Differentiating seizure symptoms in adults and choosing appropriate treatment while waiting for neurology

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Objectives

- Define seizures, including the different types/subtypes of seizures
- Identify seizure etiology
- Identify the 3 stages of seizures and different signs/symptoms seen during seizures
- Learn how to properly evaluate a patient suspected of seizure activity
- Recognize common treatment options for seizures, including most likely treatment options to use prior to patient being seen by neurology
- Recognize complications of seizures
- Define SUDEP
- Identify role of primary care providers

Seizure Definition

- International League of Epilepsy (ILAE) definition of Epilepsy: “a disorder of the brain characterized by an enduring predisposition to generate epileptic seizures and by the neurobiological, cognitive, psychological, and social consequences of this condition”[5]
- In the clinical application, **epilepsy** is defined as two unprovoked seizures separated by 24 hours.[5] There are other cases that can dictate a diagnosis of epilepsy (eg: only one unprovoked seizure with positive electroencephalography [EEG] reading post seizure), but these would be determined by further testing with neurology.

Seizure Types

Epileptic Seizures

Generalized[1]

Focal[1]

Focal Aware

Focal Unaware

Partial seizure

Generalized seizure

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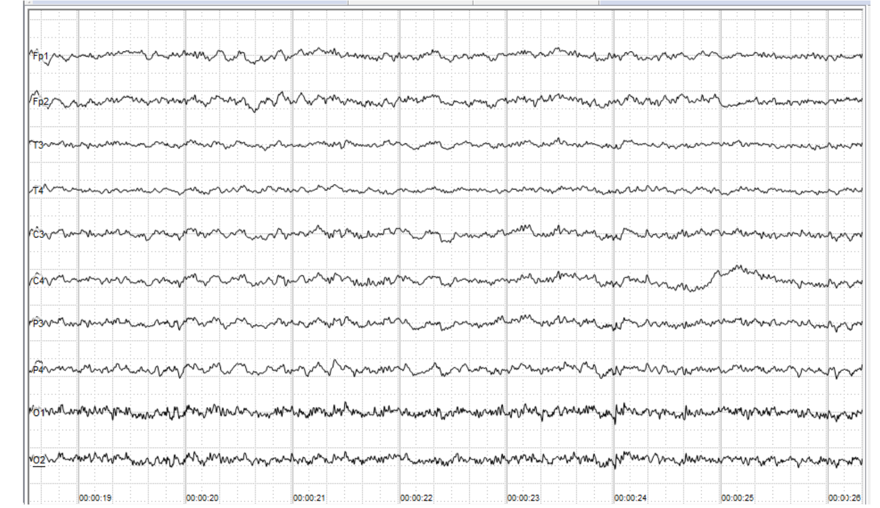
Unknown[1]

Unclassified[1]



Psychogenic Nonepileptic Seizures

Previously called "Pseudoseizures"

Seizure Types (cont.)

THEIR ACTIONS MAY PUT
THEM IN HARM'S WAY.

Seizure Etiology

- Epileptic Seizures
  - Structural (abnormality on neuroimaging)
  - Genetic (genetic variant)
  - Infectious (eg: encephalitis, neurosyphilis)
  - Metabolic (eg: severe electrolyte imbalances, significant blood glucose abnormalities)
  - Immunologic
  - Idiopathic
- Provoked vs. Unprovoked
  - Provoked seizures – defined by ILAE as a seizure directly caused by an *acute, symptomatic* condition[6]
  - Unprovoked seizures – seizure of unknown etiology or related to *remote, symptomatic* condition/lesion[6]
- Psychogenic Nonepileptic Seizures (PNES)
  - Etiology unclear – appears to be a link between sexual abuse and other forms of early trauma

Stages of Seizures

How can you tell if this is an epileptic or a nonepileptic seizure? There are little signs in each of these phases that give you hints as to what kind of seizure it is.

* *That being said – the ONLY way to know if a patient has had an epileptic seizure or not is for the patient to have a seizure on EEG and determine if there is associated EEG activity!*

AURA

- Metallic taste or smell
- Other smells (burning, familiar but unidentifiable)
- Sense of déjà vu
- Rising sense in stomach
- Nausea
- Dizziness
- Sudden onset of anxiety
- Flashing lights, images

ICTAL

- The period of time in which the patient is actually seizing
- Important to get clear history of events
- Ictal behaviors are useful for localization and determining focal vs. generalized
- Majority of seizures end spontaneously within 2-3 minutes

POSTICTAL

- Period of transition from ictal state to preseizure baseline
- Varies from confusion to suppressed alertness
- Patients usually start to recover responsiveness and alertness usually 10 to 20 minutes after seizure but confusion can last hours to days
- Patient may be unknowingly violent

Clinical Features of Seizures

	Clinical Features	Duration	Recall of Events
Focal Seizure	Initial symptoms depend on location in brain. “Positive” symptoms are usually motor or visual (eg: shaking, jerking, flashing, visual distortion)	Usually lasts less than 2 minutes. Can be difficult to distinguish ictal from postictal stage.	Variable depending on if seizure was focal aware or focal unaware.
Generalized Seizure	Sudden loss of consciousness without warning; tonic stiffness followed by clonic movements; rhythmic movements; eyes often open; tongue biting and urinary incontinence may occur	Less than 5 minutes for general tonic clonic (GTC); Longer than 5 minutes is sign of status epilepticus and indicates medical emergency	Complete amnesia; patient may recall initial focal/aura symptoms
PNES	Fluctuating, asynchronous movements, often with eye closure, side-to-side head or body movements, pelvic thrusting; most occur in front of a witness; fully or partially alert despite bilateral motor activity; tongue biting is rare	Rarely less than 1 minute; often prolonged (greater than 30 minutes)	Variable, often able to recall some of the event
Syncope	Transient loss of consciousness resulting in postural tone; prodrome of warm or cold feeling, sweating, palpitations, pallor; myoclonic jerks or tonic posturing may occur; no or minimal post-event confusion	1 to 2 minutes	Patient can recall prodromal symptoms, if present

(Adapted from Schacter, S. C., Garcia, P. A., & Dashe, J. F. (2025). Overview of the management of epilepsy in adults. *UpToDate*. Retrieved August 17, 2025 from https://www.uptodate.com/contents/overview-of-the-management-of-epilepsy-in-adults, Table 7)

Evaluation of Seizures

- Evaluation of seizures includes a thorough history including:
  - Age of onset of seizures
  - Frequency of seizures
  - Family history of seizures
  - History of anti-seizure medication (ASM) use (if ever on any)
  - Response/side effects to said ASMs
  - Psychosocial history
  - Any factors that could have triggered or provoked the seizures
  - History of head injury Comorbid conditions
  - Any aura if present.[2, 8]

- Gather information about seizure details, gathering information, ***preferably from an observer if at all possible for the most accurate details***, including:
  - Posturing
  - Movements
  - Presence of automatisms (ie: lip smacking, hand movements)
  - Eye movements,
  - Bowel/bladder function
  - Postictal behavior.[2]

- Physical Exam
  - Detailed neurologic exam assessing for focal neurologic deficits and lateralizing abnormalities
  - Cutaneous exam and examination of the mouth

Evaluation of Seizures (cont.)

- Laboratory studies [2, 8]
  - POC Glucose
  - CBC
  - CMP
  - Magnesium
  - Serum Lactate
  - Renal Function Tests
  - Liver Function Tests
  - Urinalysis
- ECG should be performed on any patient with LOC [8]
- EEG
- Neuroimaging should be completed on any patient with a first seizure [2, 8]
  - CT Head upon initial evaluation
  - Outpatient MRI Brain w/wo contrast while waiting for neurology consult with epilepsy/seizure protocol

Evaluation of Seizures (cont.)

(A) Hippocampal Sclerosis

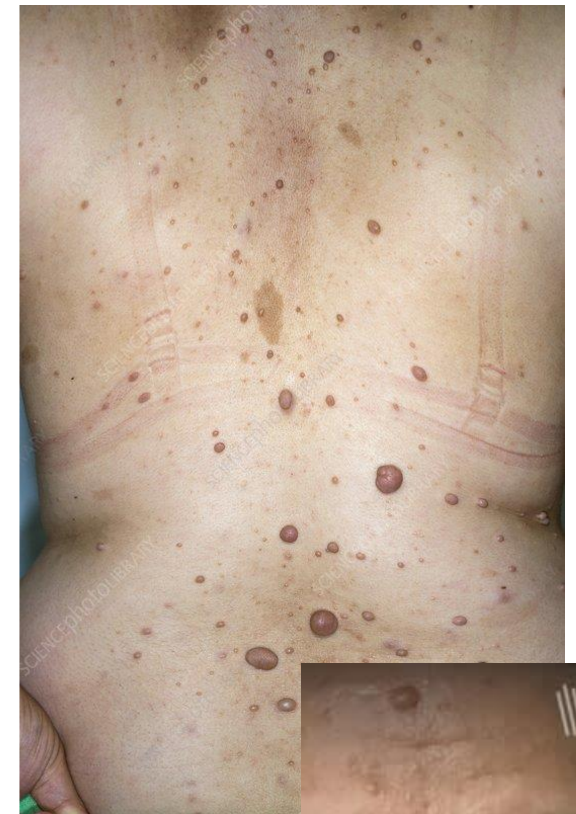
(B) Focal Cortical Dysplasia

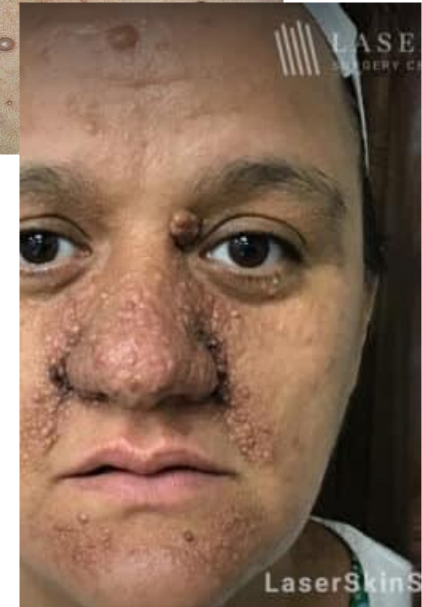
(D) DNET, Ganglioglioma

(C) Heterotopia, Schizencephaly, Hamartoma, Hemi-megalencephaly, Polymicrogyria, Band Heterotopia, Pachygyria

(E) Cavernous Angioma, AVM

(F) Ulegyria, Post-stroke





Seizure Treatment

- Multiple different anti-seizure medications available with varying mechanisms of action, pharmacologic properties, and side effect profiles[6]
- Medication decisions are typically made based on age, sex, side effects, and potential drug interactions
- All seizure medications work by suppression neuronal activity
  - Blocking sodium channels, blocking calcium channels, inhibiting glutamatergic (excitatory) neurotransmission, increasing GABAergic (inhibitory) neurotransmission

- Two categories
  - Broad spectrum
    - Keppra (levetiracetam)
    - Depakote (divalproex sodium, valproate)
    - Lamictal (lamotrigine)
    - Topamax (topiramate)
    - Zonegran (zonisamide)
  - Narrow spectrum
    - Vimpat (lacosamide) [CONTROLLED]
    - Trileptal (oxcarbazepine)
    - Tegretol (carbamazepine)
    - Dilantin (phenytoin)
    - Neurontin (gabapentin)
    - Lyrica (pregabalin) [CONTROLLED]

Seizure Treatment (cont.)

- Primary goal of treatment – prevent further seizures from occurring
- Seizure medications must be taken daily in almost all patients
  - Some patients may require seizure medications acutely (eg: those with metabolic disturbances)
- All anti-seizure medications (ASMs) can have unpleasant side effects[9]
  - Drowsiness
  - Dizziness
  - Nausea
  - Fatigue
  - Headache
  - All very commonly reported side effects of many ASMs[7]
- Maximize the dose of one medication prior to starting a second medication if a second medication is needed[9]
  - A minimum of 2 weeks at therapeutic levels of one ASM should be given before a second medication is added[9]

Seizure Treatment (cont.)

- Treatment considerations:
    - Child-bearing age – utilize medications that are safe for pregnancy in the case that the patient were to get pregnant
        - Keppra or lamotrigine are the only pregnancy safe ASMs at this time[5]
    - Pregnancy has a large effect on pharmacokinetics of ASMs
        - Often, seizure medications require increase in dosing[5]
        - Regular serum levels should be obtained monthly throughout pregnancy AND immediately after to avoid toxicity
    - Elderly – Consider drug-drug interactions
        - Eg: phenytoin and carbamazepine are contraindicated with blood thinners
        - Age-related alterations in protein binding, reduced hepatic metabolism, decreased renal clearance[7]

- What about PNES?
    - It is difficult to distinguish epileptic from nonepileptic. **If in doubt, treat!** Risk of seizing outweighs benefit of avoiding treatment of possible PNES. Neurology will determine if medication needs to be continued.

Complications of Seizures

- Injury due to tonic-clonic seizures
  - Tongue lacerations, shoulder dislocations, vertebral compression fractures, aspiration injury[2]
- Status Epilepticus
  - Convulsive status epilepticus
  - Nonconvulsive status epilepticus [6]
- Psychosocial issues
  - Loss of independence, underemployment, decreased leisure time [7]
- Cognitive impairment
  - Often present at diagnosis and may worsen over time [7]
- Increased incidence of depression and anxiety
  - Regular screening should be done [7]
- Sudden Unexpected Death in Epilepsy Patients (SUDEP)
  - Occurs when someone with epilepsy suddenly dies without an discernable cause [6]

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What Primary Care Providers Can Do

- Be aware of seizure first aid recommendations.
  - Great one page seizure first aid print out available
- Know potential seizure triggers
  - Knowing triggers can help a patient plan and avoid seizures
  - Trigger examples: Lack of sleep, missed ASM, menstrual periods for some women, illness, stress, flashing lights
- Be aware of a patient’s individualized Seizure Action Plan (SAP) and assist patient in maintaining these
- Know when to recommend that a patient/family calls 911/presents to ED
- Understand effects of drugs and alcohol on seizures
  - Alcohol consumption in small amounts (1 to 2 drinks) may not affect seizure frequency in well controlled epileptic patients; heavier consumption increases risk of seizures, particularly in withdrawal period
  - In patients with epilepsy and known alcoholism, I often recommend that they do not quit cold turkey, as this could be very dangerous for them

What Primary Care Providers Can Do (cont.)

- Be aware of medications that lower seizure threshold and should be avoided if possible
  - Certain medications will lower seizure threshold and possibly worsen seizure disorder
    - Wellbutrin (bupropion) – this is a BIG offender
    - Bucapsol (buspirone)
    - Lithobid (lithium)
    - Stimulants (eg: amphetamines, methylphenidate)
    - Sympathomimetics and decongestant (eg: pseudoephrine)
    - Opioids (eg: tramadol, meperidine)
- Understand restrictions that seizure patients should follow
  - Understand driving laws where you practice.
    - It is a felony in the state of Kansas and Missouri to drive within 6 months of having a seizure.
  - Patients should not swim alone and should avoid high heights, cooking over heat, using power tools or sharp objects, or any other activity that could cause harm to themselves or others within 6 months of having a seizure.

References

1. Beniczky, S., Trinka, E., Wirrell, E., Abdulla, F., Al Baradie, R., Alonso Vanegas, M., Auvin, S. Bhushan Singh, M., Blumenfeld, H., Bogacz Fressola, A., Caraballo, R., Carreno, M., Cendes, F., Charway, A., Cook, M., Craiu, Ezeala-Adikaibe, B., Frauscher, B., French, J., . . . Cross, J. H. (2025). Updated classification of epileptic seizures: Position paper of the International League Against Epilepsy. *Epilepsia, 00*, 1-20. https://doi.org/10.1111/epi.18338

2. Biller, J. (2017). *Practical Neurology* (5th edition). Wolters Kluwer.

3. Duncan, R., Garcia, P. A., & Dashe, J. F. (2024). Functional seizures: Etiology, clinical features, and diagnosis. *UpToDate*. Retrieved August 17, 2025 from https://www.uptodate.com/contents/functional-seizures-etiology-clinical-features-and-diagnosis

4. Espay, A. J., & Biller, J. (2021). *Concise Neurology: A Focused Review* (2nd edition). Wolters Kluwer.

5. Jones, L. K., & Hopp, J. L. (Eds.). (2025). *Continuum: Lifelong learning in neurology: Epilepsy* (1st ed., Vol. 31). Wolters Kluwer.

6. Thaler, A.I, & Thaler, M. S. (2023). *The Only Neurology Book You'll Ever Need*. Wolters Kluwer.

7. Schacter, S. C., Garcia, P. A., & Dashe, J. F. (2025). Overview of the management of epilepsy in adults. *UpToDate*. Retrieved August 17, 2025 from https://www.uptodate.com/contents/overview-of-the-management-of-epilepsy-in-adults

8. Schacter, S. C., Haider, H. A., & Bullinger, K. (2025). Evaluation and management of the first seizure in adults. *UpToDate*. Retrieved August 17, 2025 from https://www.uptodate.com/contents/evaluation-and-management-of-the-first-seizure-in-adults

9. Wiederholt, W. C. (2000). *Neurology for Non-Neurologists* (4th edition). W. B. Saunders Company.

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Questions?