

## Study of Clinical Profile, Management and Outcome of Patients Presented with Seizures in Emergency Medicine Department

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### ABSTRACT

**Background:** Seizures are sudden, uncontrolled electrical disturbances in the brain that causes wide range of symptoms. Predominant causes are CNS infection, trauma, space occupying lesion, cerebro-vascular accident etc. The goal of the emergency clinician is to differentiate seizures from mimics and identify reversible causes. Management focuses on identifying reversible causes such as hypoxia, hypoglycemia and initiating pharmacological treatment. **Aim:** The aim is to study different variables related to clinical profile, management and outcome of the patients presenting with seizures in Emergency Department (ED). **Material & Methods:** We conducted a prospective observational study on 200 patients who presented with seizures in the emergency medicine department according to inclusion and exclusion criteria from September 2020-October 2021. In all patients of our study, primary and secondary surveys along with immediate resuscitation were done. A brief history, clinical examination and all necessary hematological and radiological investigations were done. Patients were treated accordingly and followed-up until discharge or death. **Results:** Out of 200, 73% patients were males and 27% were females. Mean age of study population was 49.3 years. Idiopathic (26%) was the leading cause followed by alcohol withdrawal seizure (20%) and cardio-vascular accident (13%) with generalized tonic clonic seizures (GTCS) being the commonest type (67%). Majority of patients (95%) were treated with anti-epileptic drugs (AEDs). **Conclusion:** Along with immediate primary resuscitation, early identification, prevention of recurrence and treating the cause forms the basis of management of seizures in emergency department.

**Key Words:** Seizure, Management, Idiopathic, Emergency department

### INTRODUCTION

Seizure is an issue of abnormal nervous system, and is usually a manifestation of an alteration in normal electrical activity of brain. Epilepsy is defined as recurrent non-inducible seizures due to genetically determined or acquired brain diseases<sup>[1]</sup>. Seizure activity lasting for  $\geq 5$  minutes or two or more seizures without regaining consciousness between seizures is called status epilepticus<sup>[2]</sup>. Seizures can be divided into two main groups: generalized seizures and partial seizures. Partial seizures are further classified into simple partial and complex partial seizure. Generalized seizures are further classified into tonic-clonic or grand mal, absence or petit mal, myoclonic, tonic, clonic and atonic seizure.

Less than half of epilepsy cases have identifiable causes and may vary from place to place. It is due to brain injury such as trauma, CNS infection, space-occupying lesions (SOL), brain tumor or stroke. Similarly, an abrupt discontinuation of anti-epileptic medications, alcohol withdrawal or intoxication, electrolyte imbalances, hypoglycemia or hypoxia can also cause abnormal electrical discharge in brain leading to seizure episodes.

The emergency physician faces many challenges in evaluating patients presenting with seizures because the differential diagnosis is broad and many conditions mimic seizures. The goal of the emergency clinician is to differentiate a seizure from seizure mimics such as syncope, dysrhythmia, dystonic drug reactions, tetanus, strychnine poisoning<sup>[1]</sup> and identify causes that are reversible such hypoglycemia or hypoxia. This study focuses on to know common age group of subjects presented with signs and symptoms of seizures to the emergency department and initiating appropriate management.

## MATERIAL AND METHODS

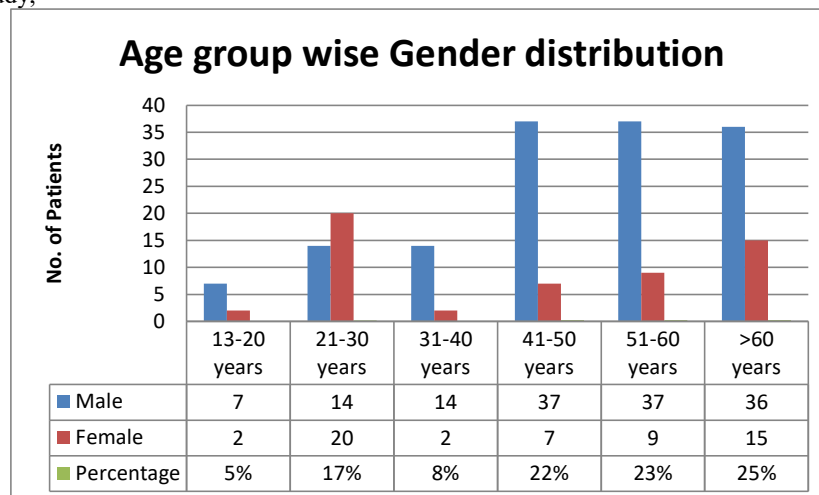
This study began after institutional ethical committee approval. All patients presented with seizures admitted in the emergency medicine department were included according to inclusion and exclusion criteria in a single-centre, prospective observational study from September 2020-October 2021 with a sample size of 200 patients. Inclusion criteria was all patients of both sexes with more than 12 years of age presenting with seizures after obtaining proper verbal and written consent. Exclusion criteria were patients or patients relatives who did not give consent for the study, patients with seizures due to acute trauma and age less than 12 years.

After admitting to Emergency medicine department, all patients presented with seizure were put on multipara monitor, oxygenation was started, IV lines were secured and all vitals were recorded. Thorough primary and secondary survey were done in all study patients. Patients with seizures were evaluated at emergency by history, clinical examination, presenting signs and symptoms. Radiological imaging in the form of chest x-ray, ultrasonography (USG), computerized tomography (CT) or magnetic resonance imaging (MRI) were performed. All the necessary hematological and radiological investigations required for the patients were done as per institute protocol. According to clinical presentation and prognosis, patients were treated. After initial stabilization and observation in ER, patients were disposed according to their clinical status. All the patients were followed-up until discharge from the hospital or in-hospital death.

The data was arranged and analyzed using Microsoft Excel software of Microsoft office 2007. The results were expressed as percentage of total and mean with standard deviation.

## RESULTS

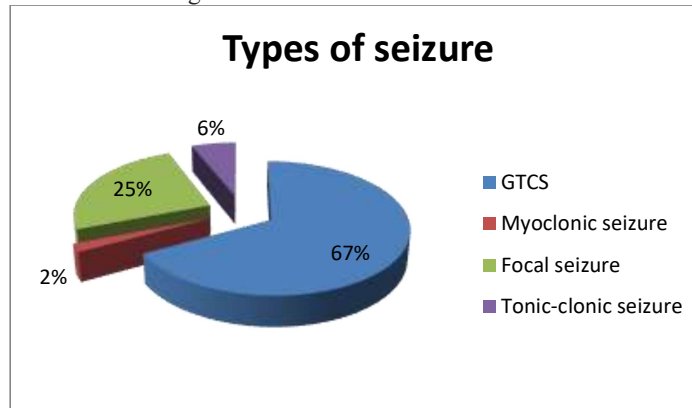
In our study,



**Figure 1:** Percentage distribution of subjects based on their age group and gender, it shows that out of total 200 patients, 145 were males (73%) and only 55 (27%) were females. Majority of participants were of more than 60 years (51.25%) of age followed by 51-60 years (46.23%). The mean age among study participants was  $49.3 \pm 16.73$  years.

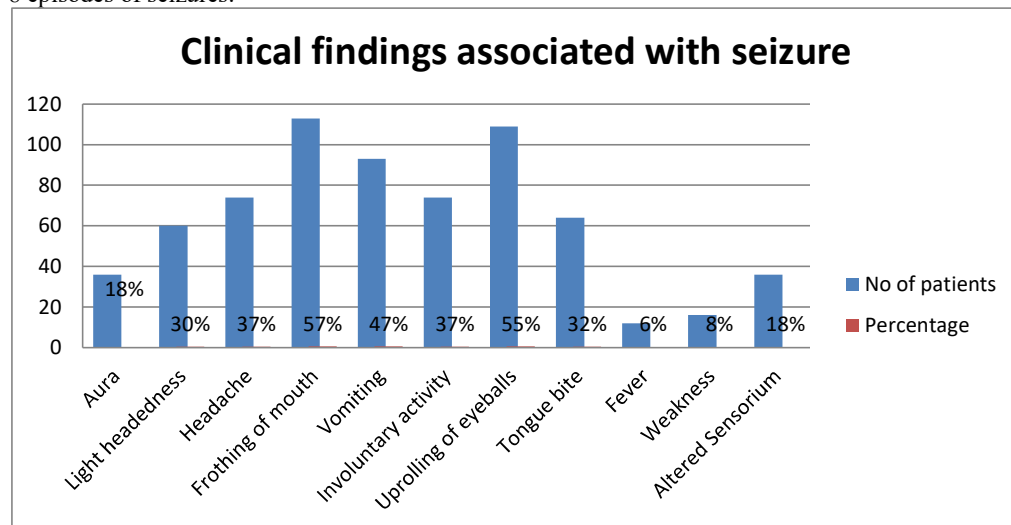
- A history of addiction was present in 85% of patients, including alcohol consumption (31%), smoking (30%), tobacco chewing (22%) and substance abuse (2%).

- Comorbidities were present in 156(76%) participants like hypertension(37%), diabetes(23%), known case of epilepsy(22%) and respiratory illness(6%).
- Majority of patients had body temperature, pulse rate, blood pressure, respiratory rate, oxygen saturation within a normal range.

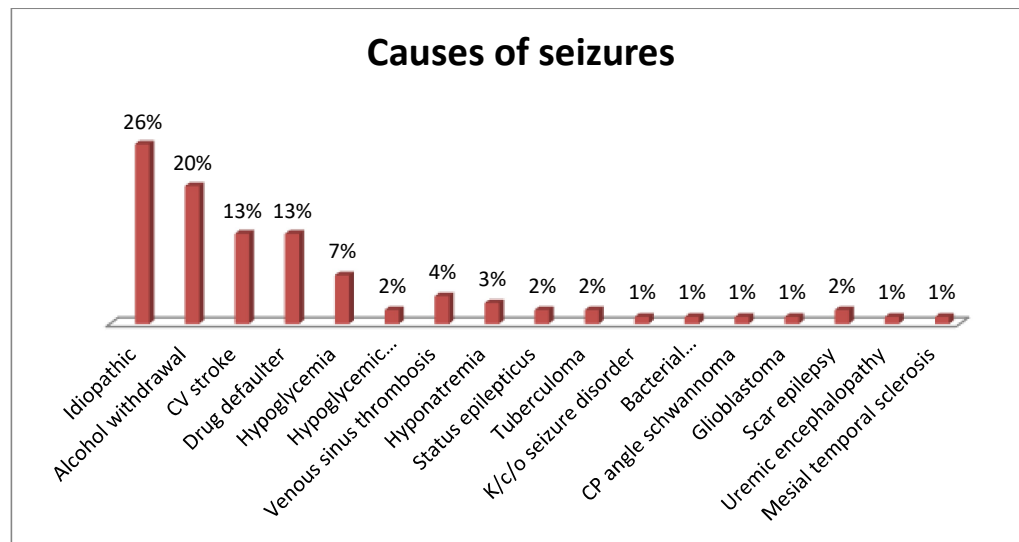


**Figure-2:** Percentage distribution of subjects based on the type of seizure, and it reveals that majority (67%) had GTCS followed by focal seizure (25%).

- Most of the patients (84%) had less than 5 episodes of seizures but 3% subjects had more than 8 episodes of seizures.

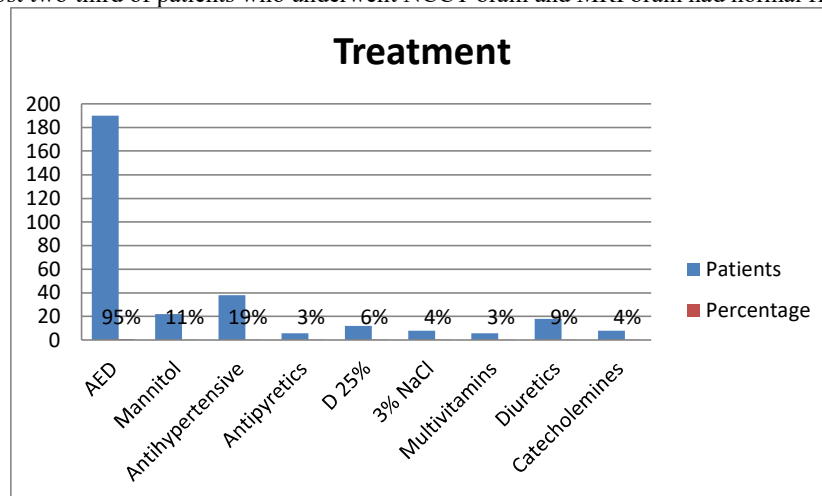


**Figure-3:** Percentage distribution of subjects based on clinical findings associated with seizures, and it shows that 57% patients had frothing of mouth followed by up-rolling of eyeballs (55%) and vomiting (47%).



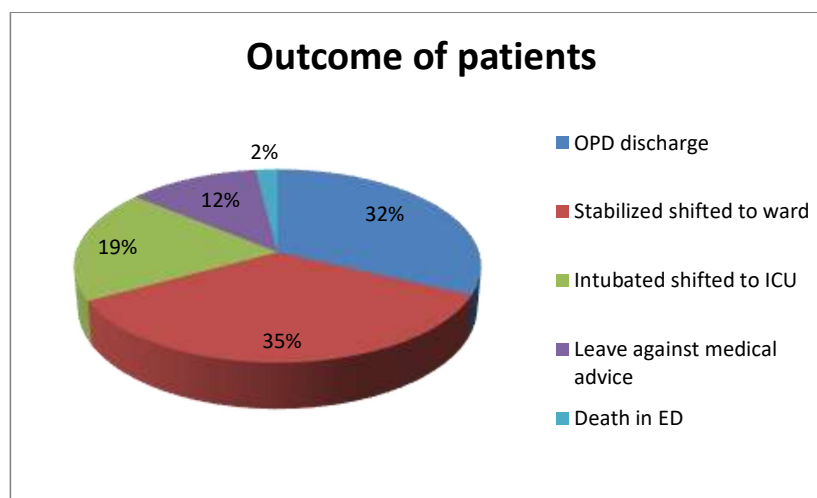
**Figure-4:** Percentage distribution of subjects based on causes of seizures, and it clearly states that most common cause found was idiopathic (26%) followed by alcohol withdrawal (20%) in our study.

- Almost two-third of patients who underwent NCCT brain and MRI brain had normal findings.



**Figure-5:** Percentage distribution of subjects based on the administration of medication, and it shows that 95% patients were received anti-epileptic drugs (AEDs), 19% patients were given anti-hypertensive drugs and 11% patients were given mannitol.

- Around half of the patients (51%) achieved spontaneous gain of consciousness, 29% patients were intubated in ED and 20% patients required non-invasive ventilation.



**Figure-6:** Percentage distribution of subjects based on the final outcome, and it says that 32% patients were discharged on OPD basis, 35% patients were stabilized in ED and shifted to ward and 2% patients were died in ED.

## DISCUSSION

The present descriptive study was conducted in Emergency Medicine department of B. J. Medical College and Civil Hospital, Ahmedabad, which aimed to determine the clinical profile and outcome of 200 patients with seizures.

In this study, 26% of patients were more than 60 years age group, 23% in 51-60 years, 22% in 41-50 years and only 5% in 13-20 years age group. Higher age group had more prevalence, similar result was seen in study done by Namitha Narayana<sup>[15]</sup>. R.Sridharan, B.N. Murthy et al 1999 state that prevalence and incidence rates is higher in the first three decades of life<sup>[22]</sup>.

In this study males (73%) were more in number than females (27%). The prevalence of epilepsy in men were 6.05 and in women 5.18 per 1000 according to R.Sridharan, B.N. Murthy et al 1999<sup>[22]</sup>.

On clinical examination, 25% had focal seizures where as 67% had GTCS. According to WHO Atlas-2005 GTCS was the most common type of seizure and was found in 68.5% of cases<sup>[24]</sup>.

In present study, only 2% of patients were found with status epilepticus. Studies in the past have reported status epilepticus to be present in 3–30% of patients presenting with seizures<sup>[18,25,26]</sup>. The 21.8% rate of status epilepticus in Honavar et al<sup>[27]</sup> study was higher than the rate seen in the literature.

After an extensive evaluation for etiology, almost one out of four of our patients (26%) was labelled as having idiopathic generalized epilepsy. The percentage of idiopathic generalized epilepsy is consistent with that reported from the West<sup>[26]</sup>. Indian studies also report etiology as idiopathic in 31–66% of patients<sup>[18,27]</sup>. The percentage of new-onset seizures in the ED as reported by Huff *et al.* was 26% and 62% as reported by Chhabra *et al.*<sup>[18,21]</sup>. Almost half of patients (221 of 477, or 46.3%) in A. G. Honavar et al<sup>[27]</sup> study were labelled as having idiopathic generalized epilepsy and a quarter (22.6%) of new-onset episodes were idiopathic.

Present study found that nearly half of all patients had a CT or MRI scan done, which closely resembles the use of imaging studies elsewhere<sup>[14,27]</sup>. Almost two-fifth of CT scans were reported normal and did not affect management in any form. Limiting the use of imaging to patients who have acute head trauma, prolonged alteration of consciousness or focal neurological deficit at the examination may increase the yield of emergent neuroimaging<sup>[14]</sup>.

On clinical examination aura was seen in 36 cases (18%) in the study population. Frothing from mouth was most common finding followed by up-rolling of eyeballs, vomiting and headache. Similar finding was seen in Narayana study in which aura was seen in 38 participants (19%) and headache was most common symptom preceding seizure. The other patients could not recollect the prodromal symptoms<sup>[15]</sup>.

In the study population 27 (14%) patients had cerebral infarct. Gupta et al <sup>[23]</sup>, in their study of 90 patients with ischemic stroke stated that 33% presented with early post-stroke seizures. Labovitz D L et al<sup>[20]</sup>, state that 5-10% of individuals with CVA experience seizure at the time of onset.

Eleven (5%) patients presented with intracerebral hemorrhage (ICH) and four patients presented with subarachnoid hematoma. Panayiotis Varelas et al also state that about 31% of patients with ICH present with seizures at the onset <sup>[32]</sup>.

AEDs are a major treatment consideration for patients with epilepsy with an effective seizure-free period of 3–5 years being the main target. Most of the patients (95%) were managed with AED. Therapy with these drugs is started at a low dose and slowly titrated up to the maintenance dose. In addition to metabolic and organic causes, suboptimal drug levels are a major factor in the recurrence of seizures.

Honavar et al <sup>[27]</sup> found that 58% of known epileptics who were advised AEDs were not immediately compliant, and hence presented with recurrences. Joseph et al<sup>[25]</sup> from Karnataka, found 90.6% compliance among patients on monotherapy and 75.7% compliance among patients with multiple AED therapy whereas Gurumurthy et al<sup>[17]</sup> noted 72.3% rate of compliance. Surprisingly, in our study, patients on multiple AEDs were found to be more compliant. We postulate that this is because patients on multiple AEDs were referred to epilepsy clinic multiple times and were more extensively counselled.

### LIMITATIONS

Major drawback of this study is that it was a single centre study with sample size of 200 cases. Some of the clinical parameters used were of qualitative variable which leads to inter-observer bias. Most of the seizure cases would arrive at tertiary care center with some delay leading to alteration in vital parameters and more importantly secondary insult to brain.

### CONCLUSION

This present study concluded that seizures are commonly seen in middle age group (41-60 years) with generalized tonic clonic seizures (GTCS) being the most common type. Idiopathic generalized seizures was the leading cause of seizures followed by alcohol withdrawal seizures, CV stroke, drug defaulter, hypoglycemia related seizures. In older patients (>60 years) CV stroke (acute IPH> acute infarct> old infarct) is a common cause of seizures. Hypoglycemia is an important metabolic cause of seizures and RBS should be considered as an important parameter to see for a reversible cause of seizures. Awareness of these etiologies will guide emergency physicians in a management of seizures. It is seen that 29% were intubated as they had either low GCS or non-patent airway or post-ictal complication such as aspiration pneumonia. Many patients with a seizure disorder are immediately non-compliant to anti-epileptic drugs. Hence, patient's education must be implemented regarding importance of maintaining compliance of antiepileptic drugs.

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