

## A clinical Study on Adult Onset Seizures in tertiary care centre in South India

Dr. Byju N, MD DM (Neurology), Associate Professor in Neurology, GMC, Thrissur

Dr. Biju P R, MS General Surgery, Associate Professor in Surgery, GMC Thrissur

Dr. Doron Susan Mathew, MD General Medicine, Lecturer in Medicine, GMC Thrissur

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### **Abstract**

Adult-onset seizure disease is a huge public health issue around the world. Seizures that develop in adulthood necessitate extra care. This is because the etiology of those seizures are likely to be due to identifiable causes. The type of seizure must be determined in order to focus the diagnostic strategy on certain etiologies. This method is based on the clinical characteristics of seizures and the electroencephalographic results that go along with them. Adult seizures deserve special attention in terms of aetiology because they are more likely to be caused by a known cause. The main causative factors for adult onset seizures are trauma, central nervous system infections, brain tumors, stroke accidents, metabolic disorders and drugs. Advent of newer imaging modalities like CT Scan head MRI brain, EEG, Video EEG have revolutionized the diagnosis management of seizures.

**Objectives :** To study the clinical presentation, age of onset and gender distribution of patient with Adult onset seizure admitted in neurology department of a tertiary care hospital in Kerala.

**Study design - Cross sectional study - Record based Study setting - GMC, Department of Neurology Thrissur Study participants**

This is a retrospective study using the copies of discharge cards of adult onset seizures patients admitted in neurology ward and out patient's details of Adult onset patients attending in the neurology OPD from August 2019 (01/08/2019 to July 2020(31/07/2020). They will be enrolled based on definite Inclusion & Exclusion criteria. Sample size is 50 patients.

There were 50 patients in our study, 32 males and 18 females. Most of the patients(20) belonged to the 20-40 age group. Generalized seizures were present in 30 patients and focal seizures were present in 20 patients. Most common etiology for the seizures was stroke which was 15 patients followed by CNS infections in 11 patients. The most common cause for generalized seizures was stroke present in 9 patients followed by idiopathic. Most common cause for focal seizures was CNS infections founding 7 patients followed by stroke in 6 patients. EEG was normal in 23 patients. Similarly CT scan was normal in 20 patients. The most common CT scan finding was infarct in 9 patients followed by ring enhancing lesion in 8 patients. MRI was normal in 11 patients. Most common MRI finding was infarct in 10 patients.

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### **I. Introduction**

Adult-onset seizure disease is a huge public health issue around the world. This is because of the nature of the illness, burden caused by the impact of the disease on the individual, family and community. Seizures that develop in adulthood necessitate extra care. This is because the etiology of those seizures are likely to be due to identifiable causes<sup>1</sup>.

### **II. A Brief Review**

Seizures are common disorders recognized centuries back and a common problem faced by all medical practitioners. Up to 5-10% of general population experience at least one seizure in their life time. The highest incidence of seizures occur in early childhood and late adulthood<sup>2</sup>.

A seizure (from the Latin word *sacire*, "to take position of") is a paroxysmal event due to abnormal excessive or synchronies neuronal activity in the brain. This discharges may be distributed non uniformly in different brain structures and will lead to production of abnormal brain activity. This will produce various clinical features which may range from casual symptoms which are not easily recognized by an observer to very dramatic convulsions which attract attention of others. The terms epilepsy and seizures needs to be distinguished. When a person has recurrent seizures due to a chronic underlying pathology, then that condition is called Epilepsy. So a person with a single seizure, or recurrent seizures which is caused by correctable or

avoidable factors he does not absolutely qualify to have an epilepsy. Epilepsy is a clinical phenomenon as opposed to a specific illness entity. Motor part of the seizure is called convulsion. Epilepsy can be defined as two or more unprovoked seizures<sup>3</sup>.

The type of seizure must be determined in order to focus the diagnostic strategy on certain etiologies. This method is based on the clinical characteristics of seizures and the electroencephalographic results that go along with them.

Seizures are broadly classified as focal or generalized. Focal seizures originate within networks limited to one cerebral hemisphere (the term partial seizures is no longer used). Generalized seizures occur in networks that span both brain hemispheres and are rapidly activated. Structural deformities are usually the etiology of focal seizures. But generalized seizures usually occur due to variation in cellular, biochemical processes. Structural abnormalities that are wide spread in both hemisphere also produce generalized seizures<sup>4</sup>.

Extra care has to be taken in the diagnosis and management of adult onset seizures as many of the causes of these seizures are identifiable and treatable. The main causative factors for adult onset seizures are trauma, central nervous system infections, brain tumors, stroke accidents, metabolic disorders and drugs. On the other hand, childhood seizures are more likely to be idiopathic.

The etiological causes and clinical presentation of adult onset seizures are deferent from young onset seizures. Their management especially the choice of the antiepileptic their continuation change and tapering and stoppage of the drug also has to be done judiciously.

Electroencephalogram (EEG) is very helpful in the diagnosis of seizures. It is helpful in differentiating seizures from pseudo seizures in this aspect video EEG is employed in many centers. Video EEG is also helpful in tracing the epileptogenic focus and hence valuable in epilepsy surgeries<sup>5</sup>. The advent of imaging modalities like CT scan head and MRI brain have revolutionized the diagnosis, classification and management of epilepsy. Special imaging protocols have been employed in many centers<sup>6</sup>.

### **III. Objectives**

To study the clinical presentation, age of onset and gender distribution of patient with Adult onset seizure admitted in neurology department of a tertiary care hospital in Kerala.

Materials and Methods

Study design - Cross sectional study - Record based Study setting - GMC, Department of Neurology Thrissur Study participants

This is a retrospective study using the copies of discharge cards of adult onset seizures patients admitted in neurology ward and out patient's details of Adult onset patients attending in the neurology OPD from August 2019 (01/08/2019 to July 2020(31/07/2020).

#### **Inclusion criteria**

All the patients in the study are cases of adult onset seizures diagnosed on clinical basis.

#### **Exclusion criteria**

Cases of children with seizures below 12 years and cases of pseudo seizures are excluded.

Study period - 2 months

Sample size - All cases during the period 01/08/2018 to 31/07/ 2021 were included and the sample size is 50.

Data collection tool - structured proforma

Methodology - Data collection Record based Analysis. Secondary data of

Patients with Adult onset Seizures will be collected using a structured proforma. Data on clinical presentation, age of onset, gender, progression and clinical test performed and diagnostic test employed will be collected.

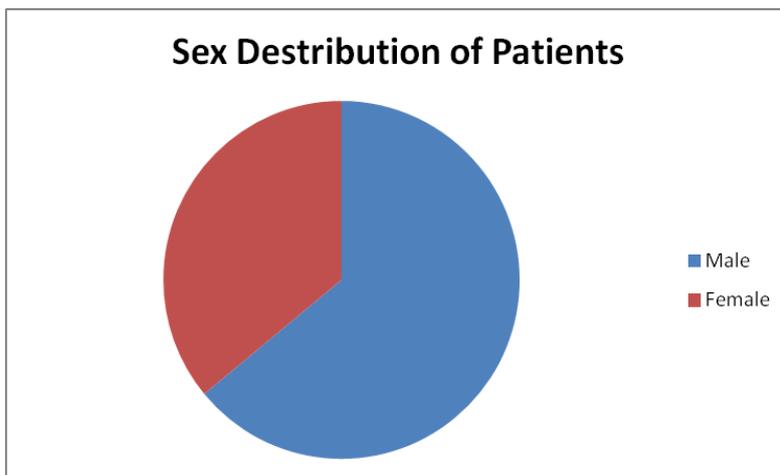
**Variables include :** Age of onset, Presentation (clinical presentation), Type of seizures, Investigations

**Data Analysis :** Data was entered in MS excel & analyzed using appropriate software like Epi info. Qualitative data will be analyzed using proportions. Were tabulated & discussed.

**Ethical consideration :** This is a record based study. It was started only after getting the approval from the research and ethical committee. Confidentiality of data will be maintained.

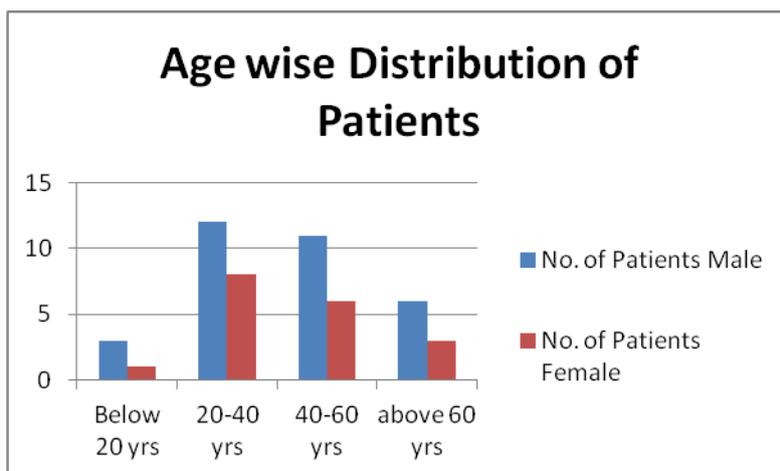
#### IV. Results

**GENDER:** In our study, there were 50 patients out of which 32 were male and 18 were females. **Illustration Fig.1**

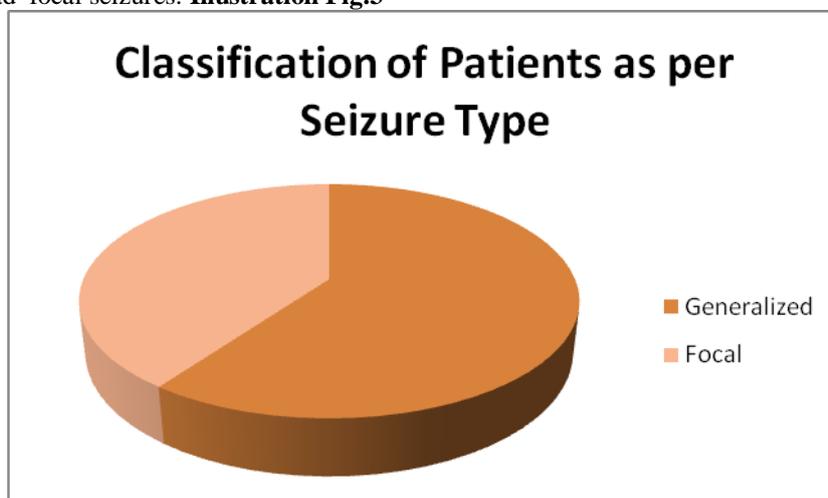


**AGE :** In our study 4 patients were below 20 years, (3 males and 1 female) , 20 patients were in the age group 20-40 years (12 males and 8 females), 17 patients were in the age group 40-60 (11 male and 6 female) and 9 patients were above 60 years (6 males and 3 females).

**Illustration Fig.2**

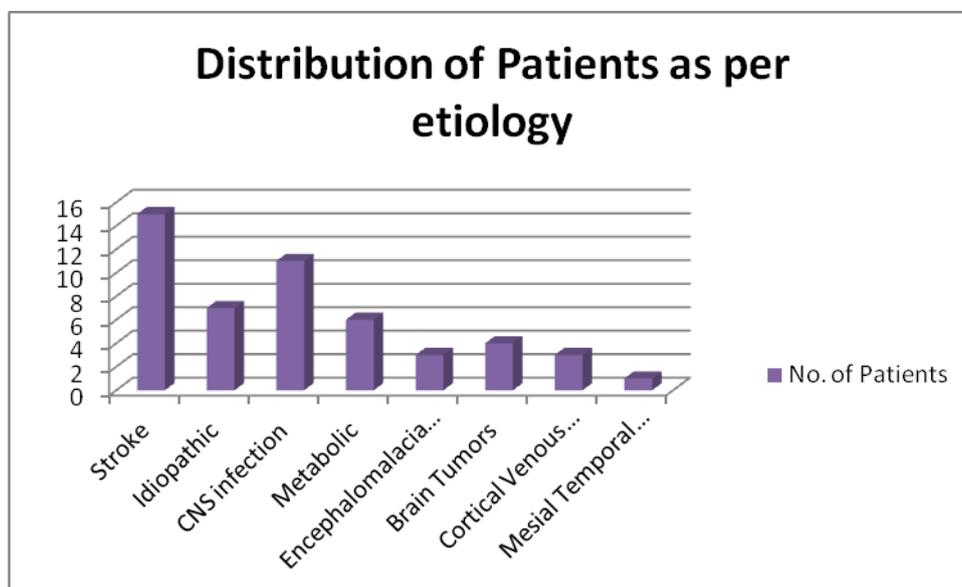


**TYPE OF SEIZURE:** 30 patients (60 % ) of our patients had generalized tonic -clonic seizures while 20 patients(40%) had focal seizures. **Illustration Fig.3**

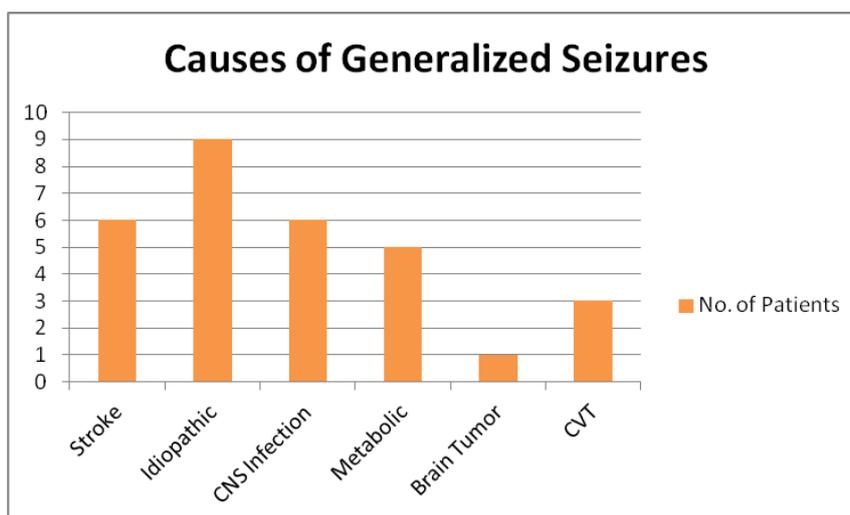


**AGE WISE DISTRIBUTION OF TYPE OF SEIZURE:** Of the 9 patients who were aged above 60 years, 6 had focal seizures (66.6%) and 3 had generalized seizure(33.3%).

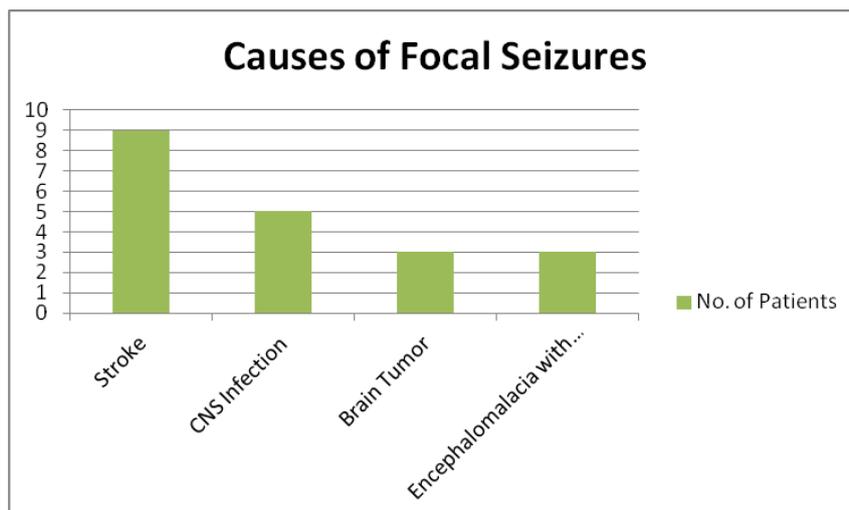
**ETIOLOGY OF SEIZURE:** While searching for the etiology, 15 patients had stroke,11patients had CNS infections,4 patients had intracranial space occupying lesions and 3patients had cortical venous thrombosis.Of the remaining patients,6 patients had metabolic causes, 3 patients hadencephalomalacia and 9 patients were classified as idiopathic . **Illustration Fig.4**



**ETIOLOGY OF GENERALIZED SEIZURES:** Out of the 30 patients who presented with generalized seizures, 6 patents had stroke, 9 patents had idiopathic causes, 6 patients had CNS infections, 5 had metabolic cause, 1 had brain tumor and 3 had cortical venous thrombosis. The most common etiology for generalized seizures was stroke followed by idiopathic, metabolic, infections, cortical venous thrombosis and tumors. **Illustration Fig. 5**



**ETIOLOGY OF FOCAL SEIZURES:** Out of the 20 patents who presented with focal seizures, 6 patients had stroke ,7patients had CNSinfections,2 patients had brain tumors , 3patients had encephalomalacia with gliosis,1patient had hypoglycemia and another patient had mesial temporal sclerosis. **Illustration Fig.6**



**ETIOLOGY OF STATUS EPILEPTICUS:** 8 patients [16%] presented with status epilepticus, 3 patients had metabolic causes 3 patients had stroke, 1 patient had brain tumor and 1 patient had CNS infection.

**AGE WISE DISTRIBUTION OF ETIOLOGY OF SEIZURE**

Idiopathic seizures were common in below 20 years (3 patients) and in the 22-40 years group (4 patients). CNS infections were common in 20-40 years (8 patients) and in 40-60 years (3 patients). 3 cases of cortical venous thrombosis for found in 20-40 age group. Stroke was present in 5 patients in the 20-40 years age group, 7 patients in 40-60 age group and 3 patients above 60 years. 2 patients had brain tumors in the 40-60 age years group and 2 patients with tumors were above 60 years.

**DISTRIBUTION OF SEIZURES IN CNS INFECTIONS**

Out of 11 patients who had presented with CNS infections. 6 (45.5%) of them had CNS tuberculosis, 3 (27.7%) had neurocysticercosis and 2 (18.8%) had viral meningoencephalitis and 1 (9.09%) had brain abscess.

**DISTRIBUTION OF METABOLIC CAUSES OF SEIZURES**

Among 6 cases with metabolic disturbances, 2 had alcoholic withdrawal and hypoglycemia 2 had hyponatremia 1 had hypocalcemia and 1 had uraemic encephalopathy.

**EEG**

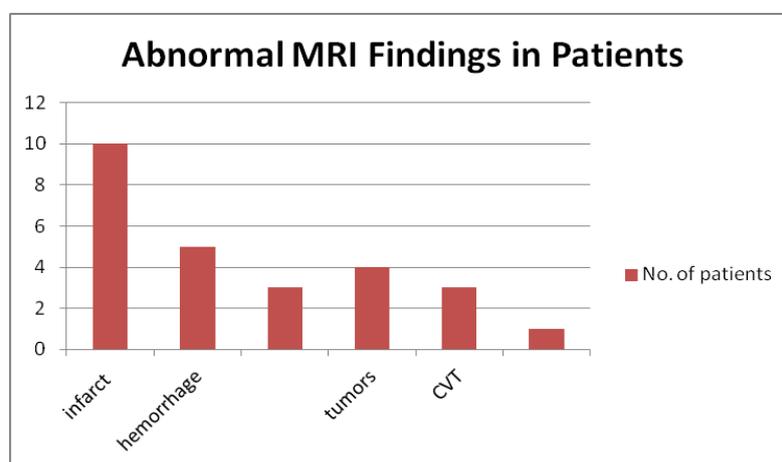
Electroencephalogram was done in all patients. It was abnormal in 23 patients.

**CT SCAN HEAD**

Computed tomography of head was done in all cases and it was normal in 20 patients among the abnormal CT findings noted in 40 patients. There were infarcts in 8 patients, tumor in 4 patients encephalomalacia in 3 patients, ring enhancing lesions in 8 patients.

**MRI**

MRI was done in all patients. In 11 patients it was normal. The following abnormalities were noted in the remaining patients, infarct 10 patients, encephalomalacia with gliosis 3 patients, intracranial hemorrhage in 5 patients, tumors in 4 patients, cortical venous thrombosis in 3 patients and mesial temporal sclerosis in 1 patients. **Illustration Fig. 7**



## **V. Discussion :**

**GENDER :** In our study, there were 50 patients out of which 32 were male and 18 were females. There was a male preponderance with a male to female ratio of 1.7:1. Ravindar Garg et al as reported a male to female ratio of 1.85:1<sup>1</sup> in his study and Sendhil et al has described a male to female ratio of 1.63:1<sup>7</sup> in his study.

**AGE :** In our study 8% of our patients were below 20 years, 40% were between 20 and 40 years, 34% were between 40-60 years and 18% were above 60 years. So majority of the patients belonged to the age group 20-40 years. In the studies by Ravindar Garg et al<sup>1</sup> and Chalasani et al<sup>8</sup> and Saha et al<sup>9</sup> incidence of patients below 40 years have been 47%, 46.9% and 40% respectively.

**TYPE OF SEIZURE :** When the seizures were classified as per ILAE classification, generalized seizures was the predominant seizure type present 60% of the patients. A similar predominance of GTCS has been observed in the studies of Narayan and Moorthy et al<sup>10</sup> and Kanitkar et al<sup>11</sup> respectively in their studies.

**AGE WISE DISTRIBUTION OF TYPE OF SEIZURE :** In the age group above 60 years the incidence of focal seizures was 66.6% compared to generalized seizures whose incidence was 33.3%. So our observation was that as age advances, the incidence of focal seizures was increasing as predominant seizure type when compared with generalized tonic clonic seizures similar observation has been reported by other studies Sendhil et al<sup>7</sup> & Hirani et al<sup>12</sup>. This increased incidence of focal seizures in the elderly may be due to the increased incidence of stroke and brain tumors in this population.

**ETIOLOGY OF SEIZURE:** In our study cerebrovascular accidents [30%] were the common cause of seizures followed CNS infections. (22%) idiopathic (14%), metabolic (6%), brain tumors (8%), encephalomalacia with gliosis (6%) cortical venous thrombosis (6%) and mesial temporal sclerosis (2%). Kanitkar et al<sup>11</sup> has reported that stroke was the commonest cause of seizure constituting about 40% in his study. The incidence of the other etiologies in that study were as follows, metabolic (26%), idiopathic (16%), CNS infections (10%) and tumors (8%) respectively.

### **ETIOLOGY OF GENERALIZED SEIZURES**

In our study, the most common cause for generalized seizures was stroke (18%) followed by idiopathic (14%), metabolic (10%) and CNS infections (8%). Quraishi et al<sup>13</sup> in his study has reported an incidence of 29.7% of patients respectively for both stroke and CNS infections<sup>14</sup>.

### **ETIOLOGY OF FOCAL SEIZURES**

When patients with focal seizures in our study were analyzed, the most common cause was CNS infections (14%) followed by stroke (12%), brain tumors (4%) and mesial temporal sclerosis (2%) Gurugobindsingh et al<sup>14</sup> and Sentil et al<sup>7</sup>

### **ETIOLOGY OF STATUS EPILEPTICUS**

Among 8 patients (16%) who presented with status epilepticus, 3 patients each (37.5%) had metabolic causes and stroke as their etiology and 1 patient had CNS infection (12.5%) and another had brain tumor (12.5%) respectively. The incidence of metabolic causes was 35.3% in the study by Gurugobindsingh et al<sup>14</sup> and Sendil et al<sup>7</sup>.

### **AGE WISE DISTRIBUTION OF ETIOLOGY OF SEIZURE**

The causes of seizures were analyzed separately in different age groups. In the age group below 20 years, idiopathic causes with epilepsy were most common. CNS infections were common in patients below 40 years. Stroke is a major cause of seizures after 40 years. Brain tumors were equally prevalent in the age group 40 – 60 and above 60 year age group. Cortical venous thrombosis was prevalent in the age group 20-40 years. In the study by Quraishi et al<sup>13</sup>, the most common causes of seizures in 15-20 years of CNS infections (77.8%) and also between 21-30 years (57.1%) Stroke was the most common cause of seizure in the age group 40-60 years in the same study.

### **DISTRIBUTION OF SEIZURES IN STROKE**

Out of the 15 patients with stroke, 10 patients (66.6%) had ischemic stroke and 5 patients (33.3%) had hemorrhagic stroke. Of the 10 patients with ischemic stroke, 5 had generalized seizures and 5 had focal seizures (almost an equal incidence of 50% each). But out of the 5 patients with hemorrhagic stroke, 4 patients (80%) had generalized seizures and 1 patient (20%) had focal seizure. Guru Gobind Singh et al<sup>14</sup> and Sentil et al<sup>7</sup>, the incidence of focal seizures in ischemic stroke are 78.3% and 83.3% respectively. Similarly the incidence of seizures in the hemorrhagic stroke group of Guru Gobind Singh et al<sup>14</sup> was 60%.

### **DISTRIBUTION OF SEIZURES IN CNS INFECTIONS**

Out of 11 patients who had presented with CNS infections. 6 (45.5%) of them had CNS tuberculosis, 3 (27.7%) had neurocysticercosis and 2 (18.8%) had viral meningoencephalitis and 1 (9.09%) had brain abscess. Kanitkar et al as reported an incidence of 60% CNS tuberc tuberculosis. And 40% of neurocysticercosis in his study<sup>11</sup>. In another study by Quraishi et al the incidence of CNS tuberculosis, neurocysticercosis, meningoencephalitis are 36.8%, 31.5% and 10.5% respectively<sup>13</sup>.

### **DISTRIBUTION OF METABOLIC CAUSES OF SEIZURES**

Among 6 cases with metabolic disturbances, 2 had alcoholic withdrawal and hypoglycemia (33.3%) 2 had

hyponatremia (33.3%). 1 had hypocalcaemia (16.6%) and 1 had uraemic encephalopathy (16.6%) . Kanitkar et al has reported that majority of the metabolic causes of seizures in his study was alcoholism (31 %) <sup>11</sup>.

#### **EEG**

Electroencephalogram was abnormal in 23 (46%) patients. Studies by Kanitkar et al <sup>11</sup>, Hirtz et al <sup>15</sup>. and Sendil et al <sup>7</sup> have shown the incidence of abnormal EEG as 42%, 42% and 32% respectively.

#### **CT SCAN HEAD**

Computed tomography of head was done in all cases and it was normal in 10 patients. Among the abnormal CT findings noted in 40 patients : there were infarcts in 18 %, tumor in 8% encephalomalacia in 6% , ring enhancing lesions in 16%. Hirani and Shrivastva <sup>12</sup> has reported in a study the incidence of various findings as normal CT 40%, infarct 16%, ring enhancing lesions 12%, tuberculoma 12%, brain tumor 8%, intracranial hemorrhage 8% and brain abscess 2%, Similarly Sinha et al <sup>16</sup> has observed has reported in his study the following findings, normal CT (40.7%), infarct (22%), Intracranial hemorrhage (9%), Tumors (7%) respectively.

#### **MRI**

MRI was done in all patients. In 30 patients it was normal. The following abnormalities were noted in the remaining patients, infarct (20%), encephalomalacia with gliosis (6%), intracranial hemorrhage in 10 patients, tumors in 4 patients, cortical venous thrombosis in 3 patients and mesial temporal sclerosis in 1 patients. Pannag and Ravi et al <sup>17</sup> in their study a reported the following findings MRI normal 46%, ischemia and hemorrhage (20%), tuberculoma (9.7%), tumor (9%), Mesial temporal sclerosis (3%) and neurocysticercosis (2.4%). Similarly in the study by Sinha et al <sup>16</sup> the following findings were noted. Normal MRI (44.2%), infarct (16.3%), intracranial hemorrhage (14%), tumor (11/6%), calcified granulomas (7%), NCC (4.6%), gliosis (2.3%) respectively.

Limitation of the study : sample size is 50 and consists of patients admitted in neuro medicine ward. One of the important cause of seizures in the young people is head trauma. Traumatic brain injuries are usually admitted in surgery and neuro surgery wards and hence they are not included in the study.

## **VI. Conclusion**

There was male preponderance in our study. Maximum number of patients were in the 20-40 age group. Generalized tonic clonic seizures were present in majority of the patients. As age advances the incidence of focal seizures was found to increase. Stroke was the the most common cause for adult onset seizures. This was followed by CNS infections, idiopathic seizures, metabolic causes, brain tumors and cortical venous thrombosis. MRI was normally 30% of the patients. It is very essential to take a detailed history, and proper physical examination in all patients. In addition all patients must undergo relevant investigations including EEG, CT Scan head and MRI. This will help in finding out the exact etiology of seizures and help in better management.

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