



Original Research Article

Study of clinical radiological and EEG profile of patients presenting with first episode of generalized tonic clonic convulsions to a tertiary care center

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ABSTRACT

Introduction: Generalised Tonic Clonic Convulsions are one of the common presentation to the emergency department. Proper understanding and approach to the same for a practicing doctor and education to the patient and its family helps in avoiding recurrence and the myths associated with it. Not many studies have studied the association of this clinical presentation in relation to neuroimaging and electroencephalography, hence this study.

Materials and Methods: Study was conducted over a period of 2 years where in all patients presenting to the out patient and emergency department with first episode of generalized tonic clonic convulsion were taken into consideration. Necessary investigation were performed especially MRI Brain and EEG, the data was analysed across various variables and correlated.

Results: In present study it was noted around 34% of patients had no specific cause, 60% had normal MRI, 40% had abnormal EEG, incidence was higher in males and in patients in age group between 18-45 years. Stroke and alcohol withdrawal were other common causes followed by metabolic abnormalities, cerebral venous thrombosis, posterior reversible encephalopathy syndrome and CNS infections.

Conclusion: A detailed history regarding semiology has to be collected, even though sometimes it is difficult to obtain the same. In such situations neuroimaging like MRI Brain and Electroencephalography should be performed in every patient presenting with first episode of generalized tonic clonic convulsion. This approach helps in preventing the recurrences and identifying the exact cause and management of the patients.

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1. Introduction

Generalized tonic clonic convulsion is defined as a seizure that has a tonic phase followed by clonic muscle contractions and is usually associated with impairment of awareness or complete loss of consciousness. Generalised tonic clonic convulsion is the most common type of seizure presenting to the emergency department and outpatient department in our daily practice. Incidence of epilepsy in developing countries is around 139 cases per 100,000 population according to WHO and generalized tonic clonic

convulsions account for 20-25% of the cases. Incidence of patients presenting to emergency department as first episode of seizure is around 0.24 to 3 percent in adults and 2% - 3% of them have a actual chance of developing epilepsy.^{1,2} Hence, not only treating the first episode of GTCS, but predicting the recurrence risk, understanding the semiology and initiating the appropriate treatment are of prime importance. History and semiology stated by the by standers of patient are at times misleading or uninformative were in investigative approach provides a clue to the appropriate diagnosis. EEG helps in understanding the type of seizure, prediction of recurrence risk, detection of ongoing occult or subclinical epileptic activity, determining

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the foci or origin of epileptic activity, detection of epilepsy syndromes especially in children, hence playing a pivotal role not only in predicting recurrence risk but also in portending the prognosis of patient. In addition, MRI helps in knowing the structural abnormalities, etiology and hence determining the appropriate management of the patient. With this understanding we can provide a better quality of life to the patients who present with first episode of GTCS and hence our study.

2. Aim

To study the Clinical, Radiological and EEG profile of patients presenting with first episode of generalised tonic clonic convulsions and its significance in the management of seizure.

3. Materials and Methods

Study was conducted for period of two years in a tertiary care hospital of South India. The study included a sample size of 100 patients which satisfied the case definitions of generalised tonic clonic convulsions. Descriptive statistics was used in present study. Continuous variable is expressed as mean +SD or median (Range) if non- normally distributed. Categorical data is expressed in proportions.

3.1. Study population

All cases presenting to our hospital diagnosed with first episode of generalised tonic clonic convulsions. A detailed history about the seizure semiology, family history and any underlying cause for the same Eg. Intake of any medication that might be responsible for seizure was collected. A complete clinical examination was done and clinical findings like fever, headache, vomiting, papilledema, focal deficits and CSF profile where noted and analysed. Ophthalmologist help was taken for fundus examination for papilledema and choroid tubercles or cysticercal lesions. MRI Brain and EEG (Standard 10-20 international system was followed) was done in all these patients.

3.2. Study Design

1. Cross – sectional descriptive study.

3.3. Inclusion criteria

1. Patients diagnosed with first episode of generalised tonic clonic convulsions.
2. Patients more than more 18 years of age.

3.4. Exclusion criteria

1. Patients less than 18 years of age
2. Patients presenting with any other type of seizures other than generalised tonic clonic convulsions.

3. Patients presenting with recurrent seizures.
4. Patients with incomplete evaluation i.e without a Mri or EEG.

4. Results

In present study we noticed that 80% of our patients presenting with first episode of generalized tonic clonic convulsion belonged to the age group of 18 to 45 years and 73% were male. Female population accounted for 27%. In 60 % of patients MRI Brain was normal, around 9% had underlying gliosis, 10% had presented with stroke, 9% patients had cerebral venous thrombosis (CVT), 3% with space occupying lesion like malignancy or benign tumors etc, 3 patients had tuberculoma and 2 had Neurocysticercosis. Most of the patients, i.e around 60% of had normal EEG, rest showed abnormality in the form of bilateral frontal slowing or diffuse slowing of background activity, sharp and wave activity across various regions of the brain. In 34% of patients no specific cause was identified. 17% of patients were secondary to alcohol withdrawal, 6% of patients had presented with Hyperglycemia secondary to Diabetes Mellitus, 4 of them had Hypoglycemia, 5 patients had hyponatremia, 10 patients had presented with stroke, 9 of them had CVT and 4 patients had posterior reversible encephalopathy syndrome (PRES), 3 patients had space occupying lesions, 4% were diagnosed to have CNS Infections like Viral Encephalitis or Meningoencephalitis and 3% patients had seizure secondary to medications.

Table 1:

Age in Years	No. of Patients
18- 45	80
45 – 65	15
>65	5

Table 2:

Sex	No. of Patients
Male	73
Female	27

Table 3:

MRI Findings	No. of Patients
Normal	60
NCC	2
Tuberculoma	3
Gliosis	9
PRES	4
Stroke (Ischemic and Hemorrhagic)	10
SOL	3
CVT	9

Table 4:

EEG	No. of Patients
Normal	60
Abnormal	40

Table 5:

Etiology	No. of Patients
No cause identified	34
Alcohol Withdrawal	17
Hyperglycemia	6
Hypoglycemia	4
Hyponatremia	5
Stroke (Ischemic and Hemorrhagic)	10
PRES	4
CVT	9
SOL	3
CNS Infections	5
Drug induced	3

5. Discussion

In our study it was observed that generalized tonic clonic convulsion presenting as first episode of seizure was common among the age group of 18 to 45 years. Incidence was higher in males compared to females. Similar findings were observed in another study by King et al and Kawakasaki et al, where in, males had a higher incidence of presentations compared to females. King et al.^{3,4} Eeg was performed at varying intervals as patients presented to us at different time periods after first episode of seizure. 40% of patients had abnormal eeg and focal or diffuse slowing of the background activity was the common abnormality noted in them. Other patients were found to have occasional sharp and wave. Recurrence risk is 21 – 45% in first year and risk increases as the number of seizure episodes increase.⁵ Presence of a eeg abnormality significantly alters the course of management and decision making on drugs to be given after first episode of seizure or at the follow up. In a study was found that 12–50% of adults had abnormalities on EEG after first episode of generalised tonic clonic convulsion.⁶ EEG not only helps in differentiating seizure from a non-seizure event but also in determining other seizure types like absence seizure or myoclonic seizure. In our present study we found that 60% of patients had normal MRI of the brain. In a study it was found that detection of a epileptogenic lesion on MRI portends the seizure recurrence risk of 67%.⁷ In various other studies it was found that seizures may be the presenting symptom of acute conditions such as cerebral venous thrombosis, posterior reversible encephalopathy syndrome, infectious encephalitis and autoimmune encephalitis.^{8–11} Similarly we observed that in the present study Stroke (Ischemic and Haemorrhagic), CVT and PRES were the next common abnormalities found on MRI. In most of

our patients no definite cause was identified that accounted for 34% of patients and 25% of the patients had a positive family history. In our study 17% of patients presented were secondary to alcohol withdrawal out of which most of them were male patients and only one was a female patient. Around 41-49% patients presented with first seizure episode to emergency department and 9-25% of patients presented with status epilepticus.¹² In a study conducted by Tardy et al, it was observed that metabolic abnormalities presented as first episode of seizure and similarly in present study it was found that 6 patients presented with GTCS following hyperglycemia (>300mg/dl), 4 patients following hypoglycemia(<75mg/dl) and 5 patients following hyponatremia (<120mM/l).^{13–15} Studies have shown that hyperglycemia causes decreased GABA levels secondary to increased metabolism and also reversible focal ischemia secondary to hyperosmolarity causing abnormal neuronal hyperexcitability leading to seizures.^{16,17} On the other hand hypoglycemia causes raise in glutamate and aspartate out of proportion to raise in GABA causing excitatory activity in neurons leading to seizures.¹⁸ Meningoencephalitis was diagnosed in 5 patients after CSF analysis and clinical presentation of fever, headache, vomiting with altered sensorium and neck stiffness. 3 patients in our study were secondary to medications like ciprofloxacin or levofloxacin and space occupying lesions were found in 3 patients which were later diagnosed as malignant lesions.^{19,20}

6. Conclusion

Careful and complete evaluation of patients presenting with first episode of generalised tonic clonic convulsion is of prime importance in appropriate management, prevention of recurrence, identifying the type of seizure and prognostication. Performing a neuroimaging like MRI Brain and EEG plays a pivotal role in understanding and aiding in the management strategy and providing a better quality of life to the patient. Education of patient and their family members regarding seizure and medication compliance also is of utmost importance.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

8. Source of Funding

None.

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