

Clinical Profile and Etiological Evaluation of New Onset Seizures after Age 20 years

Dr. Sudhir Chalasani¹, Dr. M. Ravi Kumar²

^[1]Assistant Professor, Department of General Medicine, Medciti Institute of Medical Sciences, Ghanpur, Telangana, India.

^[2]Department of General Medicine, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.

Abstract: Epilepsy by definition is recurrent spontaneous seizures. Epilepsy must begin with first seizures, but not all first seizures mean beginning of epilepsy. This study is aimed to evaluate etiology and clinical profile of adult onset seizures. In a design to analyze etiology, it is desirable to select incident cases instead of prevalent cases. There are hardly any major incidence studies in India which makes our study special. All cases aged more than 20yrs admitted to medical wards with first time seizures formed the subjects of the study except cases of seizures in patients below age of 20yrs, patient with past history of seizures and patients with insufficient clinical data for seizures diagnosis. The study observed that new onset seizures were more common in males and occurred most commonly in age group of 21- 40yrs. Most common seizure type of adult onset seizures were partial seizures while CNS infections were the leading cause for both provoked and unprovoked seizures.

Keywords: Seizures, Epilepsy, adult onset

I. Introduction

Epileptic seizures were described in ancient cultures, including those of China, Egypt, and India. The seizure was attributed to the god of the moon and many supernatural powers. In fact the word epilepsy comes from a Greek word meaning “to be seized by forces from without”. Hippocrates wrote the first book about epilepsy almost 2500 years ago. He rejected ideas regarding the divine etiology of epilepsy and concluded that the cause was excessive phlegm that caused abnormal brain consistency.

Modern investigation of the etiology of epilepsy began with the work of Fritsch, Hitzig, Ferrier, and Caton in the 1870's. They recorded and evoked epileptic seizures in the cerebral cortex of animals. In 1929, Berger discovered that electrical brain signals could be recorded from the human head by using scalp electrodes; this discovery led to the use of electroencephalography (EEG) to study and classify epileptic seizures^[1]. Gibbs, Lennox, Penfield, and Jasper further advanced the understanding of epilepsy and developed the system of the 2 major classes of epileptic seizures currently used.

After a long circuit through ages of magic, black humors and black disinterest, medical thought has returned to the affirmation that epilepsy, like many other diseases, is root in natural causes. In terms of today epilepsy is not cryptogenic, born of ignorance, but is merely disturbance of the normal rhythm of the brain. In nature, rhythm is inherent, in man dysrhythmia means disease, in brain, paroxysmal dysrhythmia spells epilepsy.

Epilepsy by definition is recurrent spontaneous seizures. Epilepsy must begin with first seizures but not all first seizures mean the beginning of epilepsy. Three fourths of persons with an isolated seizure never have another. There is a substantial difference in the distribution of syndromes in the fresh seizures when compared to a newly diagnosed epilepsy groups. Certain seizure types which are characteristic of specific syndromes are less likely to present to medical attention at the time of an initial event, such as absence, myoclonic, infantile spasms and complex partial seizures, whereas generalized tonic clonic seizures are more likely to come to medical attention. It is important to consider differences among studies using prevalent cases of epilepsy and those who recruit newly diagnosed epilepsy when considering etiology. In a design to analyze etiology, it is desirable to select incident cases instead of prevalent cases. There are hardly any major incidence studies in India, which makes our study special, as it is first of its kind to evaluate etiology and clinical profile of adult onset seizures.

II. Materials And Methods

All cases aged more than 20yrs admitted in medical wards with first time seizures during a period of two years formed the subjects of the study.

Exclusion Criteria

1. Cases of seizures in patients below age of 20yrs.
2. Patients with past history of seizures.
3. Patients with insufficient clinical data for seizure diagnosis

A prospective analysis of all patients aged more than 20 years with new onset seizures was performed. Detailed history and clinical examination was done on all patients.

Routine investigations like CBP, CUE, ESR, RBS, Blood urea, Serum Creatinine, Serum Electrolytes were done on all patients. Specific investigations where ever indicated – CT/ MRI Scan Brain plain and contrast, Electroencephalography, CSF analysis, Electrocardiograph, X-ray – Chest (PA), Liver function tests, Serum Anti cysticercal antibodies, Mantoux, Serum anti tubercular antibodies were done where ever indicated.

The diagnostic probability was based on clinical data obtained from the patient charts and the results of the EEG and/or CT scans.

In all cases the seizure type is classified according to International League Against Epilepsy (ILAE) 1981 Classification^[2] in to Generalized and Partial (simple, complex & partial with secondary generalization) based on description of seizures by patient and/ patient attendants.

The etiology of seizures was determined on the basis of medical history, neurologic examination, the EEG recording, and the CT scan. We used the classification of risk factors by following the guidelines proposed by the Commission of Epidemiology and Prognosis of the International League Against Epilepsy^[3]. The categorization of seizures is based on the presence or absence of a presumed acute precipitating insult, which permits distinction into Provoked (Acute Symptomatic seizures) and Unprovoked seizures. Unprovoked seizures may belong to two categories: Remote symptomatic and Seizures or epilepsies of unknown cause (idiopathic and cryptogenic).

Seizure frequency was classified according to definitions by ILAE Commission Report^[4] into, Single seizure, Status epilepticus & Seizure cluster (Cluster of seizures that occur within a short period of time but do not meet the criteria for diagnosis of status).

III. Results

Table 1: Seizure Type

Seizure Type	Number of Patients N = 98	Percentage
I. Partial	55	56.13%
a. Simple Partial	8	14.54%
b. Complex Partial	10	18.18%
c. Secondarily Generalized	37	67.25%
II. Primarily Generalized	43	43.87%

Table 2: Etiology of First Seizure

ETIOLOGY	Number N = 98	%
Vascular	26	26.50%
Infectious	39	39.70%
a. Neurocysticercosis	18	46.15%
b. Tuberculoma	2	5.12%
c. Meningoencephalitis	8	20.51%
d. Clacified granuloma	11	28.22%
Tumor	3	3.00%
Metabolic	15	15.30%
Trauma	3	3.00%
Cryptogenic	12	12.20%

Table 3: Distribution of Provoked and Unprovoked Seizures

ETIOLOGY	PROVOKED N=47	%	UNPROVOKED N=51	%
Vascular	12	25.50%	14	27.40%
Infectious	17	36.10%	22	43.10%
a. Neurocysticercosis	10	58.80%	8	36.36%
b. Tuberculoma	0	0.00%	2	9.09%
c. Meningoencephalitis	7	14.80%	1	5.54%
d. Clacified granuloma	0	0.00%	11	50.00%
Tumor	2	4.20%	1	19.00%
Metabolic	15	31.90%	0	0.00%
Trauma	1	2.10%	2	3.90%
Cryptogenic	0	0.00%	12	23.50%

Table 4: Etiology of Seizures in Relation to Age

ETIOLOGY	21-40 yrs N=46	%	41-60 yrs N=37	%	> 60yrs N=15	%
Vascular	2	4.3%	14	37.8%	11	73.3%
Neurocysticercosis	14	30.4%	3	8.1%	1	6.6%
Tuberculoma	1	2.1%	1	2.7%	0	0
Meningoencephalitis	5	10.8%	3	8.1%	0	0
Calcified Granuloma	6	13.0%	5	13.5%	0	0
Tumor	1	2.1%	2	5.4%	0	0
Metabolic	9	19.5%	4	10.8%	2	13.3%
Trauma	1	2.1%	1	2.7%	1	6.6%
Cryptogenic	7	15.2%	5	13.5%	0	0

Table 5: Seizure type relation to etiology

SEIZURE TYPE	Vascular N=26 (%)	Infection N=39 (%)	Tumor N=3 (%)	Metabolic N=15(%)	Trauma N=3 (%)	Cryptogenic N=12 (%)
Simple Partial	3 (11.50%)	5 (12.80%)	0	0	0	0
Complex Partial	2 (7.6%)	8 (20.50%)	0	0	0	1 (8.33%)
Secondarily Generalized	10 (38.50%)	16 (41%)	3 (100%)	0	2 (66.70%)	5 (41.7%)
Primarily Generalized	11 (42.30%)	10 (25.60%)	0	15 (100%)	1 (33.30%)	6 (50%)

IV. Discussion

Most epidemiologic studies of seizure disorders are studies of the prevalence of epilepsy and in most of them, as in studies of the incidence of seizure disorders, information was collected retrospectively. Only a few prospective incidence studies of cases with a first unprovoked seizure or a newly diagnosed unprovoked seizure in the adult population exist. There were no major hospital based studies which evaluated new onset seizures in adults especially from developing countries. There were no major incidence studies from India.

In the present study seizures are more common in the age group of 21-40yrs accounting for 46.9% of total cases, similar to other studies from India and other developing countries (In studies by Sankar.P Saha, West Bengal study^[5] 40%, study by K.S. Mani, Yelandur Study^[6] 71.4% and study by R. Sridharan, Libya^[7] 73.3%). In contrast, among studies from developed countries number of patients with first seizure are more in age group >60yrs EPIMART^[8] (48.1%); Lars Forsgren^[9] (41.8%); Perre Jallon^[10] (40.1%).

This variation is probably because, in developing countries and rural areas first seizure in elderly is often neglected. Major population of India falls in the age group of 21-40yr, so number of patients with first seizure in this group are more when compared to elderly (>60yrs).

Incidence of seizure was higher in males in present study, with a male to female ratio of 1.9:1 which is comparable to other studies.

Most common seizure type in our study was Partial seizure, accounting for 56.2% of all seizure types similar to studies by Nadir. E. Bharucha, Parsi community^[11] (56.4%); study by Lars Forsgren, Sweden^[12] (68%) and study by Nimal senanayake, Srilankan study^[13] (77.02%). In the partial seizures secondarily generalized seizures were most common seizure type accounting for 37.7% of all seizure types.

Among all causes of seizures, CNS infections formed leading cause of first seizure in adults accounting for 39.7% of all causes in present study. Cerebrovascular diseases formed Second most common cause with 26.5%. Most common seizure type secondary to infectious etiology was secondary generalized accounting to 41%. Among the CNS infections, Neurocysticercosis formed leading cause with 46.15%. Neurocysticercosis and small single cerebral calcific CT lesion (SSCCCTL) together accounted for 29.6% of all etiological factors in the present study. Neurocysticercosis, SCTL and small single cerebral calcific CT lesion (SSCCCTL) together accounted for 40% of etiological factors in a study by J.M.K Murthy and Ravi Yangala^[14]. In present study patients with Neurocysticercosis most commonly presented with partial with secondarily generalized seizures accounting for 61.1%. In a study by Alessandra Nicoletti^[15] of 34 cases of NCC, 21(61.76%) presented with secondarily generalization.

In younger age group (21-40 yrs) most common cause of new onset seizure is Neurocysticercosis accounting to 30.4% of all causes in that age group. Most common cause of new onset seizures in elderly is cerebrovascular diseases accounting to 73.3% of all causes in that age group.

In the present study of the 98 cases, 47 patients had acute symptomatic seizures accounting to 47.96% and in 51 patients (52.04%) it was unprovoked. Acute symptomatic seizures occurred in 53% of patients in a study of localization related epilepsy by J.M.K.Murthy and Ravi Yangala^[14]. In a study by Pierre Jallon^[10], acute symptomatic seizures represented 35.5% of total cohort. In studies by L. Forsgren, acute symptomatic seizures accounted for 26.6%^[9] & 24.11%^[12] of all etiologies. As our hospital is a referral center for surrounding areas, the higher number of cases with acute symptomatic etiologies leading to hospitalization contrasts with the higher representation of unprovoked seizures cases in community based studies.

In the present study among acute symptomatic seizures, CNS infections were the most common cause accounting to 36.2% of all causes. Similar observation was made in other Indian studies, by JNK. Murthy ; Jaishree T Narayan^[16] (31.8%). In present study among acute symptomatic seizures, Neurocysticercosis (NCC) accounted for 58.8% of CNS infections. Similar observations were made by Jaishree T.Narayan^[16] (43%) , JNK Murthy^[17] (50%). In developing countries endemic to NCC, the cyst in degenerative phase is the most common cause of acute symptomatic seizures.

In present study there were 12 cases with vascular etiology (25.5%), which formed second most common cause of acute symptomatic seizures followed by metabolic derangements in contrast to studies from developed countries in which alcohol related seizures were the most common cause EPIMART – French island^[8] 31.1% ; Perre Jallon, Geneva^[10] 28.9%.

In present study of 12 cases of vascular aetiology 6 were thrombotic (3 arterial & 3 venous) and 3 were hemorrhagic with no relation between haemorrhage / thrombosis as cause of post stroke acute symptomatic seizures. A study by Reith et al^[18] has shown that the sub type of stroke per se does not influence the risk of early seizures. In present study there were only 2 cases below age 41yrs with stroke as precipitating factor of acute symptomatic seizure and both had cortical sinovenous thrombosis. Cortical sinovenous thrombosis accounted for 25% of vascular causes of acute symptomatic seizures. In a study of acute symptomatic seizures by J.M.K Murthy and R Yangala^[17], cortical sinovenous thrombosis accounted for 37% of strokes.

Among remote symptomatic seizures, CNS infections were most common etiology (43%) in present study, similar to studies by JNK Murthy^[19] (48.8%) & Macro T.Medina, in Rural Honduras USA^[20] (57.6%).

Cerebrovascular diseases formed 2nd most common cause in present study. Studies from developed countries had maximum percentage of patients in whom no cause could be identified-cryptogenic, Perre Jallon, Geneva^[10] (56.3%); Lars Forsgren Sweden^[12] (47.62). In our study cryptogenic cases formed 23.45% of unprovoked seizures.

In present study most of the patients presented with single seizures (53.1%). 11 (11.2%) patients presented in status epilepticus similar to observations made by Jaishree T.Narayan^[16] in their study (11%).

Summary

- New onset seizures are more common in males when compared to females, with a male to female ratio of 1.9:1.
- First seizures in adults most commonly occurred in age group of 21-40 years with 46.9%
- Most common seizure type of adult onset seizure was partial seizures with 56.2%.
- Most common cause in both provoked and unprovoked seizures was CNS infection with 36.1 & 43.1% respectively.
- Among CNS infections most common cause was Neurocysticercosis with 46.15%
- Most common seizure type in seizures secondary to Neurocysticercosis was partial with secondarily generalization with 61.1%
- Most common cause of first seizure in young adults was Neurocysticercosis with 30.4%
- Among cerebrovascular diseases there was no difference between thrombotic or hemorrhagic events as a cause of new onset seizures in adults.
- In elderly (>60yrs) most common cause and type of seizure were cerebrovascular diseases with 73.3% and primary generalised seizures with 42.3% respectively.

V. Conclusion

There are hardly any major incidence studies in India evaluating etiology and clinical profile of adult onset seizures, which makes our study first of its kind. Most of the patients in the present study were from rural areas with endemicity of diseases like Neurocysticercosis and Tuberculosis, low socioeconomic status, and poor personal hygiene, all of which contribute to higher percentage of infectious etiology of first seizure in present study and other studies from developing countries. Most of the patients living in these areas are infected at younger age and become symptomatic with first seizure at a younger age. As the age increases risk factors for stroke increase contributing to higher percentage of stroke as a etiology of first seizure in elderly. In this regard patient education and taking necessary preventive measures at community level will significantly reduce the incidence of seizures.

References

- [1]. Mario F. Mendez Ashla, Neuropsychiatric aspects of Epilepsy, In Kaplan & Sadock's Comprehensive Textbook of Psychiatry, 8th edi; Philadelphia; Lippincot Williams & Wilkins, 2005; p377-389.
- [2]. Commission on Classification and Terminology of the International League against Epilepsy. Proposal for revised clinical classification and electroencephalographic classification of epileptic seizures. *Epilepsia* 1981; 22:p489-501.
- [3]. Commission on Epidemiology and Prognosis, International League Against Epilepsy, Guidelines for Epidemiologic Studies on Epilepsy. *Epilepsia*, 1993; 34(4): p592-596.
- [4]. ILAE Commission report. The Epidemiology of the Epilepsies, Future Directions. *Epilepsia* 1997; 38 (5); p614-618.
- [5]. Shankar P Saha, Sushanta Bhattacharya, Biman Kanti Roy, Arindam Basu, Trishit Roy, Bibekananda Maity, Shyamal K Das. A Prospective incidence study of epilepsy in a rural community of West- Bengal, India. *Neurology Asia* 2008; 13: p41 – 48.
- [6]. Mani K.S, Rangan. G Srinivas H.V et al. The Yelandur study : A community based approach to epilepsy in rural South India – Epidemiological aspects. *Seizure* 1998; 7: p281-288.
- [7]. R. Sridharan, K. Radhakrishnan, P P Ashok, and M. E. Mousa. Epidemiological and Clinical Study of Epilepsy in Benghazi, Libya. *Epilepsia*. 1986; 27 (1): p60-65.
- [8]. Pierre Jallon, Didier Smadja, Philippe Cabre, Guillaume Le Mab, Marcel Bazin, and EPIMART Group. EPIMART: Prospective Incidence Study of Epileptic Seizures in Newly Referred Patients in a French Carribean Island (Martinique). *Epilepsia*, 1999; 40(8): p1103 – 1109.
- [9]. Lars Forsgren, Prospective Incidence Study and Clinical Characterization of Seizures in Newly Referred Adults. *Epilepsia*. 1990; 31(3):? 92-301.
- [10]. Pierre Jallon, Incidence of First Epileptic Seizures in the Canton of Geneva, Switzerland, *Epilepsia*, 1997; 38(5): p541-552.
- [11]. Nadir E. Bharucha, Prevalence of Epilepsy in the Parsi Community of Bombay. *Epilepsia*, 1988; 29(2): p292-301.
- [12]. Lars Forsgren, Gosta Bucht, TSture Eriksson, and Lars Bergmark. Incidence and Clinical Characterization of Unprovoked Seizures in Adults: A Prospective Population- Based Study. *Epilepsia*, 1996; 37(3): p224-229.
- [13]. Nimal Senanayake. Classification of Epileptic Study of 1,250 Patients of Siezures: A Hospital – Based study in a Developing Country. *Epilepsia*, 1993; 34(5): p812-818.
- [14]. J.M.K. Murthy and Ravi Yangala. Etiological Spectrum of symptomatic localization related epilepsies: A study from South India. *Journal of Neurological Sciences*. 1998; 158(1): p65-70.
- [15]. Alessandra Nicoletti, Alessandro Bartoloni, Vito Sofia, Filippo Bartalesi, Jos'e Rosado Chavez, Rimberto Osinaga. Epilepsy and Neurocysticercosis in Rural Bolivia: A Population – Based Survey. *Epilepsia*, 2005; 46(7): p1127-1132.
- [16]. Jaishree T Narayan, J.M.K Murthy, New onset acute symptomatic seizures in a neurological intensive care unit, *Neurology India*, April-june 2007; (55): p220-244.
- [17]. J.M.K Murthy & Ravi Yangala, Acute symptomatic seizures - incidence and etiological spectrum: a hospital – based study from South India. *Seizure* 1999; 8: p162-165.
- [18]. Jakob Reith, Henrik Stig Jorgensen,; Hirofumi Nakayama, Hans Otto Raaschou, Tom Skyhoj Olsen. Seizures in Acute Stroke: Predictors and Prognostic Significance: The Copenhagen Stroke Study. *Stroke*. 1997; 28: p1585-1589.
- [19]. JNK Murthy. Syndromic classification of ILAE: A hospital based study from South India. *Epilepsia*, 1998; 39(1): P48-54.
- [20]. Marco T. Medina, Incidence, prevalence, & etiology of epilepsy in rural Houndras USA The Salama Study. *Epilepsia*, 2005; 46(1): p124-131.