




A Whole Lot of Shakin' Goin' On!
Understanding Seizures

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Shake, Rattle and Roll



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In this Session

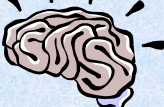
- Discuss the pathophysiology
- Classify the seizure
- Outline a treatment plan



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Seizures

- Paroxysmal and abnormal discharge of neurons that results in prolonged electrical activity of the brain
- Excessive discharges are manifested by the clinical signs we know as seizures.



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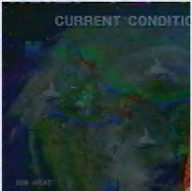
Seizures

- Abrupt onset
- Altered LOC
- Brief duration
- Rapid recovery
- Recurrent stereotypic episodes

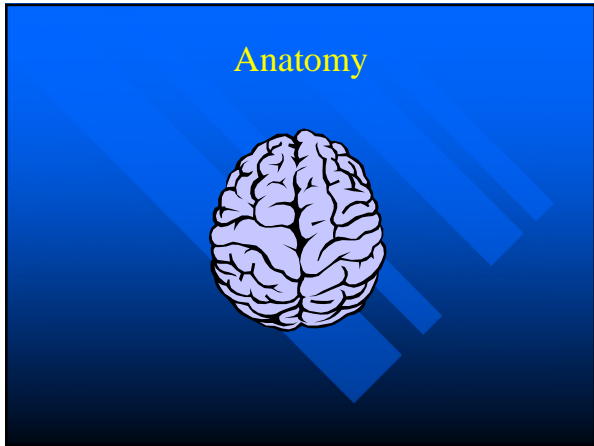
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"An Electrical Storm"

- Rapid firing of impulses
- Like VF of the brain



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Two Main Etiologies

- **Idiopathic**
 - Epilepsy
 - Easily controlled
 - Sometimes goes into remission
- **Physiological**
 - Underlying injury
 - Structural lesion
 - Unpredictable
 - Difficult to control

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Seizure Classifications

- **Partial Seizures**
 - Focal electrical malfunction (single side)
 - No alteration in consciousness (simple)
 - May alter consciousness (complex)
- **Generalized Seizures**
 - Both hemispheres
 - Loss of consciousness/awareness

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Partial

- Portion of the brain is effected
- Possible change in mental status
- Classified as Simple or Complex

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Generalized

- Change in mental status
- Clinical presentation can range from Absence to Tonic Clonic

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Simple vs Complex

■ No change in mental status	■ Change in mental status
■ Affect brain activity in temporal lobe or limbic system	■ Affect any area of the brain

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International Classification of Epileptic Seizures

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Partial Seizures

Type	Duration	Symptom	Postictal
Simple Partial	90 seconds	No LOC Sudden jerking, sensory	Possible weakness Loss of sensation
Complex Partial	1-2 Minutes	Aura, staring, automatisms, Unaware, may wander	Amnesia for event, Mild confusion

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Generalized Seizure

Type	Duration	Symptoms	Postictal
Absence (petit mal)	2-15 seconds	Stare, Eyes fluttering	Amnesia for event, No confusion, resumes activity
Generalized tonic/clonic (grand mal)	1-2 minutes	Cry, Fall, tonic, clonic, cyanosis	Amnesia for event, Confusion, Deep sleep

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Simple Partial

- Has an Aura
- Is still aware of surroundings
- Focal
- No loss of consciousness



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Complex Partial

- May have an aura
- Staring
- Automatism
- Unaware of environment
- May wander



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Complex Partial



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Generalized Seizures

- Starts with a LOC
- An epileptic "cry"
- Tonic rigidity
- Bilateral jerking
- No recollection of the event
- Rests after the seizure



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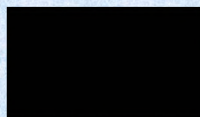
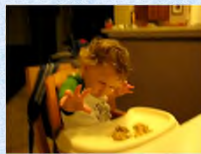
Generalized Seizures in a child



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Myoclonic Seizures

- Sudden onset jerking
- No loss of consciousness
- Amnesia of the event



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Absence Seizures

- The seizures formerly known as "Petit Mal"
- Short duration (2-15 seconds)
- Staring - eye fluttering
- Amnesia for event
- No confusion - picks right up!

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Absence Seizures



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Absence Seizures



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Tonic Seizures



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Atonic "Drop" Seizures



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Not All That Shakes is Epilepsy

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Incidence

- No statistics on total number of Americans having seizures annually but...Seizures account for 1% of ED visits (1 million annually)
 - Seizure accounts for higher proportions of ED visits among infants and toddlers, males and Blacks
- 4 million Americans have epilepsy
 - more males
 - more African-Americans

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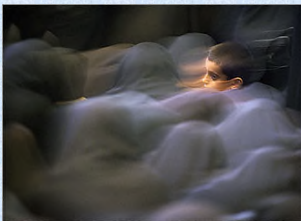
Causes

- Ionic Changes
 - pH
 - Electrolyte Imbalances
 - Hyperventilation
- Metabolic Changes
 - Hypoglycemia
 - Fever
 - Stress
 - Fatigue
- Neuronal Structural Changes
 - Hypoxia
 - Trauma
 - Tumors
 - Vascular Insufficiency

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Epilepsy Stats


- 50% have seizure before age 20
- Age is often related to etiology




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Epilepsy

- Disorder of the Central Nervous System
- Characterized by recurrent seizures not otherwise provoked by acute injury or other medical emergency





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Your Clues

- AMPLE or SAMPLE hx's
 - Medicines
 - PMH
 - Events

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Common Antiepileptics

- Dilantin ◦
- Cerebyx ◦
- Tegretol ◦
- Depakote ◦
- Barbita ◦
- Zarontin ◦
- Neurontin ◦
- Lamictal ◦



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Vagus Nerve Stimulation

- Used for Partial Seizures
- Vagus nerve goes to parts of the brain that may be responsible for the activity
- Similar to a "pacemaker" for the heart

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Epilepsy

- A chronic seizure disorder

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Stages of Seizure Activity

- Aura
- Prodrome
- Tonic Phase
- Clonic Phase
- Postictal State

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Status Epilepticus

- 5% Epileptics
- 10-20% mortality due to Anoxia & Acidosis
- Definition: greater than 30 min of continuous seizure activity, more than 2 sequential seizures without full recovery of consciousness between activity.

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Status Epilepticus

- Definition:
 - 2 or more seizures without a period of lucidity
- Can be life threatening

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Incidence of Status Epilepticus

- 50,000 - 60,000 cases per year
- 3% pediatric mortality
- 10% adult mortality

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Management of Status Epilepticus

- Recognize this life threatening emergency!
 - Protect the patient from injury
 - Airway management, O2, Monitor
 - IV access, Normal Saline KVO
 - Check blood sugar level
 - IV Benzodiazepine, per protocol
- **This patient may require BVM ventilation
**Be prepared for cardiac arrest

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Time Factors

- Seizures lasting greater than 30 min maybe associated with increased neuronal injury.
- Initiate therapy after greater than 5 min of continuous seizure activity.
- 12% of pts with epilepsy present with seizures lasting at least 30 min.
- 20% will have SE within 5 yrs

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Status Epilepticus



- "No acute mortality in patients with pre-existing epilepsy who receive prompt & appropriate treatment"

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Not All That Shakes is Epilepsy

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Newborns

- Genetic metabolic
- Developmental defects
- Severe hypoxia
- Hypoglycemia
- Hypocalcemia



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Childhood



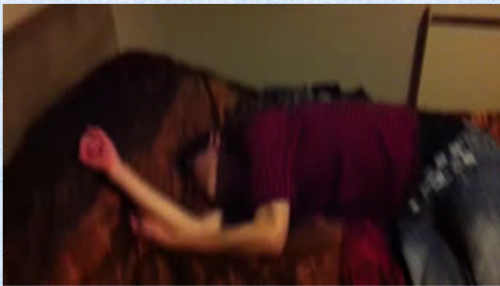
- Meningitis
- Encephalitis
- Brain Abscess
- First seizure
- Febrile seizure
- Few occur after age 4

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Not All That Shakes is Epilepsy

- Alcohol withdrawal
- Eclampsia
- Pseudo (PNES) Seizures

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20 year old male, having a non-epileptic seizure. The young man had a 30 minute warning in advance (Aura). The young man has given his permission for this video to be shared.

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Monitor Ventilations

- Capnography can play a major role
- Pulse ox may be helpful but not definitive

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Seizure Management

- Establish IV
- Check blood glucose level
- If hypoglycemic, administer D50W

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Seizure Management

- Stop the seizure activity
 - Valium (diazepam) IV
 - Rectal Valium (Diastat)
 - Ativan (lorazepam)
 - Versed

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Seizure Meds

- Control seizure
 - Cerebyx (Fosphenytoin) 20mg/kg
 - Dilantin?
 - Levels?



I PROMISE
I WON'T LOOK...

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Use of Benzodiazepines

- In some settings, this is controversial in the prehospital setting
 - Prolonged seizures caused hypoxia and cellular and neuronal damage and death
 - Benzodiazepines can cause respiratory depression

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Benzodiazepines

- Potentiates the effects of gamma-aminobutyric acid (GABA) an inhibitory neurotransmitter, and depresses the CNS at the limbic and subcortical levels of the brain.
- Used for 30 years
- Controls status in 79% of patients
- Can cause respiratory and CNS depression

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Todd's Paralysis

- Postictal focal motor deficit or weakness that may last up to 24 hrs
 - 13% occurrence post seizure (any type)

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