

A STUDY OF AETIOLOGY OF FIRST EPISODE OF SEIZURES IN ADULTS

Mohammed Shafee¹, Mohammed Abdur Rahim²

¹Assistant Professor, Department of General Medicine, SVS Medical College, Mahbub Nagar, Telangana.

²Associate Professor, Department of General Medicine, Government Medical College, Ananthapuramu, Andhra Pradesh.

ABSTRACT

BACKGROUND

Epilepsy is probably as old as man himself. Jackson (1931) described epilepsy "as a sudden excessive rapid discharge of grey matter of some part of the brain". Seizures are common disorders, the average incidence rate in most studies is 20-70/1,00,000 per year (range 11 "134/1,00 000 per year). Incidence varies considerably with age, rates are greatest in early childhood, reach a nadir in early adult life, and rise again in elderly person.

The aims and objective of the study are: 1) To investigate for the aetiology of First episode of seizures in adults. 2) To study the clinical course of admitted cases with First time seizures.

MATERIALS AND METHODS

Inclusion Criteria- Patients in the medical wards with history and clinical features suggestive of seizures for the first time are included in the study.

A provisional diagnosis made on clinical grounds and substantiated by carrying out appropriate Biochemical, Pathological, and Radiological investigation. A detailed analysis for aetiology and the clinical presentation will be studied.

Exclusion Criteria- Patients with past history of seizures, head injury on anti-epileptic drug treatment were excluded.

RESULTS

This study included 45 patients examined and treated in the Dept. of Medicine. Their ages ranged from 15 to 75 years. The 45 patients studied were divided into 6 age groups.

CONCLUSION

This study included 45 patients (more than 15 years of age) presenting with seizures. Patients with past history of seizures, head injury on anti-epileptic drug treatment were excluded.

There were 33 males 12 females and ages ranged from 15 to 75 years. Detailed history was obtained and physical examination was done in each patient.

KEYWORDS

Epilepsy, Seizures, Cerebrovascular Diseases (CVD), Computerised Topography (CT) Scan, Electroencephalogram (EEG).

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BACKGROUND

Epilepsy is as old as man himself, Jackson described Epilepsy as a sudden excessive rapid discharge of grey matter of some part of the brain. Incidence of seizure varies with age, rates are greatest in early childhood reach a nadir in early adult life and rise again in elderly person. Until 1940 diagnosis was based on history, clinical examination and skiagram of skull. Introduction of EEG & CT Scan made diagnosis more accurate and changed the course of management. We report a case series of 45 patients with first episode of seizure in adults, evaluated with necessary

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Corresponding Author:

Dr. M. Abdur Rahim,

Associate Professor,

Department of General Medicine,

Government Medical College,

Ananthapuramu, Andhra Pradesh.

E-mail: docraheem@gmail.com

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lab investigations and managed appropriately. A detailed analysis for aetiology was attempted.

Epilepsy is probably as old as man himself. Jackson (1931) described epilepsy "as a sudden excessive rapid discharge of grey matter of some part of the brain". Seizures are common disorders, the average incidence rate in most studies is 20-70/1,00,000 per year (range 11,134/1,00,000 per year). Incidence varies considerably with age, rates are greatest in early childhood, reach a nadir in early adult life, and rise again in elderly person.

Until 1940, the etiological diagnosis had been based on history, clinical examination & skiagram of the skull in different views. However with the introduction of the Electroencephalogram (EEG) and later Computerized Axial topography (CAT Scan) the diagnosis has become more accurate and has completely changed the course of management.

Aims and Objectives

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RESULTS

This study included 45 patients examined and treated in the Dept. of Medicine. Their ages ranged from 15 to 75 years. The 45 patients studied were divided into 6 age groups. 15-24, 25-34, 35-44, 45-54, 55-64, 65 & above.

Age group	Total Number	Sex	
		Male	Female
15-24	13	8	5
25-34	5	3	2
35-44	7	6	2
45-54	7	6	1
55-64	7	7	-
65 & above	6	3	3
	45	33	12

Table 1. Age - Sex Distribution

As it is evident from the table total 55.5% of patients were below the age of 40 years there were 33 males & 12 females.

Age Group	Generalized Tonic-Clonic Seizure	Simple Partial Seizure	Focal Seizure
15-24	7	2	4
25-34	1	4	-
35-44	5	2	-
45-54	4	2	1
55-64	2	5	-
64 & above	-	2	4
	19	17	9

Table 2. Various Types of Seizures in Different Age Groups

From the above table, majority i.e., 42.2% patients presented with generalized Tonic Clonic seizures. 37.7% of patients with Simple Partial Seizure & 20% of patients with Focal Seizures.

Group	Diagnosis	No. of Cases	% of Cases
I	Idiopathic	26	57.7
II	CVD	7	15.5
III	Infective	9	20
IV	SOL	3	6.6

Table 3. Aetiological Diagnosis & Their Percentage

57.7 % of patients belong to the idiopathic group where no aetiology could be ascertained. Infective was 2nd common aetiology seen in 9 patients (20%), while CVD accounted for 15.5% of patients.

Age Group	Idiopathic	CVD	Infective	SOL
15-24	9	2	2	-
25-34	2	-	3	-
35-44	2	1	3	1
45-54	5	2	-	-
55-64	4	-	1	-
65 & Above	4	2	-	1
	26	7	9	3

Table 4. Aetiology of Seizures in Different Age Groups

It is clear from the above table that in 26 patients no aetiology could be determined and were included in the idiopathic variety. 13 out of their 26 patients were below 40 years of age.

Infective & CVD was not important cause of seizures especially in patients above 40 years of age.

SOL were most commonly seen in the age group of 30-60 years.

Age Group	Idiopathic	CVD	SOL	Infective
Generalized	12	4	4	-
Tonic Clonic Seizure				
Simple Partial Seizure	11	-	5	2
Focal Seizure	3	3	-	1
	26	7	9	3

Table 5. Type of Seizures According to Different Aetiological Group

Majority of the patients from idiopathic group had generalized tonic clonic seizures.

Whereas patients with CVD had Focal onset on seizures, however 4 patients with CVD had generalized tonic clonic seizures.

CT Scan	Aetiology Idiopathic	Structural
Normal	23	
Abnormal-		
Granulomas		6
Tumour		3
Cerebral Infarction		2
Cerebral Haemorrhage		9

Table 6. CT Scan findings

23 patients out of 26 in the idiopathic variety were CT head scan was done, showed no abnormality.

While in all the cases where a space occupying lesion, a cerebrovascular disease was suspected had abnormal scans.

- a. No. of Patients : 45
- b. EEG Done : 20
- c. EEG not done : 25

Aetiology	Normal	Slow Wave		No. of EEG done
		Focal	Gen.	
Idiopathic	16	-	-	16
CVD	2	-	-	2
SOL	1	-	-	1
Infective	-	-	1	1
	19			20

Table 7. Electro Encephalogram Findings

As it is evident from the above table, out of 20 patients who underwent EEG, 1 patient i.e. 5% had EEG abnormality, with Generalized seizures.

DISCUSSION

Age-Sex Incidence and Seizures-

Incidence of seizures varies considerable with age, rates are greatest in early childhood, reach a nadir in early adult life and rise again in elderly people.¹

In the present study 55.5% of patients were below the age of 40 years.

Anthony Hopkins et al (1988) in their study of 408 patients had highest incidence of seizures in the younger age group i.e., 60% patients were below 40 years of age.

In the National General Practice Study of Epilepsy (1990) of the 792 patients 60.6% of patients were below the age of 40 years.

Another study conducted by Hauser W.A et al in 1993 had 65% of patients who presented below the age of 40 years.

Most studies show a slight excess of epilepsy in males.

In the present study out of 45 patients studied 73.3% were males and 26.7% were females. The male: female ration is 2.7:1

Our findings are in agreement to the observations reported in various studies as shown below.

Study	M:F (Ratio)
NGPSE Series (1990)	1.2 1
Anthony Hopkins et al (1998)	1.2:1
Hauser W.A et al (1993)	1.3:1
J. Kalita et al	1.4:1

Idiopathic Seizures

Generally seizures for which no aetiology can be found are termed idiopathic seizures or seizures of indeterminate origin.

In the National General Practice Study of Epilepsy 60% of all patients had no identifiable cause of epilepsy (1990).

Oxybury and Whitty in 1971 conducted a study of 86 adult patents who presented with seizures. In 32 patients (37.2%) the cause of seizures could be found, while in 54 patients (62.7%) no cause was detected.

Two thirds of causes in the Rochester study had no clearly identified antecedent.²

A. P. Singh et al in their study of 100 patients found 61% of seizures without any obvious cause.³

In the present study 26 out of 45 patients had seizures. Where no definite aetiology could be established. Majority of them were below 40 years of age.

Seizures in Cerebrovascular Disease

Cerebrovascular disease and stroke become an increasingly common cause of epilepsy in later years of life.

Incidence of seizures is highest in-patients with subarachnoid haemorrhage, followed by intracerebral haemorrhage and cerebral infarction.

It has been estimated that Cerebrovascular disease may account for 15% of all new cases of epilepsy.

Thrombotic infarcts are convulsive only if cortex is involved. Seizures are more common in aneurysmal rupture or hypertensive subarachnoid haemorrhage.

In the year 1991; Asconap and Penry, had given special attention to Cerebrovascular disease as a cause of late onset epilepsy. They divided these into two groups. Early seizures occur during the evolution of stroke. Late seizures, occurring months or year after the stroke, are due to structural brain abnormalities with the development of epileptic foci.⁴

In the present study 15.5% of patients presented with seizures are due to cerebrovascular disease.

Observations from different studies are as follows-

Study	Incidence of Seizures Due to CVD
Sander J. W. A. S et al (1990)	15% (12-18%)
Hauser W. A et al (1993)	11%
S. D. Sharvan (1990)	15%

In our study, cerebrovascular disease as a group constitutes the commonest cause of secondary epilepsy.

Seizures due to Intracranial Space Occupying Lesions

Epileptic attacks due to an intracerebral mass are caused by changes in the cortex following deprivation of its blood supply, traction on the cortex by the tumor, pressure from oedema or direct deformation by the tumor. In this study 6.6% of patients had seizures due to Intracranial SOL.

Intracranial Ring or Disc Enhancing Lesions (Tuberculomas, Cysticercosis)-

Tuberculomas are structural lesions, composed of characteristics granulomatous tissue, either single or multiple, with variation in size of a few mm. to occupying a

large portion of a hemisphere.⁵ Commonest site in cerebral cortex is parietal or parietooccipital.

Tuberculomas are rare in developed countries, but are quite common in developing countries. India has the highest incidence of tuberculomas, and also shows a regional variation. In Madras and Andhra Pradesh, the incidence is as high as 19.4% (Ramamurthi 1958), while in North India it is only 4% (Tandon et al 1979).⁶ In India it constitutes 20-30% of all intracranial space occupying lesions.

Intracranial Tumours and Epilepsy

40% of patients with Intracranial tumours (gliomas, meningiomas, metastases etc.,) had seizures is the presenting complaint⁷

In adults tumours are found in 6-20% of the seizures population.⁸ Sheehan 1958, Rasmussen 1968, Carney et al 1969, Currie et al 1971, Vigaendra et al 1978. Lombardo 1980, have reported the incidence of brain tumours ranging from 6-40%.^{9,10,11}

Tumours are usually located in the cerebral cortex and there is an inverse relationship between malignancy and the propensity to cause seizures.¹²

CNS Infections and Epilepsy

A wide range of viral, bacterial, opportunistic, and parasitic infestations can be associated with seizures. Infections accounted for 3% of seizure disorders in the epidemiological study in Rochester, Minnesota.¹³

In the present study out of 45 cases 9 patients with CNS infection presented with seizures. 2 cases of pyogenic meningitis presented with seizures, 6 cases of tubercular meningitis and 1 with encephalitis of presumed viral aetiology.

Electro-Encephalography

Even in these days of highly sophisticated brain imaging techniques, EEG still remains one of the most useful diagnostic aid in the evaluation of epileptic seizures, used as an adjunct to clinical diagnosis and never as the sole diagnostic tool for epilepsy. Under interpretation is preferred to over – interpretation as a normal EEG does not exclude the diagnosis of epilepsy.

It is unusual for a routine EEG recording to coincide with an actual seizure, and it is therefore necessary to depend upon interseizure patterns for diagnosis.

Interseizure records may show abnormal discharges which may be in the form of spikes or spike and slow waves, and which in conjunction with appropriate history, may be accepted as supportive evidence for the diagnosis of idiopathic seizures.

The spike and waveforms may also be seen in persons who never had any seizures, and hence idiopathic seizures should be diagnosed on clinical grounds, and not EEG evidence alone.

The EEG by demonstrating the presence of focal slow wave abnormalities, suggest the presence of structural lesions as a cause for epilepsy. Focal delta activity increases the chances of detection of a cerebral tumor on

computerized tomography (CT) scanning in patients who present with epilepsy. (2.61) If the clinical examination is normal and EEG shows no focal abnormality, the chances of intracranial tumours are less.¹⁴

In the present study, out of 16 patients of idiopathic group has normal EEG. Patients with focal seizures, focal neurological signs, focal EEG abnormalities, were subjected to CT scanning to rule out structural lesion.

CONCLUSION

This study included 45 patients (more than 15 years of age) presenting with seizures. Patients with past history of seizures, head injury on anti-epileptic drug treatment were excluded.

There were 33 males 12 females and ages ranged from 15 to 75 years.

Detailed history was obtained and physical examination was done in each patient.

Investigations included routine blood and biochemical test. EEG was done in most of the patients. CT scan was done in patients who had focal seizures, focal neurological deficits or focal EEG abnormality. CSF was done whenever felt necessary.

Following Observations were made-

1. Maximum number of patients with seizures (55.35%) were below the age of 40 years.
2. There is a male preponderance. Male 73.3% Females 26.7%
3. Generalized tonic – clonic seizures were the commonest type (42.2%) followed by partial seizures with secondary generalization (37.7%)
4. The commonest type of seizures was idiopathic where no aetiology could be determined. 57.7 % patients had idiopathic seizures.
5. Cerebrovascular disease was commonest cause of symptomatic seizures seen in 15.5% patients, most of them were above 40 years of age.
6. Space occupying lesions as a cause of seizures was seen in 6.6% patients. Of them 6 had granuloma, 2 cerebral infarct, 4 cerebral haemorrhage and 3 had tumours.
7. EEG was normal in 95% patients and showed abnormality in 5% patients.
8. Abnormal CT scan finding were seen in 44.4% of patients (20 out of 45 patients).

From these observations following conclusions can be drawn:

1. Seizures have male preponderance.
2. Most common age group affected is 15 to 40 years
3. Commonest seizure type is generalized tonic – clonic.
4. In 50% of patients aetiology remains uncertain.
5. Focal seizures of recent onset, evidence of focal deficit and focal EEG abnormality need thorough investigations including brain imaging to exclude structural disease as a cause of seizures.

6. Cerebrovascular disease is commonest cause of symptomatic seizures, particularly above 40 years of age.
7. Granulomas and tumours constitute sizeable group as a cause of seizures.

REFERENCES

- [1] Sander JW, Hart YM, Johnson AL, et al. National General Practice Study of Epilepsy. Newly diagnosed epileptic seizures in a general population. *Lancet* 1990;336(8726):1267-1271.
- [2] Hauser WA, Annegers JF, Kurland LT. Incidence of epilepsy and unprovoked seizures in Rochester, Minnesota: 1935-1984. *Epilepsia* 1993;34(3):453-468.
- [3] Sethi PK, Kumar BR, Madan VS, et al. Appearing and disappearing CT scan abnormalities and seizures. *J Neurol Neurosurg & Psychiatry* 1985;48:866-869.
- [4] Asconape JJ, Penry JK. Poststroke seizures in the elderly. *Clin Geriatric Medicine* 1991;7(3):483-492.
- [5] Rajshekhar V, Haran RP, Prakash GS, et al. Differentiating solitary small cysticercus granulomas and tuberculomas in patients with epilepsy. Clinical and computerized tomographic criteria. *J Neurosurg* 1993;78(3):402-407.
- [6] Louis S, McDowell F. Epileptic seizures in non-embolic cerebral infarction. *Arch of Neurol* 1967;17(4):414-418.
- [7] Vignaendra V, Ng KK, Lim CL, et al. Clinical and EEG data indicative of brain tumours in a seizures population. *Postgraduate Med J* 1978;54(627):1-5.
- [8] Ahuja GK, Behari M, Das SM. Epilepsy of late onset. *Acta Neurology Scand* 1980;(Suppl 79):72-79.
- [9] Carney LR, Hudgins RL, Espinosa RE. Seizures beginning after the age of 60. *Archives of Internal Medicine* 1969;124(6):707-709.
- [10] Lowenstein DH. *Text book of Harrison*. 5th edn. McGraw-Hill 2001: p. 2354-2368.
- [11] Subramaniam TP, Korath PM, Selvaraj P, et al. Metabolic epilepsy. *JAPI* 1986;34(1).
- [12] Marsden CD, Reyond EH. *Neurology IA*. Laidlaw J, Richens A, eds. *Text book of Epilepsy*. 2nd edn. London: Churchill Livingstone 1982.
- [13] Hauser WA, Kurland LT. The epidemiology of epilepsy in Rochester, Minnesota, 1935 through 1967. *Epilepsia* 1975;16(1):1-66.
- [14] Angeleri F, Provinciali L, Salvolini V. CT in partial epilepsy. In: Canger RF, Angeleri F, Penry J, eds. *Advances in epileptology*. 11th Epilepsy International Symposium. New York: Raven Press 1980: p. 53-64.