug was used than others. The percentage of partial seizures was found to be higher in whom sodium valproate drug was used than others. There was no significant (p>0.05) association of stage and anti-epileptic drug with type of seizures (Table-2).
The percentage of GTCS and partial seizures was 89.5% and 10.5% in those with fever present and this association was found to be statistically significant. None of the other symptoms were associated (p>0.05) with the type of seizures (Table-3).

On CT scan, the percentage of GTCS and partial seizure was 86.3% and 13.7% respectively in whom NCC was found. However, there was no significant association between CT findings and type of seizures (Table-4).

### Table-1: Association of baseline characteristics of children with type of seizures (GTCS and partial)

| Characteristics       | No. of children | GTCS | Partial | p-value<sup>1</sup> |
|-----------------------|-----------------|------|----------|---------------------|
| No. of children       | 168             | 138  | 30       | 0.81                |
| Gender                |                 |      |          |                     |
| Male                  | 104             | 86   | 18       |                     |
| Female                | 64              | 52   | 12       |                     |
| Age in years          |                 |      |          |                     |
| 0-4                   | 45              | 37   | 8        | 0.95                |
| 5.8                   | 44              | 37   | 7        |                     |
| 9-12                  | 44              | 35   | 9        |                     |
| 13-16                 | 35              | 29   | 6        |                     |
| Religion              |                 |      |          |                     |
| Hindu                 | 154             | 125  | 29       | 0.27                |
| Muslim                | 14              | 13   | 1        |                     |
| Mantoux test          |                 |      |          |                     |
| Positive              | 8               | 5    | 3        | 0.15                |
| Negative              | 156             | 129  | 27       |                     |
| Gastric aspirate for AFB |               |      |          |                     |
| Positive              | 3               | 1    | 2        | 0.03*               |
| Negative              | 158             | 130  | 28       |                     |

<sup>1</sup>Chi-square test, *Significant

### Table-2: Association of stages on CT scan and anti-epileptic drugs with type of seizures (GTCS and partial)

| Stage on CT scan        | No. of children | GTCS | Partial | p-value<sup>1</sup> |
|-------------------------|-----------------|------|----------|---------------------|
| Vesicular               | 55              | 44   | 11       | 0.20                |
| Calcified               | 13              | 9    | 4        |                     |
| Colloidal               | 2               | 1    | 1        |                     |
| Nodular                 | 2               | 2    | 0        |                     |
| Anti-epileptic drugs    |                 |      |          |                     |
| Phenytoin (P)           | 98              | 84   | 14       | 0.27                |
| Sodium valproate (V)    | 55              | 41   | 14       |                     |
| Both F and V            | 11              | 9    | 2        |                     |
| More than above two     | 4               | 4    | 0        |                     |

<sup>1</sup>Chi-square test

### Table-3: Clinical correlation with type of seizures

| Clinical symptoms#      | No. of children | GTCS | Partial | p-value<sup>1</sup> |
|------------------------|-----------------|------|----------|---------------------|
| Fever                  | 67              | 60   | 7        | 0.04*               |
| Vomiting               | 59              | 51   | 8        | 0.28                |
| Headache               | 27              | 24   | 3        | 0.31                |
| Meningeal irritation   | 7               | 6    | 1        | 0.80                |
| Unconsciousness        | 93              | 78   | 15       | 0.51                |
| Speech disorder        | 4               | 2    | 2        | 0.08                |
| Pallor                 | 6               | 6    | 0        | 0.24                |

<sup>1</sup>Chi-square test, *Significant
DISCUSSION
In previous studies, age has been documented to have a relationship with the etiology and type of seizures. In this study, the percentage of GTCS was higher in all the age groups. Infection as an etiology is more common in children, whereas drug default and toxic-metabolic causes are common in adults, who present to with seizures (4-6). Generalized tonic clonic seizure was the most common type of seizure noticed at initiation of this study, as has been the experience in other studies as well (4-6). The partial seizure was in 17.9% children. Bhalla et al (7) reported partial seizure being 14%. However, it is possible that a focal onset may have not been noticed by the bystanders/relatives, therefore not documented. Study by Adhikari et al (3) and others (8, 9) also showed majority of seizures as generalized one. In contrast, the majority of seizures in the study by Kaeranen et al (10) were focal in nature. This may be because of most of the patient in this study were patients with febrile seizure which predominantly present with generalized feature.
In the present study, GTCS was slightly higher among male children (82.7%) compared to females (81.2%). However, partial seizure was slightly lower among male children (17.3%) compared to females (18.8%). In a study, male to female ratio was 4:1. 57.5% were known cases of seizure disorders (7).
Fever, vomiting, headache, meningeal initiation, unconsciousness, speech disorders and pallor were the commonly associated co-morbidities found in this study population. This is in agreement with the study by Yun and Xuefeng (11). Similar findings were also noted in a retrospective study, where up to 42% patients presenting with seizure had an underlying disease (12). This is also comparable to the findings by Idro et al (13) who had 80% of their study population had seizure associated with fever. Whether co-morbidity had a direct adverse effect on seizure in this study population could not be ascertained as numbers of patients was small.
Both phenytoin and Sodium valproate were used together for termination and phenytoin was used. This finding is in agreement to the study by Bhalla et al (7).
The investigations such as neuroimaging, lumbar puncture and electroencephalography has always been a contentious issue (7,14). In this study, all the children underwent for CT of head. And majority children had NCC.

CONCLUSION
The study showed that seizure is one of the major causes of hospital admissions in children, particularly in the children. Febrile seizure is the most common cause of seizure in children and majority of them have generalized form of seizure. Seizure control with single drug, seizure without recurrence and idiopathic seizure are favorable prognostic factors.

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Table-4: Neuro imaging in GTCS and partial seizures

| CT scan findings | No. of children | GTCS No. | %   | Partial No. | %   | p-value¹ |
|------------------|-----------------|----------|------|-------------|------|----------|
| Normal           | 73              | 63       | 86.3 | 10          | 13.7 | 0.40     |
| NCC              | 72              | 56       | 78.2 | 16          | 22.2 |          |
| Others           | 23              | 18       | 78.2 | 5           | 21.7 |          |

¹Chi-square test
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