

Original article:

Clinical and etiological study of seizures in young adults

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Abstract

Background and objectives: Seizures are among the commonest presentations of diseases affecting the central nervous system. Most of the new onset seizures are due to variety of treatable conditions. Neuroinfections like meningitis, tuberculosis, neurocysticercosis, cerebrovascular events like stroke and cortical venous thrombosis, metabolic like hypoglycemia and dyselectrolytemia account for the majority of cases.

Materials and Methods: 50 Cases of new onset seizures from the hospital attached to JJM Medical College, Davangere, were included in the study. The etiology was determined by neuroimaging and appropriate investigations including cerebrospinal fluid examination.

Results: Neuroinfection was the leading cause of seizure, which accounted for 32%, followed by Cerebrovascular accidents (26%) and metabolic (10%). Meningitis is most common cause in neuroinfection (31%), followed by meningoencephalitis (25%) and tuberculoma (19%). 16% of seizures were because of CNS Tuberculosis. 54% of the CVA were due CVT and 36% due to stroke. 16% of seizures were pregnancy related. In patients with cerebrovascular diseases, aged under 40 years, cortical venous thrombosis accounted for 87%.

Conclusion: This study illustrates that the etiological spectrum of seizures in this part of the world is different from that described from developed countries and CNS infections account for a significant number of cases. CVT is the predominant cause of seizures among the cerebrovascular accidents.

Key words: seizure, Cerebrovascular accidents; Neuroinfection; cortical venous thrombosis

Introduction

India is home to about 10 million people with epilepsy (prevalence of about 1%);¹ this being higher in the rural (1.9%) as compared with the urban counterpart (0.6%).²⁻⁴ The burden of epilepsy as estimated using the disability-adjusted life years (DALYs) accounts for 1% of the total burden of disease in the world. Seizures can be presenting feature in tubercular meningitis, which is the most common type of chronic meningitis in India. More than 60% of patients with intracranial tuberculoma may have seizures.⁵ With the advent of modern technologies like CT scan, MRI and CSF

serology for infection like viral, tubercular, neurocysticercosis, the diagnosis of seizure has become more accurate and has completely changed the course of management. So this study is done to know the various etiologies of new onset seizures in young adults in this region.

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Methodology

This was a hospital based prospective study conducted over a period of one year from December 2012 to December 2013. 50 patients, both male and female with new onset seizures getting admitted at a tertiary level district hospital at Davangere were included. New onset seizure is defined as the first seizure (or the first cluster of seizures with in 24 hour period) ever experienced by the patient. Sampling technique was by consecutive sampling technique after taking written informed consent.

Inclusion criteria:

1. Patients with new onset seizures aged more than or equal to 15 years.
2. Patients with new onset seizures aged less than or equal to 45 years.

Exclusion criteria:

1. Patients aged <15 years or >45 years.
2. Patients with onset of seizures before the age of 15 and continue to have seizures.
3. Patients not willing to participate in the study.

Each patient was clinically evaluated with detailed history and thorough clinical examination as per protocol. Each patient was subjected to haematological, biochemical and radiological investigations. Special investigations like EEG and CSF analysis were done whenever investigators thought it was required for patient.

Data collection and entry was done by the investigator. The study has been approved

by the Ethical Committee, JJM Medical College.

Statistical analysis:

The collected data was analysed using SPSS 11.0 and Systat 8.0 Microsot word and Excel have been used to generate graphs tables etc. Descriptive analysis was used to compute percentage, to calculate Mean and Standard deviation.

Results

50 patients, both male and female with new onset seizures getting admitted at a tertiary level hospital were included in this study.

Demographic profile: The mean age of the entire group of patients was 32.3 (standard deviation 8.5, range 18-45) years. Majority of the patients were in the age group of 21-30 years (n= 22, 44%) followed by 41-45 years (n=13, 26%).24% of the patients were in 3rd decade and 6% of the patients were below 20 years of age.

Out of the 50 patients 29 were males and 21 were females with male to female ratio 1.38:1. Majority of the females were in the 3rd decade (57.1%) where as males were distributed in 3rd to 5th decade.

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Based on clinical presentation, headache was the most consistent symptom seen in 72% patients followed by vomiting in 60%. Fever was present in 32% of the patients. Among neurological findings, altered sensorium was the most common neurological abnormality seen in 48% of patients. 100% of alcohol withdrawal seizures were associated with tremors. 38% of Neuroinfection patients had signs of meningeal irritation. 83% of stroke patients had hemiparesis.

Among the etiological causes, neuroinfection was the leading cause of seizure (32%), followed by cerebrovascular accidents (26%) and metabolic (10%). In 8% of patients cause could not be found and thus were considered as idiopathic.

Among Neuroinfections (n=16), meningitis and meningo-encephalitis accounted for

majority of the cases 56.5% (9), followed by tuberculoma 18.8% and Neurocysticercosis 18.8%.

Among cerebrovascular accidents, cortical venous thrombosis accounted for 53.8% (7) and stroke accounted for 46.2% (Infarct-4, Haemorrhage-2) cases. 16% of seizures were pregnancy related (CVT- 6, Eclampsia-2). In metabolic seizures, both hypoglycemia and hyponatremia accounted for 40% each. Alcohol withdrawal was implicated as the major cause among miscellaneous. 16% of seizures were because of CNS Tuberculosis (8). Meningitis and Tuberculoma equally contributed (37.5% each) and Meningoencephalitis made up the rest (25%). Meningitis accounted for 10% of the seizures (n=5). Tubercular meningitis was the most common (n=3, 60%)

NEUROINFECTION		
MENINGITIS-TUBERCULAR	3	18.8%
MENINGITIS-BACTERIAL	1	6.3%
MENINGITIS-VIRAL	1	6.3%
MENINGOENCEPHALITIS-TUBERCULAR	2	12.5%
MENINGOENCEPHALITIS-BACTERIAL	1	6.3%
MENINGOENCEPHALITIS-VIRAL	1	6.3%
TUBERCULOMA	3	18.8%
NEUROCYSTICERCOSIS(NCC)	3	18.8%
CEREBRAL MALARIA	1	6.3%
TOTAL	16	
CVA		
INFARCT	4	30.8%
HAEMORRHAGE	2	15.4%
CORTICAL VENOUS THROMBOSIS	7	53.8%
TOTAL	13	
METABOLIC		

HYPOGLYCEMIA	2	40.0%
HYPONATREMIA	2	40.0%
HYPOCALCEMIA	1	20.0%
TOTAL	5	
TUMOUR		
MENINGIOMA	1	33.3%
GLIOMA	1	33.3%
SECONDARIES	1	33.3%
TOTAL	3	
POISONING		
OP	1	50.0%
NON OP (CYPERMETHRIN)	1	50.0%
TOTAL	2	
MISCELLANEOUS		
ALCOHOL WITHDRAWAL	3	60.0%
A-V MALFORMATION	1	20.0%
POST DIALYSIS	1	20.0%
TOTAL	5	

It was found that among the males (n=29) majority of the seizures were because of Neuroinfection 37.9%, followed by CVA, Metabolic and Miscellaneous (17.2% each), Idiopathic 6.9% and Tumours 3.4%. All the metabolic and miscellaneous seizures were exclusive to males. 100% of seizures due to Alcohol Withdrawal occurred in males. 7% of seizures were accounted for as idiopathic seizures in males.

In Females (n=21), majority of the seizures were because of CVA 38.1% (n=8), followed by Neuroinfection 23.8% (n=5). Poisoning, Idiopathic, Eclampsia and tumours accounted for 9.5% each. 100% of the seizures due to poisoning occurred in females (all occurred in females). Among CVA (n=8), majority were because of CVT 75% (n=6). 38% of seizures were pregnancy related.

Based on age group of the patients, among 15-20 years (n=3), most common etiology was Idiopathic in 66.7%. among 21-30 years (n=22), most common etiology were Neuroinfection (36.4%) and CVA(36.4%), followed by Idiopathic and eclampsia 9.1% each. Among 31-40 years (n=12), most common etiology was Neuroinfection accounting for 50% of the cases, followed by Miscellaneous 25% and Metabolic 16.7%. Among 41-45 years (n=13), most common etiology was CVA accounting for 38.5% of the cases, followed by Metabolic 23.1% and Tumours 15.4%.

87.5% of Neuroinfections were seen in 3rd and 4th decade. 61.5% of CVA occurred in 3rd decade and 38.5% occurred in 5th decade. All the CVT occurred in 3rd decade. All the metabolic seizures occurred in 4th and 5th decade.

Among types of seizures, GTCS (n=42) was found to be the most common seizure type, followed by focal seizures. Most of the Neuroinfections presented with GTCS (87.5%) 77% of CVA patients presented with GTCS and remaining 21% with focal seizures. 100% of metabolic seizures, idiopathic seizure and eclampsia were GTCS. 50% of focal seizures were caused by CVA. 1 patient had myoclonic seizures due to OP Poisoning.

Discussion

Seizures are common disorders found all over the world and are encountered frequently during medical practice in variety of settings.

Since these infections vary from region to region; etiology of seizure may also vary from region to region. In Indian subcontinent cortical venous thrombosis is common in post-puerperal women and presents with severe headache, low-grade fever and seizures.¹⁴ Single small enhancing CT lesions are frequently reported from India. Etiological spectrum of seizures in developing countries is different from developed countries. So this study on “seizures” was done to know the various etiologies of new onset seizures in young adults in this region. The present study was carried out in a tertiary level hospital at Davangere. 50 cases of new onset seizures were selected as per the criteria mentioned in the materials and methods. The observations are compared with the studies done by others on the same subject.

Age and Sex distribution:

Etiological spectrum depends on age, sex, geography and medical setting.¹⁵ Out of 50

patients 29 were males and 21 were females, with male to female ratio of 1.38: 1. Majority of males and females were in 3rd decade, similar trend was noticed in a study done by Thapa et al¹⁶. In a study from United Kingdom by SANDER¹⁷ et al (1990), 25% were below the age of 15 years, 51% in 3rd-4th decade, and 24% above 60 years. In another study from south India (Hyderabad) by NARAYANAN JT and MURTHY JMK¹⁸ (2007), 36% were > 60 years, with mean age of 49 years.

In the present study (table-1) patient's age ranged from 18 years to 45 years, with Mean of 32.3 years. Majority of patients were in the age group of 21-30 years (n = 22, 44%) followed by 41-45 years (n = 13, 26%). 94% of the patients were in the age group of 21-45 years. Mean age was lower (32 years) when compared with study by NARAYANAN JT and MURTHY JMK¹⁸, probably etiological spectrum varies from region to region. More of CVT patients were seen in our study. No significant difference in male (58%) to female (42%) ratio was observed. All studies were slightly male predominate.

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Clinical profile:

Headache was the predominant symptom associated with seizures in our study seen in 72% which was comparable to study done by G SENDIL¹⁹ et al. Altered sensorium was observed in 48% of patients which was in

accordance with study done by G SENDIL¹⁹ et al.

Hemiparesis was seen in 38% of CVA cases in our study and in 44% of CVA cases in study done by G SENDIL¹⁹ et al. the difference could be attributed to the predominance of cortical venous thrombosis in our study.

Etiological spectrum of seizures:

	Sander ¹⁷ et al	Our study
Acute symptomatic seizure	15%	88%
Idiopathic seizures	62%	8%
Remote symptomatic seizures	21%	4% (post infarct)

In present study (table-5, 6, 7)

Neuroinfection is the leading cause of seizure which accounted for 32%, followed by CVA 26% and Metabolic 10%. In 8% of patients cause is idiopathic. Tuberculosis (16%) contributed to the majority of cases of Neuroinfections in the form of meningitis, tuberculoma and meningoencephalitis. Neurocysticercosis accounted for 6% of cases. The remainder cases of Neuroinfection were of bacterial, viral and malarial etiology.

CVT accounted for 14%, followed by Stroke 12% (Infarct-4, Haemorrhage-2).

Neuroinfection occurred in 2% of the patients in SANDER¹⁷ et al study, 15% in HAUSER²⁰ et al, 77% in study by MURTHY JMK and RAVI Y⁵ and 32% in a study by NARAYANAN JT and MURTHY JMK¹⁸. In our study etiology is comparable to Indian studies.

Single small enhancing CT lesions (SSECTL) (ring enhancing/disc lesions, 20 mm in size) are an important cause of seizures in India.²¹ SSECTL accounted for 50% of seizures in study by MURTHY JMK and RAVI Y⁶. In our study it occurred only in 6% of cases (table-

3). This may be because of regional variation in incidence of neurocysticercosis.

CVA occurred in 15% of the patients in SANDER¹⁷ et al study, 18% in HAUSER²⁴ et al, 14% in study by MURTHY JMK and RAVI Y⁵ and 21% in a study by NARAYANAN JT and MURTHY JMK¹⁸, 47% in study done by G SENDIL¹⁹ et al. In our study CVA occurred in 26%. This is because postpartum CVT were seen in 12% of cases, which is higher even when compared in Indian studies. Alcohol related seizures occurred in 9% of the patients in SANDER¹⁷ et al study, 11% in HAUSER²⁰ et al, and 6% in our study. Alcohol related seizures were less common when compared with western studies.

Etiological spectrum of seizures in different age group:

Etiological spectrum of seizures in different age groups was significantly different in our study, when compared to HAUSER²⁰ et al study. Seizures due to neuroinfection were leading cause in age group of 15-40 years where as Alcohol related seizures were leading cause in HAUSER²⁰ et al study. Our study correlated well with SI YANG²² et al in which

Neuroinfection was the predominant cause in younger age group.

Association of etiology and type of seizures:

61% of seizures due to CVA occurred in the age group of 15 to 35 because almost all the

cerebrovascular accidents were because of, cortical venous thrombosis which occurred in the 2nd and the 3rd decade.

Study	Generalized seizures	Focal seizures
SANDER ¹⁷ et al	39%	52%
MURTHY JMK and RAVI Y ³	22%	78%
NARAYAN JT and MURTHY JMK ¹⁸	55%	45%
RADHAKRISHNAN ¹⁰ et al	59%	31%
G SENDIL ¹⁹ et al	64%	36%
OUR STUDY	84%	16%

GTCS was the predominant type of seizure in our study similar to that observed in most of the Indian studies.

In the current study, most of the Neuroinfections patients presented with GTCS (87.5%). 77% of CVA patients presented with GTCS. All metabolic and idiopathic seizures were GTCS which was in accordance to G SENDIL¹⁹ et al. 50% of poisoning and 68% of tumour related seizures were GTCS.

Conclusion

This study found that there a slightly higher male predominance with a majority of patients being in the age group of 21-30 years. Headache was the most common associated symptom and altered sensorium was the most common neurological abnormality. Majority (88%) of seizures were acute symptomatic seizures with an identifiable etiology.

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