

ORIGINAL RESEARCH

A Study on Etiological Profile of Adult New Onset Seizures at a Tertiary Hospital in Southern India

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ABSTRACT

Background: Etiological profile of seizure is different from region to region owing to socio, economic and cultural differences between countries. Etiological profile will determine the outcome along with mortality and morbidity associated with the disease. Few studies till date report the etiological profile in adult new onset seizures. **Aim:** We here report a study to evaluate the etiological profile in adult patients reporting their first seizure at a tertiary hospital with the objective of identifying the variation in aetiology pertaining to socio economic status and prevalent culture of the population.

Material and methods: Hundred adult patients (18years and above) presenting with new onset seizures, were recruited over a period of one year and evaluated for identification of the cause of their seizures.

Results: Neuro infections (37%) were the most commonly observed cause of seizure in the present study. Males (male: female 1.22:1) were predominantly affected and generalized tonic clonic seizures (GTCS) was the predominant seizure type observed in these participants. **Conclusion:** Tuberculous meningitis was the most common cause due to its endemic nature in the area of study. Stroke was the most common cause in adults over 50 years while, in younger adults neuro infection was the leading cause in the present study group. Etiological profile of a population is dependent on the socio-economic status and prevalent culture of the population.

Keywords: Cerebro vascular accidents, focal seizures, Generalized tonic clonic seizures, Neuro infection, tuberculous meningitis

INTRODUCTION

Seizures are common disorders found all over the world and are frequently encountered in our day-to-day medical practice. Seizures may sometime be a manifestation of an underlying disease seeking attention. Etiological spectrum of seizures in developing countries is different from developed countries. Presently CNS infections like malaria, meningitis, tuberculosis, HIV, neurocysticercosis account for significant number of cases in developing countries ^[1,2,3]. Developing nations are posed with the problem of double tragedy due to the unresolved threat of infections and growing concern of non-communicable disease ^[4]. There are few studies reporting the etiological profile of new onset seizures in adult patients ^[5] in India. Adult-onset seizures are mostly secondary in nature and treatment based on such knowledge of the underlying cause helps reduce both the mortality and morbidity related to the disease ^[6]. Aetiology of seizure in adults may vary based on the age, sex, medical settings, geographic distribution and the prevalent culture in that area ^[7]. Patients age is an important factor that increases the likelihood of a specific acute precipitant. This study was done with the intent of identifying the etiological profile of seizures in adults pertaining to a tertiary hospital in an area in Southern India.

MATERIAL AND METHODS

A hospital based cross sectional observational study for a period of one year was carried out at our institute. A total of hundred patients with new onset seizures presenting to the emergency and outpatient unit of the hospital were included in the study after obtaining their wilful informed consent. Institutional ethics committee approval was taken prior to initiating the study.

Patients aged 18 years and above presenting with new onset seizures were included in the study. Known epileptics, patients with past history of seizure disorder and seizure mimics like syncope, migraine, transient

ischemic attack (TIA), pseudo seizures/hysteria, sleep disorders, hyperventilation, narcolepsy, psychogenic disorders and movement disorders like choreoathetosis, tic disorders were excluded from the study.

Patients and eyewitness were interviewed regarding detailed history of the episode. Full medical history including relevant past, personal and family history was obtained. Thorough clinical examination of the patient was performed. Blood investigations like haemoglobin level, total and differential counts, erythrocyte sedimentation rate (ESR), urine examination, blood urea, serum creatinine, blood glucose levels, liver functional tests, prothrombin time, blood culture and serum electrolytes (sodium, potassium and calcium) were done. Other investigations like fundus examination, lumbar puncture, electro cardiogram (ECG), x ray chest PA view, serological tests, serum anti cysticercal antibodies, Mantoux and serum antitubercular antibodies, toxicological screening, CT brain, electro encephalogram (EEG) and magnetic resonance imaging (MRI) were also performed based on the need.

Sample Size

Sample size calculation was done based on the study by Aswin T et al with reported prevalence of 1.1%, at 95% level of significance and 2.25% absolute precession, estimated sample size adjusted to a 10% non-response rate was 91.9 and was rounded off to 100 for this study.

Statistical Analysis

The collected data was analysed using SPSS 20.0 and Systat 8.0. Microsoft word and excel software were used to generate graphs and tables. Descriptive analysis was used to compute percentage, calculate mean and standard deviation.

RESULTS

A total of hundred patients who attended our institute at the time of first seizure were included in the study. 55.0% (55 patients) were males and 45.0% (45 patients) were females with male to female ratio of 1.22:1. Patients age in the present study ranged from 18 to 80 years with mean of 41.81 years (Table1). Out of 100, majority of males were in the 5th decade and female in the 3rd decade.

Table 1: Age and Sex distribution of seizures in the study participants.

Age in years	Male		Female		Combined	
	Number	% Among Males	Number	% Among Females	Number	%
18-20	3	5.5	7	15.6	10	10
21-30	10	18.2	18	40	28	28
31-40	11	20	6	13.3	17	17
41-50	13	23.6	6	13.3	19	19
51-60	9	16.4	5	11.1	14	14
61-70	6	10.9	2	4.4	8	8
>70	3	5.5	1	2.2	4	4
Total	55	100	45	100	100	100
Mean +SD	44.84+16.15		35.22+15.33		40.51+16.42	

Various aetiologies observed in the study participants were neuro infections, cerebro vascular accidents (CVA), idiopathic, metabolic, neoplastic, poisoning, eclampsia and miscellaneous causes (Fig 1). In patients aged between 16 years to 40 years, neuro infection was the leading cause. In patient between 41-50 years metabolic was the most common cause. In patients above 50 years CVA was the most common cause.

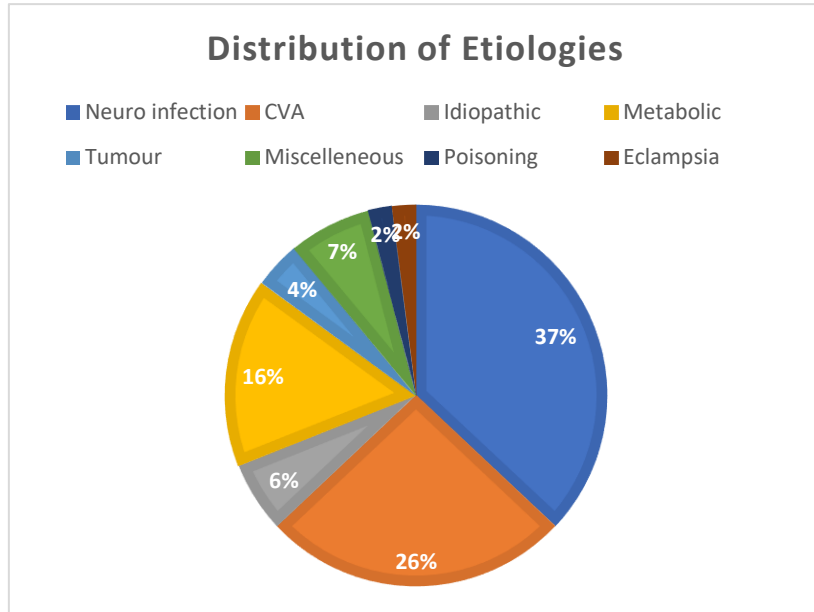


Figure 1: Distribution of various aetiologies of adult-onset new seizures

Most common cause in the study group was neuro infection (37.0%), followed by cerebro vascular accidents (26.0%), metabolic (16.0%) and idiopathic (cryptogenic) (6.0%) causes. Among neuro infection, meningitis (46.0%) was the leading cause followed by neurocysticercosis (24.0%), meningoencephalitis (13.5%), tuberculoma (10.0%) and cerebral malaria (5.0%). Among cerebrovascular accidents, stroke accounted for 77.0% (n=20, infarct -12, haemorrhage -8), followed by cerebral venous thrombus 11.5%. Within metabolic seizures (16.0%), hyperglycaemia accounted for 31.0%, followed by hypoglycaemia 25.0%, hyponatremia (18.0%), hypocalcaemia (12.0%), hypernatremia (6.0%) and uraemia (6.0%).

In male patients, neuro infection was leading cause (36.0%), followed by CVA (29.0%), metabolic (10.0%) and idiopathic (9.0%) cause. Among CVA causes in males, both infarct and haemorrhage contributed to 37.5%. In females, neuro infection contributed to 38.0%, followed by CVA 22.0%, metabolic cause 20.0%. Among CVA causes in females, infarction accounted for 60.0% followed by haemorrhage 40.0% (Fig 2).

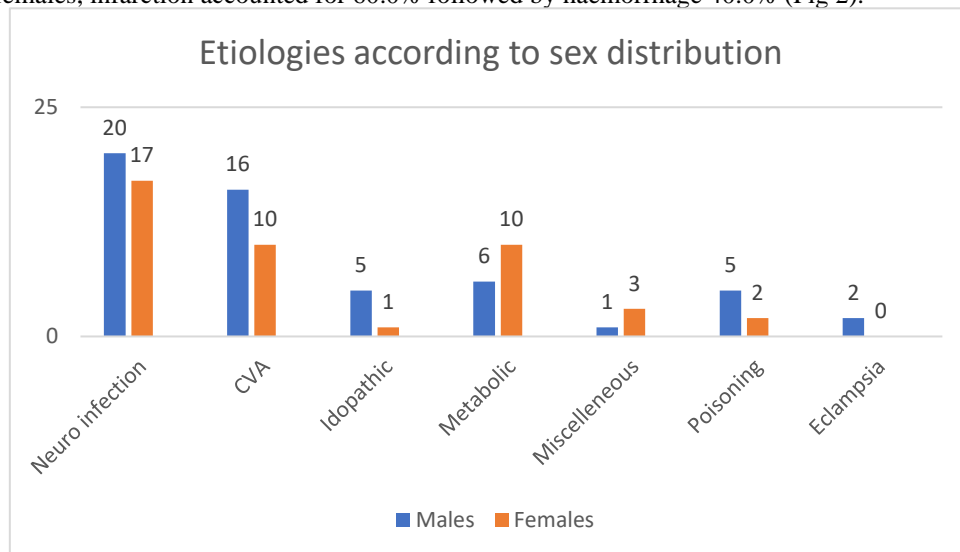


Figure 2: Gender based distribution of the various aetiologies of net onset seizures in study participants

Generalized tonic clonic seizure (GTCS) was the most common form observed in 53.0% of patients. Most common cause in GTCS patients was neuro infection (36.0%) followed by CVA (21.0%) and metabolic (19.0%). CVA and neuro infection contributed to 72.0% of Focal seizures with dyscognitive features (FSWDF). neuro infection (40.0%) was the most common cause of status epilepticus (SE) (5.0%) type of seizures. Two patients had epilepsy partialis continua (EPC) due to hyperglycaemia and neuro cysticercoses as the etiological factor in each of the patients. All patients of poisoning presented with GTCS. 83.0% of idiopathic seizures were of GTCS.

DISCUSSION

A total of hundred patients with new onset seizures were interviewed, examined and evaluated with some relevant laboratory tests and imaging to determine the underlying aetiology related to their seizure episode. Most common cause of seizure in the present study was neuro infection (37.0%) which was similar to the study by Chalasani S et al but was in contrast to the study by Hirani et al who reported unknown cause (40.0%) as the most common aetiology in his fifty participants [8]. Sendil [9] et al observed stroke and unknown causes as the leading causes. Stroke (26.0%) was the second most common cause in the present study. Among neuro infections, meningitis (46.0%) was the commonest similar to Aswin T et al and unlike Chalasani et al studies, where neurocysticercosis was reported as the most common type of neuro infections.

Mean age group in the present study was 41.81 years which was different from that observed by Narayana JT [10] et al (mean age – 49 years) in their study. Neuro infection was the leading cause in age group 21-30 and 31-40 different from study by Hauser [11] et al. 62.0% of neuro infections were seen in 2nd and 3rd decade. 69.0% of CVA occurred in 4th, 5th and 6th decade. Seizures due to CVT were related to pregnancy, post-partum status and contraceptive use [12] in female. All alcohol related seizure occurred in males. There was differential distribution of epilepsy with various socio demographic and economic groups with higher rates being reported for the male gender, rural population and low socio-economic status.

Tuberculosis accounted for 20.0% of seizures which is high when compared to other studies as present study was done in endemic area of tuberculosis. CNS involvement constitutes 10.0-15.0% of all tuberculous infections. High burden in India is due to large population, lower income group and education, socio economic prejudices, inadequate resources, competing infectious and non-communicable disease [13]. More than 60.0% of patients with intra cranial tuberculoma may have seizures. Tuberculomas are seen as ring enhancing lesions in imaging of brain. In TB meningitis seizures can occur at any stage of the illness and may be the presenting feature. Sriharsha et al [14] reported both tuberculosis and neurocysticercosis accounting for 18.8% of seizures in their study.

Stroke leads to a 9.0 % cumulative probability over 10 years of developing seizures with the greatest risk in the first year. Cortical involvement, severity and early seizures after the stroke increase the risk of late seizures and epilepsy as stated by Murthy JMK et al. The risk of late seizures from previous CNS infection depends on the type of infection and its remoteness. Aseptic meningitis does not increase the risk. Bacterial meningitis carries a risk for late seizures that is five times more than in general population for just five years. Viral encephalitis is associated with a risk ten times higher than general population lasting up to fifteen years after the insult.

CVA accounted for 26.0 % of seizures comparable to other Indian studies. In older adults acute stroke is the most common cause accounting for up to one half of cases [15]. Seizures account for 4.0-9.0% of acute cerebrovascular events. All stroke types including transient ischemic attack (TIA) are associated with seizures. Risk factors for acute seizures (occurring within two to four weeks after the event) including haemorrhage of large size and cortical involvement [16] or infarct. CVA was the second most common cause of seizures in present study.

Among CVA, stroke accounted for 77.0% and CVT 11.5% comparable to Indian scenario in a study by Rao BS [17] et al (stroke 84.0% and CVT 12.0%). According to Oslén TS [18] seizures are more common in haemorrhagic stroke and in stroke with cortical involvement. In this study, among stroke epilepsies 57.0 % of acute symptomatic seizures were due to haemorrhagic stroke, 42.0 % were due to ischemic stroke. Increased incidence of infarct related seizures due to increase risk factors in population like smoking, diabetes mellitus, alcohol consumption, hyperlipidaemia which are among the major contributors for the development of ischemic stroke.

Metabolic seizures accounted for 16.0 % in the study. Hyperglycaemia accounted for 31.0 % of metabolic cases. Hyperglycaemia without ketosis may lead to haemoconcentration, dehydration and is epileptogenic particularly in non ketotic hyperosmolar coma. Seizures are common with hyperglycaemia and are often the first manifestation [19]. Mostly focal seizures occur. Seizures are controlled with the control hyperglycaemia, thus representing a specific neuro endocrine syndrome [20]. Many studies found out that epilepsy partialis continua is an early symptom of non ketotic hyperglycaemia [21].

Unknown seizures/idiopathic seizures, previously known as cryptogenic seizures may have a fundamental genetic defect at its core or it may be the consequence of a separate, yet unrecognized disorder [22]. Sanders et al [23] reported 62.0 % of patients with unknown seizures, while only 6.0% seizures in the present study were due to idiopathic cause.

Alcohol related seizures occurred in 4.0% of patients and were identical to other Indian studies like Rao BS et al (6.0%) and Sriharsha et al. Alcohol withdrawal seizures usually occur in 4th and 5th decade associated with many

years of alcohol abuse often in binge drinkers. History of seizures between 6 to 48 hours of alcohol intake after excluding other causes are referred to as alcohol withdrawal seizures. Seizures are usually generalized convulsions [24] occurring abruptly without warning, after 6 to 48 hours after cessation of alcohol, often in clusters and rarely exceeding 5 to 6 hours. One fourth of such withdrawal seizures may have focal onset. Alcohol abuse is a major precipitant of status epilepticus which may even be the first ever seizure type. Risk of seizure development is dose dependent.

Acute symptomatic seizures accounted for 94.0 % of seizures comparable to study by Sinha et al [25]. Remote symptomatic seizures in the present study account for 6.0 %. Acute symptomatic seizures occur at the time of a systemic insult or in close temporal association with a documented brain insult. Seizures are considered as acute if they occur in the first seven days of cerebro vascular insults, traumatic brain injury, CNS infection or provoked by acute medical illness. Prior cerebro vascular disease is the most commonly identified remote precipitant for new seizures.

GTCS was the most common type reported in this study. A partial seizure with secondary generalization is often difficult to distinguish from a primarily GTCS since the bystanders tend to emphasise the more dramatic generalized convulsive phase of seizure and overlook the more subtle, focal symptoms present at onset. Most of the seizures due to neuro infection were GTCS (51.0%), followed by CVA (42.0%). 62.5% of metabolic seizures were GTCS. All patients of poisoning presented with GTCS. 83.0% of idiopathic seizures were of GTCS. Status epilepticus occurred in 5.0% in present study.

The main limitation of this study was sample size as which was not in proportion to the disease prevalence and moreover the study was hospital-based. Another limitation was recall bias since focal seizures with secondary generalization are often difficult to distinguish from primary generalized seizures to bystander observation.

CONCLUSION

Adult-onset seizure is an entity than demands the attention of the physician. Treatment is aetiology driven, hence an idea towards the common causes of new onset adult seizures should be deemed essential to reduce mortality and morbidity related to the disease. New onset seizures were more prevalent in males with GTCS being the predominant seizure type. Neuro infections are a common cause of these seizures in developing countries. Identification of at-risk groups will help the treating neurologist in early diagnosis and proper management of the disease.

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