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### CLINICAL AND RADIOLOGICAL EVALUATION OF NEW-ONSET EPILEPTIC SEIZURES IN A TERTIARY CARE HOSPITAL

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**ABSTRACT: BACKGROUND:** Epilepsy is one of the most familiar neurological disorders which can cause bodily injury and death from inadequately treated or untreated cases. The imaging and EEG of new onset seizures is done with different indications, to identify an acute illness as the underline course for the seizure and possible neurological deficit. To this purpose we have evaluated new onset seizures in adult patients in correlation with their clinical profile, Electroencephalography (EEG) and Computerized tomography (CT) imaging of brain. **METHODS:** This cross sectional study was studied in 100 adult patients, presenting with seizures attending the Emergency department, General Medicine and Neurology wards and OPD of Tertiary care teaching hospital during the period of March 2006 to March 2008. All the patients were examined clinically and subjected to CT imaging of brain and EEG. Other necessary blood investigations were also done. Correlation between various seizures and CT scan brain and EEG were studied. Descriptive statistics were used to analyze the data. **RESULTS:** 63% of patients were in the age group of 20-39 years, 63% were males and 37% were females. 65% presented with GTCS, 35% with partial seizures. CT scan was found abnormal in 49.2% patients in GTCS, 71.4% in partial seizures. EEG showed abnormal pattern in 39% patients. 40% of the patients with partial seizures had epileptic form discharges. 33% patients had focal lesions on CT brain with normal EEG. **CONCLUSION:** Generalized Tonic clonic seizures were the commonest type of seizures was present, seen mostly in male patients. CT scan brain was abnormal in 57% of the patients. Neurocysticercosis and calcified granuloma were the commonest causes for seizures up to 3<sup>rd</sup> decade of life. Majority of the patients with focal lesions on CT scan brain had epileptic form discharges on EEG which indicate a strong correlation of EEG with CT findings. Initiating the treatment with antiepileptic drugs was left the sole discretion of the treating physician for a case of new onset seizures.

**KEYWORDS:** Epilepsy, Computerized tomography (CT), Electroencephalography (EEG), Generalized Tonic Clonic seizures (GTCS), Partial seizures.

**INTRODUCTION:** An epileptic seizure is a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. Epilepsy is a disease characterized by an enduring predisposition to generate epileptic seizures and by the neurobiological, cognitive, psychological, and social consequences of this condition.<sup>(1)</sup> Epilepsy is one of the most familiar neurological disorders which can cause bodily injury and death from poorly treated or untreated epilepsy. India is habitat about 10 million people with epilepsy. It is

## ORIGINAL ARTICLE

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being higher in the rural (1.9%) as compared with the urban counterpart (0.6%).<sup>(2,3,4,5)</sup> The imaging of new onset seizures is done with different indications, to identify an acute illness as the underline course for the seizure and possible neurological deficit; and in patients who are not acutely admitted with the first seizure, to establish the etiology of the new onset seizure disorder.<sup>(6)</sup> To this purpose we have evaluated new onset seizures in adult patients in correlation with their clinical profile, EEG and CT imaging of brain.

**METHODS:** This cross sectional study was studied in 100 patients, presenting with seizures attending the Emergency department, General Medicine and Neurology wards and OPD of King George Hospital, Andhra Medical College, Visakhapatnam during the period of March 2006 to March 2008. Patient's age above 18 years with new onset of seizures without an apparent cause were included in the study. Cases like Head injury, acute stroke, alcohol withdrawal seizures, metabolic disorders (Hypoglycemia, Hyperglycemia, Uremia, Electrolyte abnormalities, Hepatic encephalopathy) obvious infections like cerebral malaria and meningo-encephalitis were excluded from the study. Institutional ethical committee has approved the study and obtained patient information consent. All the patients were examined clinically and subjected to CT imaging of brain and EEG. Other necessary blood investigations were also done. Correlation between various seizures and CT scan brain and EEG were studied.

**STATISTICAL ANALYSIS:** Data entered into excel spread sheet 2007. Statistical analysis was done using excel. Data was presented as mean and SD, actual numbers and percentages

**RESULTS:** Out of 100 patients 16% of patients were in the age group of 18-19 years, 63% of patients were in the age group of 20-39 years, 15% of patients were in the age group of 40-59 years and 6% were in the age group of 60 years and above. (Table -1) 63% were males and 37% were females. 65% presented with GTCS, 35% with partial seizures. (Table -2) Among partial seizures 57% presented with simple partial, 17% with complex partial and 26% with partial seizures with secondary generalization. CT scan was found abnormal in 49.2% patients in GTCS, 71.4% in partial seizures. (Table -3) Out of 57 patients with focal lesions 47.4% had CT findings suggestive of Neurocysticercosis, 26.3% with calcified granulomas, 12.3% suggestive of tuberculoma, 5.3% with brain tumor and 8.8% with vascular disease with infarct. (Table -4) Out of 7 patients with tuberculoma only one patient had previous history of left tuberculous pleural effusion and none of the other patients had any evidence of tuberculosis elsewhere in the body.

Out of 27 cysticercosis ring lesions 85.2% were in the age group of 18-39 years, remaining 14.8% were in the age group of above 40 years. Out of 15 calcified granulomas 80% were in the age group of 18-39 years, remaining 20% were in the age group of above 40 years.

All 7 tuberculous granulomas were in the age group of 18-49 years. Brain tumors were in the age group of 30-49 years. Out of 5 vascular diseases with infarcts 40% were in the age group of 30-49 years and remaining 40% were in the age group of 50-59 years. Out of 100, EEG showed abnormal pattern in 39% patients (Table -5). Out of 65 patients with GTCS, 38.5% (25 patients) had epileptic form discharges. Out of 35 patients with partial seizures 40% (14 patients) had epileptic form discharges.

## ORIGINAL ARTICLE

Among them 35% (7 patients) with simple partial, 50% (3 patient) with complex partial and 44.4% (4 patients) with partial seizures with secondary generalization had epileptiform discharges. Out of 100 patients 24% patients had focal lesions in CT and abnormal EEG showing epileptiform discharges; 28% patients had normal EEG and CT scan brain; 33% patients had focal lesions on CT brain with normal EEG; 15% patients had abnormal EEG discharges without focal lesions on CT brain. (Table -6)

Age in years→	18-19	20-29	30-39	40-49	50-59	60-69	70-79
Seizure type↓							
GTCS	13	28	14	3	4	2	1
SPS	2	8	2	4	2	2	—
CPS	—	4	1	1	—	—	—
SEC.GEN.	1	3	3	1	—	1	—
<b>TOTAL</b>	<b>16</b>	<b>43</b>	<b>20</b>	<b>9</b>	<b>6</b>	<b>5</b>	<b>1</b>

Table 1

SI. No.	Seizure type	Male	Female
1.	GTCS	45	20
2.	Simple partial	11	9
3.	Complex partial	4	2
4.	Partial seizures with secondary generalization	3	6
<b>Total</b>		<b>63</b>	<b>37</b>

Table 2

SI. No.	Seizures type	Normal CT findings	Focal lesion
1.	GTCS	33	32
2.	Simple partial	5	15
3.	Complex partial	1	5
4.	Partial seizures with secondary generalization	4	5
<b>Total</b>		<b>43</b>	<b>57</b>

Table 3

SI. No.	CT diagnosis	No. of patients	Percentage
1.	NCC	27	47.4%
2.	Calcified granuloma	15	26.3%
3.	Tuberculoma	7	12.3%
4.	Brain Tumor	3	5.3%
5.	Vascular diseases with infarct	5	8.8%

Table 4

## ORIGINAL ARTICLE

Sl. No		Normal C.T.	C.T With Focal lesion
1.	Normal EEG	28	33
2.	Epileptiform discharges	15	24

Table 5

Sl. No.	Seizure Type	Normal EEG			Epileptiform Discharge	
		No. of Pts	No. of Pts	% of Pts	No. of Pts	% of Pts
1.	GTCS	65	40	61.5%	25	38.5%
2.	Simple partial	20	13	65%	7	35%
3.	Complex partial	6	3	50%	3	50%
4.	Sec. Gen.	9	5	55.6%	4	44.4%
	Total	100	61	61%	39	39%

Table 6

**DISCUSSION:** The accumulated data from clinical evaluation, biochemical tests, EEG and imaging have been analyzed and compared with other studies. Similarities and differences have been noted which will help in drawing conclusion from this study.

In the present study, total number of 100 cases from the General Medicine, Neurology and Emergency OPD and inpatients of KGH, Visakhapatnam with a history of new onset seizure was included following satisfying the clinical criteria.

Our study also supported by Van Donselaar et al.,<sup>(7)</sup> Mussico et al.,<sup>(8)</sup> Hopkins et al.<sup>(9)</sup> with a mild to moderate predominance of males.

Whereas the following Indian studies; Sridharan R et al,<sup>(10)</sup> Bansalal et al,<sup>(11)</sup> Rajasekhar et al,<sup>(12)</sup> showed following comparison in the clinical, EEG and radiological evaluations in first onset of seizures in different patient population.

Study characteristic	Present Study	Comparing Study
Age	19-39 years 79%	Sridharan R et al. <sup>(10)</sup>
Sex	Males 63% Females 37%	Sridharan R et al (M-55%, F-45%)
Type of seizure	GTCS 65% Partial 35%	Sridharan R et al (Das – GTCS 73.68%)
CT abnormality	57%	Bansalal be et al. <sup>(11)</sup> (51.7%)
CT focal lesion		
NCC	47.4%	Rajshekar et al. <sup>(12)</sup> (50%)
Cal. Gra.	26.3%	.....
Tuberculoma	12.3%	Rajasekhar et al (12%)
Tumors	5.3%	Sridharan R et al (6%) Sridharan R., (15%)
Infarct	8.8%	
EEG abnormality	39%	AAN. <sup>(13)</sup> (23%)
CT&EEG abnormality	24%	Soren et al. <sup>(14)</sup> (38.6%)

## ORIGINAL ARTICLE

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There is small number of elderly patients in this study compared to younger age groups. This may reflect genuine difference in prevalence of epilepsy in developing countries because of high incidence of CNS infections like TB, Cysticercosis affecting younger individuals. In Sridharan R et al.<sup>(10)</sup> of pattern and prevalence of epilepsy of India is age specific prevalence rates were higher in the younger age group with onset of epilepsy reported mostly in the first 3 decades and higher incidence in males than females, incidence of GTCS was more common than partial seizures in India. In our study out of 100 patients CT scan was found abnormal in 57% patients, compared to Daras et al.<sup>(15)</sup> in 62.6% of cases. CT was found abnormal in 49.2% patients in GTCS, 71.4% in partial seizures. Rajshekar et al.<sup>(12)</sup> found cysticercosis ring lesions in 50% of cases.

Soren et al.<sup>(14)</sup> have shown that 38.6% patients with seizures had abnormal CT finding along with epileptiform discharges on EEG. According to American academy of neurology 24% of patients with new onset seizures without an apparent cause clinically, had abnormalities in EEG. Overall our study results were also similar to Muralidhar et al.<sup>(16)</sup> in concluding the study results.

**CONCLUSION:** Males in the age group of 20 to 39 years were commonly affected. Generalized Tonic clonic seizures were the commonest type (65%). CT scan brain was abnormal in 57% of the patients. Neurocysticercosis and calcified granuloma were the commonest causes for seizures in 18-39 years age group. Majority (62%) of the patients with focal lesions on CT scan brain had epileptiform discharges on EEG which indicate a strong correlation of EEG with CT findings. Initiating the treatment with antiepileptic drugs was left the sole discretion of the treating physician for a case of new onset seizures.

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## ORIGINAL ARTICLE

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