

EPILEPSY



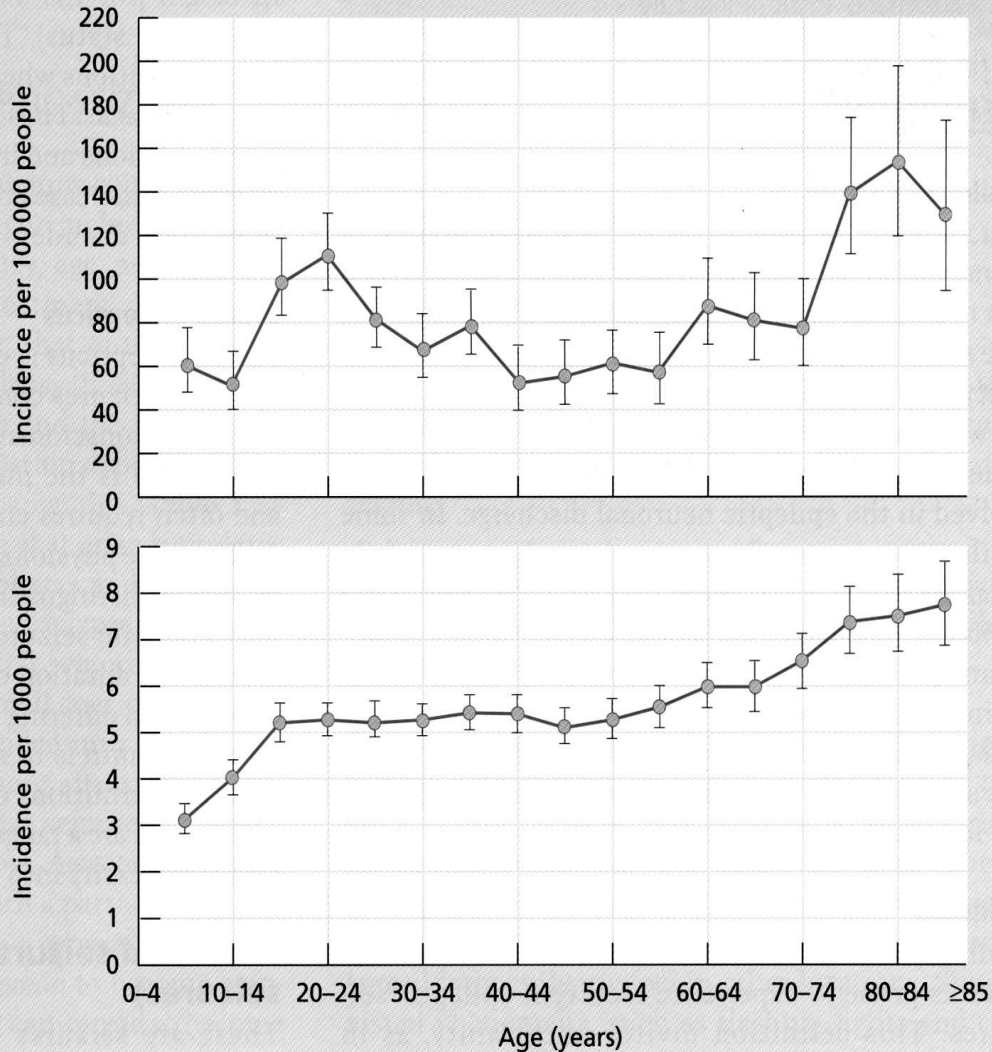
LECTURE 22

Definition



A chronic neurologic disorder manifested by repeated epileptic seizures (attacks or fits) which result from paroxysmal uncontrolled discharges of neurons within the central nervous system

Epidemiology and course

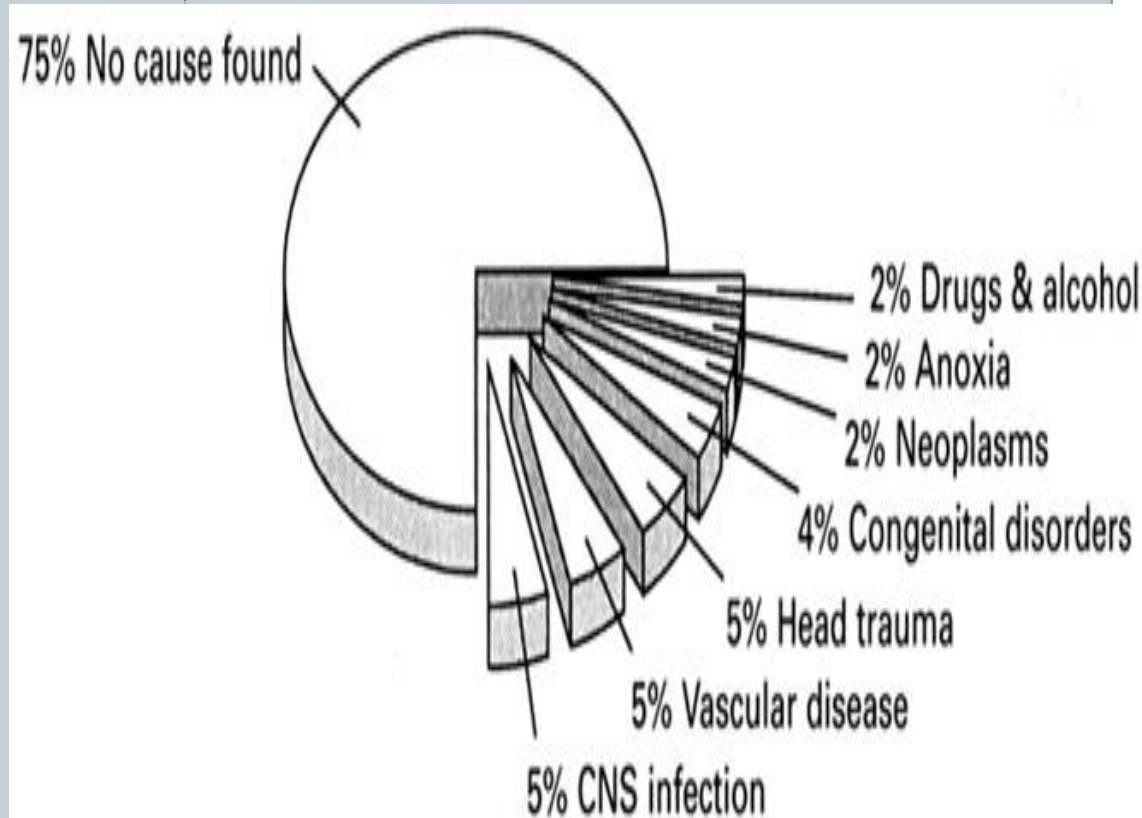


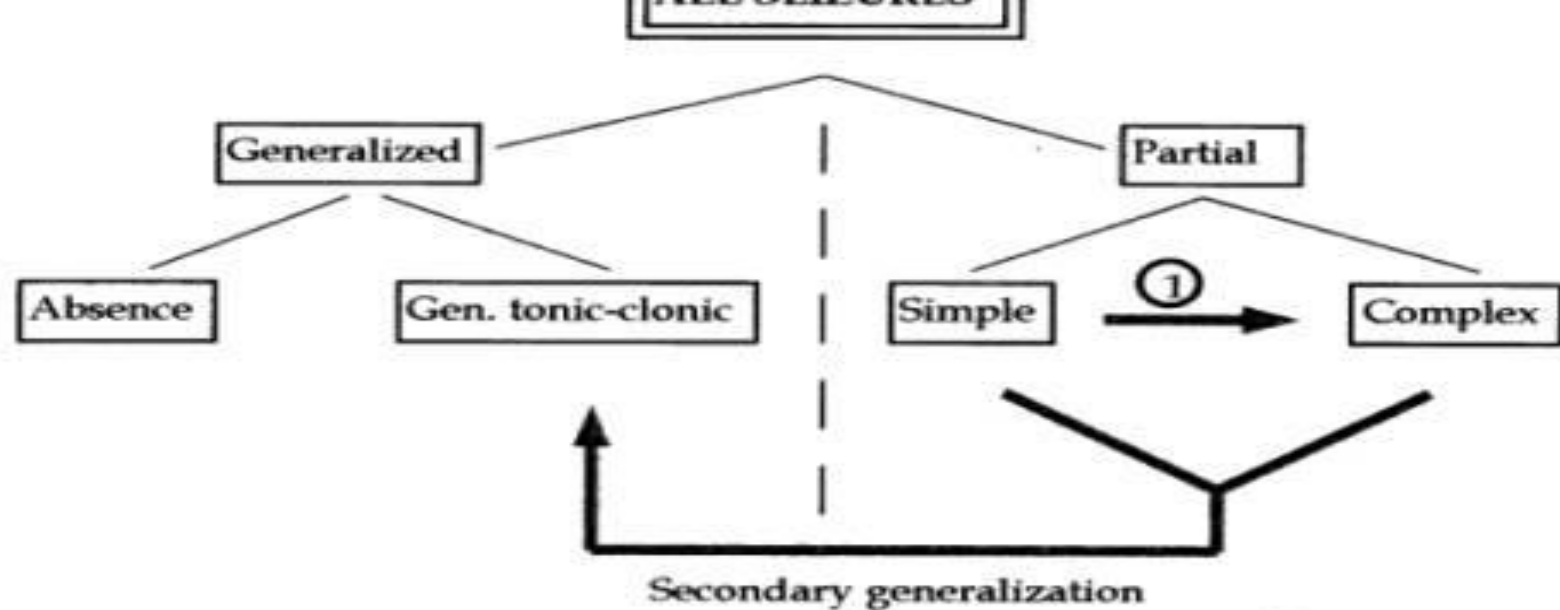
usually presents in childhood or adolescence but may occur for the first time at any age

it affects 50 M people world wide

Etiology

- a symptom of numerous disorders but in the majority of sufferers the **cause remains unclear - idiopathic** despite careful history taking, examination and investigation





Generalized seizures

- LOSS of consciousness
- Idiopathic
- "Entire cortex" affected at once
- EEG shows gen spike and wave
- Valproic acid is drug of choice

Partial (focal) seizures

- consciousness NOT lost
- often symptomatic (secondary)²
- only a portion of brain is affected
- EEG is focal
- Carbamazepine (and phenytoin) are drugs of choice

Figure: Over-simplified scheme for classifying seizures. Note that focal seizures of both types can undergo secondary generalization producing a generalized seizure (specifically a secondarily generalized seizure). 1. Indicates a simple partial seizure can evolve into a complex partial one. 2. The main exception to this rule is Benign Rolandic Epilepsy, which is a focal idiopathic seizure disorder.

Types of Seizures



PARTIAL

- **SIMPLE**
- **COMPLEX**

GENERALISED

- **ABSENCE**
- **MYOTONIC**
- **TONIC CLONIC**
- **TONIC**
- **ATONIC**

Epilepsy - Classification



3 types

1. Grand Mal Epilepsy
2. Petit Mal Epilepsy
3. Focal Epilepsy → Jacksonian Epilepsy
→ Psychomotor Epilepsy

EEG in different types of Epilepsy



Grand mal



Petit mal



Psychomotor



Grand Mal Epilepsy (Tonic Clonic)



- extreme neuronal discharges in all areas of the brain—in cerebral cortex, deeper parts of cerebrum and brain stem
- May have AURA (sensory hallucinations)
- The discharges → spinal cord which cause generalized ***tonic seizures of the entire body***
- Towards end of attack by alternating tonic and spasmodic muscle contractions - ***tonic-clonic seizures***

Grand mal....



- Lasts from a few seconds to 3 to 4 minutes
- Post seizure depression(1 to many minutes)

Features of Grand Mal Epilepsy



- Tonic clonic seizure
- Tongue bite or swallowing the tongue → Cyanosis
- Urination/defecation
- Post seizure depression

Tonic phase



Clonic phase



Tonic Phase



Clonic Phase



Postictal Stupor



**Straightening of
body & limbs**

**Clonic jerks of
body, limbs,
head**

Handwritten signature

What initiates a grand mal attack?



- Most have hereditary predisposition
 - a) Strong emotional stimuli
 - b) Alkalosis caused by overbreathing
 - c) Drugs
 - d) Fever
 - e) Loud noises
 - f) Flashing lights

What stops the attack?



- Presumably, the major factor that stops the attack after a few minutes is

1. neuronal fatigue

2. active inhibition by inhibitory neurons

Petit Mal Epilepsy or Absence seizures



- involves **thalamocortical brain activating system** characterized by
- 3 to 30 seconds of unconsciousness (or diminished) during which time person has **twitch-like contractions** of muscles usually in the head region, especially **blinking of eyes**
- followed by return of consciousness and resumption of previous activities
- ***Absence syndrome or Absence epilepsy***

Petit Mal..



- Appears during late childhood and disappear by **30y**
- Brain wave is **spike dome** pattern
- It can lead to a grand Mal attack
- results from oscillation between inhibitory thalamic reticular neurons and
Excitatory thalamocortical and corticothalamic
neurons

Focal Epilepsy



- Involves any **local part of brain**
(cerebral cortex or deeper structures)

- **Starts from**
 - a) scar tissue
 - b) tumor
 - c) destroyed area of brain tissue
 - d) congenitally deranged neural circuitry

Focal epilepsy...



- 2 types
 - 1. Simple Partial Seizure** (aura)
 - 2. Complex Partial Seizure** – a larger part of a hemisphere is affected and may lose consciousness

Partial seizure



Before the seizure.



Jerking of the right half of the face. The patient is fully conscious.

Simple Partial Seizures

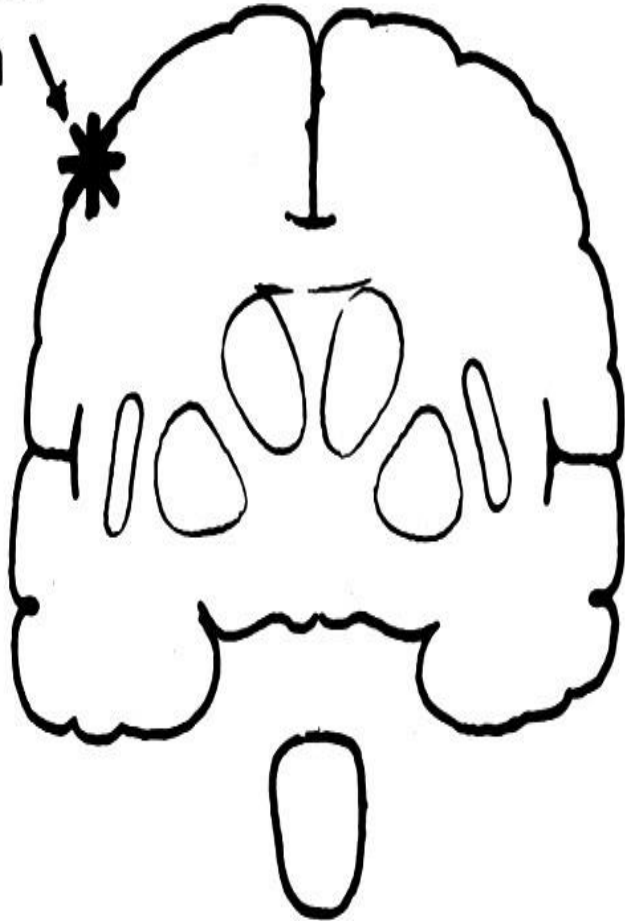


- affect only a small region of the brain, often the temporal lobes or hippocampi
- retain consciousness
- (Aura)

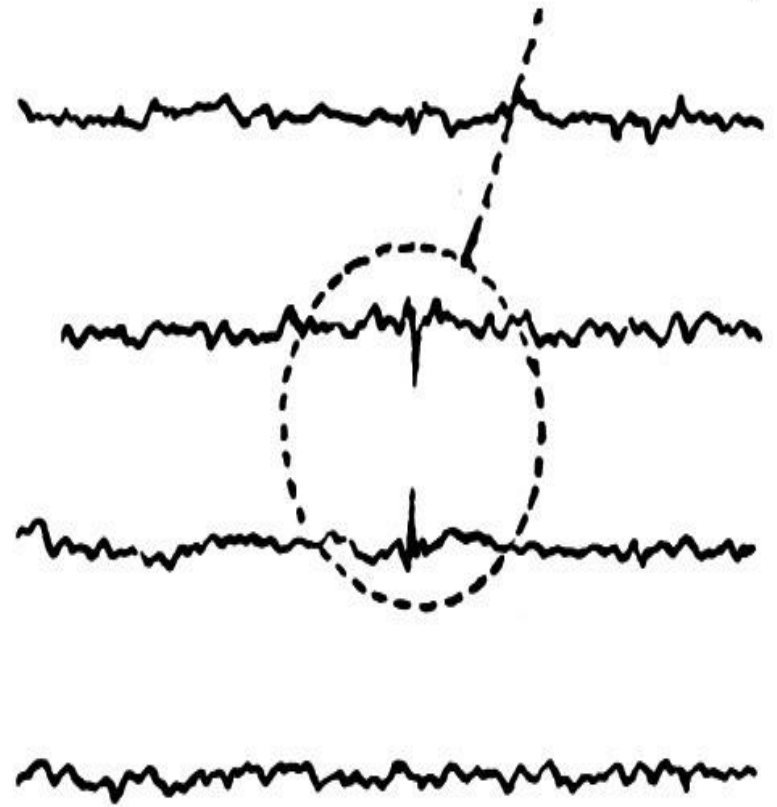
- **JACKSONIAN EPILEPSY**
simple focal seizure spreads from the distal part of the limb toward the ipsilateral face or otherwise

Simple Partial Seizures

Cortical
origin



Focal EEG abnormality



Complex Partial Seizure



- **unilateral cerebral hemisphere** involvement and causes **impairment of awareness** or responsiveness, i.e. alteration of consciousness
- Arise from temporal lobe especially amygdala, hippocampus, and neocortical regions
- Often preceded by **AURA**
- Loss of consciousness and abnormal behaviour

Psychomotor seizure (Focal Epilepsy)



- (1) a short period of **amnesia**;
 - (2) an attack of **abnormal rage**;
 - (3) **sudden anxiety, discomfort**, or fear; and/or
 - (4) a moment of **incoherent speech** or mumbling of some trite phrase
- the person cannot remember his or her activities during the attack or is conscious of everything that he or she is doing but unable to control it
 - involve limbic portion of brain- hippocampus, the amygdala, the septum, and/or portions of the temporal cortex

Seizure Triggers

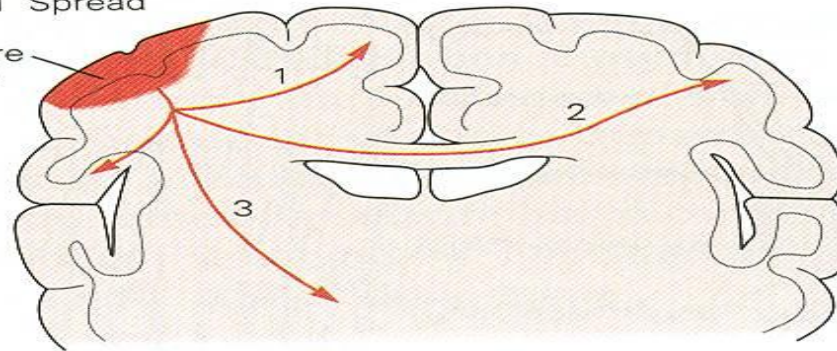


- Missed medication (#1 reason)
- Stress, anxiety
- Hormonal changes, Menstruation
- Dehydration
- Lack of sleep, extreme fatigue
- Photosensitivity
- Illicit Drug, alcohol use
- Certain Medications
- Fever in Some Children

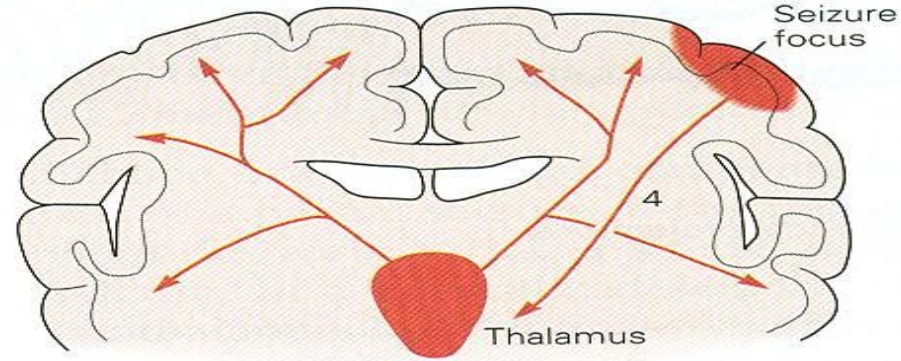
A Partial seizure

1 Spread

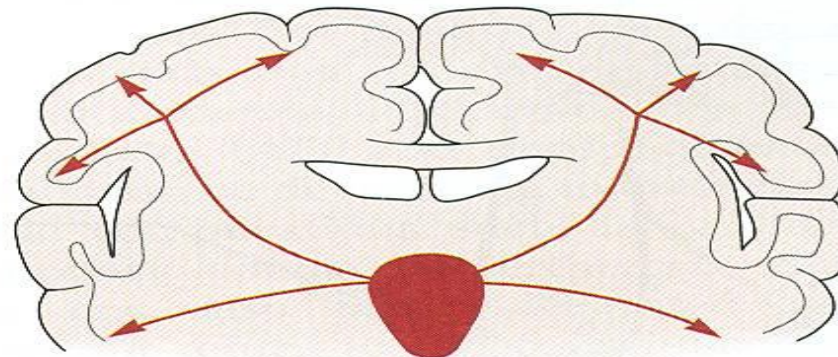
Seizure focus



2 Secondary generalization



B Primary generalized seizure



Epilepsy - Treatment



- **Drug therapy (anticonvulsants)**

Carbamazepine, Sodium valproate, Phenytoin (first line drugs)

Lamotrigine, Topiramate, Levetiracetam, Pregabalin (new AEDs)

- **Surgical Excision of Epileptic Foci** can often prevent seizures

Status Epilepticus



- consciousness does not return between seizures for more than 30 min
- may be life-threatening with pyrexia, deepening coma and circulatory collapse
- Death occurs in 5-10%
- **frontal lobe lesions** (incl. strokes), **head injury**, **reducing drug therapy**, **alcohol withdrawal**, **drug intoxication**, **metabolic disturbances** or **pregnancy**
- Treatment: AEDs intravenously
General anesthesia

Potentially Dangerous Responses to Seizure



- Don't restrain person
- Don't put anything in the person's mouth
- Don't try to hold down or restrain the person
- Don't attempt to give oral anti seizure medication
- Don't keep the person on their back face up