



Seizures and Epilepsy for Physician Assistants

Cheryl McNeil, MD

Objective

- ❖ Define Seizures and Epilepsy and differentiate between the two terms
- ❖ Describe the clinical presentation of seizures
- ❖ Formulate a differential diagnosis for patients presenting with possible seizures
- ❖ Select the appropriate diagnostic evaluation for patient presenting with seizure
- ❖ Choose the appropriate treatment for patients with seizures
- ❖ Explain the protocol for emergent management of status epilepticus

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Epilepsy: Definitions

- **Seizure**: a paroxysmal pathological discharge of neurons which results in a stereotypical behavior or sensation- A seizure is a symptom- like a cough
- **Epilepsy**: the chronic condition of recurrent unprovoked epileptic seizures- Epilepsy is a disease like COPD
- **Status Epilepticus**: a rare emergency in which a person has continuous seizures for greater than 30 minutes, with great morbidity and mortality

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Types of Seizures

Focal Onset

Simple Partial

Motor

Sensory

Complex partial

Generalized Onset

Absence

Tonic-Clonic

Infantile Spasms

Rare Types such as Atonic

Any Partial Onset Seizure can Secondarily Spread and become a Generalized Tonic Clonic Seizure

Epilepsy

What is the underlying cause of epilepsy? It is very multifactorial.

Back to the cough analogy,
chronic cough can be caused by:
genetic problems- CF
toxic problems -COPD from smoking
Cancer- lung ca, mets to the lung
allergic/ inflammatory -asthma
Infectious - TB

Getting to the bottom of the
pathophysiology in each case
is greatly facilitated by
specific diagnosis.

As a modern physician with
near complete understanding of
how the respiratory system
works , I can tell you why you
are coughing



Epilepsy Syndrome

Oh, I have seen this syndrome before. I think it is caused by his Id having a tantrum because he is lusting after his mother



In the case of epilepsy- we are a 100 years or so behind the cough folks. This means that patients with similar symptoms and clinical courses are clumped together for the purpose of determining prognosis, best treatment, etc... As science advances, and there is a widespread effort to keep data, more and more syndromes are being identified. Each syndrome likely has its own genetic and environmental causal factors, prognosis and response to treatment- yet to be teased out in the

Important Epilepsy/ Seizure Syndromes for Physician Assistants- generalized

Febrile Seizures



- Most Common- 4% of population
- Seizures only occur with fever
- Only in small children

Absence Epilepsy

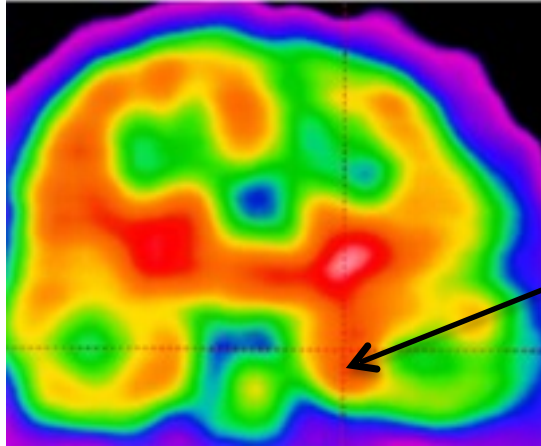
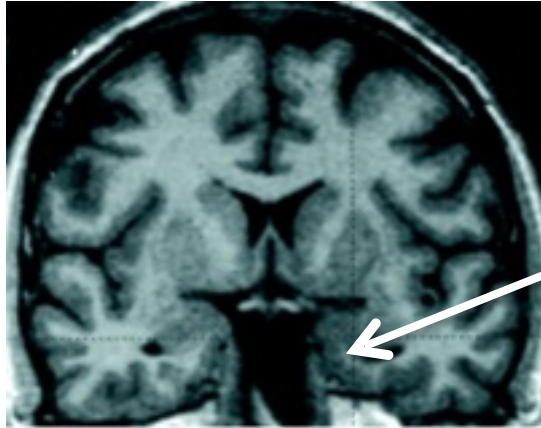


- Look like a few second staring spell
- Returns immediately to normal

Other Common Primary Generalized Epilepsy Syndromes

Syndrome	Onset	Other Information
Infantile Spasms	Infants	Associated with developmental regression
Lennox-Gastaut Syndrome	First decade	Associated with developmental regression
Juvenile Myoclonic Epilepsy	adolescents	Normal Development

Important Epilepsy Syndromes for PAs: Temporal Lobe Epilepsy



- Very Common form of epilepsy
- Seizures are described as:
 - 1) Simple partial- and consisting of a de-ja-vu, or transient sense of fear, or unpleasant olfactory sensations OR
 - 2) Complex Partial- above sensation followed by confusion and speech problems lasting seconds to minutes, and followed by amnesia of the event and mild post ictal cognitive changes
- Usually arise from the hippocampus or amygdala (medial temporal lobe)

Top, MRI and bottom, a coregistered postictal SPECT, with cross section through the region of the amygdala. There is persistent postictal hyperperfusion over the left amygdala region in this patient with left mesial temporal lobe epilepsy

Videos



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Epileptic Seizures: Differential Diagnosis

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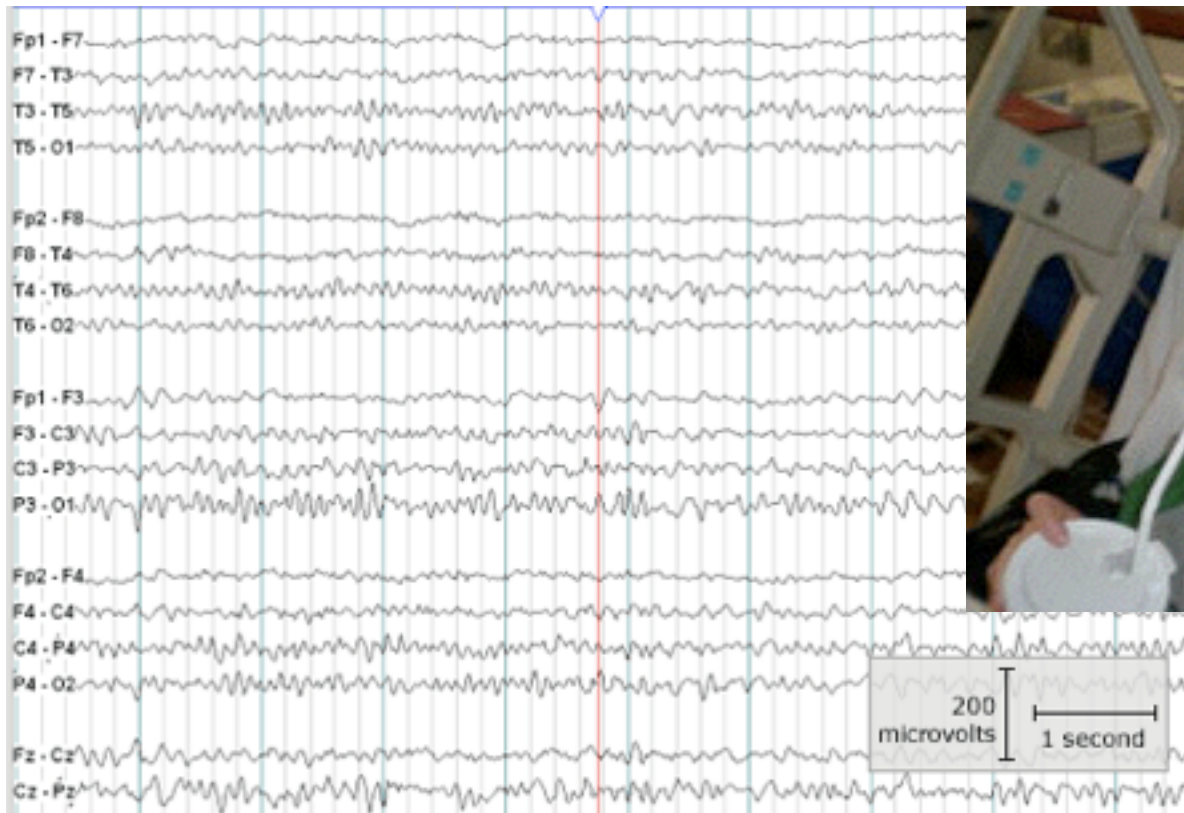
- ❖ Syncope
- ❖ TIA
- ❖ Complicated Migraine
- ❖ Repetitive Behaviors
- ❖ Non-epileptic Seizures

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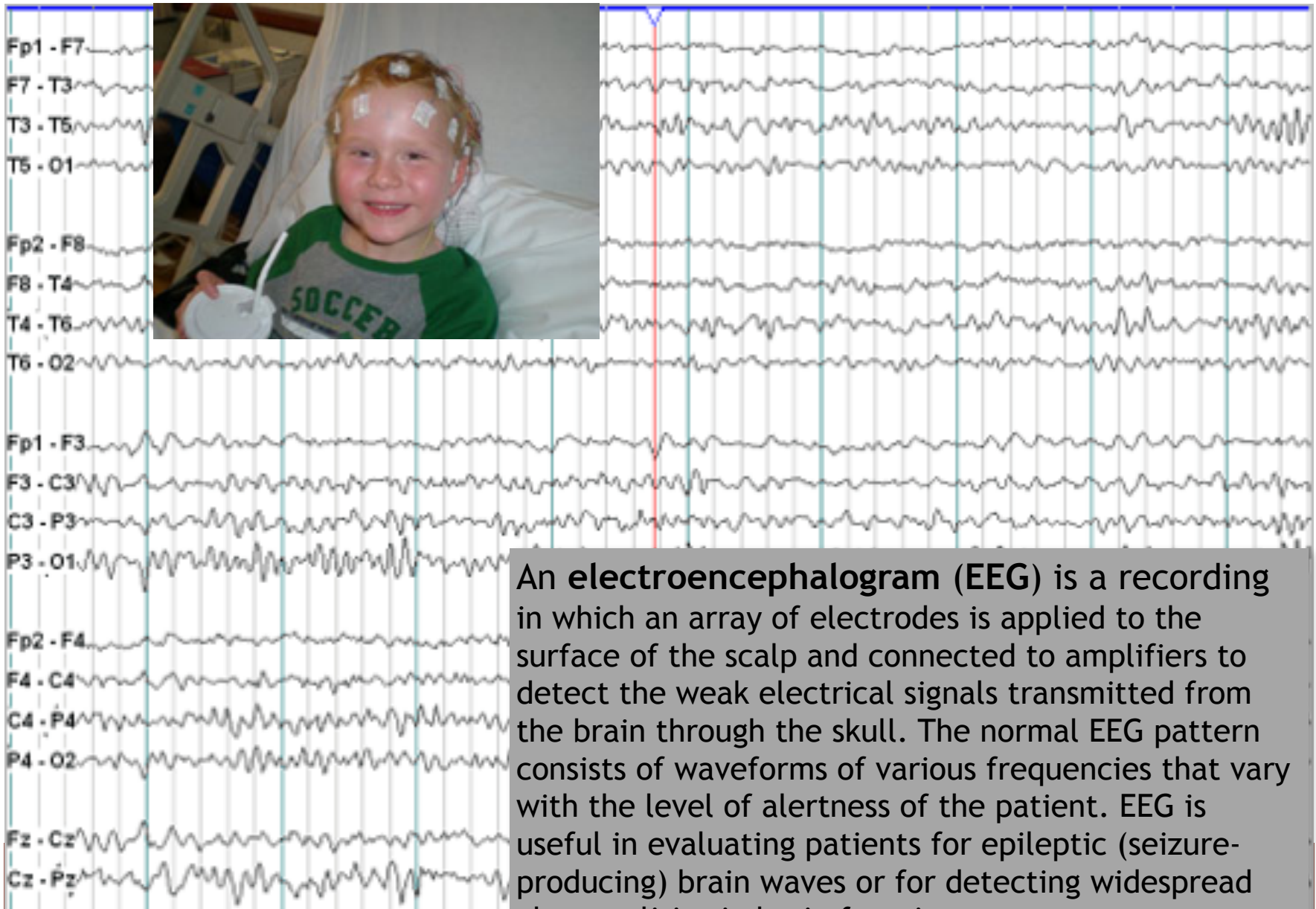
Epilepsy:

Evaluation



The mainstay of evaluation is EEG to identify the type of epilepsy
MRI is often done to look for an underlying cause such as a tumor

What is an EEG ?



An **electroencephalogram (EEG)** is a recording in which an array of electrodes is applied to the surface of the scalp and connected to amplifiers to detect the weak electrical signals transmitted from the brain through the skull. The normal EEG pattern consists of waveforms of various frequencies that vary with the level of alertness of the patient. EEG is useful in evaluating patients for epileptic (seizure-producing) brain waves or for detecting widespread abnormalities in brain function .

Indications and Contraindications

When is an EEG indicated?

EEGs are most useful in epilepsy. Many epilepsy syndromes have characteristic abnormalities between seizures. In others it is only helpful if the recording is taken during a seizure.

EEGs can also be useful in delirium, coma , and brain death.

When is it Contraindicated?

EEGs are painless and risk free- the only concern is that it takes a couple of hours and costs several hundred dollars, and are therefore not indicated when the results will not impact management- i.e. the history is convincing for complex partial seizures and the patient is already well controlled on their current anticonvulsants.

Once we have the EEG, what can it tell us?

An abnormal EEG with epileptiform discharges confirms the diagnosis of epilepsy and usually characterizes the epilepsy syndrome and therefore guides management with medication.

An abnormal EEG with diffuse slowing can confirm the presence of an encephalopathy

A normal EEG does not exclude any diagnosis.

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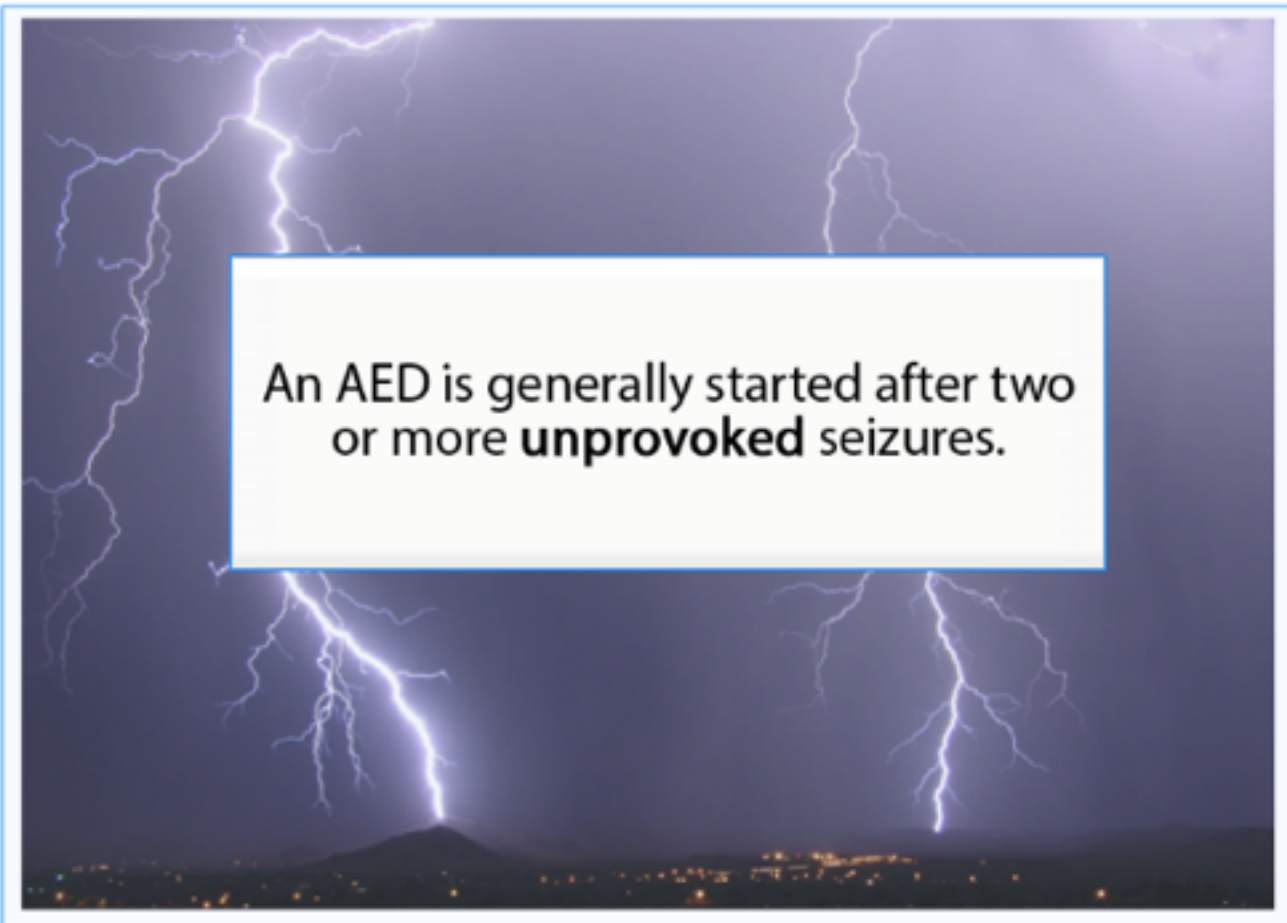
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Epilepsy: Management



The mainstay of therapy is the chronic use of anticonvulsants, or antiepileptic drugs. Some patients undergo epilepsy surgery

Initiation of Treatment



An AED is generally started after two or more **unprovoked** seizures.

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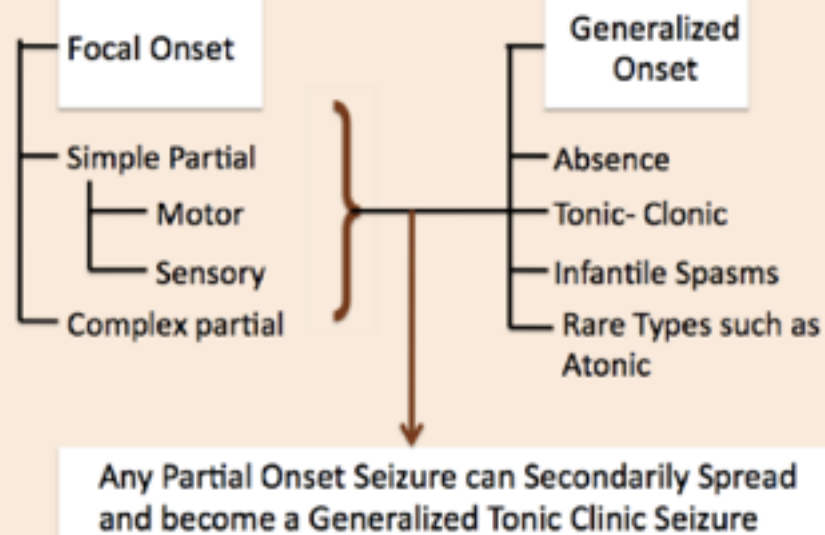


First Step



The first step in designing a treatment plan is to classify the patient's seizure type(s).

Types of Seizures



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Choosing the Initial AED (cont.)

Traditional/Simplified Approach

- Absence seizure: ethosuximide
- Other 1° generalized seizures: valproate
- Partial seizures (including 2° generalized): carbamazepine, phenytoin
- Neonatal seizures: phenobarbital

Modern/Advanced Approach

- Broad spectrum: *all seizure types*
 - lamotrigine
 - levetiracetam
 - topiramate
 - valproate
- Narrow spectrum: *simple partial, complex partial, 2° generalized*
 - carbamazepine
 - gabapentin/pregabalin
 - phenobarbital
 - phenytoin
- Narrow spectrum: *absence*
 - ethosuximide

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What If It Doesn't Work?



50% successfully treated!

50% fail the first agent

25% continue to have seizures

25% cannot tolerate side effects

Continue

Next Steps

Treatment Algorithm

Click on each button.

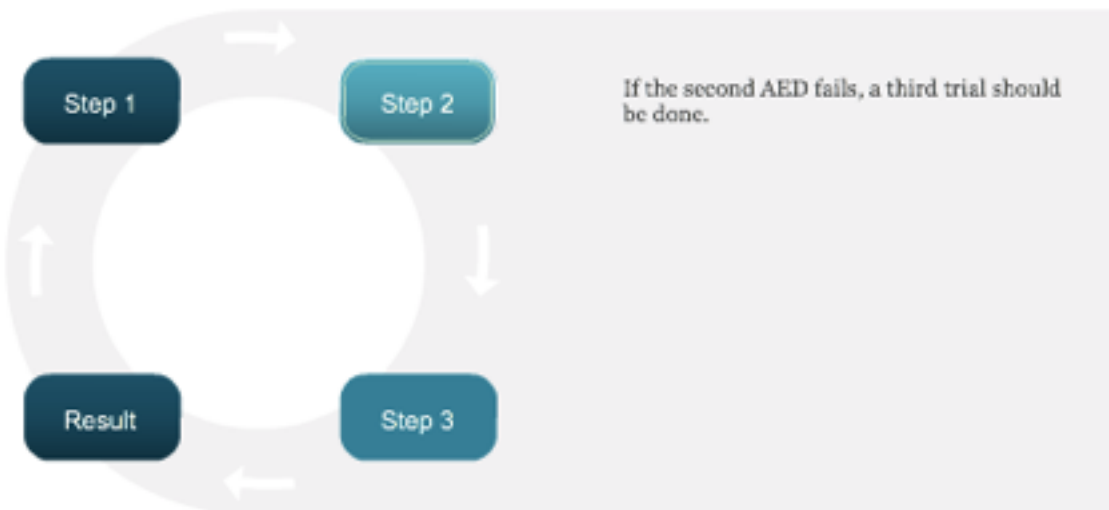


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Next Steps

Treatment Algorithm

Click on each button.



Continue

Next Steps

Treatment Algorithm

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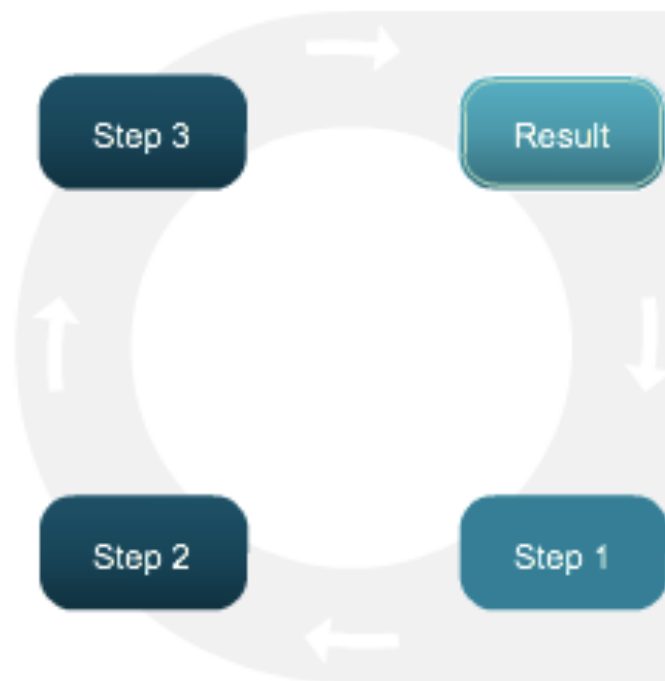


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Next Steps

Treatment Algorithm

Click on each button.



In total, 80% of patients are seized with AED therapy.

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Status Epilepticus

Treatment

Click on each button.

STAGE 1: FIRST 30 MINUTES

1

Early Status Epilepticus:

Treat with benzodiazepines - IV lorazepam, buccal midazolam, IV or rectal diazepam

2

3

4

Continue

Status Epilepticus

Treatment

Click on each button.

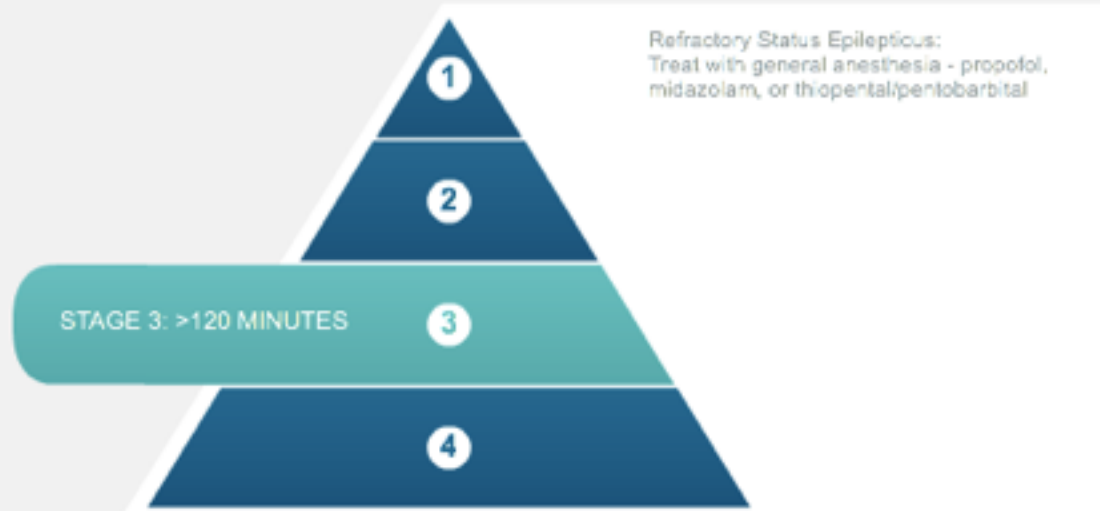


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Status Epilepticus

Treatment

Click on each button.



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Status Epilepticus

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**Question
s????**