



CLINICAL PROFILE OF NEW ONSET SEIZURES IN ADULTS: A HOSPITAL BASED STUDY FROM A TERTIARY CARE HOSPITAL OF NORTHEAST INDIA

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ABSTRACT A seizure is a transient occurrence of signs or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. Seizures beginning in the adult life require special attention as regards to their etiology because these are likely to be due to an identifiable cause. This is a cross-sectional observational study on 100 patients admitted to the Department of Medicine, JMCH from July 2020- June 2021. Amongst the 100 patients the mean age was 48.66 years, 66% patients were male and 34% patients were female, 91% patients suffered from GTCS, 8% patient had focal seizure and 1% patient had focal seizure with secondary generalization. Most common cause was vascular etiology in 40% and most common comorbidity was found to be hypertension 43%. Most of the patients were males who suffered from GTCS. Vascular etiology was the leading cause. The most common comorbidity was found to be hypertension.

KEYWORDS : new onset seizure, focal, GTCS, cerebro vascular accident, clinical and etiological profile.

INTRODUCTION

A seizure is a transient occurrence of signs 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. Although a variety of factors influence the incidence and prevalence of seizures, ~5–10% of the population will have at least one seizure, with the highest incidence occurring in early childhood and late adulthood.¹

Seizures beginning in the adult life require special attention as regards to their etiology because these are likely to be due to an identifiable cause. These are mainly due to trauma, central nervous system (CNS) infections, space-occupying lesions, cerebrovascular accidents (CVA), metabolic disorders, and drugs.

On the other hand, seizures beginning in childhood are more likely to be idiopathic. In addition, the etiology and clinical profile of seizures in adults necessitate decisions about the initiation and discontinuation of pharmacotherapy that are different from those in younger patients.^{1,2}

The incidence of generalized seizures shows a falling trend as the age advances, whereas focal seizures increases in incidence with advancing age.³

The clinical presentation and etiology of seizure varies in different geographical regions, also it varies with Age and Sex of the patient.

In one study the most common cause of first seizure in young adults was Neurocysticercosis. However in another study among the middle age and elderly population the cerebrovascular diseases was found to be the most common reason for seizures.⁴

Not much clinical data is available on new onset seizures in adults in this North Eastern part of the country. Hence this study has been undertaken with the aim to study the clinical and etiological profile of new onset seizures in adults.

MATERIALS AND METHODS

Hospital based Cross sectional observational study. Conducted in Department of Medicine, Jorhat Medical College and Hospital, Jorhat, Assam. The participants were 100 patients clinically diagnosed to have seizures and admitted under department of medicine at JMCH.

Study duration was 1 year (1st JULY 2020 to 30th JUNE 2021).

Inclusion Criteria:

- Age of patients more than or equal to 18 years.
- Patients presenting with new onset seizures. (New onset seizures in adults is defined as first episode of seizure occurring after the age of 18yrs).

Exclusion Criteria:

- Patient with seizure like episodes:
 - Hyperventilation
 - TIA
 - Narcolepsy
 - Movement disorders
 - Psychogenic seizures
- Patients with past history of seizures.
- Seizures due to recent traumatic brain injury (≤ 6 months), postoperative seizures (including neurosurgical procedures), and seizures due to obstetric causes (including eclampsia) were excluded from the study.
- Patients not giving consent to undergo the study.

Patients above 18 years of age presenting with history of new onset seizures were included in the study. Patient and his attendant or eyewitness were interviewed regarding history and clinical examination was done and recorded. The patient was subjected to various investigations like biochemical, pathological, radiological and other relevant investigations were also done and were recorded. All data were subjected to standard statistical analysis and logical conclusions were withdrawn.

RESULTS

Table 1: Age And Sex Distribution Of Patient With New Onset Seizure

Age group (years)	Males		Females		Total	
	No	%	No	%	No	%
18-29	8	8%	5	5%	13	13%
30-39	6	6%	9	9%	15	15%
40-49	16	16%	7	7%	23	23%
50-59	15	15%	4	4%	19	19%
60-69	14	14%	5	5%	19	19%
70-79	6	6%	4	4%	10	10%
>80	1	1%	-	-	1	1%
Total	66	66%	34	34%	100	100%

Table 2: Type Of Seizure According To Age Group In Patients With New Onset Seizure

Age	Types of seizures			Total
	GTCS	FOCAL	FSWG	
18-29	13(13%)	-	-	13(13%)
30-39	13(13%)	2(2%)	-	15(15%)
40-49	20(20%)	2(2%)	1(1.29%)	23(23%)
50-59	18(18%)	1(1%)	-	19(19%)
60-69	17(17%)	2(2%)	-	19(19%)
70-79	10(10%)	-	-	10(10%)
≥ 80	-	1(1%)	-	1(1%)
Total	91(91%)	8(8%)	1(1%)	100(100%)

Table 3: Etiologies of New Onset Seizure

Etiology	Number(n=)	%
Vascular	40	40%
Metabolic	18	18%
CNS Infections	11	11%
Tumours	10	10%
Alcohol withdrawal seizures	11	11%
Mesial Temporal Lobe Epilepsy	1	1%
Unknown etiology	9	9%
Total	100	100%

Table 4: Etiologies Of New Onset Seizure In Patients <40Years, 40-59Years And ≥60 Years Of Age

ETIOLOGY	<40years (young)	40-59years (middle age)	≥60 yrs. (elderly)
	n=28	n=42	n=30
Vascular	3 (10.7%)	25(59.5%)	12 (40%)
Metabolic	8(28.5%)	4(9.5%)	6 (20%)
CNS Infection	6(21.4%)	4(9.5%)	1 (3.3%)
Tumour	1(3.5%)	3(7.1%)	6 (20%)
Alcohol withdrawal	2(7.1%)	5(11.9%)	4 (13.3%)
Mesial Temporal Lobe Epilepsy	1(3.5%)	-	-
Unknown etiology	7(25%)	1(2.3%)	1 (3.3%)
Total	28(100%)	42(100%)	30(100%)

The present study was done over a period of 1 year, 1st JULY 2020 till 30th JUNE 2021 and included a total of 100 subjects. The following results and observations were recorded from the study.

The age ranged from 18 to 82 years with mean age being 48.66 +/-15 years. 23 patients belonged to 40-49 years age group (23%) and 19 patients were in 50-59 years age range (19%).

Out of 100 patients 66 (66%) were males and 34 (34%) were females, and male: female ratio was found to be 1.9:1. Highest number of males were in the age group 40-49 years (n=16; 16%) while highest of females were in the age group of 30-39 years (n=9; 9%).

Out of the total 100 patients the most common type of seizure observed was generalised tonic clonic seizure (GTCS) in 91(91%) patients while 8(8%) patients had focal seizures and only 1(1%) patient was observed to have focal seizure with generalization.

Highest incidence of GTCS was seen to occur in 40-49 years age group (n=23;23%), while 2 cases of focal seizures was observed in 30-39 years, 40-49 years and 60-69 years age group. The only case of focal seizure with generalisation (FSWG) were seen in the 40-49 years age group.

Out of the total 66 males, 60 males experienced GTCS while 6 experienced focal seizure and out of the total 34 female patients, 31 had GTCS while only 2 had a focal seizure and also the only patient who experienced focal seizure with generalisation was a female.

A variety of co-morbidities were observed in the patients with new onset seizures. Most of the patients were Hypertensive (n=43; 43%) followed by Diabetes Mellitus (n=20; 20%). A group of patients with Alcohol Dependence Syndrome was also seen (n=10; 10%). Also around 31 (31%) patients didn't have any co morbid conditions.

Amongst the total 100 patients the most common cause for new onset seizure was vascular insult (n=40; 40%), followed by metabolic derangements (n=18; 18%). Infective cause was found in 11 (11%) patients, along with Tumour etiology which also was observed in 10 (10%) patients. Alcohol withdrawal was the cause of seizure in 10 (11%) patients while in 9(9%) patients etiology remained unknown.

On comparing the etiological incidence between the patients aged less than 40 years, 40-59years and more than 60 years it is observed that in patients aged less than 40 years the most common etiology is metabolic disorder (28.5%), followed by unknown etiology seizures (25%) and CNS infection (21.4%) while Tumour cause were least common (3.5%).

In patients in middle age (40-59 years), the commonest etiology was found to be vascular (59.5%) followed by Alcohol withdrawal seizures (11.9%) and the least common etiology for seizures was unknown

etiology seizures (2.3%).

While in elderly patients the most common cause were vascular (40%) and tumour (20%) followed by metabolic disorder (20%) and the least common occurrence was of CNS infection (3.3%) and unknown etiology seizures (3.3%).

Amongst the total 100 patients included in the study 40 patients underwent EEG evaluation. Out of which 55% (n=22) patients had normal EEG recording while 45% (n=18) patients had abnormalities in EEG, amongst which 22.5% (n=9) had focal epileptiform discharges while 22.5% (n=9) patient showed generalised spike and wave pattern abnormality.

All the patients included in the study underwent a neuroimaging either in form of MRI or CT scan of the brain. Amongst the total 100 cases 65 patients had an abnormality either in the MRI or the CT scan. 35 patients had a normal study on neuroimaging.

DISCUSSION

In the present study a total of 100 patients were included over a period of 1 year, 1st JULY 2020 to 30th JUNE 2021.

The observations made in our study are compared with other similar studies on the subject.

Majority of patients in our study belonged to middle age 40-59 years (42%), while 30% patients were in elderly age group and 28% were aged less than 40 years. Which was slightly contrasting to the study by Chalasani and Kumar⁴ who reported 46.9% cases to be from younger age groups(<40years). Few other studies also reported similar results of higher incidence in younger population are Hirani and Shrivastva⁵(54%), Saha *et al.*⁶(40%) and Muralidhar and Venugopal⁷ (64%).

The discrepancy observed between our study and other studies of higher incidence of seizure in middle age in comparison to younger age group can be explained by endemicity of diseases like hypertension and diabetes mellitus leading to higher incidence of Cerebro vascular accidents, thereby increasing the incidence of seizures in middle age groups.

The male: female ratio was found to be 1.9:1, with slight male predominance, which was similar to most of the earlier studies such as Hirani and Shrivastva⁵ (1.17:1), Muralidhar and Venugopal⁷ (2.12:1) and Sendil *et al.*⁸ (1.63:1).

The most common type of seizure in our study was found to be generalized tonic clonic type 91% (n=91), similar observations were recorded in the following studies too, Narayanan and Murthy⁹ (55%), Kanitkar *et al.*¹⁰ (70%), Sendil *et al.*⁸ (64%) and Hirani and Shrivastva⁵ (60%).

It is widely observed that the incidence of focal seizure increases with age while incidence of generalized seizures decreases, as seen in studies by Sinha *et al.*¹¹ where they reported 69.7% patients aged more than 60 years to have experienced focal seizures, also similar findings were given by Sendil *et al.*⁸ and Hirani and Shrivastva⁵. But these literatures are contradicting with our observations where the majority seizure type reported across all age groups was GTCS, and in elderly population also 27 out of total 30 cases had GTCS (90%) while only 3 patients had focal seizure (10%).

In the present study the commonest comorbidity was found to be hypertension 43%, followed by Diabetes mellitus in 20% patients. Similar findings was reported by Stam *et al.*¹², of commonest incidence of hypertension and diabetes as a comorbidity in patients presenting with seizure disorder.

ETIOLOGY OF SEIZURES:

Various etiologies of seizures when compared to other studies revealed similar observations. In our study Vascular insult (CVA haemorrhage, CVA infarct, SAH) were found to be the leading cause (40%), followed by metabolic derangement (18%), Infective cause was found in (11%) patients, along with tumor etiology which was observed in (10%) patients, Alcohol withdrawal was the cause of seizure in 11 (11%) patients while 9 (9%) patients were found to have unknown etiology seizures.

Similar observations were reported by Kanitkar et al.¹⁰ who found stroke as the cause of seizure in 44% cases, metabolic in 26% cases, 16% were labelled as cause unknown, CNS infection was found in 4% cases while tumors were a cause in 8% patients. Sendil et al.⁸ also had reported similar findings.

Few studies which had slightly varying observations were Hirani and Shrivastava⁵ (40%), Pradeep et al.¹³ (44%) and Jimenez et al.¹⁴ (51%), who observed unknown etiology seizures as the most predominant finding. While Quraishi et al.¹⁵ (38%) and Murthy JMK and Ravi Y¹⁶ (77%) reported CNS infection as the leading cause.

On studying the age wise distribution of the etiology it was clearly observed that the most common etiology of seizure in our study CVA was significantly predominant in the later age groups. In the patients belonging to 40-59 years age group the incidence of vascular insult as the cause of seizure was found to be 59.5% and in patients aged more than 60 years the incidence was 40%. Similar findings was recorded by Chalasani and Kumar⁴ and Quraishi et al.¹⁵ From amongst the younger population aged <40 years the most common etiology was found to be metabolic (35%) followed by CNS infection (20%). The incidence of CVA stroke has increased in the older age group due to accumulation of multiple risk factors such as hypertension, diabetes mellitus, cardio vascular illness, atherosclerosis etc.

Metabolic derangements were an important contributor to the seizure etiology in our study (18%), it had approximately equal male and female incidence and most of the cases occurred in extremes of age groups. Variety of metabolic derangements were seen in the patients like hypoglycaemia, hyperglycaemia, hypo and hypernatremia and uremia. Studies by Hauser et al.¹⁷ showed metabolic derangement in 10% of the patients while study by Narayanan and Murthy⁹ it accounted for 32% of cases.

The CNS infections were a cause of seizure in 11% patients. The most common infection leading to seizure was found to be neurocysticercosis while bacterial and tubercular meningitis were a cause for seizures in 1 patient each. Similar studies by Kanitkar et al.¹⁰ showed CNS tuberculosis caused seizure in 60% of patients while Neurocysticercosis was the cause in 40% cases, also in the study by Quraishi et al.¹⁵, neuroinfection was found to be the cause in 38% patients; tuberculoma was seen in 36.8% and neurocysticercosis in 31.5% cases of CNS infections. The higher predominance of neurocysticercosis in our study is because it was done in a neurocysticercosis endemic area.

Alcohol withdrawal was the etiology in 11% (n=11) patients, all the patients who presented with alcohol withdrawal seizures were males and all the patients had GTCS seizures. The incidence of alcohol withdrawal seizures was seen to increase with age as majority of cases occurred after the age of 40 years, after many years of continuous alcohol abuse when there was abrupt cessation for few hours to days. Similar results were recorded in the studies by Kanitkar et al.¹⁰ (31%), Sander et al.¹⁸ (9%), Hauser et al.¹⁷ (11%).

Tumors were the cause of seizures in 10% (n=10) patients in our study, there was a male predominance in incidence. Most of the patients experienced GTCS. The most common type of tumor found in our study was glioma. The incidence of tumor increased with age with 60% cases occurred after 60 years of age. Sander et al.¹⁸ reported 6% cases of seizure relating to tumor while, Hauser et al.¹⁷ reported 13%.

In many patients even after a rigorous and extensive clinical examination and investigations the cause of seizure still remains obscure, such patients are generally grouped under unknown etiology seizures. In our study 9% (n=9) patients were diagnosed with unknown etiology seizures. Other various studies have reported a varying incidence of unknown etiology seizures such as Hirani and Shrivastava⁵, the incidence was reported as 40% and Quraishi et al.¹⁵ reported it as 20%.

LIMITATIONS

The study includes patients from a single tertiary care center only.

Most of the patients admitted are referred cases from peripheral centers hence many patients were missed from our study.

Due to ongoing COVID19 crisis, sample size of present study was limited to 100. It will be more reliable on conducting study with a large

sample size. As the study had relatively smaller population, the finding cannot be extrapolated to patients in general.

Due to limitation of resources and poor compliance from patients EEG could be carried out only in 40 patients.

Only the first episode of new onset seizures was studied and the patients were not followed up for evaluation of recurrent seizures.

CONCLUSIONS

Seizures are a common cause of morbidity in the adult age group. A timely and correct diagnosis of the type and cause of seizure can prevent a lifelong social and vocational disability.

It was observed that the highest incidence of seizure was seen in the 40-49 years age group and males were more commonly affected than females.

The commonest type of seizure was generalized seizure.

Hypertension was the most commonly associated comorbid condition. Etiology most commonly associated with seizure was found to be vascular and it was most commonly associated with generalized seizure. Highest incidence of vascular disorder was seen in 40-59 years (middle) age group.

In the elderly age group the commonest etiologies of seizure were found to be vascular and tumor followed by metabolic derangement. In the middle ages, the commonest etiology was vascular followed by Alcohol withdrawal seizures. While in the younger age group the commonest etiology was metabolic derangement followed by Unknown etiology seizures and CNS infection.

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