A STUDY OF AETIOLOGY OF FIRST EPISODE OF SEIZURES IN ADULTS
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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).


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 has completely changed the course of management. We report a case series of 45 patients with first episode of seizure in adults, evaluated with necessary lab investigations and managed appropriately. A detailed analysis for aetiology was attempted.

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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.

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<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total Number</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>13</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>25-34</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>35-44</td>
<td>7</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>45-54</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>55-64</td>
<td>7</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>65 &amp; above</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>33</td>
<td>12</td>
</tr>
</tbody>
</table>

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.

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

CT Scan

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Idiopathic</th>
<th>CVD</th>
<th>SOL</th>
<th>Infective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>12</td>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Abnormal-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Granulomas</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Tumour</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Normal</th>
<th>Slow Wave</th>
<th>No. of EEG done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idiopathic</td>
<td>16</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>CVD</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>SOL</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Infective</td>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>20</td>
</tr>
</tbody>
</table>

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. 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 65% of patients who presented below the age of 40 years of age.

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.

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

Observations from different studies are as follows-

<table>
<thead>
<tr>
<th>Study</th>
<th>Incidence of Seizures Due to CVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGPSE Series (1990)</td>
<td>15% (12-18%)</td>
</tr>
<tr>
<td>Anthony Hopkins et al (1998)</td>
<td>11%</td>
</tr>
<tr>
<td>Hauser W.A et al (1993)</td>
<td>15%</td>
</tr>
<tr>
<td>S. D. Sharvan (1990)</td>
<td>15%</td>
</tr>
</tbody>
</table>

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

Idiopathic Seizures
Generally seizures for which no aetiology can be found are termed idiopathic seizures or seizures of indeterminate origin.
large portion of a hemisphere. 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). 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 complaint.

In adults tumours are found in 6-20% of the seizures population. 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


