

Seizure Disorder

Long-term seizure care means picking the right anti-seizure medicine for the seizure type, teaching the person how to stay safe, and watching for the medicine's side effects.

THE ONE-LINE TRUTH

First figure out whether the seizure starts in one spot (focal) or everywhere at once (generalized), because that split steers every choice you make next.

The chain — how it unfolds

1. The balance between excitatory signals (glutamate) and inhibitory signals (GABA) tips too far toward excitation in a group of nerve cells. — why: Normally, GABA (the brain's main calming messenger) keeps glutamate (the 'go' signal) in check—but a stroke scar, tumor, gene defect, or chemical imbalance can weaken GABA or boost glutamate, so the cells fire too easily.
2. One group of nerve cells begins firing wildly and in sync, and that abnormal burst either stays local (focal seizure) or spreads across both sides of the brain at once (generalized seizure). — why: If the trigger is in one spot—like a scar in the hippocampus (the memory-sorting center deep in the brain) or a tumor in the frontal lobe (the front part that controls movement and planning)—the seizure starts focal; if the whole brain's wiring is too excitable (genetic or metabolic), the seizure is generalized from the start.
3. During the seizure, the person loses control of movement, awareness, or both, depending on which brain regions are involved. — why: If the motor cortex (the strip that controls movement) fires abnormally, you get shaking or stiffening; if the temporal lobe (the side part that handles memory and emotion) fires, you get strange feelings, déjà vu, or automatisms (repetitive actions like lip-smacking); if both sides of the thalamus (the brain's relay station deep in the middle) fire, you lose awareness and stare or shake all over.
4. The seizure burns through glucose and oxygen faster than the blood can deliver them, and muscles working without enough oxygen produce lactic acid (a waste product that makes muscles sore). — why: Nerve cells firing nonstop need huge amounts of energy—if the seizure lasts more than a few minutes, the brain runs low on fuel and oxygen, which can damage cells permanently, especially in the hippocampus.

5. After the seizure stops (the in the groggy phase after a seizure (postictal) period), the person is confused, exhausted, or weak because the nerve cells are depleted and need time to recharge and clear out waste. — why: The brain has just sprinted a marathon—it takes minutes to hours to restore glucose, clear lactic acid, and pump the sodium and potassium back to normal levels so the nerve cells can fire in rhythm again.
6. Between seizures the brain tries to re-balance 'go' and 'stop' signals, but the underlying trigger (scar, tumor, gene, chemical imbalance) remains, so another seizure will happen without treatment. — why: Each seizure can strengthen the abnormal electrical pathways (kindling), making the brain more excitable and the next seizure easier to trigger—this is why early treatment matters.
7. Rare but life-threatening complications include status epilepticus (a seizure that will not stop) (seizure lasting longer than five minutes, risking brain damage), SUDEP (sudden death from breathing or heart pause during or after a seizure, especially in sleep), serious injury from falls, and Stevens-Johnson syndrome (a severe drug rash). — why: Status epilepticus (a seizure that will not stop) is an emergency because the brain runs out of glucose and oxygen, killing cells; SUDEP happens when the seizure disrupts the brainstem centers that control breathing and heart rhythm; and a few anti-seizure medicines (especially lamotrigine, carbamazepine, phenytoin) can trigger a dangerous immune reaction in the skin.

Spot it — what you see, and why

- Sudden jerking movements that the person cannot control: A burst of electrical signals fires through the brain all at once (like a lightning storm in the wiring), making muscles clench and relax over and over without the person choosing to move.
- Staring spell with no response when you talk to them: The electrical storm locks up the thalamus (the brain's relay station that keeps you aware and awake), so the person cannot notice or answer you even though their eyes are open.
- Confusion or sleepiness right after the event: The burst of electricity drains energy from neurons (brain cells) and floods the brain with extra potassium and waste chemicals, so the brain needs time to clear the mess and recharge—like rebooting after a power surge.
- Loss of bladder or bowel control during the event: The electrical storm spreads to the motor cortex (the part of the brain that tells muscles when to squeeze and when to relax), so the sphincter muscles (the rings that hold urine and stool in) let go without warning.
- Tongue biting on the side during the event: The jaw muscles clench hard and fast during the jerking, and the tongue gets caught between the teeth—bites on the side of the tongue (not the tip) are a strong clue it was a real seizure.

- Feeling a strange smell, taste, or rising feeling in the belly right before: The electrical storm starts in a small spot—often the temporal lobe (the brain area near your ear that handles smell, taste, and gut signals)—before it spreads, so the person gets a warning sensation called an aura.

Red flags — act now

- Seizure lasts longer than 5 minutes or repeats without the person waking up in between (status epilepticus—a medical emergency that can kill brain cells)
- New seizure in an adult, especially over age 25 (raises worry for tumor, stroke, or infection)
- Fever, stiff neck, or severe headache with the seizure (may be meningitis or encephalitis—brain infection)
- Sudden weakness or numbness on one side after the seizure clears (could be a stroke instead of or along with the seizure)
- Person is pregnant (seizures can harm the baby, and eclampsia—dangerously high blood pressure in pregnancy—can cause seizures and needs immediate treatment)

Treat it — in this order

1. Identify seizure type (focal vs. generalized) by witness description, patient memory, and EEG findings → Knowing where the seizure starts — one spot (focal) or both sides at once (generalized) — tells you which medicine will quiet the break. Focal seizures respond to levetiracetam, lamotrigine, or carbamazepine. Generalized seizures respond to valproate, lamotrigine, or levetiracetam. Picking the wrong type can make seizures worse (for example, carbamazepine can worsen absence or myoclonic seizures).
2. Start a first-line anti-seizure medicine matched to seizure type: levetiracetam or lamotrigine for focal-onset; valproate (avoid in women of childbearing age) or lamotrigine for generalized-onset → These medicines stabilize the brain's electrical system by either boosting the brain's natural calming signal (GABA) or dampening overactive sodium or calcium channels. This keeps the abnormal electrical wave from spreading and causing shaking, staring, or loss of awareness. Most people (60–70%) become seizure-free on the first or second medicine tried.
3. Obtain brain MRI to find structural causes (stroke, tumor, malformation, hippocampal sclerosis) → Imaging shows you the physical break causing the seizures. If you find a removable tumor, operable scar, or blood vessel tangle, surgery may cure the epilepsy instead of requiring lifelong medicine. If you find hippocampal sclerosis (common in temporal lobe epilepsy), you know surgery is an option if medicines fail.

4. Titrate medicine dose slowly (especially lamotrigine) and recheck at 2–4 weeks; monitor for rash and measure drug levels if seizures continue → Slow titration prevents allergic rashes (Stevens-Johnson syndrome) and reduces side effects like dizziness and nausea. Measuring drug levels (for phenytoin, valproate, carbamazepine) tells you if the dose is too low to work or too high and causing toxicity. Levetiracetam and lamotrigine levels are less useful because their effect does not match blood level reliably.
5. Counsel on safety: no driving until seizure-free per state law (usually 3–12 months), avoid swimming alone, avoid heights and heavy machinery, and shower instead of bath → Seizures can strike without warning. A seizure while driving, swimming, or on a ladder can cause death. State laws restrict driving after a seizure to protect the person and others. These rules prevent injury during the vulnerable period before seizures are controlled.

Your top priorities at the bedside

1. Place the patient on continuous pulse oximetry and position them on their side if they have altered mental status or are still in the in the groggy phase after a seizure (postictal) period — why: Seizures cause tongue falling back and blocking the airway plus increased saliva, so side-lying prevents aspiration (breathing in saliva or vomit into lungs) and keeps oxygen saturation above 94 percent to protect the brain
2. Establish IV access and check fingerstick glucose immediately if the patient is still seizing or has not returned to baseline mental status within 10 minutes — why: Low blood sugar (Hypoglycemia) (low blood sugar below 70) mimics seizures and causes real seizures if severe, while IV access allows urgent medicine delivery if seizure continues into status epilepticus (a seizure that will not stop) (seizure lasting over 5 minutes), which causes permanent brain damage
3. Protect the patient from injury by padding bedrails, removing hard objects from the bedside, and staying within arm's reach during the first 24 hours after a witnessed seizure — why: Patients can have repeat seizures within the first day before anti-seizure medicine reaches therapeutic levels (effective blood concentration), and falls or head strikes during seizure cause skull fractures and intracranial bleeding (blood inside the skull)