

Clinical evaluation of seizures in correlation with CT brain and EEG findings- an institutional experience

Venkata Umakant Kodali^{1*}, K Sravani², VRR Vasanth Kumar³, MBR Sharma⁴

¹Associate Professor, ²Post Graduate, ³Assistant Professor, ⁴Professor, Department of General Medicine, Konaseema Institute of Medical Sciences, Andhra Pradesh, INDIA.

Email: nageshmsc@gmail.com

Abstract

Epilepsy is a neurological disorder marked by sudden recurrent episodes of sensory disturbance, loss of consciousness, or convulsions, associated with abnormal electrical activity in the brain. The aim of the present study was undertaken for clinical evaluation of seizures in adult without an apparent cause clinically, and correlated with CT brain and EEG findings. Present study was carried out in 100 patients presenting with seizures attending the Medicine department of Mamata General Hospital, Khammam during the period 2010 – 2011. All the 100 patients were examined clinically and subjected to CT scan brain and EEG. Out of 100 patients maximum number of patients was in the age group of 20-39 years and males were 61% and females were 39% with a male to female ratio of 1.56. Generalized tonic-clonic seizure was the commonest type of seizure. CT scan brain was abnormal in 61 % of the patients with seizures without apparent cause. Neurocysticercosis (41%) and calcified granuloma (29.5%) were the commonest causes for seizures in the study group. Neurocysticercosis and calcified granuloma were most commonly seen in 18-39 years age group (NCC - 88%, Calcified granuloma 77.8%). Tuberculoma was evenly distributed from 1st to 5th decade. Cerebral infarct was the commonest cause in the 50-69 years age group (55.56%).

Key Words: Epilepsy, Computerized tomography, Electroencephalogram, seizures, Glioma.

*Address for Correspondence:

Dr. Venkata Umakant Kodali, Associate Professor, Department of General Medicine, Konaseema Institute of Medical Sciences, Andhra Pradesh, INDIA.

Email: nageshmsc@gmail.com

Received Date: 22/10/2017 Revised Date: 19/11/2017 Accepted Date: 07/12/2017

DOI: <https://doi.org/10.26611/10041210>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:
29 December 2017

INTRODUCTION

Epilepsy is a chronic disorder characterized by recurrent seizures, medical and psychosocial implications. Incidence of epilepsy is 20 to 50 per 1 lakh population. Occurrence of epilepsy is more common among males and in the first two decades of life. Cause of epilepsy varies in different age groups and geographical locations.

Seizures are paroxysmal event due to abnormal, excessive, hyper synchronous discharges from an aggregate of central nervous system neurons. A fundamental principle is that seizures may be either focal (synonymous with partial) or generalized. In a majority of cases, the causative factors are not evident by history and clinical examination alone. History and physical examination, laboratory investigations, lumbar puncture and cerebrospinal fluid (CSF) analysis to know about the acute or chronic infectious cause or subarachnoid hemorrhage, Electro Encephalogram (EEG) and Computerized tomography (CT) are used as investigation modalities ¹. The aetiology of seizures is different in India and other developing countries as compared to the developed world. Tuberculoma and neurocysticercosis have relatively high frequency in India ². 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

How to cite this article: Venkata Umakant Kodali, K Sravani, VRR Vasanth Kumar, MBR Sharma. Clinical evaluation of seizures in correlation with CT brain and EEG findings- an institutional experience. *MedPulse – International Medical Journal*. December 2017; 4(12): 1055-1058. <http://www.medpulse.in>

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 common³. Many causes are common result of endogenous factors, epileptogenic factors and precipitating factors. Precipitants include those due to intrinsic physiologic processes such as psychological or physical stress, sleep deprivation or hormonal changes associated with menstrual cycle on well on exogenous factors such as exposure to toxic substance and certain medications. Generally accepted risk factors associated with recurrent seizure include abnormal neurologic examination, Seizure presenting as status epilepticus, Postictal Todd's paralysis, Strong family history of seizure. Diagnostic tools like serum biochemistry, Electro Encephalogram (EEG) and Computerized tomography (CT) scan are employed. EEG is used for functional or electrical mapping of brain and not used for diagnosis and confirmation of epilepsy because in as many as 50% epileptics' single interictal recording may be normal. Normal EEG does not exclude the presence of epilepsy. EEG if abnormal helps in classifying seizures, selecting appropriate antiepileptic drugs, withdrawing antiepileptic drugs and planning for surgery. While several studies have been published regarding evaluation of seizures, there is limited published data on evaluation of seizures using CT and EEG^{4,5}. Hence this study was undertaken for clinical evaluation of seizures in adult without an apparent cause clinically, and correlated with CT brain and EEG findings.

MATERIALS AND METHODS

Present study was carried out in 100 patients presenting with seizures attending the Medicine department of Mamata General Hospital, Khammam during the period 2010 - 2011

Inclusion Criteria:

1. New onset seizures without an apparent cause clinically
2. Age is 18 and above

Exclusion Criteria:

1. Head injury
2. Alcohol withdrawal seizures
3. Metabolic disorders (Hypoglycemia, Hyperglycemia, Uremia, Electrolyte abnormalities, Hepatic encephalopathy)
4. Obvious infections like cerebral malaria and meningoencephalitis

Methods

Patients and eyewitness were interviewed regarding history. All the 100 patients were examined clinically and subjected to CT scan brain and EEG. Other investigations

included hemoglobin level, total count, differential count, ESR, Routine examination, blood urea, serum creatinine, random blood glucose, liver function tests and estimation of serum sodium, calcium and potassium. Lumbar puncture was done only in selected cases. Correlation between various seizures, CT scan brain and EEG were studied.

RESULTS AND DISCUSSION

TABLE 1: DISTRIBUTION OF INDIVIDUALS ACCORDING TO AGE

Age Group	No of Cases (Percentage)
10-19	14
20-29	33
30-39	22
40-49	14
50-59	8
60-69	7
70-79	2

Out of 100 patients 14% of patients were in the age group of 10-19 years, 55% of patients were in the age group of 20-39 years, 22% of patients were in the age group of 40-59 years and 9% were in the age group of 60 years and above (Table 1). Out of 100 patients males were 61% and females were 39% with a male to female ratio of 1.56 (Figure 1). 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 neurocysticercosis and TB affecting younger individuals in tropical countries.

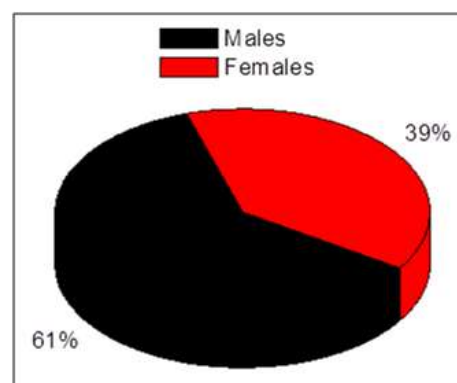


FIGURE 1: DISTRIBUTION OF INDIVIDUALS ACCORDING TO SEX

TABLE 2: CT SCAN FINDINGS and CORRELATION WITH EEG RESULTS

	Normal CT	CT with focal lesion
Normal EEG	27	32
Epileptiform discharge	12	29

EEG remains a major technique for investigation of epilepsy. Easy availability and cost effectiveness has

made EEG a very useful tool in cases of epilepsy but also in several neurological conditions like encephalitis, sleep disorders, dementias, encephalopathies of metabolic origin. In cases of epilepsy, interictal and ictal EEG recording provide useful information. Out of 100 patients 29% patients had focal lesions in CT and abnormal EEG showing epileptiform discharges; 27% patients had normal EEG and CT scan brain; 32% patients had focal lesions on CT brain with normal EEG; 12% patients had abnormal EEG discharges without focal lesions on CT brain (Table 2). Majority (73%) of the patients had CT and or EEG abnormalities and only 27% had no abnormality either on CT or EEG. Out of 100 patients 59% presented with GTCS, 41% with Focal seizures. Among focal seizures 58.5% presented without dyscognitive features, 17% with dyscognitive features and 24.5% with focal seizures with secondary GTCS. In Rochester, Minnesota 1935-74 study⁵³- Tonic clonic, simple partial, complex partial seizures had similar incidence and incidence of absence seizures was low. In Sridharan 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* study⁶. Out of 100 patients CT was found to be abnormal in 61 patients showing focal lesions, 41 % of them had CT findings suggestive of Neurocysticercosis, 29.5 % patients with Calcified granulomas, 14.8 % patients with tuberculomas, 3.3 % patients with brain tumor, 8.8 % patients with cerebrovascular disease with infarct. In a study by Sridharan *et al*⁶¹, CT scan was done in 219 patients, disclosed abnormal results in 50. Among those with abnormal CT scans, 84% had partial seizures. CT was found to be abnormal in 47.4% patients in GTCS and 80.5% patients in focal seizure Murthy *et al*⁷ found cysticercosis ring lesions in 40% of cases.⁸

Vasudev *et al*⁸ found tuberculomas in 12% patients, Murthy *et al* found in 10% of cases and Rudresh *et al*⁹ in 20% of patients in their study on epilepsy. Murthy *et al* study (7) found 7% tumors and 14% vascular disease in their study. Percentage of tumors in a study by Reinkainen *et al* is 17%. In the studies by Hauser *et al*⁵⁷ and Sander *et al*⁶⁴ neuroinfections are less common causes of seizures when compared to the present study and other Indian studies. This study illustrates that the etiological spectrum of seizures in this India is different from that described from developed countries and CNS infections account for a significant number of cases. Out of 100 patients EEG showed normal awake record in 59% patients and abnormal pattern in 41% patients. Out of 59 patients with GTCS. 35.6% (21 patients) had epileptiform discharges. Out of 41 patients v. focal seizures 48.8% (20 patients) had epileptiform discharges. Among them 50% patients (12 patients) with

focal seizures without dyscognitive features, 42.8% (4 patients) with focal seizures with dyscognitive features and 60% (4 patients) with focal seizures with secondary GTCS had epileptiform discharges. In the age group of 18-19 years 21.4 %, in 20-39 years age group 41.8 %, in 40-59 years age group 50 %, in above 60 years group 44.4 % had epileptiform discharges. When CT findings were correlated with EEG results, 29% patients had focal lesions in CT and abnormal EEG showing epileptiform discharges; 27% patients had normal EEG and CT scan brain; 32% patients had focal lesions on CT brain with normal EEG; 12% patients had abnormal EEG discharges without focal lesions on CT brain. Majority (73%) of the patients had CT and / or EEG abnormalities and only 27% had no abnormality either on CT or EEG. Out of 41 patients with epileptiform discharges on EEG, 24 patients (70.7%) had focal lesions on CT which indicate strong correlation of EEG with CT findings. Sorel *et al*¹⁴³ have shown that 38.6% patients with seizures had abnormal CT finding along with epileptiform discharges on EEG.

SUMMARY AND CONCLUSIONS

100 patients with new onset seizures without apparent cause clinically are most common in the age group of 20 to 39 years. Generalized tonic-clonic seizure was the commonest type of seizure. CT scan brain was abnormal in 61 % of the patients with seizures without apparent cause. Neurocysticercosis (41%) and calcified granuloma (29.5%) were the commonest causes for seizures in the study group. Neurocysticercosis and calcified granuloma were most commonly seen in 18-39 years age group (NCC - 88%, Calcified granuloma 77.8%). Tuberculoma was evenly distributed from 1st to 5th decade. Cerebral infarct was the commonest cause in the 50-69 years age group (55.56%).

REFERENCES

1. McGahan J.P., Dublin A.B., Hill R.P. The evaluation of seizure disorders by computerized tomography. *J. Neurosurg.*, 1979; 50: 328-332
2. Gulati PP, Kothan SS, Wadhwa P. *Journal of Tropical Medicine and Hygiene* 1991; 3: 131-4.
3. J. Annegers Jf, Shirts SB, Hauser WA: Risk of recurrence after an initial unprovoked seizure. *Epilepsia* 1996 Jan-Feb; 27(1): 43-50.
4. Yamamoto N, Watonobe K, Negoro T. Complex partial seizure in children. *Neurology* 1987; 37: 1979-82.
5. Sotijanov NG. Clinical evaluation and diagnosis of childhood epilepsies. *Epilepsia* 1982; 23: 61-9
6. D Sridhar, L Muralidhar, S Raghavender. Etiological profile of new onset seizures in adults. *International Journal of Multidisciplinary Research and Development*. Volume 3; Issue 2; February 2016; Page No. 392-397
7. Murthy JM, Yangala R, Srinivas M. The syndromic classification of the International League Against

- Epilepsy: a hospital-based study from South India. *Epilepsia*. 1998 Jan;39(1):48-54.
8. Vasudev MK, Jayakumar PN, Srikanth SG, Nagarajan K, Mohanty A. Quantitative magnetic resonance techniques in the evaluation of intracranial tuberculomas. *Acta Radiologica*. 2007 Mar;48(2):200-6.
9. Rudresh KM, Karthik SJ, Sebastin J. Clinical and aetiological profile of ring-enhancing lesions on CT brain. *Journal of Indian Academy of Clinical Medicine*. 2008;9(2):100-2.

Source of Support: None Declared
Conflict of Interest: None Declared

