

"He who studies medicine without books sails an uncharted sea, but he who studies medicine without patients does not go to sea at all." – William Osler



430

MEDICINE
TEAMWORK

EPILEPSY (SEIZURES)

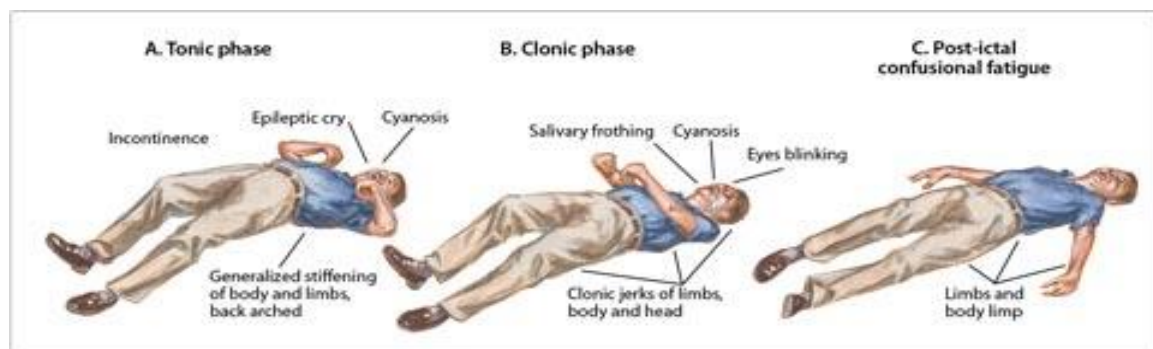
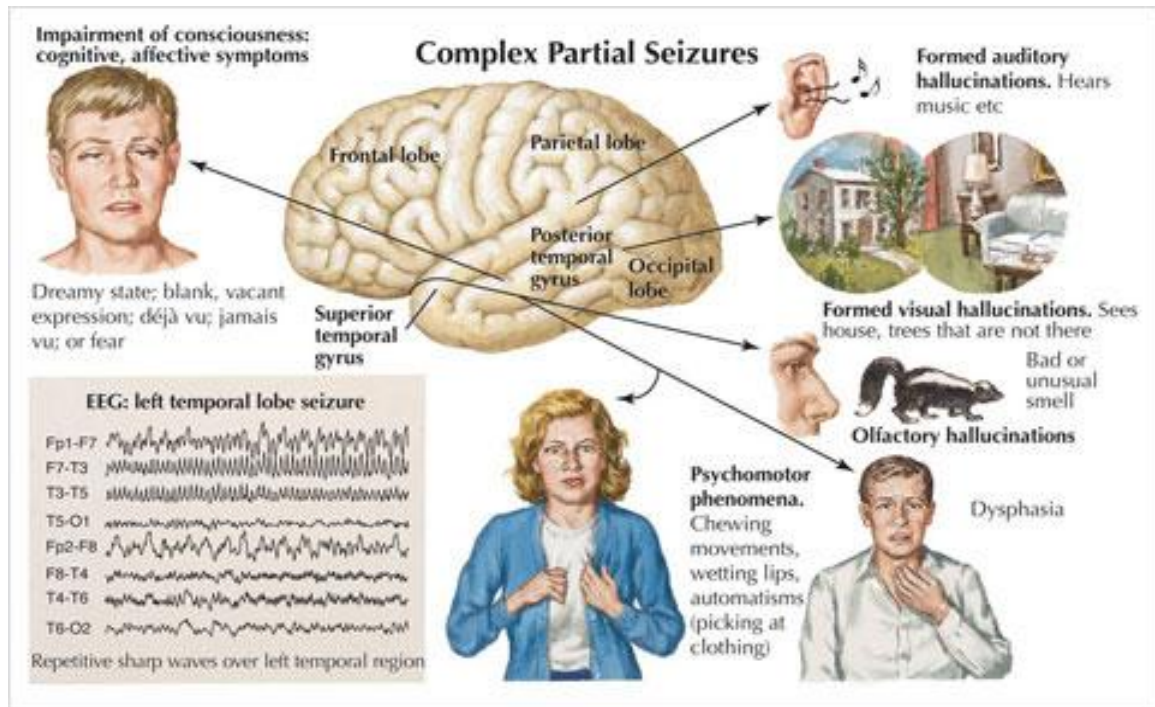
Done By: Hadeel AlSajjan

Epilepsy

- Epileptic seizure: transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain.
- Provoked seizures: is occur in the setting of acute medical and neurological illnesses in people with no prior history of seizures
 - Seizure is caused by a medical issue e.g: Hypoglycemia
- Epilepsy: recurrent (two or more) unprovoked seizures.
- Seizure is a symptom of epilepsy.
- Status Epilepticus (SE): defined as recurrent convulsions that last for more than 20 minutes and are interrupted by only brief periods of partial relief.
 - Serious, life threatening, Medical emergency, can cause lots of complications
- (SE): is a serious, potentially life-threatening.
- Any type of seizure can lead to SE, the most serious form of status epilepticus is the **generalized tonic-clonic type**.
- Seizer is a Symptom, Epilepsy is a diagnosis.
- **Epidemiology:**
 - 5% of the population suffer a single sz at some time
 - 0.5-1% of the population have recurrent sz = EPILEPSY
 - 70% = well controlled with drugs (prolonged remissions)
 - 30% epilepsy at least partially resistant to drug treatments = INTRACTABLE (FARMACORESISTANT) EPILEPSY.
- **Causes:**
 - Most commonly idiopathic
 - Brain tumors
 - Vascular incident (Ischemic or Hemorrhagic)
 - Infection (Meningitis, encephalitis)
 - Genetic
 - Trauma → Patients with severe head trauma are at risk of having seizures, mostly **frontal and penetrating trauma**
- **Triggers for Seizures** (In epileptic patients)
 - Poor compliance → **most common cause in Epileptic patients.**
 - SD (Sleep Deprivation)
 - Stress
 - Alcohol → Increase seizure frequency in epileptic patients
 - Infection → Even simple URTI can trigger them
 - Menstrual cycle → Catamenial seizures
- **Danger of Seizures**
 - Car accidents
 - Drowning
 - Status Epilepticus
 - Sudden death → Poor control, patients on more than one drug, specific EEG pattern
- **Classification**
 - Focal (Partial) *account for 80% of adult epilepsies*
 - Simple Partial → **Preserved consciousness**
 - Complex Partial → **Impaired consciousness**
 - Partial can lead to secondary generalized
 - Generalized
 - Tonic-clonic → **Postictal phase (Sleepy, drowsy.. etc)**
 - Myoclonic
 - Atonic
 - Tonic
 - Absence → **No postictal phase**

Auras:

- Flashes → Focus is in the Occipital lobe
- Numbness → Focus is in the Parietal lobe
- Epigastric rising sensation → Focus is in the Temporal lobe
- Aura with no specific pattern (Resembles psychogenic epilepsy) → Focus is in the frontal lobe



- **DDX**
 - TIA
 - Syncope
 - Migraine
 - Movement disorders
 - Panic attack
 - Psychogenic seizure
- **Seizure Approach**
 - **Non invasive tests**
 - Clinical history
 - MRI
 - Lesional
 - Tumor
 - Vascular
 - Trauma

- Developmental
 - Mesial Temporal Sclerosis
 - Non lesional
- video EEG
- neuropsychological evaluation
- nuclear medicine
- MEG
- **invasive monitoring**
 - Intracranial electrodes
 - Intraoperative corticography
 - Cortical stimulation.
- **Questions that help clarify the type of seizure include the following:**
 - Was any warning noted before the spell? If so, what kind of warning occurred?
 - What did the patient do during the spell?
 - Was the patient able to relate to the environment during the spell ?
 - How did the patient feel after the spell? How long did it take for the patient to get back to baseline condition?
 - How long did the spell last?
 - How frequent do the spells occur?
 - Are any precipitants associated with the spells?
- **Cognitive Testing-Neuropsychology**
 - Intelligence
 - Memory
 - Verbal
 - Visual
 - Language
- **Treatment**
- The majority of pts respond to drug therapy (anticonvulsants). In intractable cases surgery may be necessary. The treatment target is seizure-freedom and improvement in quality of life!
- The commonest drugs used in clinical practice are: **Carbamazepine, Sodium valproate, Lamotrigine** (first line drugs) **Levetiracetam, Topiramate, Pregabalin** (second line drugs) **Zonisamide, Eslicarbazepine, Retigabine** (new AEDs)
- Basic rules for drug treatment: Drug treatment should be simple, preferably using one anticonvulsant (monotherapy). "Start low, increase slow".
- Add-on therapy is necessary in some patients...
- If pt is seizure-free for three years, withdrawal of pharmacotherapy should be considered. It should be performed very carefully and slowly! 20% of pts will suffer a further sz within 2 yrs.
- The risk of teratogenicity is well known (~5%), especially with valproates, but withdrawing drug therapy in pregnancy is more risky than continuation. Epileptic females must be aware of this problem and thorough family planning should be recommended. Over 90% of pregnant women with epilepsy will deliver a normal child. **(Give Folic Acid to reduce risk of Teratogenicity)**
- **Mechanism of Action**
 - *Current antiepileptic drugs are thought to act mainly by two main mechanisms:*
 - Reducing electrical excitability of cell membranes, possibly through inhibition of sodium channel.
 - Enhancing GABA-mediated synaptic inhibition. This may be achieved by an enhanced pre- or post- synaptic action of GABA, by inhibiting GABA-transaminase, or by drugs with direct GABA-agonist properties.
- **Clinical Uses of Antiepileptic Drugs**
 - *Tonic-clonic (grand mal) seizures:* **phenytoin, valproate**. Use of single drug is preferred when possible, because of risk of pharmacokinetic interactions.
 - *Partial (focal) seizures:* **carbamazepine (Drug of Choice), valproate; clonazepam or phenytoin** are alternatives.
 - *Absence seizures (petit mal):* **ethosuximide (Drug of Choice) or valproate**. Valproate is used when absence seizures coexist with tonic-clonic seizures, since most drugs used for tonic-clonic seizures may worsen absence seizures.
 - *Myoclonic seizures:* **valproate (Drug of Choice) or clonazepam**.
 - *Status epilepticus:* must be treated as an emergency.

- **Attentions**
 - Selection of an appropriate antiseizure agent
 - Use of single drug
 - Withdrawal
 - Toxicity
 - Fetal malformations
- **Seizure Freedom with AED use**
 - 1st drug ----- seizure free (47%)
 - 2nd drug----- seizure free (14%)
 - 3rd drug----- seizure free (3%)
 - Medication resistant 36%
- **Elderly and epilepsy**
 - More cautious dosing
 - Monotherapy preferred
 - More frequent SEs
 - Comorbid medical problems/meds
 - Osteoporosis
 - Cognitive decline
 - Risk of falls/injury
- **Surgery → Number one treatment for Partial Epilepsy**
 - Hemispherectomy
 - Hemispherotomy
- **Non-Surgical Approach:**
 - Vagal Nerve Stimulation (VNS)
 - Deep Brain Stimulation (DBS)