

Study of etiology and clinical profile of patients presented with first episode of seizure

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Abstract

Background: A first seizure is a frightening event for the individual, for onlookers and for family members. The diagnosis of such an event is common in everyday clinical practice. The knowledge of the etiologic risk factors of acute symptomatic seizures will invariably contribute to the effort aimed at preventing and managing medical conditions frequently complicated by seizures. The present study was undertaken to determine the etiology of the seizure and study the clinical profile of patients presenting with first onset seizures. **Material and Methods:** A total of 100 consecutive adult patients above 18 years of age presenting to the tertiary care hospital with first onset seizures. All patients were clinically evaluated and thorough clinical examination was done. Hematological, biochemical and radiological investigations were conducted. Depending upon the suspected etiology, patients also underwent certain specific investigations like CSF examination, serological tests, carotid angiogram – DSA and histopathological examination of biopsy specimen. **Results:** GTCS was the most common type of seizure accounted for 63% and focal seizures in 37% cases. Infections (35%) were the most common cause (Neurocysticercosis 14%, Tuberculoma 9%, Others 12%) followed by Vascular (29%) causes, Idiopathic seizures (17%), Metabolic (7%), Alcohol related seizures (11%). Males presented 2.8 times more often than females to the tertiary care hospital as first onset seizure. Peak incidence was seen in 26-45years age group. **Discussion:** Acute episode of seizures is one of the commonest causes of hospitalization with high morbidity and mortality. Most of acute symptomatic seizures are caused by CNS infections like neurocysticercosis and tuberculoma, which can be prevented with improvement in health care facilities.


Keywords: Seizure, first episode, etiology, infections, neurocysticercosis

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INTRODUCTION

Seizures are common disorders found all over the world and are encountered frequently during medical practice in variety of settings. Annually approximately 150,000 adults will present with a first seizure in the United State¹. India is home to about 10 million people with epilepsy (prevalence of about 1%)². An epileptic seizure is an episode of neurologic dysfunction in which abnormal neuronal firing is manifest clinically by changes

in motor control, sensory perception, behavior, or autonomic function. A first seizure means an uncertain future for the individual. It's a frightening event for the individual, for onlookers and for family members, but the consequences of a recurrence vary between individuals in different geographical areas and social situations. The diagnosis of such an event is common in everyday clinical practice. Approximately 5 to 10% of the population will have at least one seizure in their lifetime. Acute symptomatic seizures are clinical seizures occurring in close temporal relationship with an acute central nervous system (CNS) insult, which may be metabolic, toxic, structural, infectious, or inflammatory that may require urgent attention and treatment to reverse potentially damaging causes. Such seizures are considered to be an acute manifestation of the insult and may not recur when the underlying cause has been removed or the acute phase has elapsed. The knowledge of the etiologic risk factors of acute symptomatic seizures in third-world countries will invariably contribute to the

effort aimed at preventing and managing medical conditions frequently complicated by seizures³. The differential diagnosis of a single seizure includes psychogenic non-epileptic events, cardiac and neurogenic syncope, transient ischemic attacks, sleep disorders, and panic attacks. It is important to distinguish all differentials as they do not have the same medical and social consequence of epilepsy. Patients with first onset seizures are common in the tertiary care hospital yet little is known regarding the management of these patients considering the availability of laboratory investigations, EEG, CT scan and MRI. The duration of seizure freedom following first-ever seizure substantially influences the risk of recurrence. Well-organized first seizure clinics often do not see patients until some weeks after the first seizure. Most of the time the physician is undecided about the choice of neuroimaging procedure to be performed i.e. an urgent CT scan or a MRI at a later date. Similarly, confusion also exists when seizures are alcohol related or due to medical causes. So, optimum investigations are required to make a diagnosis and starting treatment⁴.

The present study was undertaken to determine the etiology of the seizure and study the clinical profile of patients presenting with first onset seizures.

MATERIAL AND METHODS

This was a hospital based prospective study conducted over a period of two years from November 2014 to October 2016. After approval from the hospital ethics committee, a prospective analysis was carried out of the 100 consecutive adult patients above 18 years of age presenting to the tertiary care hospital with first onset seizures. Seizures in patients following head injury, in terminal stages of illness, known cases of seizure disorders, psychogenic seizures and eclampsia were excluded from the study. Each patient was explained about study and written informed consent was taken. A detailed history was taken from all patients and eyewitness. All patients were clinically evaluated and thorough clinical examination was done as per protocol. Each patient was subjected to hematological, biochemical and radiological investigations. Depending upon the suspected etiology, patients also underwent certain specific investigations like CSF examination, serological

tests, carotid angiogram – DSA and histopathological examination of biopsy specimen. A CT scan of the head was done in all patients. The scan was performed without and with injection of contrast material. Wherever indicated double contrast studies were done. EEG was not available on an urgent basis hence it was performed in the inter-ictal period on an elective basis within the first 48 hours since a seizure. MRI was done in all patients where CT scan was non-diagnostic or inconclusive. All the information was recorded in a proforma (case record sheet) and analyzed according to age groups, CT/MRI findings and according to the type of seizure presentation.

RESULTS

In present study, 100 patients, above the age 18years, both male and female with first onset seizures getting admitted at a tertiary care hospital were included.

Table 1: Demographic distribution of study population

Gender Age Group	Male		Female	
	Frequency (n=74)	Percentage (%)	Frequency (n=26)	Percentage (%)
18 – 25yrs (n=24)	13	54.2	11	45.8
26 – 45yrs (n=48)	39	81.3	9	18.6
46-65yrs (n=20)	16	80	4	20
Above 65yrs (n=8)	6	75	2	25

Totally 74% were males and 26% were females. The highest number of cases was seen in the 26-45yrs age group i.e., 48% of patients (males 81.3% and females 18.6%), followed by 18-25yrs age group 24% of patient (males 54.2% and females 45.8%) (Table 1). The highest number of cases was seen in the 26-45yrs age group 48% of patients, followed by 18-25yrs age group 24% of patient (Table 1). Peak incidence was 30% in 21-30yrs age group, followed by 27% in the 31-40yrs age group, 14% in the 41-50yrs age group, 15% in the 51-65yrs age group, 8% in the above 65yrs age group and 6% in the 18-20yrs age group.

Table 2: Etiology of Seizures

	Infectious (%)	Vascular (%)	Idiopathic (%)	Metabolic (%)	Alcohol Related (%)	Neoplastic (%)	Arachnoid cyst (%)
Number of patients (n=100)	35	29	17	7	5	4	3

Infectious causes together were found to be the most common cause of seizures 35%, followed by vascular causes (29%) and Idiopathic (17%). Other causes like metabolic causes (7%), alcohol related (5%) and neoplastic causes (4%) and arachnoid cyst (3%) can also be seen (Table 2).

Table 3: Etiology of Seizures: Age Specific Observations

Etiology Age Groups	Vascular n=29(%)	Infectious n=35(%)	Idiopathic n=17(%)	Alcohol Related n=5 (%)	Metabolic n=7(%)	Neoplastic n=4(%)	Arachnoid cyst n=3 (%)
18-25yrs (n=24)	1 (4.2%)	12 (50%)	7 (29.2%)	0	1 (4.2%)	1 (4.2%)	2 (8.3%)
26-45yrs (n=48)	7 (14.6%)	20 (41.7%)	10 (20.8%)	4 (8.3%)	4 (8.3%)	2 (4.2%)	1 (2.1%)
46-65yrs (n=20)	13 (65%)	3 (15%)	0	1 (5%)	2 (10%)	1 (5%)	0
>65yrs (n=8)	8 (100%)	0	0	0	0	0	0

In the 18-25yrs age group, Infectious causes was the most common etiology followed by idiopathic causes. In the age 26-45yrs age group, Infectious causes were more common followed by idiopathic causes. Alcohol related seizures were also seen in this age group, while the number of neoplasms observed were low. In the 46-65yrs age group, vascular causes were more common followed by Infectious, followed by metabolic causes. In >65yrs age group vascular causes were found to be the most common causes.

In the 18-25yrs age group idiopathic causes with 29.2% was the most common cause, followed by neurocysticercosis (20.8%), other infectious causes (20.8%), and all vascular causes were 8.3%, tuberculomas were 8.3%, Arachnoid cyst 8.3% while neoplasms were 4.2% which was more than in other age groups. In the 26-45yrs age group idiopathic causes with 20.8% were more common, followed by neurocysticercosis (16.7%), followed by other infections (14.5%) and tuberculoma (10.4%). Alcohol related seizures with 8.3% were also seen in this age group, metabolic causes were also observed including hypoglycemia (6.3%), neoplasms (4.3%), and hypocalcaemia (2.1%). In the 46-65 age group vascular causes (65%) is more common, followed by Alcohol Withdrawal (10%). In >65yrs age group vascular causes (100%) were found to be the most common.

Out of 29 patients, IC bleed was most common in 46-65yrs age group (55.6%), followed by 26-45yrs age group and above 65yrs age group (22.2%) each. Stroke was most common in 46-65yrs age group (43.8%), followed by above 65yrs age group (37.5%). In 26-45yrs age group venous thrombosis (50%) was most common, 18-25yrs age group (25%) and 46-65yrs age group (25%). Early onset seizures were more than late onset seizures in stroke. Early onset seizures presented as generalized in 63.6% while late onset were generalized in 40%. Early onset seizures were more than late onset seizures in stroke. Early onset seizures presented as generalized in 63.6% while late onset were generalized in 40%. Focal seizures were associated with abnormal clinical examination in 80% while 20% associated with abnormal clinical examination. Generalized seizures were

predominantly (75%) associated with abnormal clinical examination, while 25% had normal clinical examinations. Patients with sinus thrombosis presented with generalized seizure in 75% and focal seizures in 25% equal frequency. All patients had abnormal neurologic examination. Patients with withdrawal seizures (rum fits) majorly had generalized seizures (80%). In patients with other causes also had a majority of generalized seizures (83.3%). Patients with withdrawal seizures (rum fits) majorly had 60% normal examination, while patients with other causes had 50% abnormal examination. Focal seizures were common presentation of tumours in 75% cases and generalized in 25% cases and 50% presented with normal neurological examination.

Metabolic causes included hyponatremia and single episode of hypoglycemia associated with abnormal examination, while hypocalcaemia were associated with normal examination. Generalized seizure was common presentation of Arachnoid cyst. All the patients with focal seizures and 50% patients with generalized seizure have normal neurological examination.

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. The lifetime risk of seizures is 9% as compared with 3% risk of epilepsy. The frequency of first onset seizures presenting to the tertiary care hospital is much more. Cortical venous sinus thrombosis (CVST) is reported to be more common in developing countries, and has been linked to pregnancy, multi-parity, dehydration, and infection. In Indian subcontinent cortical venous thrombosis is common in post-*puerperal* women and presents with severe headache, low-grade fever and seizures. 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 first onset seizures in young adults in this region. Etiological spectrum depends

on age, sex, geography and medical setting⁵. In our study 76% were male and 24% were female. The highest number of cases seen in the 26-45yrs age group, 48% of patients, followed by 18-25yrs age group (24%). Peak incidence was in 21-30yrs age group (30%). In the study by Annegers JF *et al* [6] incidence was more in male as compare to female. Similar results were seen in the study by Thapa *et al*⁷. In the study by Quraishi SM *et al*⁵, most frequently affected age group was 21-30yrs (28%). So, age and sex distribution in our study is similar with previous studies. Infectious causes together were found to be the most common cause of seizures 35% (like neurocysticercosis 14%, tuberculoma 9%, and other infections 12%). This was in accordance with the study of Narayanan JT *et al*⁸ where infections are most common causes of seizures, account for 32%. In the study by Thapa *et al*⁷, neuroinfections account for 30% (20% neurocysticercosis and 10% meningitis). Neurocysticercosis was common in studies done in endemic region like Mexico, Medina MT *et al*⁹. Infections are followed by vascular causes 29% (included here were arterial and venous strokes and intracerebral hemorrhage). Idiopathic were 17%, and other causes like metabolic and alcohol related causes also seen. Cerebrovascular accidents account for 15% in the study by Sander *et al*¹⁰ and 18% in the study by Annegers JF *et al*⁶ which are smaller than our study but it is comparable with Indian studies, 21% in the study by Narayanan JT *et al*⁸ and 30% in the study by Quraishi SM *et al*⁵. Seizures were often the first clinical manifestations in this study and as observed by White AC¹¹.

Males were more common, the peak incidence was in the 26-45yrs age group and common medical history was of fever, pulmonary tuberculosis, past or present and HIV. The predominant seizure type was generalized (77.8%). In the study by Quraishi SM *et al*⁵, tuberculoma accounts for 14% and in Thapa *et al*⁷ study, it accounts for 10%. The incidence was high in studies of Ramamurthi *et al* (19.4%)¹². Hence, a suspicion of tuberculoma was more when patient had fever, neck stiffness, past history of tuberculosis and HIV. In the study of Ong S *et al*¹³, where 38% of cases were idiopathic from a total of 1348 neuroimaged first onset seizure patients.

In this study, alcohol related seizures formed 11% of cases. 45.5% of patients had alcohol withdrawal seizures 'rum fits' and 54.6% had other causes. This is similar to the findings of Rathlev *et al*¹⁴, where 53.6% patients had causes other than alcohol withdrawal.

It is concluded that etiological spectrum of seizures was varied and Infections (35%) were the most common cause (neurocysticercosis 14%, tuberculoma 9%, Others 12%). In >65 years age, vascular causes were

the most common. In 18-25 years age group, Infections (neurocysticercosis, tuberculoma, meningitis, malaria) was the most common cause followed by idiopathic. In middle 26-45 years age group, infections such as neurocysticercosis, tuberculoma, meningitis, malaria, toxoplasma was the most common cause followed by idiopathic followed by vascular which included arterial and venous infarcts and intracranial bleed. GTCS was the most common type of seizure accounted for 63% cases.

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