

## AETIOLOGICAL EVALUATION OF NEW ONSET SEIZURES IN ADULTS IN EAST GODAVARI DISTRICT OF ANDHRA PRADESH

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### ABSTRACT

#### BACKGROUND

Seizures are common disorder found all over the world and are encountered frequently during medical practice in a variety of settings. At the global level, it is estimated that nearly 70 million people suffer from epilepsy and the prevalence of epilepsy across the globe is estimated to be 5-9 per 1,000 populations. About 12 million persons with epilepsy live in India. Numbers of deaths attributed to epilepsy in 2015 were 7419 for 10,000 population and deaths attributable to epilepsy were 0.21% of total deaths globally. Idiopathic seizures account for most of the hospital admissions. Aetiological spectrum of acute symptomatic seizure in developing countries is different from developed countries. Studies from developed countries showed CVA as the leading cause of new onset seizures. CNS infections like Malaria, Tuberculosis, HIV, Neurocysticercosis account for significant number of cases in developing countries like India. Since these infections vary from region to region. Aetiology of seizure may vary from region to region. Single small enhancing CT lesions (SSECTL) are important cause of seizures in India. Initially it was thought that SSECTL were because of Tuberculosis focal encephalitis and micro abscess were due to Cysticercosis but now studies suggest that, in most of the cases of SSECTL Neurocysticercosis predominates. So, aetiology changes over time. Focal seizures are more common, but they may generalize to life threatening status epilepticus. Most common causes for this type of presentation include subdural haemorrhage, stroke, central nervous system infections, degenerative disorders like Alzheimer's disease and space occupying lesions including malignancy (glioma and brain metastasis). They also occur in systemic metabolic conditions like uremia, hyperglycemia, hypoglycemia, hypernatremia, alcohol withdrawal. Seizures can be a presenting feature in TB meningitis which is most common type of chronic meningitis in India. More than 60% patients with intracranial TB may have seizures. Our medical college is located in a predominantly coastal area. The ongoing disease spectrum and their complications are likely to be different from those encountered in metropolitan area. Hence this effort is made to know the various aetiologies of new onset seizures in adults in coastal area.

#### MATERIALS AND METHODS

During this period of prospective observational study, 100 newly diagnosed seizure patients either admitted or attending as our patients to Medicine department in RMC General Hospital, Kakinada were enrolled in the study.

#### RESULTS

Out of 100 patients, 7% were in age group of 18-19 years, 25% in the age group of 20-29 years, 20% in the age group of 30-39 years, 16% in the age group of 40-59 years and 9% in the age group of 50-59 years, and 23% in the age group of 60-79 years. Majority of patients presented between age group 20-29 years, (i.e.; in 3<sup>rd</sup> decade), there after incidence decreased from 4<sup>th</sup> decade to 6<sup>th</sup> decade and again incidence increased thereafter. Out of 100 patients, males (64%) were more affected than females (36%). GTCS (Generalized Tonic Clonic Seizures) (62%) was more common than Focal Seizures (38%). Out of 38 patients who presented with focal seizures, focal seizures without dyscognition were more common. Comparing both CT and EEG findings, out of 100 patients (n=100), 26 patients had both abnormal epileptiform discharges and abnormal finding in CT scan brain. Forty patients had both normal EEG & CT scan brain results. Twenty-one patients had CT scan brain focal lesion with normal EEG. Thirteen patients had normal CT scan brain findings in spite of epileptiform discharges on EEG and 60 patients had either abnormal CT scan brain focal lesion or epileptiform discharges on EEG.

#### CONCLUSION

Incidence of seizures is more common in males than in females. Incidence is more common in the third decade and thereafter decreases up to sixth decade and incidence again increased after sixth decade. Neurocysticercosis and calcified granuloma were most commonly seen in 18-39 years age group, Tuberculoma was evenly distributed from 2<sup>nd</sup> to 6<sup>th</sup> decade and cerebrovascular disease was the commonest cause in the 60-70 years age group. Generalized tonic-clonic seizure was the commonest type of seizure (62%). Among focal seizures, focal seizures without dyscognition are more common (65.78%). CT scan brain was abnormal in 47% of the patients with new onset seizures in adults without apparent cause clinically. Forty percent patients were found to have idiopathic seizures and no abnormality was identified clinically, biochemically, CT scan brain and EEG. Six percent of patients had recurrent seizures during the follow up period of this study and all were due to drug noncompliance and had no specific correlation with underlying CT/EEG abnormality.

#### KEYWORDS

Epilepsy C10.228.140.490 Electroencephalography E01.370.376.300 Tomography E01.370.350.825

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## BACKGROUND

Seizure is defined as a paroxysmal event due to abnormal, excessive or hyper synchronous discharges from an aggregate of central nervous system neurons. Epilepsy describes a condition in which a person has recurrent seizures due to a chronic underlying process. Partial seizure activity can begin in a very discrete region of cortex and then spread to neighboring regions, i.e., there is a seizure initiation phase and a seizure Propagation phase. Under proper circumstances, a seizure discharge can be initiated in entirely normal cortex, as when the cortex is activated by ingestion or injection of drugs, alcohol withdrawal or other sedatives or by repeated stimulation from sub convulsive electrical pulses (kindling phenomenon). The initiation phase is characterized by two concurrent events in an aggregate of neurons: high-frequency bursts of action potentials and hyper synchronization. The bursting activity is caused by a relatively long-lasting depolarization of the neuronal membrane due to influx of extracellular calcium ( $Ca^{2+}$ ), which leads to the opening of voltage-dependent sodium ( $Na^+$ ) channels, influx of  $Na^+$ , and generation of repetitive action potentials. This is followed by a hyperpolarizing after potential mediated by  $\gamma$ -amino butyric acid (GABA) receptors or potassium ( $K^+$ ) channels, depending on the cell type. The synchronized bursts from a sufficient number of neurons result in a so-called spike discharge on the EEG. Repetitive discharges lead to an increase in extracellular  $K^+$ , which blunts hyper polarization and depolarizes neighboring neurons; accumulation of  $Ca^{2+}$  in presynaptic terminals, leading to enhanced neurotransmitter release; and depolarization-induced activation of the N-methyl-D-aspartate (NMDA) subtype of the excitatory amino acid receptor, which causes  $Ca^{2+}$  influx and neuronal activation. The recruitment of a sufficient number of neurons leads to a loss of the surrounding inhibition and propagation of seizure activity into contiguous areas via local cortical connections and to more distant areas via long commissural pathways such as the corpus callosum.

Etiology of epilepsy varies in different age groups and geographical locations. Congenital and genetic conditions are the most common causes in early childhood. In infancy, metabolic and perinatal insults are the leading causes. In older children and young adults, inherited predisposition, hippocampal sclerosis, alcohol, drug abuse and trauma are important causes. In the elderly vascular aetiology is common. Tumors and sporadic infections occur at all ages, although malignant tumors are more likely to occur above the age of 30 years. In certain areas, endemic infections are

common like neurocysticercosis, Japanese B-encephalitis, etc., Epilepsy is multi factorial. In any acquired condition it is more likely to occur if an inherited predisposition is present, as in epilepsy after head injury or caused by alcohol or by its withdrawal.

## Aims and Objectives

### Aim

To study various aetiologies of new onset seizures and follow up of these cases for this study period.

### Objectives

- 1) To study various aetiologies of new onset seizures.
- 2) To study frequency of generalized and focal seizures of new onset seizures.
- 3) To study frequency of CT scan abnormalities in new onset seizures.
- 4) To study frequency of EEG abnormalities in new onset seizures.

## MATERIALS AND METHODS

Period of study was from December 2014 to May 2016. Hundred newly diagnosed seizure patients either admitted or attending as outpatients to Medicine department in RMC General Hospital, KAKINADA was taken up for study. Patient and eyewitness were interviewed regarding history and detailed clinical examination is done.

All the patients were investigated with complete blood picture, urine analysis, blood urea, serum creatinine, random blood sugar, liver function tests, serum electrolytes, CT scan of brain and special investigations like EEG, CSF Analysis were done in necessary cases. Consent of the patient and attendants is taken for doing the above investigations. This study is a hospital based prospective analytical study. All the data is tabulated, and the results are statistically analyzed. Ethical clearance has been obtained from my institution at the beginning of this study.

### Inclusion Criteria

1. Age of onset of seizure more than 18 years (all types of seizures).
2. Patient presenting with new onset seizures (new onset is defined as first seizure or first cluster of seizures ever experienced by the patient).

### Exclusion Criteria

Patient with seizure like episodes

- Hyperventilation precipitated
- TIA'S
- Narcolepsy
- Movement disorders like chorea, athetosis, tic disorder
- Psychogenic seizures
- Drug withdrawal status
- Seizures in pregnancy
- Known epileptics on Anti-epileptic drug therapy.

**RESULTS**

In the present study, the minimum age recorded was 18 years and maximum age recorded was 79 years. Out of 100 patients, 7% were in age group of 18-19 years, 25% in the age group of 20-29 years, 20% in the age group of 30-39 years, 16 % in the age group of 40-59 years and 9% in the age group of 50- 59 years, and 23% in the age group of 60 -79 years. Majority of patients presented between age group 20-29 years, (i.e.; in 3<sup>rd</sup> decade), there after incidence decreased from 4<sup>th</sup> decade to 6<sup>th</sup> decade and again incidence increased thereafter. Out of 100 patients, males (64%) were more affected than females (36%). GTCS (Generalized Tonic Clonic Seizures) (62%) was more common than Focal seizures (38%). Out of 38 patients presented with focal seizures, Focal seizures without dyscognition were more common. Among focal seizures of 38 patients, 65.79% presented without dyscognitive features. Among them only 13.16% presented with dyscognitive features & 21.05% presented with focal seizures with secondary generalization. It was observed that, GTCS is more common in all age groups in this study.

Highest incidence of focal seizures was recorded in the age group of 20-39 years i.e., 20 (54.05%) out of 37 cases. CT scan of brain was found to be abnormal in 47% of patients and normal in 53%. Out of 62(100%) patients of GTCS, CT scan brain finding was abnormal in only 17 36.17%) patients, whereas out of 38 (100%) patients with focal seizures, CT brain scan finding was abnormal in 30 (78.94%) patients. In the present study, out of 62 patients of GTCS, 17 patients had abnormal CT scan brain finding, and among 17(100%) patients, 35.29% had calcified granulomas and 23.52% had NCCs and 23.52% had CVAs and 17.67% had Tuberculomas. In the present study, out of 100 patients, 47 patients had CT brain abnormalities and among 47(100%) patients, 31.92% of them had CT abnormalities suggestive of Calcified granuloma, 27.66% patients had Neurocysticercosis, 19.14% patients with Tuberculomas, 17.02% patients with Cerebrovascular disease, 2.13% patients with brain tumour and 2.13 % patients with heterotopia. Among 38 patients with Focal seizures, 30 patients (78.94%) had abnormal CT brain scan findings and among the 30 (100%) patients, 30% had calcified granulomas, 30% had neurocysticercosis, 20% had tuberculoma and 13.3% had cerebrovascular disorders, 3.3% had tumors & 3.3% heterotopias (Table-1).

CT Lesion	No. of Patients (n=47)	Percentage of CT Lesions
Calcified Granuloma	15	31.92
Neurocysticercosis	13	27.66
Tuberculoma	9	19.14
Tumors	1	2.13
Vascular Diseases	8	17.02
Others (Heterotopia)	1	2.13

**Table 1. The Distribution of Various Types of Abnormal CT Brain Scan Findings Noticed in 47 (100%) Out of 100 Patients in Our Study**

In the present study, out of 100 patients, EEG shows epileptiform discharge in 39 patients.

Out of 62 patients who presented with GTCS, EEG shows epileptiform discharge in 22(35.48%) patients (Table-2).

Sl. No.	Seizure Type	No. of pts	Normal EEG		Epileptiform discharge	
			No. of pts	% of pts	No. of pts	% of pts
1.	GTCS	62	40	64.52	22	35.48
2.	FS	25	14	56	11	44
3.	FSD	5	2	40	3	60
4.	FSS	8	5	62.5	3	37.5
5.	total	100	61		39	

**Table 2. Distribution of EEG Findings in Various Types of Seizures**

Out of 38 patients who presented with Focal seizures, EEG showed epileptiform discharges in 17(43.58%) patients. Comparing both CT and EEG findings, out of 100 patients (n=100), 26 patients had both abnormal epileptiform discharges and abnormal finding in CT scan brain. Forty patients had both normal EEG & CT scan brain results. Twenty-one patients had CT scan brain focal lesion with normal EEG. Thirteen patients had normal CT scan brain finding in spite of epileptiform discharges on EEG and 60 patients had either abnormal CT scan brain focal lesion or epileptiform discharges on EEG.

**DISCUSSION**

Rochester, Minnesota 1935-74 study showed the incidence of epilepsy was highest at extremes of life.<sup>1</sup> Present study showed a double peak in incidence one in 3<sup>rd</sup> decade and in 7<sup>th</sup> decade of life. In Stillman R, Murthy BN study pattern and prevalence of epilepsy. Age specific prevalence rates were higher in the younger age group with onset of epilepsy reported mostly in the first 3 decades.<sup>2</sup> Our present study was done only in adults. Hence, we had nearly 50% of cases below 40 years of age and it is similar to Sanapala SN study where 48% of their cases were in the age group of 20-35 years.<sup>3</sup>

In Sridharan R., Murthy BN study incidence in males (55%) was higher than females (45%).<sup>2</sup> In the study by Sanapala SN 76% were males and 24% were females .other studies also reported similar male preponderance similar to the present study.<sup>3</sup> In present study, GTCS (62%) was more common than Focal seizures (38%), which was comparable to similar higher incidence of GTCS in the studies of Manoj Kumar K et al Sridharan et al, T Narayanan and JMK Murthy studies whereas Ranjith G et al Sanapala SN, Sander et al studies reported higher prevalence of focal seizures compared to GTCS in their studies.<sup>3,4,5,6,7,8,9</sup>

In Rochester, Minnesota 1935-74 study Tonic clonic, simple partial, complex partial seizures had similar incidence and incidence of absence seizures was low.<sup>1</sup> In Sridharan R, Murthy BN study incidence of GTCS was more common than focal seizures in India. The incidence of GTCS in our study is

comparable to Sridharan et al study.<sup>2</sup> But study by Ranjith et al showed GTCS 48%, focal seizures with secondary generalization 30%, focal seizure without loss of cognition 12% and with loss of cognition 10%. This differ from our study. This may be due to epidemiological difference.<sup>7</sup>

Sanapala SN et al found (48%) with infective (tuberculoma and neurocysticercosis) aetiology is most common followed by cerebrovascular accidents.<sup>3</sup> Manoj Kumar K et al found Neurocysticercosis is most common cause in Neuroinfection (29%), followed by meningitis (24%), cerebral malaria (19%). Cerebrovascular accidents (29%) and metabolic (9%).<sup>9</sup> Murthy JMK et al found cysticercosis ring lesions in 40% of cases.<sup>6</sup> Rajasekhar et al

found tuberculomas in 12% patients, Murthy JM et al found in 10% of cases and Rudresh et al in 20% of patients in their study on epilepsy.<sup>10,6,11</sup> Murthy JMK study found 7% tumors and 14% vascular disease in their study.<sup>6</sup> Percentage of tumors in a study by Reinkainen et al was 17%.<sup>12</sup> These were all Indian studies showing neuro infections as more common causes for seizures in India and also illustrates that the aetiological spectrum of seizures in India is different from that described from developed countries as studied in Hauser et al & Sander et al studies.<sup>13,8</sup> In their studies the incidence of neuro infections as aetiology of seizures is about 2 to 15% (Table-3).

Ct focal lesion	Present study	Rajshekar et al	Rudresh k et al	Murthy, JMK, Yangala R
NCC	28.89%	50%	52%	40%
Calcified granuloma	31.11%	-	-	-
Tuberculoma	20%	12%	20%	10%
Tumors	2.2%	6%	8%	7%
Infarct	17.78%	15%		14%

**Table 3. Comparison of CT Abnormalities in Present Study with Other Studies**

Ranjith et al found idiopathic epilepsy (34%) was the commonest cause, followed by post stroke epilepsy (20%), neurocysticercosis (16%), tuberculoma (12%), posttraumatic (6%), brain tumor (6%), brain abscess (4%) and primary cerebral degenerative disease (2%).this is contradictory to our present study and other Indian studies.<sup>7</sup> This may be due to inclusion of cases with past history of seizures in childhood also. In a study by Sridharan et al EEG was done in 219 patients, disclosed abnormal results in only 50(22.5%).<sup>14</sup> While the other studies by various authors as depicted is closer to present study incidence (Table-4).

no abnormality was identified clinically, biochemically, CT scan brain and EEG. Six percent of patients had recurrent seizures during the follow up period of this study and all were due to drug noncompliance and had no specific correlation with underlying CT/EEG abnormality.

**REFERENCES**

- [1] Hauser WA, Kurland LT. The epidemiology of epilepsy in Rochester, Minnesota, 1935 through 1967. *Epilepsia* 1975;16(1):1-66.
- [2] Sridharan R, Murthy BN. Prevalence and pattern of epilepsy in India. *Epilepsia* 1999;40(5):631-636.
- [3] Sanapala SN, Thangellapally H, Reddy SK, et al. Study of aetiological profile of new-onset focal seizures in adults. *J Assoc Physicians India* 2016;64(1):62.
- [4] Bharucha NE, Bharucha EP, Bharucha AE, et al. Prevalance of epilepsy in the Parsi community of Bombay. *Epilepsia* 1988;29(2):111-115.
- [5] Narayanan JT, Murthy JM. New onset acute symptomatic seizures in a neurological intensive care unit. *Neurol India* 2007;55(2):136-140.
- [6] Murthy JM, Yangala R. Acute symptomatic seizures-incidence and aetiological spectrum: a hospital based study from south India. *Seizure* 1999;8(3):162-165.
- [7] Ranjith G, Gandiah P, Venkateswarulu N. Clinical profile and aetiological analysis of new onset epilepsy in adults. *J Assoc Physicians India* 2016;64(1):60.
- [8] Sander JW, Hart YM, Johnson AL, et al. National general practice study of epilepsy: newly diagnosed epileptic seizures in a general population. *Lancet* 1990;336:1267-1271.
- [9] Kushwaha MK, Usmani MH, Patel R. aetiological study of new-onset seizures. *J Assoc Physicians India* 2016;64(1):62.

EEG	Normal	Abnormal
Hauser et al	56%	44%
Das et al	79%	21%
JMK Murthy et al	44%	56%
Sridharan et al	44.2%	55.8%
Present Study	61%	39%

**Table 4. Comparison of EEG Results in Various Studies with Present Study**

**CONCLUSION**

Incidence of seizures is more common in males than in females. Incidence is more common in the third decade and thereafter decreases up to sixth decade and incidence again increased after sixth decade. Neurocysticercosis and calcified granuloma were most commonly seen in 18-39 years age group. Tuberculoma was evenly distributed from 2nd to 6th decade and cerebrovascular disease was the commonest cause in the 60-70 years age group. Generalized tonic-clonic seizure was the commonest type of seizure (62%). Among focal seizures, focal seizures without dyscognition are more common (65.78%). CT scan brain was abnormal in 47% of the patients with new onset seizures in adults without apparent cause clinically. Forty percent patients were found to have idiopathic seizures and

- [10] Rajsekhar. Evaluation of single ring enhancing lesion in epilepsy by computed tomography. 1993;6(3):200-224.
- [11] Rudresh K, Krishna MV, Karthik, et al. Clinical and aetiological profile of ring enhancing lesions on CT brain. JIACM 2008;9(2):100-102.
- [12] Reinikainen KJ, Keranen T, Lehtinen JM, et al. CT brain scan and EEG in the diagnosis of adult onset seizures. Epilepsy Research 1987;1(3):178-184.
- [13] Hauser WA, Rich SS, Annegers JF, et al. Seizure recurrence after a first unprovoked seizure: an extended follow up. Neurology 1990;40(8):1163-1170.
- [14] Sridharan R, Radhakrishnan K, Ashok PP, et al. Epidemiological and clinical study of epilepsy in Benghazi, Libya. Epilepsia 1986;27(1):60-65.