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Original Research Article

CLINICO-ETIOLOGICAL PROFILE OF SEIZURES AMONG ADULT SUBJECTS ATTENDING A TERTIARY CARE HOSPITAL

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ABSTRACT

Background
The nature, burden, and effects of adult-onset seizure disorder on the person, family, and community make it a serious public health concern. The purpose of this study was to evaluate the etiology and clinical features of adult-onset seizures. The current study aims to investigate the clinical profile of seizures in adult patients visiting our hospital, classifying seizures in accordance with the 2010 ILAE classification system, and identifying the cause of seizures in adult patients.

Material and methods
This was a prospective cross-sectional hospital-based study conducted on 100 cases presenting with adult-onset seizures at medical emergency ward/OPD/ICU in the Department of General Medicine, KR Hospital, Mysore for a period of 2 years. Renal function tests, serum electrolytes, electroencephalograms (EEG), and Computed Tomography (CT) brain scans were the parameters that were evaluated. SPSS version 25.0 was used to analyze the results, and $P < 0.05$ was deemed statistically significant at 95% confidence interval.

Results
Men made up 77% of the patients overall, while women made up 23%. There were 47% of patients with aberrant EEG results and 48% of patients with abnormal neuroimaging results.

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75% of patients experienced a generalized tonic-clonic seizure, 20% had focal seizure with preserved consciousness, 3% had focal seizure with impaired consciousness, and 2% had a seizure of unknown onset. Non-compliance to antiepileptic drugs (AED) and alcohol withdrawal were the two most common causes of seizures.

Conclusions

Among adults, non-compliance to AED and alcohol withdrawal was the most frequent cause of seizure disorder. Despite significant advancements in laboratory, neuroimaging, and neurophysiology testing, no etiology could be identified in up to 16% of patients.

All cases of adult epilepsy should be treated carefully and effectively. Identifying and understanding the causes and types of epilepsy can help better manage patients.

Clinicians play an important role in identifying adults with epilepsy and should encourage these patients to undergo neuroimaging to reach a diagnosis of etiological disease.

With the recent advancements in neuroimaging technology, adult epilepsy treatment appears to have a promising future.

Keywords: Adults, Etiology, Antiepileptic drugs (AED), Neurocytosticercosis, Outcome, Seizures.

INTRODUCTION

Since ancient times, seizures have been recognized as prevalent illnesses and are frequently encountered in medicine. Up to 10% of the general population has had a seizure at some point in their lives, with the highest frequency occurring in early infancy and late adulthood. A brief period of signs and/or symptoms caused by unusually high or coordinated brain neuronal activity is known as a seizure.[1] 2% of visits to the emergency room are due to seizures.[2]

When it comes to the etiology of seizures, adult-onset seizures demand particular attention because there is a good chance that they have a known cause.[3]

These are mostly brought on by brain tumors, traumatic brain injury, subdural hematoma, subarachnoid hemorrhage, meningitis, viral encephalitis, neurocysticercosis, metabolic imbalance, substance use or withdrawal, and medicine exposure.[4]

Decisions regarding the start and termination of medication in adult patients differ from those in younger individuals due to the etiology and clinical characteristics of seizures.

Misdiagnosis entails a possible risk of both morbidity and fatality. Comprehending the patterns in the frequency of different seizure etiologies can aid in developing a diagnostic technique and potentially lower the expense of research. To ascertain if an underlying structural abnormality is present or not, neuroimaging studies should be performed on all patients who have seizures that start in adulthood. When evaluating individuals with new-onset seizures, magnetic resonance imaging (MRI) has been shown to be more beneficial than computed tomography (CT) scanning. CT scan is still a suitable option in emergency situations, though.

Research on the etiology and clinical characteristics of adult seizures in developing nations such as India is scarce. Therefore, this study aimed to assess the clinical profile and etiology of adult-onset seizures in the Mysore region of the Indian state of Karnataka.

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MATERIAL AND METHODS

The prospective observational cross sectional study was conducted at medical emergency ward/OPD/ICU in the Department of General Medicine, KR Hospital, Mysore for a period of 2 years (2021-2023). The ethical permission was taken from institutional ethics committee. Patients were asked to sign an informed consent form before participating on the study.

The sample size was calculated by using the formula- 4pq/l^2

Through this the final sample size was calculated as 100. The patients were selected according to inclusion and exclusion criteria.

Inclusion criteria

- Patients with age >= 18 years with new onset of seizures by history.
- Patients taking >=1 antiepileptic drug for seizures, with recurrence of seizures by history.

The 2010 ILAE classification system for seizures was used to determine the type of seizure.

Exclusion criteria

- Patients experiencing syncope, movement problems, and hyperventilation syndrome.

The proforma sheet contained the demographic, social, and medical information about the patients. The aforementioned variables were examined: Serum electrolytes, electroencephalogram, renal function test, and CT brain.

Frequency and percentage were used to display categorical data. The mean and standard deviation were the formats used to present continuous variables. With SPSS 25.0, all statistical analyses were carried out.

RESULTS

Of the 100 patients in this study, 23% were female and 77% were male. Of them, 81% were married, 25% had diabetes mellitus, 33% had hypertension, 31% had a stroke, 1% had malignancy, 5% had chronic kidney disease, 6% had chronic liver disease, and none had mental retardation. 11% of patients were discovered to be taking medicines that could cause seizures, and 42% of patients were intoxicated by pharmaceuticals. Of the all patients, 47% had aberrant EEG results, and 48% had abnormal neuroimaging results. Table 1 displays patient demographic and clinical profile details.

Table 2 displays the mean and standard deviation of several laboratory measures as well as the patients' vital signs.

75% of patients experienced a generalized tonic-clonic seizure, 20% had focal seizure with preserved consciousness, 3% had focal seizure with impaired consciousness, and 2% had a seizure of unknown onset. Graph 1 displays the different types of seizures that patients had.

Hyponatremia affected 11% of patients, intracranial space-occupying lesions affected 8%, neurocysticercosis affected 4%, alcohol withdrawal affected 23%, post-stroke seizures

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affected 4%, tuberculoma affected 4%, drug noncompliance affected 30%, and no etiological cause was established for 16% of patients. In graph 2, the etiology of seizures is displayed.

Demographic and clinical profile		**Percentage**
Gender	Male	77
	Female	23
Marital status	Married	81
	Unmarried	19
Diabetes mellitus	Yes	25
	No	75
Hypertension	Yes	33
	No	67
Mental retardation	Yes	0
	No	100
Malignancy	Yes	1
	No	99
CLD	Yes	6
	No	94
CKD	Yes	5
	No	95
Stroke	Yes	31
	No	69
EEG	Abnormal	47
	Normal	53
Neuroimaging	Abnormal	48
	Normal	52
Drugs causing seizures	No	89
	Yes	11
Drug intoxication	No	58
	Yes	42

Table 1: Details of demographic and clinical profile of patients

Vital and laboratory profile	**Mean ±SD**
Systolic blood pressure	134.2±20.5
Diastolic blood pressure	82.5±10.9
Pulse	92.7±81.0
Temperature	97.1±0.5
Spo2	96.1±16.8
Serum sodium	135.3±5.0

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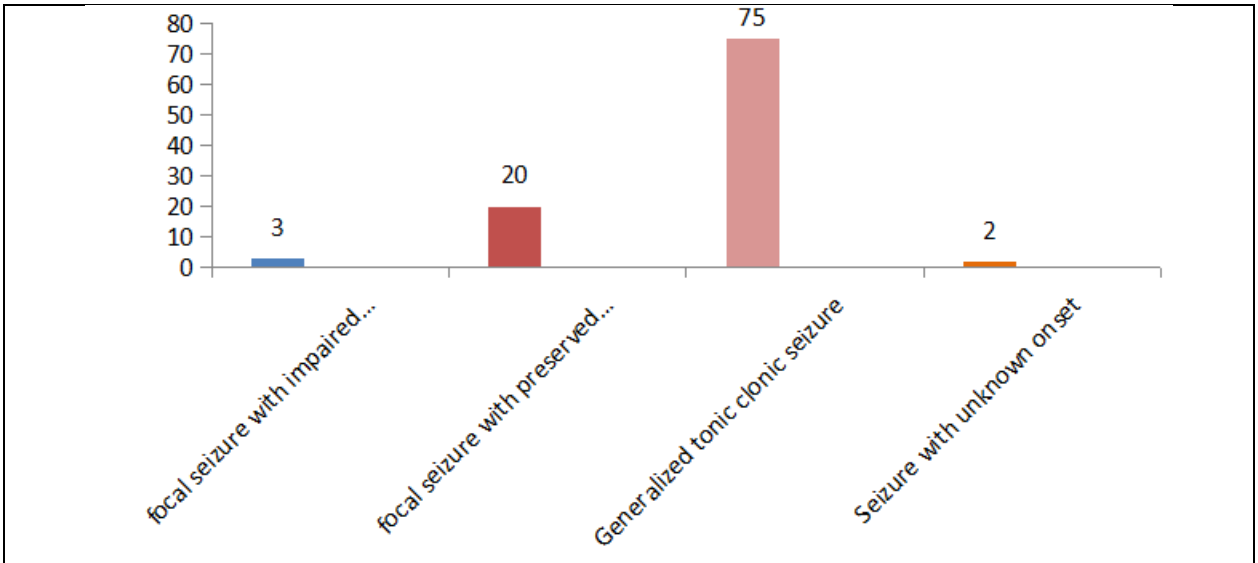
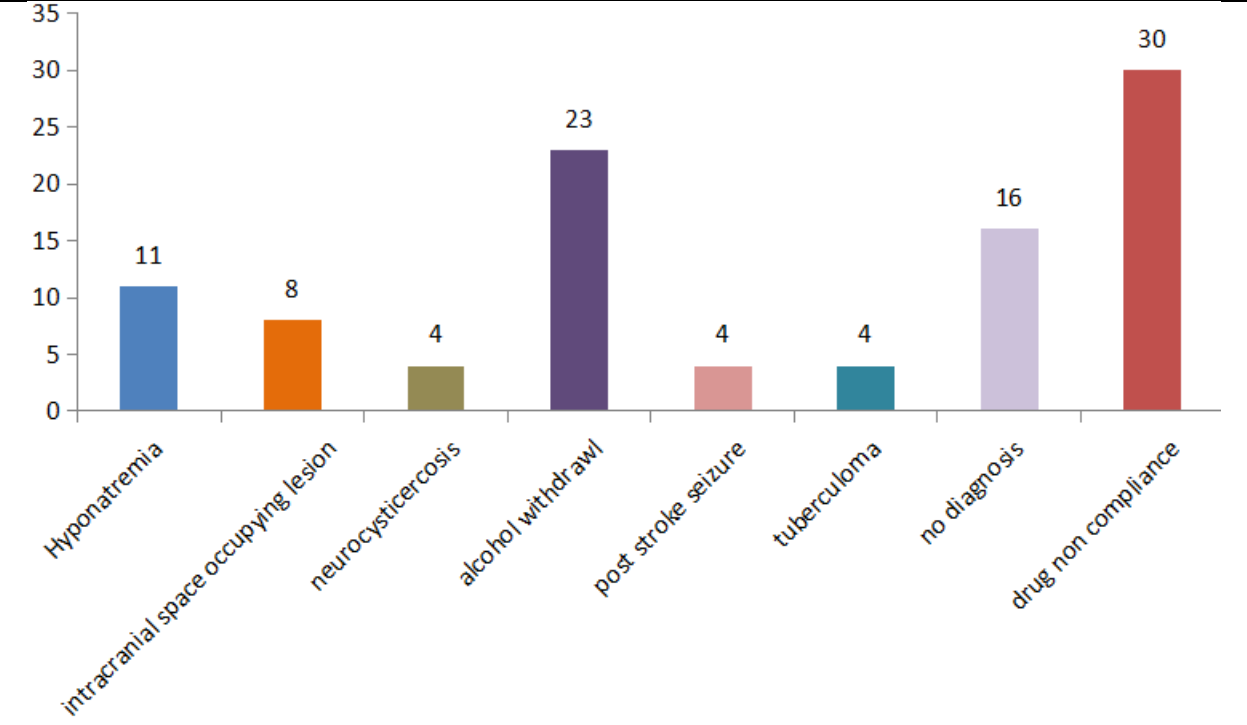
Serum potassium	4.1±0.5
Serum urea	33.2±17.0
Serum creatinine	1.06±0.7

Table 2: Vitals and laboratory profile of patients



Graph 1: Types of seizures among patients



Graph 2: Etiology of seizure

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DISCUSSION

Generalized tonic clonic seizures (75%) were the most prevalent form of seizure, and drug non compliance (30%) followed by alcohol withdrawal (23%) was the most common cause of seizures. This was because during withdrawal from drugs and alcohol, usually 6–8 hours after the cessation of, seizures may occur. Drugs and alcohol affect the brain in a number of ways that affect seizure threshold. These include impacts on the ion-gated glutamate (NMDA) and GABA receptors' calcium and chloride flow. Tolerance develops as a result of the CNS's adaptation to alcohol's effects during extended intoxication; however, these adaptive effects appear to be temporary and end when alcohol use is discontinued. Despite the likelihood of a dose-dependent and causative association between alcohol and drug use and seizures, the clinical evidence currently available does not support the idea that drug use causes seizures. Nonetheless, there may be a hereditary tendency to withdrawal symptoms from drugs or alcohol.[5]

Another study conducted in Nepal revealed the most common cause of seizures as NCC with frequency ranging from 42.9% to 45.9% which was dissimilar to our study.[6] Taenia solium, a pork tapeworm, is the parasite that causes NCC, an avoidable infection of the central nervous system.[7] People can contract the infection by eating undercooked food, drinking water tainted with tapeworm eggs, or by not washing their hands frequently enough. The most prevalent nervous system parasite illness in underdeveloped nations, NCC is the primary cause of acquired epilepsy and seizure disorders. The illness may show no symptoms at all or may manifest as localized neurological impairments, headaches, elevated intracranial pressure, seizures, or cognitive impairment.[8] The diagnosis accuracy of NCC has increased with the introduction of contemporary neuroimaging technology and enhanced immunodiagnostic testing.[9,10] To prevent over diagnosing and misdiagnosing NCC, serological testing and neuroimaging must be interpreted in the context of a specific patient.[10] The pathophysiology and symptoms associated with the condition should be addressed as the primary focus of care. Consequently, before considering the use of the currently available cystic therapies, albendazole and praziquantel, appropriate symptomatic treatment (anti-epileptic medications, analgesics, anti-inflammatory drugs, anti-edema drugs, or surgery) should always be administered under supervision. Cysticidal therapy is recommended. It successfully eliminates a viable parasite cyst in the majority of NCC instances, while treatment may cause temporary clinical decline brought on by antigen-induced paranchymal inflammation around the patient.[11]

Hyponatremia is the other most frequent cause of seizures in our study. A study conducted in Taiwan revealed that the prevalence of hypoonatremia in the emergency room was 2.9%, whereas a report in the United States indicated that it was 2.7%.[12] Reduced serum sodium levels can cause systemic tonic-clonic seizures, which are frequently accompanied by disorientation and unconsciousness. There is a significant chance of death from these convulsions, thus prompt medical attention is required.[13] It's important to exercise caution when treating severe hyponatremia too quickly.[14] Some major 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

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antidepressants, selective serotonin reuptake inhibitors, fever, and polydipsia.[15] In as many as 16% patients, no underlying reason could be identified even with EEG, imaging systems, and laboratory testing.

However, the distinct evidence for identifying etiology is determined by the sensitivity/specificity of the available tests, which is a constraint in developing countries. More extensive epidemiological studies on seizure disorders are needed to show the actual cost of the condition.

CONCLUSION

Adult seizure disorders were most commonly caused by drug non compliance and alcohol withdrawal. Despite significant advancements in laboratory, neuroimaging, and neurophysiology testing, no etiology could be identified in up to 16% of patients.

REFERENCES

[1] Fisher RS, Cross JH, French JA, Higurashi N, Hirsch E, Jansen FE, et al. Operational classification of seizure types by the International League Against Epilepsy: Position Paper of the ILAE Commission for Classification and Terminology. Epilepsia 2017;58(4):522-30.
[2] Gilliam FG, Mendiratta A, Pack AM, Bazil CW. Epilepsy and common comorbidities: improving the outpatient epilepsy encounter. Epileptic Disorders 2005;7(1):27-33.
[3] Kaur S, Garg R, Aggarwal S, Chawla SPS, Pal R. Adult-onset seizures: clinical, etiological, and radiological profile. Journal of Family Medicine and Primary Care 2018;7(1):191.
[4] Murthy J, Yangala R. Acute symptomatic seizures-incidence and etiological spectrum: a hospital-based study from South India. Seizure 1999;8(3):162-5.
[5] Hillbom M, Pieninkeroinen, Leone M. Seizures in Alcohol-Dependent Patients. CNS Drugs 2003;17:1013-30.
[6] Kafle D, Oli K. Clinical Profile of patients with recurrent seizure in tertiary care hospital in Nepal. Kathmandu University Medical Journal 2014;12(3):202-6.
[7] García HH, Gonzalez AE, Evans CA, Gilman RH, Peru CWGi. Taenia solium cysticercosis. The Lancet 2003;362(9383):547-56.
[8] Garcia HH, Del Brutto OH. Taenia solium cysticercosis. Infectious Disease Clinics of North America 2000;14(1):97-119.
[9] Deckers N. Serological markers for improved diagnosis of porcine cysticercosis: Ghent University 2009.
[10] Sapkota K. Role of serology, neuroimaging and stool examination in diagnosis of neurocysticercosis 2012.
[11] Willingham AL, Engels D. Control of Taenia solium cysticercosis / taeniosis. Advances in Parasitology 2006;61:509-66.
[12] Hao J, Li Y, Zhang X, Pang C, Wang Y, Nigwekar SU, et al. The prevalence and mortality of hyponatremia is seriously underestimated in Chinese general medical patients: an observational retrospective study. BMC Nephrology 2017;18(1):328.

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[13] Nardone R, Brigo F, Trinka E. Acute symptomatic seizures caused by electrolyte disturbances. J Clin Neurol 2016;12(1):21-33.
[14] Vaidya C, Ho W, Freda BJ. Management of hyponatremia: providing treatment and avoiding harm. Cleve Clin J Med 2010;77(10):715-26.
[15] Wakil A, Ng JM, Atkin SL. Investigating hyponatraemia. BMJ 2011;342:d1118.