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The Clinical Profile of Patients Presenting with Seizure in Emergency Department

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Abstract: ***Background: A seizure is an abnormal electrical discharge that occurs in your brain. Usually brain cells or neurons, flow in an organized fashion along the surface of the brain, then a seizure occurs when there is an excess of electrical activity in the brain. Seizures can cause symptoms such as muscle spasms, limb twitches, and loss of consciousness also can be fatal at times if not intervened immediately. Objective: This study was designed to study the commonest age group of people presented to the emergency department with the signs and symptoms of seizure, along with the commonest cause behind the seizure activity among those common group of people. Methods: This is a prospective observational study done on 150 patients with seizure episodes who visited the Emergency Department of Amrita Institute of Medical sciences, Cochin from July 2017 to December 2017. Results: Out of 150 patients included in the study, 59% were males and 41% were females. Majority of them were in the age group of 0-12 years. Data analysis showed that among the 0-12 years age group were presented with breakthrough seizures (46.7%) and with fever (29.3%) as the common cause. Conclusion: The present study analysed the clinical profile of patients presenting with seizure in the emergency department, in which seizure has become one of the most common neurologic emergency among the pediatric age group. It has been found that the most common causes with seizure were fever, followed by seizures with unknown cause of origin.***

Keywords: Seizures, Emergency department, common cause

1. Introduction

A seizure is a sudden, uncontrolled electrical disturbance in the brain. It can cause changes in your behaviour, movements or feelings, and in levels of consciousness. If you have two or more seizures or a tendency to have recurrent seizures, you have epilepsy. A seizure that lasts longer than five minutes is a medical emergency. Most seizure disorders can be controlled with medications, but the management of seizure can still have a significant impact on your daily life. The interesting part is you can work with your health care professionals to balance seizure control and medication effects. There are several different types of seizures. Most seizures can be categorized as either focal or generalized. Focal seizures can be of two types, focal seizures with retained awareness and focal seizures with a loss of awareness. The different types of generalized seizures include: absence seizures, tonic-clonic or convulsive seizures, atonic seizures, clonic seizures, tonic seizures, myoclonic seizures.

People with seizure or epilepsy (recurrent episodes of seizure) have a type of brain dysfunction that intermittently causes episodes of abnormal electrical activity. This can be due to any type of brain injury, such as trauma, stroke, brain infections, or brain tumors. Similarly, discontinuation of anti-epileptic medications, certain drugs, alcohol withdrawal, and other imbalances, such as hypogylcemia, hyperglycemia, and electrolyte abnormalities also causes abnormal electrical activity in the brain. Some other conditions which cause seizures in seniors includes: head injuries from falls, chronic alcoholism, heart diseases, previous brain injury, infections of brain, high blood pressure, Alzheimer's disease or dementia. Most of the scenarios the reason behind the seizure activity is unknown. There have been recent different studies and publications on causes of seizure disorder among different age group and triggering factors of the same, differential diagnosis, early diagnosis and management and so on. This study focus on to rule out the common group of people presented to the emergency department with signs and symptoms of seizure.

2. Materials and Methods

This is a prospective observational study done in 150 patients who were presented with seizure in the Emergency Department of Amrita Institute of Medical Sciences and Research Centre, Kochi. It was done over a period of one year duration. Parameters include age, sex, comorbidities, heart rate, respiratory rate, blood pressure, temperature, blood sugar. In addition to this, electrolytes and causes were included in the study

Study type

The study design was a prospective observational study which consisted of patients with seizure at Amrita Institute of Medical Sciences after fulfilling the inclusion and exclusion criteria.

Study place
Amrita Institute of Medical Sciences, Kochi, Kerala.

Study size
This is a prospective observational study on seizure. All patients satisfying the inclusion and exclusion criteria were selected for the study over a period of one year. Total number of 150 patients were included in this study.

Inclusion Criteria
- Patients presented with seizure were included in the study.
- Patients with new onset and history of seizures were included in the study.
- Patients with 0 – 80 years of age group were included in the study.

Exclusion Criteria
Age group above 80 years old were excluded in the study.

Statistical Analysis

Statistical analysis was performed using SPSS software version 17.0 software.

3. Results

Gender distribution

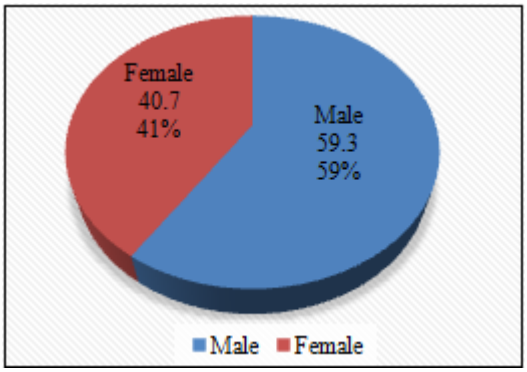

Figure 1: Percentage distribution of subjects based on their gender, shows that majority of the subjects (59%) were male and 41% were female.

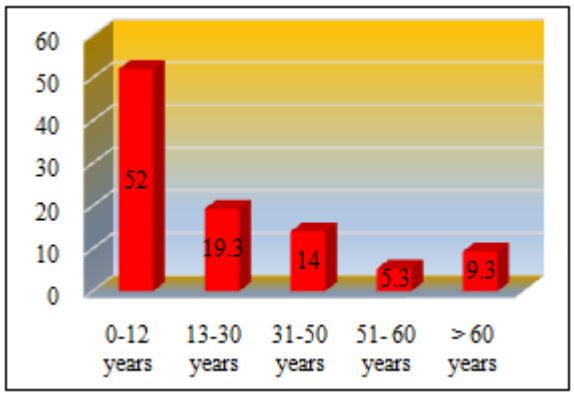

Figure 2: Percentage distribution of subjects based on their age group, and it shows that majority of the subjects (52%) belongs to the age group of 0-12 years.

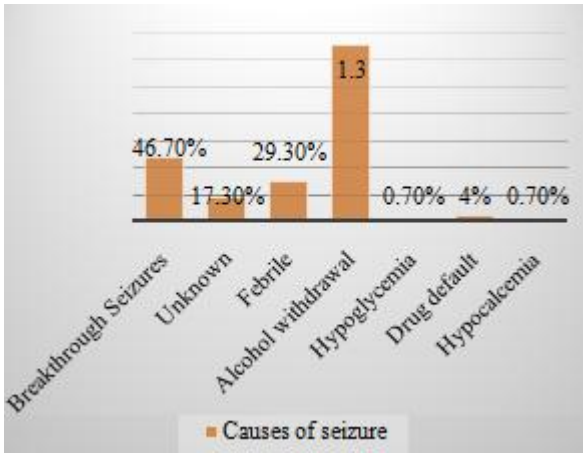

Figure 3: Percentage distribution of subjects based on the cause of seizure, and it shows that majority (46. 7%) were presented with breakthrough seizure, 29.3 % had fever (febrile seizures) as cause of seizure.

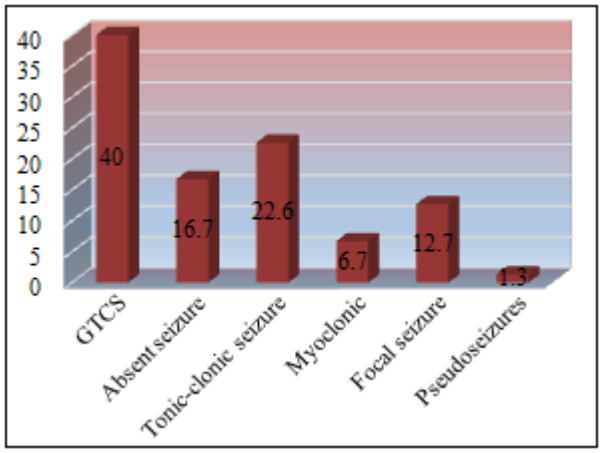

Figure 4: Percentage distribution of subjects based on the type of seizure, and the data clearly states that majority (40 %) had GTCS, followed by tonic-clonic seizure (22.6%).

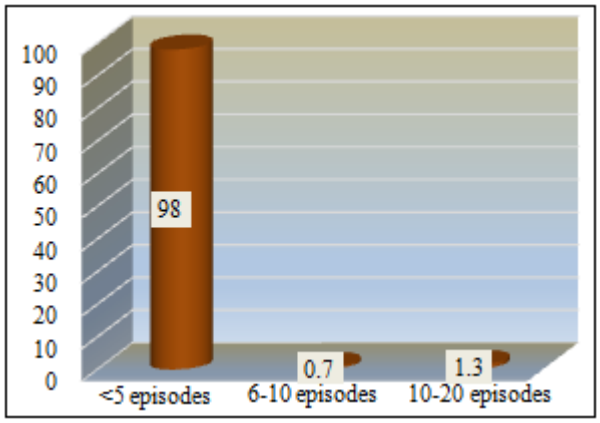

Figure 5: Percentage distribution of subjects based on the number of episodes of seizure, and it reveals that 98% of the subjects had less than 5 episodes of seizures, but 1.3% of them had 10 – 20 episodes of seizures

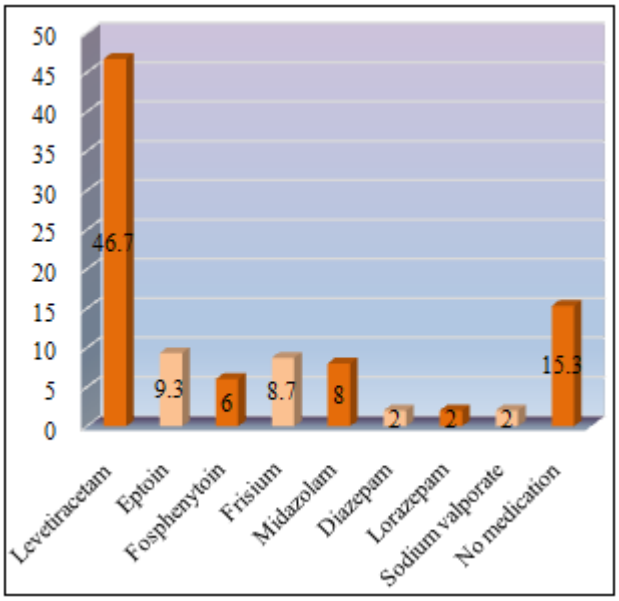

Figure 6: Percentage distribution of subjects based on the administration of medication. The figure shows that majority (46.7%) received levetiracetam, followed by eptoin (9.3 %, whereas 15.3 % did not receive any medications.

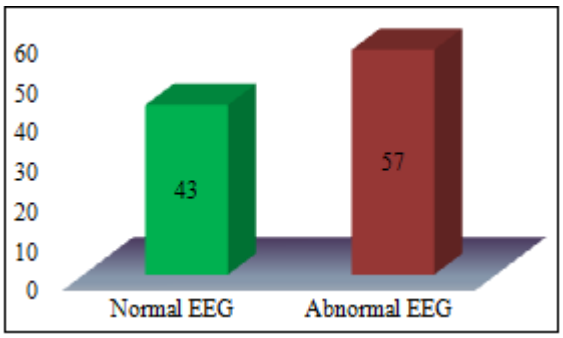

Figure 7: Percentage distribution of subjects based on their EEG finding

The data depicted in the above figure shows that out of the 135 subjects who had an EEG taken, majority i.e. 57 % had abnormal EEG findings.

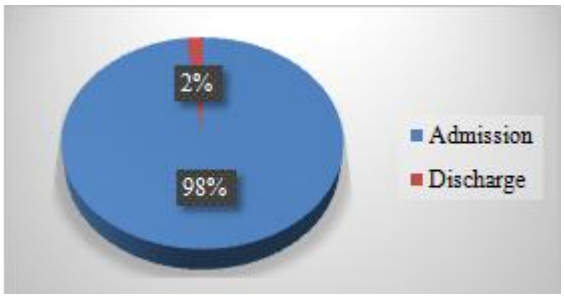

Figure 8: Percentage distribution of subjects based on their admission and discharge.

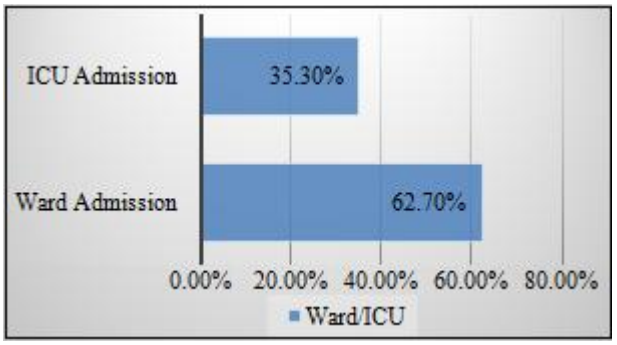

Figure 9: Percentage distribution of subjects based on their ICU (35.3%) and Ward admission (62.7%).

4. Discussion

A prospective observational study conducted at emergency department of AIMS, Kochi among 150 subjects presented with seizures. The main findings of the study are discussed in this chapter.

The findings of the study revealed that majority of the subjected (52%) presented with seizures to emergency department were in the age group of 0-12 years (children) 19.3% were in the age group 13-30 years, 14% in the age group 31-50 years, 5.3 % in the age group 51- 60 years and 9.3 % were in the age group of above 60 years. Considering the gender 59% of the subjects were male and 41% were female. Reviews had shown that children younger than age 2 years and adults older than 65 are more likely to have seizures because risk factors are more common in theseage groups [34].

The most common causes were found to be break through seizures and febrile seizures. Studies had shown that febrile seizures (FS) are the single most common seizure type and occur in 2 to 5% of children younger than age 5 years with a peak incidence in the second year of life [4].Fever is the most common etiology of seizure in children, hypoglycemia should be taken into consideration as the second most common etiology of seizure. Although other etiologies such as hypernatremia and intracerebral haemorrhage are less common [1].It is also important to note that drug default, hypocalcaemia, were also lead to seizures in subjects. And majority of these subjects got admitted either to the ward or to the ICU.

The present study also revealed that majority (40 %) had GTCS, followed by tonic-clonic seizure (22.6%) and only 1.3 % had pseudo seizures, which is in line with other study findings where 86 % of the subjects had generalized seizures whereas only 3 % of them were presented with pseudoseizures.[51]

Anticonvulsants are the drug of choice for seizures and most commonly used ones are benzodiazepines, which is in congruent with the findings of the study by Huff et al. where 45 % of the subjects received one or more benzodiazepines (lorazepam, diazepam, midazolam) and 42 % received eptoin[51], where as in this study majority (46.7%) received levetiracetam as the drug of choice, followed by eptoin (9.3 %), and 15.3 % did not receive any medications.

Electroencephalography (EEG) can be helpful in determining diagnosis and classification of seizure, so majority of the subjects (90%) of them had an EEG taken during their admission to emergency department in this study and 57 % of the subjects were found to have abnormal EEG findings, where as in another study only 3 % of the subjects were taken EEG and majority (83 %) of them had only laboratory investigations done.[51]

A patient presented with seizure is said to be in the stage of status epilepticus when they are having continuous seizure activity for 30 min or a series of seizure without return to full consciousness between seizures. In this prospective observational study, patients with continuous seizure activity for more than 10 minutes were taken into account as the stage of status epilepticus. Only 7.3 % of the subjects of the present study had gone to the stage of status epilepticus, which is in line with the findings of another study where 6% of the subjects had status epilepticus[51].

Reviews had shown that eighty three percent of patients discharged from the A&E department with a letter to take to their general practitioners, but only 20% of those referred directly to the neurology clinic, were lost to follow-up [49], but the findings of this study reports that 98 % of the subjects presented to emergency department with seizure got admitted and 72.7% of them had a hospital stay for at least one week.

The literature suggests that laboratory testing is of very low yield in patients with a new-onset seizure who have returned to baseline. Glucose abnormalities and hyponatremia are the most frequent abnormalities identified and are usually predicted by the history and physical examination [48]. The analysis of laboratory investigations of this study subjects were also shown variation in their blood sugar level, sodium level.

The incidence and prevalence of unprovoked seizures is found to be higher in men than women. A few studies have examined sex differences in seizure. A retrospective review of patients with medial temporal lobe epilepsy identified less frequent isolated auras and more frequent secondarily generalized seizures in men[47]. The present study findings also support these findings, and it shows there is a significant association between gender and seizure occurrence. Although no differences in the frequency of focal seizure types were seen between sexes, an increased frequency of autonomic, psychic, and visual features was seen for females compared to males. For generalized seizures, atonic seizures were seen with greater frequency in males than females [47].

Reviews had also shown that acute symptomatic seizures predominate in men, in the youngest age class and in the elderly. The incidence of single unprovoked seizures is also variable. As with epilepsy, single unprovoked seizures predominate in men, in patients younger than 12 months, and in those older than 65 years [45].

The reviews also suggest there is a high risk for occurrence of febrile seizures. The risk of recurrence is influenced by both the age of the child and the type of FS. About one-third of children with a first FS will have a recurrence. Risk factors for recurrence include family history of FS, less than 18 months of age, temperature lower than 40.0°C at first convulsion and less than 1 hour between onset of febrile illness and first convulsion. The numbers of risk factors are directly proportional to the risk of recurrence. A child with two or more risk factors has a more than 30% recurrence risk at 2 years of age, and that risk doubles with three risk factors [4].These findings are in line with the present study findings where 74.3% of the subjects had a previous history of seizure.

There is evidence that FS are associated with an increased risk of subsequent epilepsy, and that epilepsy develops in 2 to 4% of children with a history of FS. Although it is accepted that a single brief simple FS is benign with no clinical consequences, the risk of developing epilepsy can be as great as 57% in children with focal, prolonged, and recurrent FS [4]. So it is important to manage the FS on time and take preventive measures from developing epilepsy.

The finding of this study also suggests that there is a higher incidence of break through seizures, which might be the result of drug default, inadequate follow up. So it is important to educate the family and the patient regarding importance of medication intake, follow up. At the same time education about seizure safety and precautions should be explained to the family, and are important to prevent consequences of prolonged seizures.

5. Conclusion

A prospective study conducted at emergency department of AIMS, Kochi to identify the most common age group and cause of seizure. And the results of the present study also concluded that seizure were one of the most common presentations among paediatric population attending the Emergency Room of AIMS. Analysis was done to determine the common age group of people presenting to Emergency room with signs and symptoms of seizure and were found that majority of the patients came under 0-12 years of age group with febrile seizure as the common cause.

The results conclude that majority of the subjects presented with breakthrough seizure with the most common cause being fever. Hence the number of patients gone to status epilepticus were very low, which was only 7.3% (11/150), which is very less thus the requirement rate of intubation was found to be only 2.3% (4/150). Majority of the patients got settled down within 5 minutes duration; hence we could manage them with drugs rather than going ahead with intubation.

Febrile seizure could be regarded as the most common neurologic emergency in paediatrics population, and it is difficult to predict that a child will develops epilepsy after simple febrile seizures. The present study concludes that most of the febrile seizures were managed with a combination of antipyretics and anticonvulsants preferably a benzodiazepine. The need for continuing these medications as prophylaxis for prevention of recurrence is not clear since the reviews pronounces that side effects of these drugs are considered dangerous than the minimal effects caused by

recurrent seizures, yet the recurrence of febrile seizures among children can be a perturb for both the patient as well as the family members. The researcher would like to put forward the need for further studies focusing only on febrile seizures among children and finding a way out to manage the reoccurrence and emotional wellbeing of the family members.

6. Study Limitation

This study has certain limitations, it has included only a single private tertiary care hospital and also the results cannot be easily established. The details of other causes of seizures among the pediatric group except the febrile seizures could not be specified due to the lack of investigation data's. A multi pivotal prospective study is needed to find out more details regarding these problems. Also it will be more relevant to consider the trends of other private hospitals in the future studies.

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