

Clinico-Etiological Profile of New Onset Seizures in Geriatric Patients at a Tertiary Care Hospital

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Abstract

Background: Seizure is defined as “a paroxysmal event due to abnormal excessive or synchronous neuronal activity in the brain.” Based on discharge characteristics and its distribution, this unusual activity can manifest either as focal or generalized tonic clonic to absence seizures which are not easily noticeable by observer. For 2010, as indicated by the Global Burden of Disease (GBD) investigation, epilepsy accounted for 0.7% of burden globally i.e, more than 17 million DALYs. Studies conducted in India have reported variable incidence rates which varies from 0.2 to 0.6 per 1,000 population. The incidence rates reported from India are similar to most of the developed countries and less than most of the developing nations which ranged from 1.0 to 1.9 per 1,000 per year. **AIM:** The aim of the study is to assess & identify the various clinico-etiological factors causing first onset of seizures in geriatric patients. **Rationale:** Several studies are available on seizure in elderly in western population but very few studies are done in this part of the world. Etiological profile of seizures varies from place to place because of difference in socio-economic and cultural attributes, prevalence of various diseases in a particular area and several other factors. This study aims to observe the clinico-etiological profile of new onset seizures in elderly in Moradabad region of western Uttar Pradesh. **Subjects and Methods:** This study was carried out at Teerthanker Mahaveer Medical College and Research Centre, Moradabad (UP) as an observational hospital based study. 51 patients of new onset seizures above 60 years of age. **Inclusion Criteria:** All patients with new onset seizures and were more than 60 years of age. **Exclusion Criteria:** All patients with age less than 60 years. All known cases of Seizure disorder/Epilepsy were excluded. All those who did not give consent. **Results:** Out of 51 elderly patients, males accounted for 55%, females accounted for 45% and a gender ratio of 1.2:1 for male to female. Among 51 patients with new-onset seizures, hypertension was seen in 29.4% patients as co-morbidity and 13.7% patients had both hypertension and diabetes as co-morbidities. The study also showed that generalized tonic-clonic seizures (GTCS) were found among 76.5% cases whereas among 23.5% patients were of focal seizures. However, acute and remote symptomatic were almost found in an equal proportion 47.1% and 45.2% respectively and only 7.8% were idiopathic. It was noted that the maximum number of patients had CVA as the cause of new onset seizures in this age group, of which 90.9% patients had an ischaemic stroke. 14 patients had metabolic insult of which, 35.71% patients had uremic encephalopathy as the cause of new onset seizures. 60% of seizures in CNS infections are secondary to tuberculosis probably because of high burden of tuberculosis in the study area. **Conclusion:** In our study CVA was the frequently observed etiology of seizures among study population and the second most common was metabolic insults. Among stroke, seizures occurred more commonly in ischemic stroke than in hemorrhagic stroke. In our study GTCS was the most common type of seizure in 76.5% of study population. And acute symptomatic and remote symptomatic were almost seen in equal numbers 47.1% and 45.2% respectively. CVA accounted for most of the remote symptomatic seizures of which ischemic stroke is most common and metabolic causes accounted for most of the acute symptomatic seizures. The high burden of tuberculosis in the study area may have accounted for this higher percentage (60%) of seizures secondary to tuberculosis in the study patients under CNS infections sub group.

Keywords: Seizures, Epilepsy, Geriatric Population.

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Introduction

A seizure is defined as “a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. Depending on the distribution of discharges, this abnormal brain activity can have various manifestations, ranging from dramatic convulsive activity to experiential phenomena not readily discernible by an observer”.^[1] Epilepsy is described “as a condition in which a person has recurrent seizures due to a chronic underlying

process”.^[1]

Epidemiological studies have showed that the incidence and prevalence of seizure is highest in the elderly patients. India, the second-most populous country in the world, has experienced a dramatic demographic transition during the past 50 years, with a significantly increasing population above the age of 60 years. Thus, among patients with seizures, elderly individuals constitute the fastest growing segment. New onset seizure in elderly patients poses diagnostic difficulties when compared to seizures occurring in younger individuals. This may relate to difficulties of

acquiring precise medical history, atypical presentations and frequent association with various comorbidities, which all complicate the clinical profile of seizures in the gaeriatric age groups.^[2]

Around 16.50% of Indian population is accommodated by the largest state of India, Uttar Pradesh in which few studies were carried out to assess the clinico-etiological profile among gaeriatric patients.^[3] The etiology of seizures also varies according to geographic distribution and the cultural attributes of the area. For example, in some states due to easy availability of alcohol, alcohol related seizures are more prevalent. Therefore this study is done with the intention of studying the clinical and etiological profile of seizures in gaeriatric patients pertaining to area of Western Uttar Pradesh, India. The emphasis is on seizures beginning in the elderly.

For 2010, as indicated by the Global Burden of Disease (GBD) investigation, epilepsy accounted for 0.7% of burden globally i.e, more than 17 million DALYs. Among the south East Asia regions, the epilepsy prevalence is about 2 to 10 per 1,000 population and India accounted for significant proportion of the total DALYs (Disability Adjusted Life Years).^[4]

Based on clinical features and EEG findings the ILAE has released recent guidelines on approach to seizure classification.

Classification of Seizures

1. Focal seizure (Can be further described as having cognitive, motor, autonomic, sensory, or other features)
2. Generalized seizures
 - a. Motor
 - Tonic clonic
 - Other motor(e.g., atonic, myoclonic)
 - b. Non motor (absence)
3. Unknown onset
(Can be further described as motor or non-motor, or unclassified)”

AIM

- The aim of the study is to assess & identify the various clinico-etiological factors causing first onset of seizures in gaeriatric patients

Objectives

- To determine clinico-etiological profile of new onset seizures among gaeriatric patients using a step wise approach at Teerthanker Mahaveer Medical College and Research Centre

Subjects and Methods

Study design & Place

This study was carried out at Teerthanker Mahaveer Medical College and Research Centre, Moradabad (UP) as an observational hospital based study.

Study Population

All elderly patients of age more than 60 years with new onset

seizures who presented during the study period of one year at Teerthanker Mahaveer Medical College & Hospital.

Period of Study

The period of study was of 12 months. The thesis protocol was approved by both ethical and scientific committees of TMMC & RC.

Sample Size

51 patients of new onset seizures above 60 years of age.

Inclusion Criteria

- All patients with new onset seizures and were more than 60 years of age.

Exclusion Criteria

- All patients with age less than 60 years.
- All known cases of Seizure disorder/Epilepsy were excluded.
- All those who did not give consent.

Data collection technique and tools

- All the patients with new onset seizure after 60 years were recruited during the study phase.
- Prior to the data collection Institutional Ethical Committee approval was obtained.
- Information regarding patients past medical history, detailed description of seizure event and the sequence of events which lead to seizure, neurological findings, and treatment if any, were noted. This information was recorded in a proforma.
- Seizure type was established based on 2017 ILAE classification system of seizures.
- Investigations

The following investigations were done in the patients included.

- Serum glucose, Electrolytes, LFT, RFT.
- EEG and Neuroimaging studies were advised for all patients.
- X-ray chest, ultrasound abdomen, 2D echo, ECG, Thyroid tests based on necessity.

Results

Data Analysis and Interpretation

A total of 51 patients gave consent and were included in our study; of them 55% (28 patients) were male individuals and 45% (23 patients) were female individuals. The age of patients distributed between 60 to 90 years age and mean of study population was 68 years (+_7.14SD). All the cases involved in this study had first episode of seizure after 60 years of age. Every patient was assessed clinically and by routine investigations and special investigations where indicated.

The demographic distribution and various characteristics of seizure and of the patients included in the study are as discussed below.

Table 1: Age wise distribution of patients

Sample Characteristics		f	%
Age in years (mean+ ₋ SD) = 68 years(+ ₋ 7.14 SD)	60-75 Years	44	86.3
	76-90 Years	07	13.7

In our study, 86.3% (44 patients) of study population belonged to 60-75 years age group and 13.7% (7 patients) of study population belonged to 75-90 years age group and mean age of the study population is calculated as 68 years(+₋7.14SD).

Table 2: Gender wise distribution of patients

Sample Characteristics		f	%
Gender	Male	28	55.0
	Female	23	45.0

As seen in the above table, in our study 55% (28 patients) of study population were males and 45% (23 patients) of study population were females.

Table 3: Table showing distribution of patients based on Types of Seizures

Sample Characteristics		f	%
Types of Seizures	GTCS	39	76.5
	Focal Seizure	12	23.5

In our study, Generalized tonic clonic seizure (GTCS) was observed in 76.5% (39 patients) of study population. Focal seizure was observed in 23.5% (12 patients). Overall, the most frequently observed seizure type in study population is GTCS.

Table 4: Distribution According to Etiology of Seizure in Elderly (N=51)

ETIOLOGY	f (%)
1.CVA (n=22)	22
Ischaemic stroke	20 (90.90%)
Subdural hematoma	1 (4.54%)
ICH (Intra Cerebral Haemorrhage)	1 (4.54%)
2.Metabolic (n=14)	14
Hyponatremia	1 (7.14 %)
Hypoglycaemia	4 (28.57%)
Uremic encephalopathy	5 (35.71%)
Co2 narcosis/hyperglycaemia	1 (7.14%)
Septic encephalopathy	3 (21.42%)
3.CNS Infections (n=5)	5
Tuberculomas	2 (40%)
TBM & vasculitic infarct	1 (20%)
Neurocystiscercosis	1 (20%)
Cryptococcal meningitis	1 (20%)
4.CNS Tumour (n=4)	4
Calcified granuloma	1 (25%)
Meningioma	1 (25%)
Metastasis	2 (50%)
5.Others (n=2)	2
Neuro degenerative disorder	1 (50%)
Post traumatic seizures	1 (50%)
6. Idiopathic(n=4)	4

From the above table, it is illustrated that the 43.1% (22 patients) of study population had Cerebrovascular Disease being the most common cause, 27.4% (14 patients) of study population had metabolic causes and second most common cause observed in study population.

Out of 22 patients with CVA, ischemic stroke was seen in 90.9% (20 patients) and hemorrhagic stroke in 4.54% (1 patient) and subdural hematoma in 4.54% (1 patient).

Out of 14 patients with metabolic insults as cause of seizures, 35.71% (5 patients) had uremic encephalopathy, 28.57% (4 patients) had hypoglycemia and 21.42% (3 patients) had septic encephalopathy and in 7.13% (1 patient), hyponatremia and CO₂ narcosis is observed which resulted in new onset seizures in study population.

Next to metabolic are CNS infections which are seen in 5 patients, of which tuberculosis accounts for 60% (3 patients) of cases and neurocysticercosis and cryptococcal meningitis 20% (1 patient) each.

CNS tumour accounted for 4 cases, of which 50% (2 patients) had metastasis.

Other causes like neurodegenerative and post traumatic seizures are observed in 1 patient each. No cause was identified in 4 patients.

Table 5: Association between types of seizures with etiology of seizures (N=51)

Etiology of Seizures	Types of Seizures	
	GTCS (n=39)	Focal Seizures (n=12)
Stroke	12 (54.5%)	10 (45.5%)
Metabolic	14 (100%)	0 (0%)
CNS Infections	4 (80%)	1 (20%)
CNS Tumour	3 (75%)	1 (25%)
Idiopathic	4 (100%)	0 (0%)
Others	2 (100%)	0 (0%)

In our study, as described in the above table, GTCS is the most frequently observed seizure type in all the etiological subgroups. 100% (14 patients) of metabolic insults patients and 54.5% (12 patients) of stroke patients had GTCS and accounted for significant proportion of this seizure type. Focal seizures occurred in 12 patients and more commonly observed in stroke patients which accounted for 83.3% of focal seizure patients.

Table 9: Association between types of seizures based on etiology with various causes of seizures (N=51)

Etiology of Seizures	Types of Seizures		
	Acute Symptomatic (n=24)	Remote Symptomatic (n=23)	Idiopathic (n=4)
Stroke	4 (16.7%)	18 (78.3%)	0 (0%)
Metabolic	14 (58.3%)	0 (0%)	0 (0%)
CNS Infections	5 (20.8%)	0 (0%)	0 (0%)
CNS Tumour	0 (0%)	4 (17.4%)	0 (0%)
Idiopathic	0 (0%)	0 (0%)	4 (100%)
Others	1 (4.2%)	1 (4.3%)	0 (0%)

In our study, as described in the above table it is observed that acute symptomatic is observed in 24 patients and remote symptomatic observed in 23 patients. Most of remote symptomatic seizures occurred due to stroke in 78.3% (18 patients) while most of acute symptomatic seizures were due to metabolic causes in 58.3% (14 patients) of cases.

Discussion

An observational study was conducted among elderly

patients of age more than 60 years with new-onset seizures during the one year study period at TMMC&RC, located in Moradabad, India. The study population comprised of a total of 51 elderly patients with first episode of seizure occurring after 60 years of age. The seizure type was established based on 2017 ILAE classification system of seizures. All the patients involved in the study had first episode of seizure after 60 years of age. In this era, proper history, clinical examination, appropriate investigations and analysis of etiology are required to reduce associated morbidity and mortality in elderly new-onset seizures and its association with different causes.

Age

In the present study out of 51 patients, age of 86.3% patients was between 60-75 years, and of 13.7% aged 76-90 years. In our study, the average age when the first seizure occurred was 68 years (+7.14SD). The study findings were similar to the findings reported by Hussain et al. and in their study they observed that incidence of seizures is more in 60-74 age group when compared to 75-89 age group.^[5] Another study conducted by Wallace showed similar results that the seizure incidence increases with age in 65-80 years age group.^[6]

Gender

The present study showed that among 51 patients of new-onset seizures, 55% were males while 45% were females. In our study males were predominant and this was similar to results reported that by Muralidhar and Venugopal, Hirani and Shrivastava, and Sendil et al.^[7-9]

Co-morbidities

In this study, a total of 27 patients with comorbidities were observed. 29.4% of study population had hypertension as comorbidity, 9.8% of study population had diabetes and 13.7% of study population had both hypertension and diabetes as co-morbidities. Hypertension was the most common comorbidity in our study followed by diabetes mellitus which is similar to several studies.^[10] A study conducted by Chen and Wang showed that diabetes mellitus was associated with late-onset of seizures.^[11]

Type of seizures

In our study, it is observed that GTCS was the most frequently observed seizure type seen in 76.5% of study population whereas in 23.5% it is focal in onset. GTCS was the most common seizure type observed in our study. Similar results were revealed by Narayanan and Murthy, Kanitkar et al., Sendil et al., and Hirani and Shrivastava also reported that maximum number of patients were of GTCS seizure type in adults (55%, 70%, 64%, and 60%, respectively).^[8,9,12,13]

In this study, 47.1% of study population had acute symptomatic seizures, whereas in the study by Sander et al.,^[14] and Sinha et al.,^[15] it was 57.8% and 15% respectively. Acute symptomatic seizures occur at the time of systemic insult or in close temporal association with a documented brain insult. Seizures are considered to be acute symptomatic if they occur in the first 7 days of illness.

In the present study, remote symptomatic seizures accounted

for 45.2% of study population. In the study by Sander et al.,^[14] and Sinha et al.,^[15] it accounted for 21% and 18.8% of cases respectively. It is observed that metabolic causes accounted for 58.3% of acute symptomatic seizures and stroke accounted for 75% of remote symptomatic seizures. This was similar to Assis et al. result,^[16] who also reported that ischemic stroke (37%) was more common than hemorrhagic stroke (12%). The occurrence of late seizures is most probably secondary to underlying anomalies like scarring, alterations in excitability of neurons & hemosiderin deposition.^[17] Overall, in this study acute symptomatic and remote symptomatic were almost found in equal numbers 47.1% and 45.2% respectively.

Etiology of seizures

The various causes responsible for seizures among the patients included is as described in [Table 4]. From the table, it is observed that 43.1% had Cerebrovascular disease; followed by 27.4% patients had metabolic causes. In CVA patients, ischemic stroke was seen in 90.9% and hemorrhagic stroke in 4.54% and sub dural hematoma 4.54% patients as the cause of new onset seizures in elderly. In metabolic causes 35.71% had uremic encephalopathy, 28.57% had hypoglycemia, 21.42% had septic encephalopathy and hyponatremia & CO₂ narcosis in 7.13% each as reason for new onset seizure in elderly. In this study among stroke, ischemic stroke was the most frequent cause. Whereas among metabolic causes it was uremic encephalopathy. These results were comparable to study done by Kanitkar et al.^[12] who reported that stroke and metabolic cause as the first and second most common cause of seizures in 44% and 26% respectively.

In our study, the third most common cause observed was secondary to CNS infections of which tuberculosis accounted for 60% of cases and neurocysticercosis and cryptococcal meningitis in 20% each. CNS tumour accounted for 7.8%, idiopathic causes in 5.8% and neurodegenerative causes in 1.9% and post traumatic seizure noted in 1.9% of study population as the cause of new onset seizures in elderly.

Uttar Pradesh being one of the high burden areas of tuberculosis in India may have accounted for this higher percentage (60%) of patients having seizures secondary to tuberculosis under CNS infections sub group.

The results were similar to study conducted by Ravi Prakash Pandey et al, in which the most common cause of seizure was stroke (56.86%) followed by metabolic causes (13.72%).^[18] In a study conducted by K. S. Amaravathi et al.,^[19] and Sowthariya et al.,^[20] at a tertiary care hospital, the most common aetiology of seizures was Stroke, constituting to 38% of cases. Our results were contrasted with the studies conducted by Pradeep et al., Jiménez et al., Sendil et al., and Hirani and Shrivastava that showed most common underlying etiology was idiopathic (33.9%) followed by metabolic (20.3%), CNS infections (16.9%), and stroke (10.2%) in their studies. Our study also, contrast the findings of the study conducted by Quraishi et al. which stated that the most common etiologies of generalized seizures among elderly age-groups were CNS infections and stroke (29.7% each), followed by idiopathic (27%), metabolic (10.8%), and tumors (2.7%).^[8,9,21]

GTCS is the most common seizure type observed in study population. Among the GTCS patients, metabolic causes were most common and seen in 35.9% patients followed by a stroke in 30.7% patients with GTCS. Meanwhile, stroke has accounted for maximum number of cases of focal seizures i.e., 83.3%.

In this study, the association between types of seizures and EEG findings it was found that abnormal EEG was observed in maximum number of cases with GTCS i.e., 69.2%, and normal electroencephalography was seen 30.8% patients. And all the patients (100%) with focal seizures have shown abnormal electroencephalography.

Conclusion

The study was conducted in a particular region of the rural population of Moradabad district of Uttar Pradesh where there is substantial burden of seizures with large rural population and limited health care resources which require proper counseling, diagnostic modalities and treatment.

In our study CVA was the frequently observed etiology of seizures among study population and the second most common was metabolic insults. Among stroke, seizures occurred more commonly in ischemic stroke than in hemorrhagic stroke. In our study GTCS was the most common type of seizure in 76.5% of study population. And acute symptomatic and remote symptomatic were almost seen in equal numbers 47.1% and 45.2% respectively. CVA accounted for most of the remote symptomatic seizures of which ischemic stroke is most common and metabolic causes accounted for most of the acute symptomatic seizures. The high burden of tuberculosis in the study area may have accounted for this higher percentage (60%) of seizures secondary to tuberculosis in the study patients under CNS infections sub group.

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