

Status Epilepticus

Status epilepticus (a seizure that will not stop) is a seizure that won't stop on its own. Your brain needs help right away or cells start dying.

THE ONE-LINE TRUTH

A seizure that lasts more than 5 minutes is status epilepticus (a seizure that will not stop) — a brain emergency that can kill cells if it is not stopped fast.

The chain — how it unfolds

1. Neurons fire all at once without stopping. — why: The seizure starts when something triggers runaway firing (like missing seizure pills, low blood sugar, or a stroke). Normally the GABA brakes would stop it in a minute or two, but in status epilepticus (a seizure that will not stop) the firing keeps going.
2. GABA receptors disappear from the neuron surface. — why: After about 5 to 10 minutes of nonstop firing, the GABA-A receptors (the brake pedals) get pulled inside the cell and tucked away, so the brain's natural off-switch stops working.
3. Glutamate receptors move to the surface. — why: At the same time, glutamate NMDA receptors (the gas pedals) move to the outside of neurons, so the turn-on signal gets even stronger and locks the seizure in place.
4. The body works at top speed — muscles squeeze hard, the heart races, and waste piles up. — why: All that firing makes muscles contract over and over without rest, burning fuel and oxygen very fast and dumping acid waste (lactate) into the blood, so the blood gets too acidic (lactic too much acid in the blood (acidosis)).
5. Body temperature climbs and muscles start breaking down. — why: The nonstop muscle work makes so much heat that the body cannot cool down, and muscles that work too hard without rest start to tear apart (rhabdomyolysis), spilling a protein called myoglobin into the blood that can clog and damage the kidneys.
6. Seizure medicines stop working as well. — why: Benzodiazepines (like lorazepam or diazepam) work by boosting GABA, but if the GABA receptors are already gone from the cell surface, the medicine has nothing to grab onto — so it does not work as well the longer you wait.

7. After 30 minutes, brain cells start to die. — why: Even if oxygen and blood flow stay normal, neurons that fire nonstop for 30 minutes or more run out of energy inside the cell and start to die — this is called excitotoxic injury, and it causes permanent brain damage.
8. The person can choke, stop breathing, or have the heart stop. — why: If the seizure is not stopped, the body's compensations fail: blood pressure drops, the heart gets unstable and can stop (from too much acid in the blood (acidosis), low oxygen, or high potassium leaking from broken muscle cells), and the airway can get blocked by the tongue or by vomit, cutting off oxygen completely.

Spot it — what you see, and why

- Shaking that won't stop for more than 5 minutes: The brain's nerve cells are firing out of control in a runaway electrical storm, causing muscles all over the body to jerk and tighten over and over without the usual shut-off signal.
- Multiple seizures one after another with no time to wake up in between: The brain doesn't get a chance to reset between electrical storms, so the person stays trapped in a repeating cycle of seizure activity without regaining normal awareness.
- Not waking up or responding after a seizure that seemed to stop: The electrical storm may still be firing silently inside the brain (called non-convulsive status epilepticus (a seizure that will not stop)) even though the visible shaking has stopped, keeping the person deeply unconscious.
- Fast breathing or pauses in breathing: The brainstem (the lower part of the brain that controls automatic breathing) gets overwhelmed by the seizure's electrical chaos, causing the breathing rhythm to speed up, slow down, or stop briefly.
- Blue lips or fingertips: Breathing becomes so inefficient during the seizure that oxygen levels in the blood drop, turning skin and nails a dusky blue color (called bluish skin (cyanosis)).
- Fever or high body temperature: The non-stop muscle contractions generate heat like a car engine running at full throttle, and the brain's temperature control center (the hypothalamus) can't cool the body down fast enough.

Red flags — act now

- Seizure lasting longer than 5 minutes without stopping
- Not breathing well or turning blue
- Not waking up between seizures or after the shaking stops
- First-ever seizure in someone who has never had one before

- Seizure in a pregnant woman, which could signal eclampsia (a dangerous pregnancy complication)

Treat it — in this order

1. Check fingerstick glucose immediately; if < 60 mg/dL, give 25 grams of IV dextrose (D50W, one amp) or 1 mg glucagon IM if no IV → Low blood sugar (hypoglycemia) shuts down the brain's off-switch because brain cells run on glucose. Raising blood sugar lets GABA (the brain's main calming signal) work again, which can stop the seizure within minutes. This is the fastest fix.
2. Establish IV access and give lorazepam 4 mg IV over 2 minutes (or diazepam 10 mg IV, or midazolam 10 mg IM if no IV) within the first 5 to 20 minutes → Benzodiazepines (benzos) boost GABA, the brain's off-signal, so the nonstop firing stops. They cross into the brain fast and stop seizures in 60 to 80 percent of cases. Lorazepam lasts longer than diazepam. Midazolam works in the muscle if you cannot get an IV.
3. Secure the airway, give high-flow oxygen, position the person on their side, suction secretions if needed, and prepare for intubation if they cannot protect their airway → Status epilepticus (a seizure that will not stop) makes muscles clench, so breathing becomes shallow and oxygen drops. Nonstop muscle activity burns oxygen fast, creating lactic acid and making blood acidic (acidosis). Keeping oxygen flowing prevents brain swelling and brain cell death from low oxygen (hypoxia).
4. If seizure continues after benzos (refractory status epilepticus (a seizure that will not stop), after 20 minutes), give a second-line anti-seizure medicine: levetiracetam 60 mg/kg IV (max 4500 mg), OR fosphenytoin 20 mg PE/kg IV (max 1500 mg PE), OR valproate 40 mg/kg IV (max 3000 mg) → These drugs work more slowly than benzos but last longer. Levetiracetam blocks calcium channels on brain cells so they cannot keep firing. Fosphenytoin blocks sodium channels so the on-signal (glutamate) cannot spread. Valproate boosts GABA and blocks sodium. All three reset how brain cells fire so the off-signal can catch up.
5. If still seizing after 40 to 60 minutes (established refractory status epilepticus (a seizure that will not stop)), start continuous IV anesthetic: midazolam infusion (0.2 mg/kg bolus, then 0.1–2 mg/kg/hr), OR propofol (1–2 mg/kg bolus, then 20–200 mcg/kg/min), OR pentobarbital (5–15 mg/kg load, then 0.5–5 mg/kg/hr). Requires ICU, intubation, and continuous EEG monitoring. → These anesthetics put the whole brain to sleep (burst suppression on EEG) so the nonstop firing stops. They are the last step when all other medicines fail. They give the brain time to rest and reset.

Your top priorities at the bedside

1. Check blood sugar with a fingerstick glucometer right now. — why: The brain needs glucose (sugar) to work. Low blood sugar causes seizure-like shaking and confusion but fixes in 2 minutes with IV dextrose, so you must rule this out first before giving seizure medicine.
2. Protect the airway by turning the patient on their side and suctioning if needed. — why: During a seizure the tongue and throat muscles relax, so spit and vomit can block the airway (breathing tube) or go into the lungs causing aspiration pneumonia (lung infection from inhaling stomach contents).
3. Give oxygen by nasal cannula or mask to keep oxygen saturation above 94 percent. — why: Seizures make the brain fire nonstop which uses huge amounts of oxygen, and the person stops breathing deeply during the seizure so oxygen levels drop and brain cells start to die.