



New Onset of Seizures in Patients Age More than 40 yrs

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ABSTRACT

Seizures could be motor, sensory, autonomic, or psychic events although in practice, when a patient presents to a health care system with a seizure it is usually a convulsive (motor) seizure, either generalized or focal. Cumulative observations of many clinical investigators, along with adjunctive neurophysiological, imaging and genetic tools created a well-accepted diversity in the etiologies of seizures in various age groups. Interestingly, the highest incidence of seizures occur in early childhood and late adulthood. In older adults and elderly the frequent causes are cerebrovascular disease, brain tumors , alcohol withdrawal , metabolic disorders , degenerative diseases

AIM OF THE STUDY

To study the etiologic profiles of first onset seizures in patients aged more than 40 years of age. To analyze the age / sex distribution, presenting history, clinical findings and investigations at admission in the study group

MATERIALS AND METHODS

The study was done in the setting of the Institute of Internal Medicine. The study was observational in nature designed to analyze patients in age group more than 40 years of age and who presented with first onset-seizures.

RESULTS

- Generalized seizures (71%) were the most common seizure type encountered in the study.*
- Cerebrovascular accidents were the most frequent etiology for the first onset seizure after forty years of age in this study.*

- CVA, tumors, metabolic causes and alcohol withdrawal formed 80% of the etiology of seizures*

INTRODUCTION

Seizures have been recognized since antiquity. One of the earliest descriptions¹ of a secondarily

generalized tonic-clonic seizure was recorded over 3000 years ago in Mesopotamia, which was attributed to the god of the moon. The word seizure is derived from Latin word "sacire",

meaning, "to take possession of" indicating that the person having a seizure is possessed or at least out of control². The clinical symptoms in seizures could be motor, sensory, autonomic, or psychic events although in practice, when a patient presents to a health care system with a seizure it is usually a convulsive (motor) seizure, either generalized or focal. Cumulative observations of many clinical investigators, along with adjunctive neurophysiological, imaging and genetic tools created a well-accepted diversity in the etiologies of seizures in various age groups. Interestingly, the highest incidence of seizures occur in early childhood and late adulthood. In older adults and elderly the frequent causes are cerebrovascular disease, brain tumors, alcohol withdrawal, metabolic disorders, degenerative diseases and idiopathic. With aging population growing in our nation, thanks to improved medical infrastructure, a growing number of elderly people will be seeking attention to our health care system. This study is to analyze the seizures occurring in age the group of more than 40 years.

REVIEW OF LITERATURE

Historical aspect⁴

Basic concepts surrounding seizures and epilepsy are found in ancient Indian medicine which dates back to Vedic period of 4500-1500BC. In the Ayurvedic literature of Charaka Samhita, seizures were identified and epilepsy was described as "apasmara" which means "loss of consciousness". Working in Germany during the 1920s, Hans Berger, a psychiatrist, developed the human electroencephalograph. Another recent stimulus towards the understanding and treatment of seizures in the last few decades has been the development in neuroimaging. Such technology has revealed many of the more subtle brain lesions responsible for seizures.

Background:

Many diseases can cause paroxysmal clinical events. The correct diagnosis of the

paroxysmal event is necessary to provide correct treatment. If the event is an epileptic seizure, the seizure type and associated clinical, electroencephalographic (EEG), and neuroimaging findings assist in determining the risk of seizure recurrence and the possible need to begin anticonvulsant therapy

Definitions of Terms

[as per the International League Against Epilepsy (ILAE) Guidelines

(Jallon, 1993; Roger, 1989).] 10

A **nonepileptic event** is a clinical event presumed to be unrelated to abnormal and excessive neuronal discharge. An example of a nonepileptic event is syncope.

An **epileptic seizure** is a clinical event presumed to result from an abnormal and excessive neuronal discharge. The clinical symptoms are paroxysmal and may include impaired consciousness and motor, sensory, autonomic, or psychic events perceived by the subject or an observer.

A **provoked seizure** is an acute symptomatic seizure that occurs following a recent acute disorder such as a metabolic insult, toxic insult, CNS infection, stroke, brain trauma, cerebral hemorrhage, medication toxicity, alcohol withdrawal, or drug withdrawal.

An **unprovoked seizure** is a cryptogenic or a remote symptomatic seizure.

Epilepsy occurs when 2 or more epileptic seizures occur unprovoked by any immediately identifiable cause. The seizures must occur more than 24 hours apart. In epidemiologic studies, an episode of status epilepticus is considered a single seizure. Febrile seizures and neonatal seizures are excluded from this category.

Frequency:

A first seizure is a sudden frightening event for the individual, onlookers and family

members. Available data^{5,6}. on an individual's lifetime risk of developing one episode of non-febrile seizures is at least 4% (THE LANCET . vol 352 . sep 26,1998) A first seizure caused by an acute disturbance in brain function (acute symptomatic or provoked) is unlikely to recur (3 to 10 %). If a seizure is unprovoked, however, meta-analysis suggests that 30 to 50 % will recur; and after a second unprovoked seizure, 70 to 80 % recur, justifying the diagnosis of epilepsy^{7,8,9}. (BMJ vol 332 11 feb 2006)

Race:

Racial differences have not been studied^{5,6}.

Sex:

Most authors report a small-to-moderate preponderance of men in their studies of first seizures in adults (van Donselaar²⁰, 1992; Musicco²⁸, 1997; Hopkins¹⁸ 1988; King²⁹ 1998).

Age³

In practice it is useful to consider the etiologies of seizures based on age of the patient, as age is one of the most important factors determining both the incidence and likely causes of seizures.

Causes for seizures in Neonates:

- Perinatal Hypoxia and Ischemia, Intracranial Hemorrhage and trauma, Acute CNS Infection, Metabolic disturbances, Drug Withdrawal, Genetic Disorders .

Causes for seizures in Infants and Children:

- Febrile seizures, Genetic Disorders, Developmental Disorders, Trauma, Idiopathic

Causes for seizures in Adolescents:

- Trauma, Genetic Disorders, Infection, Tumor, Illicit drugs, Idiopathic

Causes for seizures in young adults:

Trauma, Alcohol Withdrawal, Illicit drug use, Tumor, Idiopathic.

Causes for seizures in older adults:

Cerebrovascular disease, Brain tumor, Alcohol withdrawal, Metabolic disorders, Degenerative diseases, Idiopathic

CLASSIFICATION OF SEIZURES

Seizures are divided into two broad categories--generalized and partial. Generalized seizures arise from both sides of the brain simultaneously. Partial (ie, focal) seizures occur within one or more restricted regions of the brain and are a secondary effect of a localized physiologic or structural abnormality of the brain (eg, tumor, dysplasia, stroke, trauma).

International League Against Epilepsy Revised Classification of Epileptic Seizures

1. Partial (focal, local) seizures:

A. Simple - motor, somatosensory, autonomic, psychic

B. Complex

a. Impaired consciousness at outset

b. Simple partial followed by impaired consciousness

C. Partial seizures generalized tonic-clonic (GTC)

a. Simple to GTC evolving to

b. Complex to GTC

2. Generalized seizures (convulsive or non-convulsive)

a. Absence seizures

b. Atypical absences

B. Myoclonic

C. Clonic

D. Tonic

E. Tonic-clonic

F. Atonic

G. Combinations

3. Unclassified epileptic seizures

Evaluation of a first seizure¹¹

The first step in evaluating a suspected seizure is to determine whether the event was, in fact, a seizure. Syncope is often mistaken for an epileptic seizure. During many syncopal episodes, clonic or myoclonic jerks occur in the distal portions of the extremities. Convulsive syncope occurs when there is severe or prolonged reduction of blood flow to the brain, resulting in an event resembling tonic-clonic seizure. Diagnosis is based on possible provocative factors in the medical history (eg, pain, dehydration), physical examination (eg, orthostatic blood pressure check), and studies such as electrocardiography and tilt table testing¹².

Another common imitator of epileptic seizure is the nonepileptic psychogenic seizure. No single feature reliably differentiates the two disorders. However, many ictal features of nonepileptic psychogenic seizure are uncommon in epileptic seizures¹³. For example, such features as gradual onset, stopping and restarting of motor activity, out-of-phase clonic movements of the extremities, vocalization in the middle of the seizure rather than at the start, pelvic thrusting, and lack of body rigidity are more common in psychogenic seizures than in tonic-clonic seizures. In addition, the typical duration of a tonic-clonic seizure is 50 to 92 seconds, whereas the range for psychogenic seizures is 20 to 805 seconds¹³. Furthermore, some epileptic seizures have symptoms that are frequently misdiagnosed as psychogenic. Frontal lobe complex partial seizures often last less than 1 minute and sometimes include rocking, kicking, "bicycling," pelvic thrusting, genital manipulation, and cursing. Their lack of postictal symptoms also makes frontal lobe seizures difficult to differentiate from psychogenic seizures. Other NonEpileptic Paroxysmal Events:mic epileptic

seizure Migraine (classic [with auras], basilar, confusional) Cerebrovascular event (transient ischemic attack) Periodic paralysis Sleep disorders (parasomnias, daytime amnesic episodes) Gastrointestinal disorders (reflux, motility disorders) Movement disorders (tics, Tourette's syndrome, nonepileptic myoclonus, paroxysmal choreoathetosis, shuddering attacks) Psychiatric disorders (panic, somatization, dissociation, conversion [nonepileptic psychogenic seizures])

Drug toxicity and substance abuse ,Breath-holding spells

History of the event¹¹

A description of the circumstances surrounding a paroxysmal event can provide important diagnostic clues. A witnessed, 90-second episode that involved loss of consciousness, stiffening, and jerking of the extremities followed by muscle soreness, headache, and the need to sleep for several hours afterwards strongly suggests a tonic-clonic seizure

A review of the events leading up to the seizure may reveal factors that suggest it was provoked. Causes of provoked seizures include alcohol withdrawal, substance abuse, hypoxia, fever, electrolyte imbalance, hypoglycemia, and sleep deprivation.

Drug history

Theophylline, meperidine hydrochloride, isoniazid, antipsychotic drugs (especially clozapine and phenothiazines), radiocontrast dyes, alkylating agents and β -lactam antibiotics are among the most commonly implicated medications in seizure. However, many other drugs can cause seizure, including lidocaine hydrochloride, general anesthetics, tricyclic antidepressants, selective serotonin reuptake inhibitors, bupropion hydrochloride, acyclovir, β -blockers, and decongestants (eg, phenylpropanolamine

hydrochloride). Also, seizures can be provoked by alcohol withdrawal as well as use of cocaine.

During an emergency department evaluation of a patient immediately after a seizure, vital signs should be measured and a general medical examination performed. Guidelines for physical examination are as follows:

- Examine the patient for injuries from the seizure or fall.
- Check oxygen saturation and auscultate the chest for possible aspiration.
- Measure heart rhythm and rate, blood pressure, and orthostatic changes for assessment of syncope.
- Auscultate for carotid murmurs or carotid bruits and sources of embolic stroke.
- Check for rapid pulses, which are often present after seizure and may help in evaluation of psychogenic seizures.

An electrocardiogram should be obtained to identify cardiac rhythm, detect possible ischemia, and measure the QT interval. Prolonged QT syndrome often presents with simple or convulsive syncope. Electrocardiography and 24-hour ambulatory continuous electrocardiographic (Holter) monitoring can help identify cardiac arrhythmias. The possibility of a recent myocardial infarction should be considered, particularly in elderly patients, in whom myocardial infarction may occur from the stress of a seizure.

Neurologic examination

The purpose of the neurologic examination is to identify focal or diffuse cerebral dysfunction. This information is particularly helpful in localization-related epilepsy. The presence of various features offers clues to the focus of a seizure. For example, aphasia suggests a left frontal, temporal, or parietal onset. Right or left hemiparesis suggests foci from the contralateral motor cortex. In initial evaluation of a seizure, patients should be

observed for fluency of language, facial asymmetry, gaze preferences, and pupillary asymmetry. The last presents in patients who have herniation from brain swelling caused by parenchymal or epidural bleeding and in those who have a rapidly growing brain tumor. The presence of pronator drift may indicate subtle weakness not detected by strength testing. Sensory deficits suggest parietal lobe dysfunction. An extensor plantar response may be noted for some time after a seizure and is not necessarily a pathologic finding.

Diagnostic testing

Laboratory workup is an essential part of evaluation of seizure. Measurement of glucose, calcium, magnesium, thyroid hormone, and liver enzyme levels, as well as toxicology screening (including blood alcohol levels), may reveal common medical causes of seizures. A complete blood cell count may suggest infection, anemia, or sickle cell disease. In patients suspected to have had an infection or a fever or to have exhibited abnormal behavior just before the event, lumbar puncture should be performed after assessment of the possible risks of the procedure (eg, coagulopathy, mass lesion). Patients who are immunocompromised because of corticosteroid use, recent transplantation or HIV infection should undergo cerebrospinal fluid evaluation to detect possible fungal, bacterial or viral infection. In patients with a systemic malignant condition, cytologic evaluation of cerebrospinal fluid can identify meningeal carcinoma.

Electroencephalogram:

- EEG should be performed within 24 hours of the seizure because it is significantly more sensitive when obtained during that period (King, 1998). If the routine EEG findings are normal, a sleep-deprived EEG should be performed.

- Standard EEG detects epileptiform discharges in 29% of patients. Standard EEG combined with sleep-deprived EEG shows epileptiform discharges in 48% of patients (van Donselaar, 1992)20. In 2000, Simpson et al described a case in which the placement of an insertable loop recorder, an important new tool in the diagnostic evaluation of patients with syncope, led to an unexpected diagnosis of a seizure. Whenever cardiovascular causes are considered as the cause of a patient's spells but cannot be proven with conventional investigations, the use of the insertable loop recorder should be considered.

- Schreiner and Pohlman-Eden studied the value of an EEG taken within 48 hours of the first seizure in an adult. They found that 38.0% of patients without seizure recurrence had normal EEGs, while only 10.2% of patients with seizure recurrence had normal EEGs. Focal epileptiform activities were found significantly more frequently (26.5% vs. 13.0%) in patients with seizure recurrence than in patients without seizure recurrence.

Limitation of EEG³⁰:

An estimated 0.4% of adults and 2.8% of children who have never had a seizure may have interictal epileptiform discharges . Furthermore, a normal EEG does not refute the diagnosis of epilepsy. The initial EEG reveals epileptiform activity in only 40% of the patients with probable epilepsy.

Imaging studies

The role of imaging studies depends on the stage of evaluation. Immediately after a seizure, computed tomography can detect the presence of bleeding or gross structural lesions. However, magnetic resonance imaging is the study of choice because it is more sensitive and specific for evaluating structural lesions and brain parenchyma. Particular attention should be directed to the hippocampus for evaluation of lesions (eg, mesial temporal sclerosis) and to the

cortical architecture for detection of abnormalities (eg, dysplasia).

Are Antiepileptic drugs needed after a first seizure? ¹⁴

Drug treatment after first seizure is controversial. Too large recent randomized studies of children and adults compared antiepileptic drugs with, no treatment after a first seizure and came to an identical conclusion. Any decision to start treatment must weigh the risk of another seizure against the risks of side effects from chronic drug treatment. Risk factors for recurrent seizures include the following¹⁵

- o Age younger than 16 years: Musicco et al found that children younger than 16 years had almost double the risk of recurrent seizures as adolescents and adults aged 16-60 years (Musicco16,1993).

- o Remote symptomatic seizure (Annegers, 1986; Hauser, 1990; Berg17, 1991): In the case of seizures after a first stroke,

Labovitz et al found that lesion location and stroke subtype are strong predictors of early seizure risk, and early seizures are a predictor of recurrent seizures (Labovitz31, 2001).

- o Seizures occurring between midnight and 8:59 am (Hopkins18, 1988; Martinovic, 1997; Bora, 1995)

- o Prior provoked seizures (Hauser19, 1990)

- o Remote symptomatic seizure in a patient whose sibling is affected with epilepsy (Hauser19, 1990)

- o Status epilepticus or multiple seizures within 24 hours as the initial remote symptomatic seizure (Hauser19, 1990)

- o Partial seizures (Annegers, 1986; Berg, 1991)

- o Todd paralysis in patients with a remote symptomatic seizure (Hauser, 1990)

- o History of neurological deficit from birth such as cerebral palsy

- o mental retardation (Annegers17, 1986)
- o Abnormal examination findings in patients without a remote symptomatic seizure (Annegers, 1986; Camfield26, 1985)
- o CT scan that shows a brain tumor (Hopkins, 1988)
- o EEG that shows epileptiform discharges

☐ In patients with a first seizure and no known etiology, van Donselaar obtained a routine EEG in all cases and a second sleep-deprived EEG if the first EEG did not show epileptiform discharges. His pooled results showed the following 2-year cumulative risks of seizure recurrence: in patients with epileptiform discharges, 83%; in patients with nonepileptiform abnormalities, 41%; and in patients with normal EEGs, 12% (van Donselaar20, 1992).

☐ In 1997, Beghi et al22 found that epileptiform discharges were associated with a 1.5- to 3-fold increase in the risk of seizure recurrence.

☐ In 1993, Musicco et al16 found that epileptiform discharges were associated with a 1.7-fold increased seizure recurrence risk.

☐ Berg and Shinnar found that epileptiform discharges were associated with a 2-fold increased seizure recurrence risk (Berg21, 1991).

☐ In 1990, Hauser et al19 found that generalized spike and wave increased the risk of recurrent seizure in patients with no known etiology. In 1997, Beghi et al22 found that an abnormal EEG finding and the presence of an underlying etiology (remote symptomatic) are the most consistent predictors of recurrence.

If drug treatment is considered , which drug is preferred ?

If drug treatment is considered after first seizure, the chosen antiepileptic drug should have high efficacy, good tolerability and low interaction potential and allow a good quality of life, especially since half of all patients would never have another seizure without treatment. The

starting dose should be in the lower range .If an underlying epilepsy syndrome has been established, the following antiepileptic drugs are available³.

GTCS Partial Absence Myoclonic,

| | GCTS | PARTIAL | ABSENCE | MYOCLONIC |
|-------------|------------------------------|-----------------------------|-------------------------------|---------------------------|
| FIRST LINE | VALPROIC ACID LAMOTRIGINE | CARBAMAZEPINE PHENYTOIN | VALPROIC ACID ETHOSUXIMIDE | VALPROIC ACID |
| ALTERNATIVE | PHENYTOIN CARBAMAZEPINE | TOPIRAMATE LEVETIRACETAM | LAMOTRIGINE CLONAZEPAM | LAMOTRIGINE TOPIRAMATE |

Further Inpatient Care:

- Many patients who have a seizure recover spontaneously and fully with normal consciousness after a short time interval. Patients with incomplete recovery or a prolonged postictal state may require inpatient hospitalization (Moore-Sledge23, 1997).
- Inpatient management may be necessary if the clinical course is complicated by other medical problems requiring inpatient management. A short hospitalization may be necessary for patients who are at risk of recurrent seizures and have no adequate supervision at home. Patients admitted from an emergency department had a 16.8% risk of an early recurrent seizure during their brief hospitalization (Tardy24, 1995). This risk of early recurrent seizures was higher than reported in other studies (Hauser, 1990; Musicco, 1993; Annegers, 1986).

Summary

The first step in evaluation of a presumed seizure is to determine whether the event was indeed a seizure and which diagnostic studies are needed. The second step is to correctly diagnose the

seizure on the basis of the medical history and findings from the physical, neurologic, and laboratory evaluation. The third step is to decide whether drug treatment is necessary. Every paroxysmal event is unique, and not every seizure needs to be treated. When treatment is deemed appropriate, an antiepileptic drug should be chosen after consideration of the risk-benefit profile of the available agents.

AIM OF THE STUDY

To study the etiologic profiles of first onset seizures in patients aged more than 40 years of age. To analyze the age / sex distribution, presenting history, clinical findings and investigations at admission in the study group.

MATERIALS AND METHODS

The study was done in the setting of the Institute of Internal Medicine. The study had collaborations with the Institutes of Biochemistry, Pathology, Radiology and Microbiology.

The study was observational in nature designed to analyze patients in age group more than 40 years of age and who presented with first onset seizures. The sample size was 68.

INCLUSION CRITERIA

- Patients who presented with first onset seizures over the age of 40 years admitted in our medical unit.
- Inpatients who developed first seizure in this hospital.
- Time between seizure and presentation to us within 15 days.

EXCLUSION CRITERIA

- History of trauma
- History of ingestion of toxins.

Clinical data was collected from patients and witnesses in a systematic manner and added

to a database, which included a checklist of seizure antecedents and the symptoms associated with seizure.

The first task was to ascertain if at all, the presenting complaint is a seizure. In a few instances, even when the presenting history was ambiguous seizure recurrences were witnessed for confirmation. The clinical diagnosis on the seizure type, whether partial or generalized was made. In-depth probes in the history for provocation factors and features suggesting organicity were attempted. Significant past medical history if any were noted. A thorough clinical examination was performed at the time of admission and relevant findings recorded. A routine metabolic screening, which included blood sugar, urea, serum creatinine, electrolytes and liver function tests (if indicated), were done at the time of admission. Lumbar puncture and CSF analysis was done if infective etiologies were suspected.

Earliest possible EEG was attempted and was performed using 32 channel digital EEG recorder.

CT brain plain study in all patients and contrast studies when necessary were done in all patients in the study group. MRI brain was done when indicated. Limitations were encountered in affordability of patients for MRI scanning. Early EEG (within 24 hours of onset of seizures) could not be performed due to delay in referral of the patients to this institution and because of the time taken for stabilizing patients. EEG could not be done in some cases owing to emergency surgical interventions.

OBSERVATION

Seizures in 68 patients in the age group of 40 to 82 are studied; of which 42 are males and 26 are females.

Table 1 sex distribution of patients

| Sex number | percentage |
|------------|------------|
| Male | 42 (62%) |
| Female | 26 (38%) |

Table 2 shows the distribution of various age group in the study.

| Age group | percentage |
|-----------|------------|
| 40 – 50 | 20% |
| 50 – 60 | 34% |
| 60 – 70 | 38% |
| 70 – 80 | 06% |
| > 80 | 02% |

The seizures are grouped as per international league against epilepsy-revised classification of epileptic seizures as partial seizures and generalized seizures. (A partial seizure with secondary generalization was found in 10% of the study group).

Table 3 seizure types found in the study

| Seizure type (%) | Number of patients |
|------------------|--------------------|
| Generalized | 48 (71%) |
| partial | 20 (29%) |

Table 4 coexistent non convulsive symptoms at admission

| Symptoms | frequency |
|---------------------|-----------|
| Limb weakness | 68% |
| Headache | 43% |
| Fever | 25% |
| Vomiting | 21% |
| Inability to talk | 21% |
| Visual disturbances | 15% |

Table 5 observation in history for organicity of seizures

| History suggestive of organicity | Frequency |
|----------------------------------|-----------|
| Post ictal confusion | |

| | |
|------------------------------|-----|
| 63% | |
| Frothing of saliva | 38% |
| Seizures during sleep | 21% |
| Bladder / bowel incontinence | 19% |
| Tongue biting | 04% |
| Bodily injuries | 04% |

Table 6 enumerates the profiles of significant past medical history

observed in this study.

| Past medical history | No of patients |
|--------------------------------|----------------|
| Diabetes | 11 |
| Hypertension | 11 |
| Both diabetes and hypertension | 03 |
| Renal failure | 02 |
| Liver disease | 01 |
| Pulmonary tuberculosis | 03 |
| Heart disease | 06 |

During an emergency evaluation of patients at admission vital signs were monitored which revealed 16% of patients were hemodynamically unstable.

Neurological examination revealed abnormality in 68% of patients.

Table 7 Spectrum of neurological signs at admission

| | |
|-------------------------------|-----|
| Motor system abnormalities | 48% |
| Altered sensorium | 39% |
| Signs of meningeal irritation | 19% |
| Cranial nerve abnormalities | 13% |
| In status epilepticus | 03% |
| Cerebellar signs | 02% |

Metabolic abnormalities at the time of admission were investigated, as they are among the most readily treatable causes of seizures. The

abnormalities in metabolic parameters were noted in 38% of patients in this study.

Table 8 Metabolic abnormalities in patients at admission

| Metabolic abnormality | Number of patients |
|-----------------------|--------------------|
| Hyponatremia | 12 |
| Hyperglycemia | 11 |
| Met Acidosis | 06 |
| Hypoglycemia | 04 |
| Renal failure | 03 |
| Hypokalemia | 06 |

Lumbar puncture and CSF analysis done in 14 patients suspected of meningitis or encephalitis revealed abnormality in three cases.

EEG was taken after stabilizing the patient and all were taken in the inter ictal period. EEG was done in 39 of the 68 patients (57%) in this study. Abnormalities were found in 18 of the 39 patients subjected to EEG.

The most common observed pattern in EEG was a diffuse slow wave pattern during the inter ictal period.

Table 9 .EEG in the study

| Total patients | Number of patients in whom EEG was done (%) | Number of Abnormal records In whom EEG was done (%) |
|----------------|--|--|
| 68 | 39(57%) | 18(46%) |

EEG patterns observed were

Normal, Diffuse slowing, Sharp discharges, Focal spike, Asymmetrical narrowing, Polyspikes and others.

Table 10 shows CT abnormalities in the study group

| CT findings | Number(%) |
|------------------|-----------|
| Cortical infarct | 19 |

| | |
|---------------------------------|----|
| (27%) | |
| Atropy 11 (16%) | |
| Parenchymal hemorrhage (6%) | 04 |
| Sub dural hemorrhage 04(06%) | |
| Tumors 09 (13%) | |
| Ring enhancing lesions (04%) | 03 |

Cortical atrophy was found in combinations with various other findings Radiologist opinion was obtained on all CT scans.CTscan brain was done in all the patients in the study group.

MRI scanning of brain could be done only in 26 patients of the study group. Besides improvement in details of CT findings MRI was helpful in uncovering lesions missed in CT.

Table 11 Etiology profiles in the study group with mean age of distribution

| ETIOLOGY | TOTAL PATIENTS % | % | MEAN AGE |
|--------------------|------------------|-------|----------|
| CVA | 27 | 39.70 | 60 |
| UNIDENTIFIABLE | 09 | 13.24 | 61 |
| METABOLIC | 09 | 13.24 | 61 |
| ALCOHOL WITHDRAWAL | 09 | 13.24 | 58 |
| GRANULOMA | 03 | 4.41 | 46 |
| ENCEPHALITIS | 03 | 4.41 | 59 |
| MENINGITIS | 04 | 5.88 | 43 |
| SUBDURAL HEMORRAGE | 04 | 5.88 | 67 |

Four of the 68 patients presented with status epilepticus.At least one recurrence in the month following first seizure was noted in 31 (46%) patients.

DISCUSSION

The study group comprised of 62% males and 38% females.

Most authors report a small-to-moderate preponderance of men in their studies of first seizures in adults (van Donselaar²⁰, 1992; Musicco, 1997; Hopkins¹⁸, 1988; King, 1998). A male to female ratio of 1.6: 1 is observed in this study, a trend noted in other studies.

Analyzing the age groups in this study the maximum incidence of first onset of seizures is found in the age interval of 60 to 70 years. Studies have shown that incidence of new onset seizures above age 65 is even higher than first year of life – 135 per 100000 vs. 79 per 100000 .

The mean age for most of the common etiologies in this study was around 61 and hence, the age of a given patient with new onset seizure does not favor any particular etiology. The less common etiologies in this study, granulomas and meningitis however occurred around 45 years of age. The highest mean age encountered in this study was for sub dural hemorrhage. After the episode of the first seizure, the nature of health care system first sought by the patient when analyzed showed that 76% sought to hospitals, as against 37% who sought to private practitioners. This is a trend towards more patients seeking institutionalized care after a first onset seizure.

The seizure type classified in this study as per International League Against Epilepsy-revised classification of epileptic seizures revealed generalized seizure in 71% and partial seizure in 29%.

Zhu PG studied new onset seizures in the ages between 20 and 80

revealed generalized seizures in 64% and partial in 30%. Retrospective study of Perez et al in 250 patients with late onset seizures revealed 59% generalized and 41% partial in nature.

The observation of seizure types in this study is almost similar to the above-mentioned studies. In contrary, a recent study of Prego-Lopez M, Devinsky O identified partial seizures as the most common seizure type in adults

Table 12 compares seizure type encountered in this study with various studies.

| SEIZURE TYPE | THIS STUDY | ZHU PG 33 | PEREZ Etal 34 |
|--------------|------------|-----------|---------------|
| Generalized | 71% | 64% | 59% |
| Partial | 29% | 30% | 41% |

The seizure typing in this study was entirely made with history.

The grey area in relying on history in classification of seizures is in the fact that the focal onset of a seizure is often missed and witnesses' attention is often drawn to the person only after an event becomes generalized. Limb weakness and headache were the most common non-convulsive symptom, which the patients / attenders complained at admission. Fever presented at admission in 25% of patients in this study. It is important here to reemphasize that fever is one of the provoking factors for seizures. Vomiting presented in 90% at the time of seizures in patients with tumors. Papilloedema was present in 20% of patients with tumors.

Post ictal confusion was the most frequent factor present in the history to suggest organicity. Seizures during sleep occurred in 35% of patients with tumors and 20% with CVA and in all patients with granuloma.

A history of alcohol intake, in most of the days of a week for more than ten years was present in 20% of patients. Previous history of diabetes was present in 11 patients, two of

whom presented with hypoglycemic seizures. Both of them were on glibenclamide and one of them was found to have renal failure. One patient

presented with seizures associated with a nonketotic hyper osmolar state.

Motor system abnormalities and altered sensorium were the most common neurological signs present at the time of admission. It was the motor system abnormality in clinical examination, which most frequently predicted an abnormality in the CT scan. Of the three patients admitted with status epilepticus two were found to have tumors and one had alcohol withdrawal seizures. Signs of meningeal

irritation were present in four patients with tumor etiologies and three patients with CVA besides presenting in all patients with meningitis. Sixth and seventh were cranial nerves comprised most of the cranial nerve abnormalities. In one patient with CP angle tumor multiple cranial nerve palsies were noted. The patient who presented with cerebellar signs was later found to have posterior circulation stroke . Metabolic abnormalities contributed to etiology in 13% of patients and most of them were readily treatable, hence a thorough search for these factors should be the early priorities. The most common metabolic abnormality was hyponatremia which was often encountered as an associated finding with other etiologies.

The study newly detected eight patients to have Type 2 diabetes, 11 to have hypertension and four to have both. Renal failure was detected in eight of the patients in the group.

EEG was done in 39(57%) of the 68 patients in the study. Abnormalities were found in 18(46%) of the EEG's done. The average period from the onset of seizure to the record of EEG was six days, owing to the late referral of patients to this institution and to the time taken to stabilize the patient before shifting to EEG room. The yield of abnormalities in the

EEG in this study could have been better if it were done more early or special methods such as

continuous EEGs and sleep deprived EEGs were adopted²⁰.

The most common abnormality in EEG was diffuse slowing of background activity. Anti-convulsant drugs slow the normal background rhythm in EEG3 and almost 80% of the patients in the study group were under the anti convulsant drugs when EEG was performed, which explains the predominance of diffuse slowing pattern in the EEG.

When the other investigations were inconclusive, "focal findings in the EEG originating from the temporal lobes" were recorded in two patients, which helped in the diagnosis of encephalitis.

CT scan was done in all patients in the study group, in which the abnormalities contributed to the etiologies in 43% of patients. Cerebral vascular accident (27%) was the most common abnormality present in the scan report but had no relevance with any etiology.

Abnormal CT findings in this study included atrophy (16%), tumors (8.8%), parenchymal hemorrhage (06%), granulomatous lesion (04%) subdural hemorrhage(03%),

CT findings in the study of new onset seizures by Sayette V³⁵ et al after the age of 50 found cerebral atrophy in 29%, CVA in 75%, tumors in 5%.The spectrum of CT findings is almost similar to our study except for the low incidence of tumors.

In the study of Zhu PG32, CT scan findings were compatible with CVA in 16% , tumors in 13% , atrophy in 7% and trauma in 8%. This study was done in age group ranging from 20 to 87 years. The inclusion of lesser age groups in this study explains the lower incidence of cerebral atrophy in CT scans.

Affordability was a limiting factor for MRI studies in the study group. MRI despite improving the descriptions of lesions already studied in CT

scans was instrumental in uncovering new lesions in nine of the patients in the study, in whom all other investigations were otherwise normal. The new lesions uncovered were tumors, encephalitis, infarcts and CVT in two patients each and granuloma in one patient.

Etiologic profiles revealed CVA, tumors, metabolic causes, and alcohol withdrawal seizures contributing to 66% in this study. CVA was the single most common etiology uncovered in this study.

Lesser and coworkers suggested that the acute and delayed post stroke seizures have different mechanism, the former related to “transient cytotoxic metabolic alterations” and latter to structural changes, especially extravasations of blood and deposition of iron. Tumors contributed to 8.8% of etiologies in this study. Of the 4 patients with tumors, two had primary CNS tumor against one patient diagnosed to have secondaries.

Tumor as etiology in older patients lies between 1% and 36% in various studies and the result of this study (8.8%) lies somewhere in the midpoint of this spectrum

In 13% of patients in this study, etiology could not be determined. This significant proportion of seizures in the elderly that remain idiopathic raises the possibility that age-related changes in the brain lower seizure threshold. Animal studies are consistent with such a possibility. For example, aged rats are more susceptible to kainite-induced seizures. Also these could be the cases of late onset epilepsies.

Hyponatremia, hypoglycemia, hyperglycemia and renal failure contributed to 13% of seizures in the study. They were the most readily treatable causes, especially those patients detected to have hypoglycemic seizures. Hence a review at the metabolic parameters at admission is mandatory and when detected is most rewarding for the treating physician.

History was the tell tale evidence in patients diagnosed to have alcohol withdrawal seizures which formed 10% of etiologies.

History was the tell tale evidence in patients diagnosed to have alcohol withdrawal seizures which formed 10% of etiologies Granulomatous etiology for first onset seizure was found in six percent of the study group. The significant point about this group was that their mean age of occurrence was the least in this study (46 years).

Meningitis and subdural hemorrhage in total contributed to nine percent of the total etiology. Both the meningitis in this study were of tuberculous etiology.

Unlike seizures in the young etiologies could be established in most of the new onset seizures in age above 40 years.

RESULTS

- The mean age of patients in the commonly encountered etiologies, in the study was around sixty years.
- The mean age of granulomatous etiology, was the least in this study.
- Generalized seizures (71%) were the most common seizure type encountered in the study.
- Limb weakness and headache were among the most common non-convulsive presenting symptom.
- In the clinical examination, motor system abnormality was the most consistent factor that predicted an abnormal CT scan.
- EEG, which was done in 57% of the patients in the study recorded abnormalities in 46%.
- Cerebrovascular accidents were the most frequent etiology for the first onset seizure after forty years of age in this study.
- Literature reveals a great diversity in the proportions of tumors forming etiology of seizures

in later ages (1% to 36%). This study established tumors as etiology in 8.8% of patients.

- CVA, tumors, metabolic causes and alcohol withdrawal formed 80% of the etiology of seizures.
- In this study, 11%(eight patients) mandated neuro-surgical intervention.
- Metabolic abnormalities contributed to etiology in 13% of patients.
- CT detected abnormal lesions in 42% of cases.
- MRI was instrumental in uncovering new lesions in nine patients.
- In this study, causes could not be identified for 13% of the patients.

CONCLUSIONS

- Unlike in young, most of the seizures in the age group studied, had their etiologies established. Hence, in a patient with new onset seizures more than 40 years, all efforts to identify the etiology should be made.
- Given the age of patients with a seizure more than forty years does not exceedingly favor any specific etiology.
- Thorough search to rule out metabolic factors as cause seizures should be an early priority.
- CT brain and MRI are indispensable in patients more than 40 years with new onset seizures.

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