Epilepsy

Objectives:

- Definition of epileptic seizure, provoked seizure and epilepsy.
- Status epilepticus.
- Frequent causes of seizure and risk factors.
- Triggers of seizures in epileptic patients.
- Epilepsy classification and seizure semiology.
- DDX of SZ
- Seizure vs syncope
- Approach to seizure disorder (Hx, Ex, inx)
- Medical and surgical management of epilepsy.
- How to select antiepileptic medications.
- When to stop antiepileptic medications.

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Resources: 435 team + Davidson + kumar + Recall questions step up to medicine.

- Editing file
- Feedback

Introduction

extra images

Highly recommended video (09:21)

- **History:**
  - One of the earliest descriptions of a secondarily generalized tonic-clonic seizure was recorded over 3000 years ago in Mesopotamia.
  - The seizure was attributed to the god of the moon.
  - Epileptic seizures were described in ancient cultures, including those of China, Egypt, and India.
  - Hippocrates wrote the first book about epilepsy almost 2500 years ago.
  - He rejected ideas regarding the divine etiology of epilepsy and concluded that the cause was excessive phlegm that caused abnormal brain consistency, so he concluded that epilepsy is an organic problem not a psychological problem.

What is epilepsy?

- **Seizure:** Transient occurrence of signs and symptoms of sudden changes in neurological function due to ABNORMAL EXCESSIVE, synchronous discharge of cortical neurons. every single word is important, 1- it is transient: it is not permanent. 2- sudden neurological dysfunction: it doesn't have to be tonic-clonic seizure it could be drop attack, partial like numbness, or absence seizure 3- "due to abnormal excessive synchronous discharge" we all have neurological discharge but they are not excessive enough to cause a seizure, same in epileptic patients they will have seizure when there is a spike (excessive) neurological discharge.
- **Provoked seizure:** occurs in the setting of acute medical and neurological illnesses in people with no prior history of seizures. (in this case we have a patient with no history of epilepsy, but he presents with seizure due to e.g CNS infection or an elderly pt with hyponatremia or hypoglycemia)
- **Epilepsy:** Recurrent (two or more) unprovoked seizure. Seizure is a SYMPTOM of epilepsy. (Epilepsy is diagnosis and seizure is a symptom, like cough is a symptom in pneumonia or COPD is a diagnosis).
- **Status Epilepticus (**serious, potentially life-threatening**):**
  - defined as recurrent convulsions that last for more than 20 minutes and are interrupted by only brief periods of partial relief (prolonged seizure). It is really important to differentiate between the type of seizures, cuz the treatment plan and the protocol is totally different.
    As the seizure prolongs the pt loses more neurons and may lead to "Recurrent epilepsy", early intervention will lead to a much better outcome.

- not returning to baseline between 2 seizures (e.g if a patient had a seizure at 6AM and he became comatose then had another seizure at 9AM and he did not go back to his baseline of consciousness between 6-9 AM, its status epilepticus).
- Any type of seizure can lead to SE (Status Epilepticus), the most serious form of status epilepticus is the generalized tonic clonic type.
- How do we know if it is SE? if you see a patient seizing, turn them to one side and wait 2-3 mins then the seizure will go away, if it persists for a longer period of time then it is SE.

★ Epidemiology and Course

- 5% of the population suffer a single seizure at some time (most of them are provoked seizure).
- 0.5-1% of the population have recurrent seizure = epilepsy.
- 70% = well controlled with drugs (prolonged remissions),
- 30% epilepsy at least resistant to drug treatments (drug resistance epilepsy DRE) = intractable epilepsy, we can treat them by surgery.

Risk factors for Epilepsy	**Triggers** (trigger for epileptic patient)	**Causes** "4 M's 4 I's"
• 60% unknown cause • Febrile convulsion (it happens in pediatrics, they develop a seizure due to high temperature.If this seizure happens 3 times OR it was a prolonged seizure then those babies are at high risk of having epilepsy). • Perinatal insult (If the mother had an infection like toxoplasmosis or VSV during pregnancy, the baby will be at high risk of developing epilepsy) • CNS infection (you have to treat them early, so they will not be at high risk of getting epilepsy) • CNS mass lesion (tumors) • Family history of epilepsy (juvenile myoclonic seizure) • Head injury (frontal penetrating trauma) • Abnormal gestation or delivery • Developmental delay • Stroke (ischemic or hemorrhagic, more common in hemorrhagic)	• Poor compliance • Sleep deprivation • Stress • Alcohol • Infection (commonly seen in pediatrics, the parent will tell you their baby is fine but when the baby has tonsillitis they have a seizure) • Menstrual cycle (catamenial seizures)	• **Metabolic** (hyponatremia, hypocalcemia, hypo- or hyperglycemia, hyperthermia, uremia, thyroid storm) • **Mass lesion** (tumor, metastasis, hemorrhage) • **Missing drug:** ○ non compliance with anticonvulsants in epileptics. ○ acute withdrawal from alcohol, benzodiazepines, barbiturates, • **Miscellaneous** (pseudoseizure "psychiatric" , eclampsia) • **Intoxications** (cocaine, lithium, lidocaine, theophylline, CO poisoning, metal poisoning) • **Infections** (septic shock, bacterial or viral meningitis, brain abscess) • **Ischemia** (stroke, TIA) • **Increased ICP** (ex: due to trauma)

★ Dangers for epileptics, epileptic patients are at high risk of:

- Drowning. People around those patients think they are playing and don't realize until the patient dies :(
- Car accidents (you have to tell the patient not to drive until you give permission)
- Status epilepticus may lead to ICU admission
- Sudden death (sudden unexpected death in epilepsy SUDEP) very common especially in uncontrolled seizures, patients on multiple AEDs but the epilepsy is not controlled, suppressed brain on the EEG for long time)

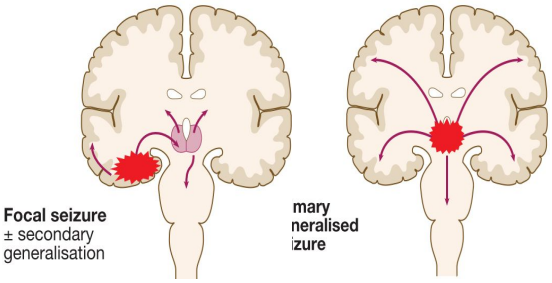
Classification

TYPES OF SEIZURES (very important أهم شي عندي)	
Generalized Seizures	**Focal Seizures** (more than 80% in epileptic adults)
Tonic-Clonic seizures: (GTC).	Focal 'simple partial' > **without impairment** of awareness or consciousness. E.g. Jacksonian seizure[1] the level of consciousness is intake لو كلمت المريض راح يرد عليك، مثلًا تقوله يوقف بيقولك والله ما أقدر يا دكتور
Absence Seizure: يسرح المريض لفترة ثم يرجع عادي (typical, atypical, absence with special features, myoclonic absence, eyelid myoclonia).	
Myoclonic seizure: (myoclonic atonic, myoclonic tonic). المريض يرجف فجأة، مثل مريضة لمن تجيها النوبة لو هي شايله طفلها ممكن ترجف ويطيح منها	Focal 'Complex partial' > **with impairment** of awareness or consciousness (altered level of consciousness, they feel cloudy يقولك يا دكتور حسيت إن فيه أحد دخل العيادة وتكلم وطلع بس ما ركزت فيه)
Atonic seizure:. يطيح المريض فجأة	
Tonic seizure. يتصلب (يشصب) المريض فجأة بعدين خلاص يفك	Focal secondarily generalized > Evolving to a bilateral, convulsive seizure. Tonic, clonic, or tonic-clonic. It starts at the temporal and then it will rapidly spread to the other hemisphere causing generalized seizure)
Clonic seizure.	
Unknown seizure	
Epileptic spasm occur mainly in infancy.	

How is primary generalized seizures different from secondary generalized seizures?

[1] Jacksonian seizure is a type of simple partial seizure characterized by abnormal movements that begin in one group of muscles and progress to adjacent groups of muscles.

A focal seizure originates from a paroxysmal discharge in a focal area of the cerebral cortex (often the temporal lobe); the seizure may subsequently spread to the rest of the brain (secondary generalisation) via diencephalic activating pathways. In primary generalised seizures the abnormal electrical discharges originate from the diencephalic activating system and spread simultaneously to all areas of the cortex.



The difference between generalized and focal seizure:

generalized: loss of consciousness, no aura.

Focal (partial): no loss of consciousness, there is an aura (the patient will tell you they feel nauseated or they smell something unpleasant or they see flashes of light or they feel numbness, depending on which lobe of the brain has the focus).

Seizure Semiology "Study of signs"	
Tonic-Clonic seizures **"Grand mal seizures"**	Initial "aura" that depends on which cortical area the seizure originate > Then patient becomes Rigid (Tonic) and unconscious > Then fall (risk of facial injury). Breathing stops and central cyanosis may occur > As cortical discharge reduced in frequency > jerking movement (clonic) is produced > Then, flaccid state of deep coma that persists for minutes.
Absence Seizure img **"Petit mal seizures"**	Characterized by 3 to 30 seconds of unconsciousness (or diminished consciousness) during which time the person has twitch-like contractions of muscles usually in the head region, especially blinking of the eyes; this is followed by return of consciousness and resumption of previous activities.
Myoclonic Seizure img	Brief jerking movements predominantly in the arms.
Atonic seizure img	Brief loss of muscle tone > results in falling with or without loss of consciousness
Tonic seizure img	Generalized increase in muscle tone associated with loss of awareness
Clonic seizure img	Generalized multiple jerking movements

★ Pathophysiology

- Attacks occur when the basal level of excitability of the nervous system (or part of it) rises above a certain critical threshold. As long as the degree of excitability is held below this threshold, no attacks occur.
- Brain functions normally in balance between Excitation (e.g. Na, amino acids "glutamate" and "aspartate") and Inhibition (Gamma-aminobutyric acid "GABA"). Imbalance between excitation and inhibition will induce seizure.
- Seizures may be local or generalized.

- Seizures that are at local areas produce symptoms related to the area thats involved. Any architectural or functional disturbance (e.g. Infection, tumor, scarring) would precipitate this.
- Seizures that are generalized may originate from central mechanisms that control cortical activation and spreads rapidly. This type may reflect widespread disturbance structurally or functionally.
- **What Stops the Generalized seizures "Grand Mal Attack"?**
    1) Neuronal fatigue.
    2) Active inhibition by inhibitory neurons that have been activated by the attack.

Seizure is initiated when excitation rises to a certain threshold > patient seize. why do seizures stop after seconds or minutes? because of neuronal fatigue and stimulation of inhibitory neurons.

Clinical Features (very important MCQs!)

Typical EEG sign	Localizes to
Oral automatisms	Temporal lobe
Hypermotor automatisms	Frontal lobe
Manual picking automatisms	Temporal lobe
Visual hallucinations	Occipital lobe
Auditory hallucinations	Temporal neocortex (Heschl's Gyrus)
Olfactory hallucinations	Mesial temporal lobe
Nystagmus, eye blinking, eye pulling sensation	Occipital lobe
Ictal amaurosis	Occipital lobe
Tonic arm elevation	Supplementary motor area
Epigastric aura	Temporal lobe
Throat tightening sensation	Insula
Ictal pain	Parietal lobe
Somatosensory sensations	Postcentral gyrus or supplementary motor area
Clonic activity	Precentral gyrus
De-ja vu or jamais vu aura	Mesial temporal lobe
Fear	Most often temporal but also frontal

★ Ddx

- Transient Ischemic Attacks (TIA) the patient may come with inability to move the hand for a 30 min period of time then the hand gets better all of a sudden, this also happens after a seizure (postictal paralysis or Todd's paralysis)
- Syncope (resembles atonic seizure)
- Migraine (they all have aura)
- Movement disorders (ex: Tics, it resemble myoclonic seizure)
- Panic attack (resembles frontal lobe seizure)

- Psychogenic seizure (subconscious reasons)

★ Syncope vs Seizure

Clinical features	Cardiogenic syncope	Seizure disorder
Loss of consciousness	Typical	Common
Episode duration	Seconds	Minutes
Involuntary movement	Common	Typical (more common than syncope)
Amnesia	Yes	Yes
Arrhythmia	Common	Rare
Electroencephalogram	Slow waves Flattening	Focal or general spike activity
Responsive to AEDs (Anti-Epileptic Drugs)[2]	No	Often
Short term mortality	High	Low
History	Pale (white coat)	Cyanosis

Clinical Approach

★ Clinical history

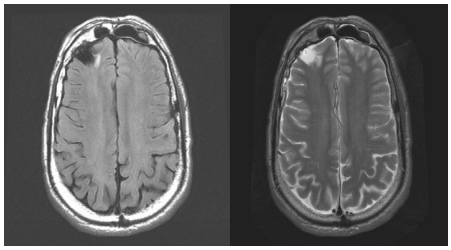
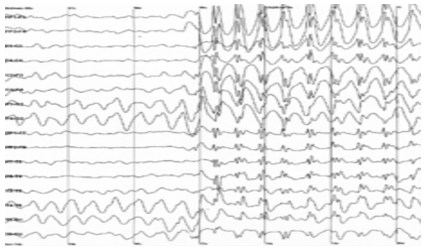
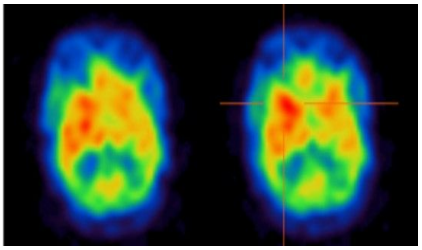
Q: Was there any warning noted before the spell?
➔ Before: aura vs presyncopal prodrome
Q:What did the patient do during the spell? to know what type of seizure
Q:Was the patient able to relate to the environment during the spell? to know if its generalized or partial
➔ During: convulsion, automatisms vs brief syncopal blackout and pallor
Q: How did the patient feel after the spell? How long did it take for the patient to get back to baseline condition?
➔ After: post-ictal confusion and headache or tiredness (in generalized) vs rapid recovery in syncope
Q: How long did it last? if it lasts for 25 min this is important (emergency)
Q: How frequent do the spells occur?

[2] you do it cuz sometimes it is vague, you can't tell from history or examination.

Q: Are any precipitants associated with the spells? E.g. focal is triggered by lack of sleep and stress. generalized seizure is triggered by flashes. Spend some time with your patient cuz it will guide you to lots of things. You have to know whether it is a seizure or if its cardiac or psychogenic, is it generalized or partial? which type of generalized seizure, or which lobe is involved? This is very important to know so you can decide the treatment plane

★ Investigations:

- Non-invasive test:
  - **Clinical history**
  - MRI: Lesional (tumor, vascular, trauma, developmental, mesial temporal sclerosis) and nonlesional. In epilepsy we can find cortical dysplasia or mesial temporal sclerosis
  - EEG to to know the type of seizure.
  - Video EEG (electroencephalogram to see the epileptic spikes) Monitoring "VEM" we keep the patient under monitoring for 24 hours to know the site of the focus or to know if it is a seizure or psychogenic, helpful but NOT diagnostic because it may be normal between attacks!!
  - Neuropsychological evaluation (cognitive testing): intelligence, memory (verbal and visual), and language. (if the focus is in the temporal region I have to do cognitive test, if the cognitive function is intact then I wont remove the focus surgically, if the cognitive function is lost then the whole lobe is diseased and I can remove it surgically)
  - Nuclear medicine (to know where the focus is exactly, then I can ask the surgeon to remove it)
- Invasive Monitoring

Single seizure:

1. Loss of consciousness → 12-lead **ECG**
2. If you suspect seizure → imaging* (**CT** or **MRI**)
3. To help asses prognosis → **EEG**
4. Other investigation for toxic, infective and metabolic causes.

*

26.41 Indications for brain imaging in epilepsy

- Epilepsy starting after the age of 16 yrs
- Seizures having focal features clinically
- EEG showing a focal seizure source
- Control of seizures difficult or deteriorating

Epilepsy (more than one seizure has occurred):

1. EEG → helps to establish the type of epilepsy and guides therapy.
2. Video EEG monitoring (VEM) → help in differentiation between epilepsy and other attack disorders.
3. Imaging (CT or MRI) for detecting focal changes.
4. Rule out other causes: see table ---------->

26.40 Investigation of epilepsy

From where is the epilepsy arising?

- Standard EEG
- Sleep EEG
- EEG with special electrodes (foramen ovale, subdural)

What is the cause of the epilepsy?

Structural lesion?

- CT
- MRI

Metabolic disorder?

- Urea and electrolytes
- Liver function tests
- Blood glucose
- Serum calcium, magnesium

Inflammatory or infective disorder?

- Full blood count, erythrocyte sedimentation rate, C-reactive protein
- Chest X-ray
- Serology for syphilis, HIV, collagen disease
- CSF examination

Are the attacks truly epileptic?

- Ambulatory EEG
- Videotelemetry

Management

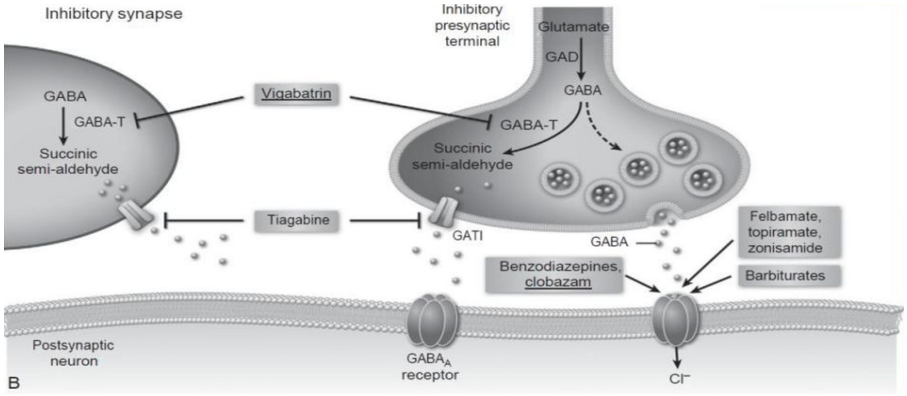
FIRST AID by witness or relative:

- Move the person away from any danger.
- After convulsions cease, Turn person into 'recovery' position (semi-prone). img
- Ensure airway is clear but do **NOT** insert anything into the mouth.
- If convulsions continue for more than 5 mins seek urgent medical attention.
- Do not leave the person alone until fully recovered (drowsiness and confusion can persist for up to 1 hr).

Immediate Medical Attention:

- Ensure airway is patent
- Give oxygen to offset cerebral hypoxia.
- Give I.V. anticonvulsant (e.g. diazepam 10 mg) **ONLY IF** convulsions are continuous or repeated (if so manage as status epilepticus).
- Consider taking blood for anticonvulsant levels (if known epileptic)
- Investigate cause.

★ Antiepileptic Drugs (AED):

Mechanism of Action	Current antiepileptic drugs are thought to act mainly by two main mechanisms: I. Reducing electrical excitability of cell membranes, possibly through inhibition of **sodium channel**. II. Enhancing GABA. This may be achieved by: ➔ inhibiting GABA transaminase OR ➔ by drugs with direct GABA agonist properties.  لا تحفظون كل الأدوية الموجودة في الصورة، يكفي المذكورة تحت
Clinical Use (use of single drug is preferred when possible, because of the risk of pharmacokinetic interactions)	**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 (first choice), valproate; clonazepam or phenytoin are alternatives.
	Absence seizures (petit mal) → ethosuximide or valproate **(MCQs)**
	Myoclonic seizures → valproate or clonazepam

*carbamazepine will worsen juvenile myoclonic seizure and absence seizure
**we don't like to give valproate to a female due to its teratogenicity and it can cause obesity and elevated liver enzymes. in case you have to go with valproate (e.g. the patient can't afford other medication) you should tell your patient to counsel you: 1-if she is planning on getting pregnant to change the medication or take folic acid. 2- check the liver enzyme

26.46 Guidelines for choice of anti-epileptic drug

Epilepsy type	First-line	Second-line	Third-line
Focal onset and/or secondary GTCS	Lamotrigine	Carbamazepine Levetiracetam Sodium valproate Topiramate Zonisamide Lacosamide	Clobazam Gabapentin Oxcarbazepine Phenobarbital Phenytoin Pregabalin Primidone Tiagabine
GTCS	Sodium valproate Levetiracetam	Lamotrigine Topiramate Zonisamide	Carbamazepine Phenytoin Primidone Phenobarbital Acetazolamide
Absence	Ethosuximide	Sodium valproate	Lamotrigine Clonazepam
Myoclonic	Sodium valproate	Levetiracetam Clonazepam	Lamotrigine Phenobarbital

N.B. Use as few drugs as possible at the lowest possible dose.

Lamotrigine is the drug-of-choice with minimal side effects, but shouldn't be used with oral contraceptives because it reduces its efficacy. Sodium Valproate is BEST for unclassified or specific syndromes. Not used in pregnancy.

Basic Rule for Drug Treatment:

- Drug treatment should be simple, preferably using one anticonvulsant (monotherapy). "Start low, increase slow".
- Add-on therapy is necessary in some patient...
- If pt is seizure free for three years, withdrawal of pharmacotherapy should be considered. (careful withdrawal, DON'T STOP THE MEDICATION SUDDENLY)
- It should be performed very carefully and slowly! 20% of pts will suffer a further seizure within 2 yrs.

Seizure Freedom with AED use:

¨1st drug ---------- seizure free (47%)
¨2nd drug---------- seizure free (14%)
¨3rd drug---------- seizure free (3%)

We can conclude that the benefits from adding another AEDs is not that important and it may cause drug-drug interaction.

Medication resistant 36%

It usually happens due to non-compliance, e.g. the patient is pregnant and takes half of the dose thinking it is enough

Drug resistant epilepsy:

Failure of at least TWO antiepileptic medications to completely control seizures:

- Appropriately chosen for seizure type
- Taken as prescribed
- Well tolerated (not failed due to side effects)

Epilepsy & pregnancy:

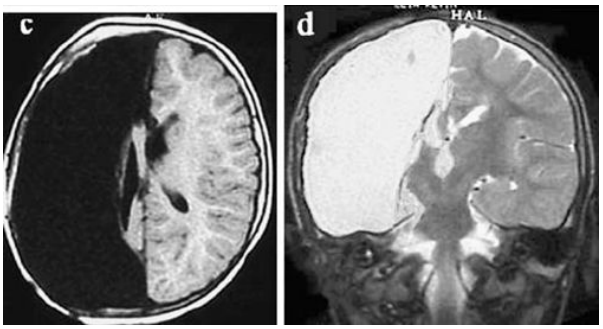
- The risk of **teratogenicity** is well known (~5%), especially with valproates, but withdrawing drug therapy in pregnancy is more risky than continuation.
- **All** antiepileptic medications are not safe, however **lamotrigine** is the safest. لا تقولون لاموتريجين هو آمن للحامل، هو أقله ضرر لكن ما يعني إنه غير ضار!!!

- 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. but you have to inform the family that there might be a complication from the drugs, however the complications of not using the drugs are much higher, cuz the mom may have status epilepticus and may die with the baby :(

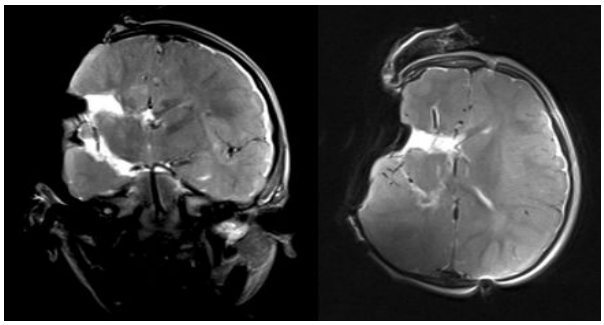
When to stop?

- If pt is seizure free for three years, withdrawal of pharmacotherapy should be considered. (careful withdrawal, DON'T STOP THE MEDICATION SUDDENLY)

★ **Surgery:** Patients who experience seizure despite taking medication should undergo surgery. You surgically resect the epileptogenic area of the brain when the seizure is focal + in a silent area (not involved in motor or vision or speech...etc.). If you resect the correct part, the post-surgical improvement is 68% but you have to use AEDs until 2 years after the surgery

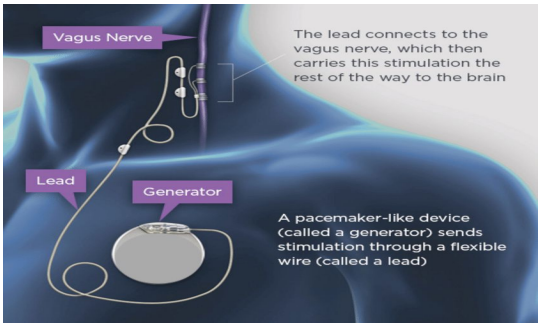


Hemispherectomy (in special cases if the brain is damaged the patient will have weakness, but if the patient is young the brain understands that there is just 1 hemisphere and the functions gradually go back)

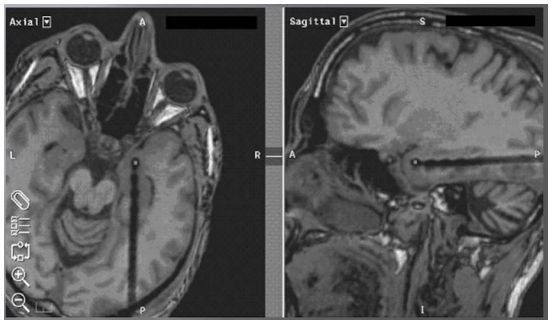


Hemispherotomy

★ Vagal Nerve Stimulation (VNS)[3]



★ Deep Brain Stimulation (DBS)[4]



* some patients may have a drop attack, we should give them helmets + corpus callosotomy (the seizure will start focally but wont go to the other hemisphere → no drop attack)

Lifestyle modifications:

- Avoid activities where they might place themselves or others at risk if they have a seizure. These include activities requiring prolonged proximity to water, prolonged cycle journeys.
- Certain occupations, such as firefighter or airline pilot, are not open to anyone who has an active diagnosis of epilepsy.
- Driving precautions. Regulations vary between countries.

Status Epilepticus (MEDICAL EMERGENCY)

- ABC + Evaluate and treat any precipitating causes of seizure
- If the patient continues to seize, the initial drug of choice is Benzodiazepines (lorazepam or diazepam).
- Continues to seize? > add phenytoin or Fosphenytoin.
- Continues to seize? > add phenobarbital.
- Ultimate therapy for unresolving seizure → NMJ blocking agent, ex: succinylcholine, they do not stop the seizure, they just stop muscular contraction)
- continues to seize? > add midazolam or propofol (patient should be intubated first).
- The longer the duration, the greater the risk of permanent cerebral damage.

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[3] if the patient is MDR and the focus on a sensitive area (e.g. the vision area). they will have like a remote to increase or decrease the stimulation -> control the seizure

[4] you insert an electrode inside the hippocampus and whenever there is a spike the electrode will send electrical impulses and the seizure will be aborted

Summary

Epilepsy:	
Definitions	1- **Seizure**: Transient occurrence of signs and symptoms of sudden changes in neurological function due to ABNORMAL excessive, synchronous discharge of cortical neurons 2- **Provoked seizure:** occurs in the setting of acute medical and neurological illnesses in people with no prior history of seizures. 3- **Epilepsy**: Recurrent (two or more) unprovoked seizure. 4- **Status Epilepticus** (serious, potentially life-threatening): defined as recurrent convulsions that last for more than 20 minutes and are interrupted by only brief periods of partial relief . **Note : Seizure is a SYMPTOM of epilepsy.**
Risk factors	1- Early in life: -Febrile convulsion. -Perinatal insult. -Abnormal gestation or delivery. -Developmental delay. 2- CNS: -CNS infection. -CNS mass lesion. -Head injury. -Stroke (ischemic or hemorrhagic). 3- Miscellaneous: -60% unknown cause. -Family history of epilepsy.
Triggers	1-Poor compliance. 2-Sleep deprivation. 3-Stress. 4-Alcohol. 5-Infection (common seen in pediatric, when the baby has tonsillitis). 6-Menstrual cycle (catamenial seizures) .
Causes	4 M's & 4 I's Metabolic. Intoxications Mass lesion. Infections Missing drug. Ischemia Miscellaneous. Increased ICP

Types	- Generalized seizures: -tonic clonic. -absence seizures. -myoclonic seizures. -atonic seizures. -tonic seizures. -clonic seizures. - Focal seizures: -focal simple partial without impairment of awareness and consciousness. -focal complex partial with impairment of awareness and consciousness. -focal secondarily generalized evolving to a bilateral, convulsive seizure. Tonic, clonic, or tonic-clonic. - Unknown seizures: -epileptic spasm.
Pathophysiology	- Brain functions normally in balance between Excitation (e.g. Na, amino acids "glutamate" and "aspartate") and Inhibition (Gamma-aminobutyric acid "GABA"). Imbalance between excitation and inhibition will induce seizure. -What Stops the Generalized seizures "Grand Mal Attack"? 1) Neuronal fatigue. 2) Active inhibition by inhibitory neurons that have been activated by the attack.
Clinical Features	A- Temporal lobe: 1-oral automatisms. 2-manual picking automatisms. 3-Auditory hallucinations. 4-olfactory hallucinations. 5-epigastric aura. 6-deja vu or jamais vu aura. 7-fear. B- occipital lobe: 1-visual hallucinations 2-nystagmus, eye blinking, eye pulling sensation 3-ictal amaurosis C-Frontal lobe: 1-Hypermotor automatisms. 2-fear. D- Ictal pain. Others: tonic arm elevation in supplementary motor area ,throat tightening sensation insula ,somatosensory sensation in postcentral gyrus or supplementary motor area ,clonic activity in precentral gyrus .

Investigations	-Non-invasive test: **-Clinical history** -MRI: Lesional (tumor, vascular, trauma, developmental, mesial temporal sclerosis) and nonlesional. -EEG -Video EEG (electroencephalogram Monitoring "VEM" helpful but NOT diagnostic because it may be normal between attacks!! -Neuropsychological evaluation (cognitive testing): intelligence, memory (verbal and visual), and language. -Nuclear medicine
Treatment	-Tonic clonic (grand mal) seizures → phenytoin, valproate. -Partial (focal) seizures → carbamazepine (first choice), valproate; clonazepam or phenytoin are alternatives. -Absence seizures (petit mal) → ethosuximide or valproate (MCQs). -Myoclonic seizures → valproate or clonazepam. **Note:** **-carbamazepine will worsen juvenile myoclonic seizure and absence seizure** **-we don't like to give valproate to a female due to teratogenicity, obesity, elevated liver enzymes.** **-All antiepileptic medications are not safe, however lamotrigine is the safest.**

Questions

1. déjà vu is common in seizures originating from:

A. Frontal lobe
B. occipital lobe
C. Mesial temporal lobe
D. Insula

2. 24-year-old female is seen in the clinic complaining that she suddenly finds herself walking around the house without control. on history the doctor found out that she has this episode during night and it last for 1-2 minutes, she feels oriented when these episodes happen and her family didn't notice any loss of consciousness. the doctor admitted her for monitoring and her EEG showed spikes at night, when she experiences the same episode, and she was diagnosed with epilepsy. Which lobe is the most likely affected in this lady?

A. Parietal lobe
B. Occipital lobe
C. Temporal lobe
D. Frontal lobe

3. which of the following drugs is the SAFEST during pregnancy?

A. Ethosuximide
B. Sodium Valproate
C. Lamotrigine
D. Phenytoin

4. which of the following is the drug of choice in case of absent seizure?

A. Ethosuximide
B. clonazepam
C. Lamotrigine
D. Phenytoin

5. 45-year-old male known to have epilepsy 5 years ago. He came to the clinic complaining of increased frequency of seizures where it used to be once every week but now its 3 times a day. His medication dose was of the highest doses and he is on 2 medications. The doctor ordered nuclear imaging and found out the focus is on the frontal lobe, what is the best treatment option:

A. Change the medication
B. Surgery

C. Supportive treatment because the site is very dangerous
D. Increase the dose

6. A 23-year-old woman is seen in clinic for recurrent funny turns. She is not aware of them, but her family and friends have noticed them. They say she looks around blankly, then starts picking at her clothes and sometimes yawns, then she comes back after a minute. She can get drowsy after these episodes. What seizure type does this patient describe?

A. Absence
B. Tonic clonic
C. Complex partial
D. Generalized

Answers:

1.C 2.D 3.C 4.A 5. B 6.C