



**A STUDY ON THE ETIOLOGY OF THE SEIZURES, CHANGES IN EEG AND CT-SCAN
AND MRI FOR THE SEIZURE PATIENTS.**

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ABSTRACT

Background: Even in today's modern world, seizures remain the one of the most mysterious and less understood topic. So, in this study, we tried to study about seizures. **Aims:** In this study, we were trying to find about the etiologies of the stroke, changes in EEG in seizure patient and changes in CT scan and MRI for the seizures. **Methods:** In this study, 50 patients were taken who were admitted to BJ medical in the department of Medicine from October 2013 to October 2015. We randomly selected 50 patients from all the patients with age>18 and admitted to BJ medical for seizures. Inclusion criteria were seizures of any kind and age >18 years. Seizures were diagnosed by proper history and examination and they were went through neuroimaging and EEG studies. Afterwards patients went through special tests like CT brain, MRI brain and EEG. **Results:** The causes of seizures in our study group was most common idiopathic. Other causes of seizures were post stroke seizures, neurocysticercosis, brain tuberculoma, brain tumor, brain abscess, post-partum convulsions, metabolic. 36% patients had an abnormal EEG. 24% patients had an abnormal CT brain and 42.1% patients had an abnormal MRI brain scan.

KEYWORDS:

BACKGROUND

A seizure a paroxysmal event due to abnormal excessive or synchronous neuronal activity in the brain. Depending on the distribution of electrical discharges, this abnormal brain activity can have various manifestations, ranging from dramatic convulsion 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.^[1,2] Convulsion means repetitive, involuntary, tonic-clonic contraction of muscle of the body for a short

duration usually with loss of consciousness. Epilepsy describes a condition in which a person has recurrent seizure (≥ 2) due to a chronic, underlying process. This definition implies that a person with a single seizure, or a recurrent seizure due to correctable or avoidable circumstances, does not necessarily have epilepsy.^[1,2] Seizures are known to occur in all geographical areas, all races, age and gender. For all these reason every physician should know something about seizure disorder and its treatment.^[1] Now days there is an increasing incidence of adult onset seizures primarily be attributed to increased life expectancy and increased incidence of head injury. Improved health care, result in increased

longevity, will unavoidably lead to an increased incidence of seizure disorder in the elderly.

The annual incidence of seizures is found to be between 20-120 cases per 1,00,000 of population.¹⁰ At least 2-5% of general population has atleast one episode of seizure in life time¹⁰. Seizures probably recurs in more than half of these population. 4-10/1,000 population suffer from chronic or active epilepsy. Annual incidence above 25 year is 1.29/1000 population. The cumulative incidence of epilepsy by the age of 70 years may be as high as 2- 5/100 population.¹⁰ Epilepsy affects all age, sex, race and ethnic population, but slightly more common in males and lower socioeconomic groups. Incidence of seizure disorder has 2 peaks. First in infants and early childhood when 2/3rd cases of seizures occur and seizures in this period have widest array of presentation, second peak occur after 60 years of age. Determining the type of seizure that has occurred is essential for focusing the diagnostic approach on particular etiologies, selecting the appropriate therapy and providing potentially vital information regarding prognosis. The international league against epilepsy (ILAE) commission on Classification and Terminology, 2010 has provided an updated approach to classification of seizures. This system is based on clinical features of seizure and associated electroencephalographic findings. Other potentially distinctive features such as etiology or cellular substrate are not considered in this classification system. A fundamental principle is that seizures may be either focal or generalized. Focal seizures originate within networks limited to one cerebral hemisphere (note that the tem partial seizure is no longer used.) Generalized seizures arise within and rapidly engage networks distributed across both cerebral hemispheres. Focal seizures are usually associated with structural abnormalities of the brain. In contrast, generalized seizures may result from cellular, biochemical, or structural abnormalities that have a more widespread distribution.

Seizures can be classified according to the international league against epilepsy commission on classification and terminology(2010).^[1,2,3]

1. Generalized seizures

- a) Tonic-clonic
- b) Absence –Typical and Atypical
- c) Clonic
- d) Tonic
- e) Atonic
- f) Myoclonic

RESULTS

TABLE-1: AGE DISTRIBUTION

Age in years	Total No. of patients	Percentage
18-29	16	32%
30-39	10	20%
40-49	9	18%

2. Focal seizures

a) Without dyscognitive (without impairment of consciousness or awareness, simple partial seizure)

- Focal motor
- autonomic
- sensory or
- psychic phenomena only – “aura”

b) With dyscognitive features (with impairment of consciousness or awareness, complex partial seizure)

c) Focal seizures Evolving to a bilateral convulsive seizure

- May include tonic, clonic or tonic and clonic components in any order

3. Currently Unclassifiable (May be focal, generalized, or unclear Epileptic spasms).

Causes of seizures in adults can be trauma, alcohol withdrawal, metabolic, illicit drug use, brain tumor in young patients (18-35 years). Causes of seizures in adults with age>35 years are autoantibodies, cerebrovascular diseases, brain tumor, alcohol withdrawal, metabolic diseases (uremia, hepatic failure, electrolyte disturbances, hypoglycemia, hyperglycemia), Alzheimer’s disease and other degenerative CNS diseases.

AIMS

In this study, we were trying to find about the following scenario:

1. Etiologies of the stroke,
2. Changes in EEG in seizure patient and
3. Changes in CT scan and MRI for the seizures.

METHODS

In this study, 50 patients were taken who were admitted to BJ medical in the department of Medicine from October 2013 to October 2015. We randomly selected 50 patients from all the patients with age>18 and admitted to BJ medical for seizures. Inclusion criteria were seizures of any kind and age >18 years. Seizures were diagnosed by proper history and examination and they were went through neuroimaging and EEG studies. Patients <18 years of age were excluded. After taking detailed medical history, all patients underwent detailed general physical examination, systemic examination and routine laboratory investigation like CBC, renal function test, urine examination, liver function test and electrolytes. Afterwards patients went through special tests like CT brain, MRI brain and EEG.

50-59	6	12%
60-69	5	10%
>70years	4	8%
Total	50	100%

As per the table 1, the distribution of the patients was 32% in age group 18-29, 20% in 30-39 age group, 18% in 40-49 age group, 12% in 50-59 age group, 10% in 60-69 age group and 8% in >70 years group.

TABLE-2: SEX DISTRIBUTION

Sex	Total No. of patients	Percentage
Male	30	60%
Female	20	40%
Total	50	100%

As per table 2, 30 patients (60%) were males and 20(40%) were females.

TABLE-3: TYPE OF SEIZURE

Type of seizure	Number of patients	Percentage
Generalized	32	64%
Focal	18	36%
Total	50	100%

In our study, we found out that 32 patients (64%) had generalized seizures, 18(36%) had focal seizures.

TABLE 4: ETIOLOGY OF SEIZURES

Etiology	Age group(years)						Total	Total (%)
	29-18	39-30	49-40	59-50	69-60	years 70≤		
Idiopathic seizure	6	4	4	2	3	1	20	40%
Post stroke seizure	00	2	00	4	1	2	9	18%
Neuro-cysticercosis	3	1	00	00	00	1	5	10%
Brain tuberculoma	1	1	2	1	00	00	5	10%
Brain tumour	00	00	1	00	00	00	1	2%
Brain abscess	00	00	1	00	00	00	1	2%
Post-partum convulsion	2	00	00	00	00	00	2	4%
Cerebral degenerative disease	00	00	1	00	00	00	1	2%
Venous sinus thrombosis	2	1	00	00	00	00	3	6%
metabolic	1	00	00	00	00	00	1	2%
Mesial temporal lobe epilepsy	1	1	00	00	00	00	1	2%
Total	16	10	9	6	5	4	50	100%

In our study, as you can see from the above table, 20(40%) patients had no known cause of the seizures and were truly idiopathic. 9 patients(18%) had post stroke seizures, 5(10%) had neurocysticercosis, 5(10%) had brain tuberculoma, 1(2%) had brain tumor. 1(2%) had

brain abscess, 2(4%) had post-partum convulsions, 1 (2%) had cerebral degenerative diseases, 3(6%) had venous sinus thrombosis, 1(2%) had metabolic disorders, 1(2%) had mesial temporal lobe epilepsy.

TABLE-5: EEG STUDY	
EEG	NO. OF PATIENTS
Normal	32
Abnormal	18
Total	50

In our study, 32 patients had normal EEG and 18 patients had abnormal EEG.

TABLE 6: ABNORMALITY IN EEG			
SEIZURE TYPE	EEG study		ABNORMALITY DETECTED
	Normal	Abnormal	
GTCS	20	12	Generalized spike and wave abnormality
FOCAL	12	6	Focal spike and wave abnormality
TOTAL	22	18	50

Out of the total 18 patients with abnormal EEG, 12 patients with GTCS had generalized spike and wave abnormality and 6 patients with focal seizures had focal spike and wave abnormality. Out of the 22 patients with

normal EEG, 20 patients with GTCS had generalized spike and wave abnormality and 12 patients with focal seizures had focal seizures and wave abnormality.

TABLE-7: IMAGING STUDIES

Imaging studies	(n)	CT brain	MRI Brain	
		N=50	(n)	N=38
		(%)	(n)	(%)
Normal	38	76%	22	57.89%
Abnormal	12	24%	16	42.1%
Total	50	100%	38	100%

In our study, 12(24%) patients had abnormal CT brain and 16(42.1%) had abnormal MRI. The different CT brain findings are given in the following table.

TABLE 8: CT BRAIN FINDING

CT scan		No of patients	Percentage	
Normal	Normal	38	76%	
	Large infarct	4	8%	
	Sub arachnoid	3	6%	
	haemorrhage			
	Intracerebral	2	4%	
	haemorrhage			
	Abnormal	Brain tumour (Glioma)	1	2%
		Posterior reversible	1	2%
		encephalopathy		
		syndrome	1	2%
Multiple calcified lesion				
Total			50	100%

DISCUSSION

The present study shows age wise distribution of seizures in total 50 cases. The highest number of patient, 16 (32%) fall in age group of 18-29. Followed by 10 (20%) patient fall in age group of 30-39. After that 9 (18%) patient in age group of 40-49. 6(12%) patient in

age group of 50-59. Lowest number of patient 5 (10%) fall in to age group of 60-69 and age >70 years. In age group of 18-29 the incidence of idiopathic seizure is more common. The mean age of group was 40.66 ± 16.36 years. The mean age of V Muralidhar at study was 32.34 ± 15.89 and in present study was

40.66 ± 16.36 years. In present highest number of patient, 16 (32%) fall in age group 18-29 as compared to previous other studies, M Hirani et al 15^[4] (30%), V Muralidhar et al 20^[5] (40%). The present study Out of total 50 patients, 30 (60%) are male and 20 (40%) are female. The present study shows male predominance. The sex distribution of cases in most of the study series reported in the literature suggest male predominance. The present study shows slight male predominance with male: female ratio was 1.5: 1, which was comparable to previous studies M Hirani et al(1.17:1) and V Muralidhar et al (2.12:1). One reason for this male predominance is due to their more outdoor activities, the incidence of head injury is more common in male. The present study having 32(64%) having GTCS which was comparable with M Hirani et al n=50, 30(60%) and Sempere et al n=98 (68.4%). In present study the number of focal seizure having 18(36%), which was comparable with M Hirani et al n=50, 18(60%) and Sempere et al n=98 (31.6%). Etiology of seizures in present study was compared with other studies. The most common one is idiopathic seizure, 20(40%) in present study compared with M hirani et al, 20(40%) and Sempere et al, 27(60.5%) having idiopathic seizure. In present study 11(22%) patient has CNS infection, M Hirani et al having 12(24%), Sempere at al having 23(40.4%). This indicates that after idiopathic seizure, most common etiology was CNS infection. The number of post stroke seizure in present study was 9(18%). The comparison study M Hirani et al having 12(24%) patients and in Sempere et al having 23(40.4%) patient. The EEG study was compared with other studies. The abnormal EEG in Ruggles KH^[6] et al 26(2001) n=48 was 29% and in Granger n^[7] et al 27(2002) n=341 was 55%. The CT brain findings are compared with other studies in present study infarct seen in 4(8%) of patients which compared with M Hirani et al 4(8%), V Muralidhar et al 6(12%). The SAH were 3(6%) compared with m Hirani et al 0% and V Muralidhar et al 4%. The ICH in present study was seen in 2(4%) of patients, M Hirani et al 4(8%) and V Muralidhar et al 0%.

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