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Clinico-etiological Profile of Seizure Disorder among Adults Admitted to Tertiary Care Hospital of Nepal

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ABSTRACT

Introduction

Seizures beginning in the adult life require special attention as regards to their etiology because these are likely to be due to an identifiable cause. Understanding the trend in prevalence of various etiology of seizure will help in formulation of diagnostic protocol and might help to reduce the cost of investigations. In this retrospective study, we, therefore, aimed to assess etiology and clinical profile of adult onset seizures.

Methods

This was a retrospective study done at Tribhuvan University Teaching Hospital (TUTH), Kathmandu, Nepal. We included patients of both sexes and age > 18 years old admitted to neurology ward with seizure disorder and excluded the patients who suffered from unprovoked seizure and epilepsy. Our study variables included demographic profile of patients, co-morbidities, clinical features, laboratory investigation, neuro-imaging, EEG and drugs.

Results

Among 26 patients, 3 (11.5%) had hyponatremia, 2(7.7%) had intra-cranial space occupying lesion, 12(46.2%) had neurocysticercosis (NCC), 1 (3.8%) had opioid withdrawal, 1 (3.8%) had alcohol withdrawal, 1 (3.8%) had stroke, 1 (3.8%) tuberculoma and in 5 (19.2%) patients no underlying cause was found.

Conclusion

NCC was the most common cause of seizure disorders among adults. Even after huge development in laboratory, neuroimaging and neurophysiology testing, in as much as 19.2% patients, no etiology could be found.

Keywords: *Adults, outcome, seizure, tertiary care hospital*

INTRODUCTION

A seizure is defined as a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain¹. On a global scale, seizures are a relatively common neurological disease that has been recognized since ancient times and is often encountered in medical practice. Seizures account for 2% of all emergency department visits². Up to 10% of the general population has experienced at least one seizure in their lifetime, with the highest incidence being early childhood and late adulthood. Seizures beginning in the adult life require special attention as

regards to their etiology because these are likely to be due to an identifiable cause³. These are mainly due to acute ischemic or hemorrhagic stroke, subdural hematoma, subarachnoid hemorrhage, traumatic brain injury, brain tumors, hypoxic-ischemic injury, brain abscess, meningitis, viral encephalitis, bacterial encephalitis, neurocysticercosis, metabolic disturbance, substance ingestion or withdrawal, and medication exposure⁴. On the other hand, seizures beginning in childhood are more likely to be idiopathic⁵. In addition, the etiology and clinical profile of seizures in adults necessitate decisions about the initiation and discontinuation of

pharmacotherapy that are different from those in younger patients.

Diagnosis and treatment pose challenges for adults due to differences in clinical manifestations and etiologies compared to children, as well as comorbidities affecting pharmacological management, cognitive problems and physiological changes. In addition, when a patient has a seizure, it is not always clear which laboratory and imaging studies should be performed. Patient admitted in emergency department with new onset of seizure are often evaluated using cranial computed tomography (CT). Treating physician have to decide for further investigations including electrolytes, glucose, calcium, magnesium, complete blood count, renal function tests, liver function tests, urinalysis, toxicology screens, pregnancy test in women of child-bearing age, lumbar puncture, electroencephalogram (EEG) and magnetic resonance imaging (MRI) for patients who present with a first attack of seizure⁶. There is concern for cost of these investigations in resource challenged environment as in Nepal. Misdiagnosis carries the potential risk of mortality and morbidity. Understanding the trend in prevalence of various etiology of seizure will help in formulation of diagnostic protocol and might help to reduce the cost of investigations.

There are limited studies on etiological and clinical profile of seizure among adults in developing countries like Nepal. In this retrospective study, we therefore aimed to assess etiology and clinical profile of adult onset seizures.

METHODS

This study was approved by the Institutional Review Board of Tribhuvan University, Institute of Medicine. The approval number for our study is 425(6-11) E2/075/076. This was a retrospective study and the site of patient enrollment was Tribhuvan University Teaching Hospital (TUTH) located in capital city Kathmandu.

We performed non probability sampling and included patient of both sexes and age > 18 years old admitted to neurology ward

with seizure disorder from 2075 /7/1 to 2075/12/1. We excluded the patients who suffered from epilepsy. Our study variables included demographic profile of patients, co-morbidities, clinical features, laboratory investigation, neuro imaging, EEG and drugs.

Categorical variables were presented in the form of frequency and percentage. Continuous variables were presented in the form of mean and standard deviation. All the statistical analyses were performed using SPSS 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.).

RESULTS

In this retrospective study, we included 26 patients admitted to Neurology ward of TUTH. The age of patients ranged from 18 to 67 years. Among them, 15(57.7%) were male, 23(87%) were from outside Kathmandu valley, 20 (76.9%) were married, 1(3.8%) had diabetes mellitus, stroke and mental retardation, 4(15.4%) had hypertension, and none of them had malignancy, CKD or CLD. Two (8.3%) patients were having drug intoxication or withdrawal, and none were found to be taking drugs that might cause seizure. EEG abnormality was present in 20(76.9%) patients, while neuroimaging abnormality was present in 17(65.4%) patients. Details of demographic and clinical profile are illustrated in table 1. Mean, maximum, minimum and standard deviation of various laboratory parameters and vitals of study population are given in table 2.

One (3.8%) patient had focal seizure with impaired consciousness, 5 (19.2%) has focal seizure with preserved consciousness, 19(73.1%) had generalized tonic clonic seizure and 1(3.8%) had seizure of unknown onset. Types of seizures among study population is illustrates in figure 1. Three (11.5%) had hyponatremia, 2(7.7%) had intracranial space occupying lesion, 12(46.2%) had neurocysticercosis, 1 (3.8%) had opioid withdrawal, 1 (3.8%) had alcohol withdrawal, 1 (3.8%) had post stroke seizure, 1 (3.8%) tuberculoma and in 5 (19.2%) patients no diagnosis was reached. Etiology of seizure is

Table 1: Details of demographic and clinical profile of included patients.

Demographic and clinical profile		N (Frequency)	% (Percentage)
Sex	Male	15	57.7
	Female	11	42.3
Address	Kathmandu	3	13
	Outside Kathmandu	23	87
Marital status	Married	20	76.9
	Unmarried	6	23.1
Diabetes mellitus	Yes	1	3.8
	No	25	96.2
Hypertension	Yes	4	15.4
	No	22	84.6
Mental retardation	Yes	1	3.8
	No	25	96.2
Malignancy	Yes	0	0
	No	26	100
CLD	Yes	0	0
	No	26	100
CKD	Yes	0	0
	No	26	100
Drug intoxication or withdrawal	Yes	2	8.3
	No	24	91.7
Drug causing seizures	Yes	0	0
	No	26	100
Stroke	Yes	1	3.8
	No	25	92.6
EEG	Abnormal	20	76.9
	Normal	6	33.1
Neuroimaging	Abnormal	17	65.4
	Normal	9	34.6

Table 2: Vitals and laboratory parameters of patients

Vitals and laboratory profile	Minimum	Maximum	Mean	Standard Deviation
Systolic blood pressure	108	140	119.62	9.2
Diastolic blood pressure	70	90	79.77	4.77
Pulse	68.0	99.0	84.24	8.99
Temperature	98.0	99.0	98.25	0.4
SpO2	8	100	95.46	17.8
Random Blood Sugar	78	110	95.54	7.3
Serum sodium	113	142	135.38	8.12
Serum potassium	3.0	5.1	4.296	0.37
Serum urea	1.5	10.0	3.715	1.73
Serum creatinine	67	155	103.04	16.4
Serum calcium	2.1	2.8	2.400	0.2

illustrated in figure 2.

DISCUSSION

The most common etiology of seizure was neurocysticercosis (NCC) and the most common type of seizure was generalized tonic clonic seizure. The prevalence of NCC was found to be 12(46.2%). Other studies done in Nepal showed prevalence of 42.9% to 45.9%⁷. NCC is a preventable parasitic

infection of the central nervous system and is caused by the pork tapeworm *Taenia solium*⁸. Humans become infected after consuming undercooked food or water contaminated with tapeworm eggs, or through poor hygiene practices. In developing countries, NCC is the most common parasitic disease of the nervous system and is the main cause of seizure disorder and acquired epilepsy. The disease may be asymptomatic or may present with seizures, headaches, focal neurological deficits, increased intracranial pressure, or cognitive impairment⁹.

The introduction of modern neuroimaging technology and improved immunodiagnostic testing have improved the diagnostic accuracy of NCC.^{10,11} However, neuroimaging and serological testing must be interpreted in the context of a given patient to avoid overdiagnosis and misdiagnosis of NCC¹¹. The first line of management should address the symptoms and pathogenesis involved in its occurrence. Therefore, before considering the use of the currently available cystic drugs albendazole and praziquantel, appropriate symptomatic treatment should always be

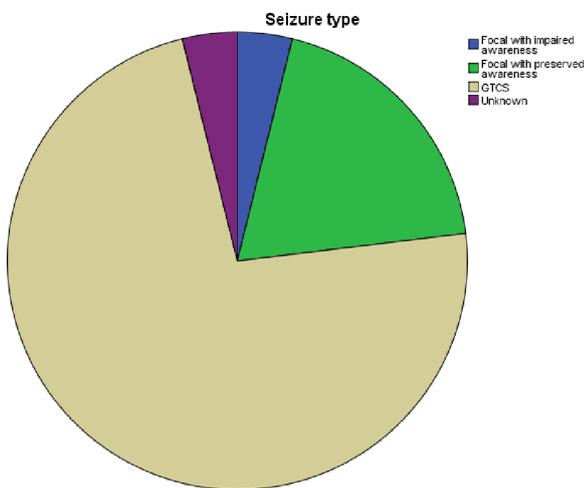


Figure 1 : Types of seizure seen in study population

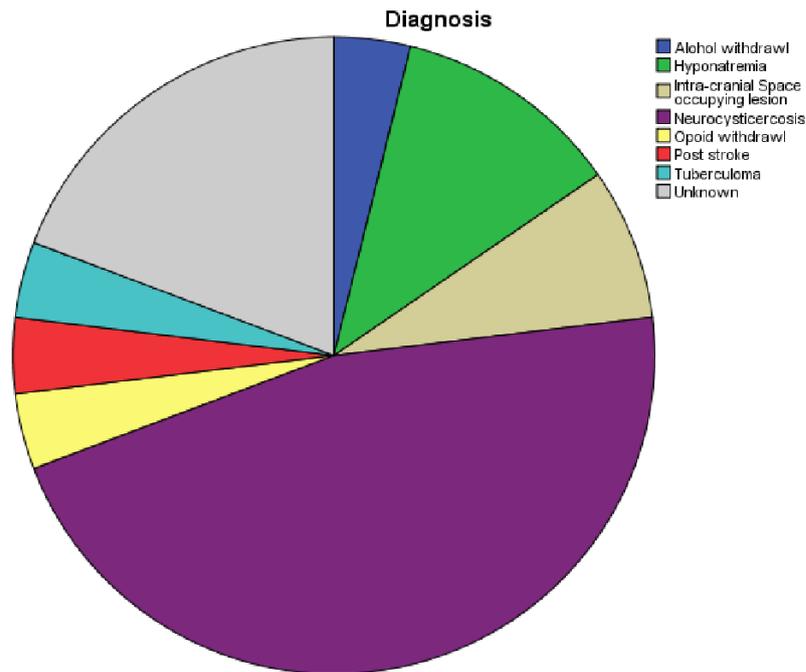


Figure 2: Causes of seizure in study population

taken: anti-epileptic drugs, analgesics, anti-inflammatory drugs, anti-edema drugs or surgery. Cysticidal treatment is indicated in most NCC cases and effectively kills a living parasite cyst, although it may cause transient symptomatic deterioration due to inflammation of the surrounding paranchyma caused by antigen release¹².

The other most common cause of seizures in our study is hyponatremia. According to a report in the United States, the prevalence of hyponatremia in the emergency department was 2.7%, and a survey in Taiwan showed 2.9%¹³. A decrease in serum sodium concentration can trigger systemic tonic-clonic seizures, often associated with confusion and loss of consciousness. These convulsions are associated with a high risk of death and must be treated urgently¹⁴. Care should be taken to avoid excessively rapid correction of severe hyponatremia¹⁵. Some important causes of hyponatremia include liver disease, kidney disease, inappropriate ADH secretion syndrome, prolonged vomiting, severe diarrhea, third spatial fluid sequestration, use of desmopressin or thiazide diuretics, tricyclic antidepressants, selective serotonin reuptake inhibitors, fever and polydipsia¹⁶.

Even after EEG, imaging systems and laboratory tests, in as many as 5 (19.2%) patients, no underlying cause could be found. However, the clear evidence for determining etiology depends on the sensitivity/specificity of the available tests, which is a limiting variable in developing countries. Nepal and other developing countries also need to conduct larger epidemiological studies on seizure disorders to highlight the actual burden of the disease.

CONCLUSION

Neurocysticercosis was the most common cause of seizure disorders among adults. Even after huge development in laboratory, neuroimaging and neurophysiology testing, in as much as 19.2% patients, no etiology could be found.

CONFLICTS OF INTEREST

None declared.

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