

Seizures

Overview

A seizure (also called a fit, spell, convulsion, or attack) is the visible sign of a problem in the electrical system of the brain. A single seizure can have many causes, such as a high fever, lack of oxygen, poisoning, trauma, a tumor, infection, or after brain surgery. Most seizures are controlled with medication. If your seizures occur repeatedly, then you may have the chronic disorder called epilepsy.

What is a seizure?

Your seizure results from an abnormal electrical discharge in your brain. This abnormal "short circuit" can cause a change in behavior without you being aware of what is happening. During a seizure you may fall down, stare into space, make jerking movements, or have a funny feeling in your stomach. You cannot control what's happening while you are having a seizure. Your only memory of a seizure may be waking up with people asking questions such as "What is your name?" "Where are you?" and "What day is it?"

Some seizures have "triggers" such as flashing lights, lack of sleep, stress, medications, or low blood sugar.

What causes seizures?

Approximately 70% of seizures have unknown causes. One in 10 people will have a seizure during their lifetime. Known causes include:

Neurologic

- lack of oxygen to the brain
- poisoning (lead, carbon monoxide)
- head injury
- genetic defect in the brain
- brain tumor
- arteriovenous malformation (AVM)
- following brain surgery
- infection (meningitis, encephalitis, abscess)

Cardiovascular

- stroke
- irregular blood pressure
- irregular heart beat (arrhythmia)

Other

- kidney or liver failure
- metabolism disorders

- low blood sugar (diabetes), hypoglycemia
- pregnancy
- withdrawal from drugs or alcohol
- high fever (febrile seizure) usually in children

Psychologic (non epileptic attack)

- Hysteria or panic attacks
- Hyperventilation
- Mental illness

Often confused with seizures is a condition called syncope, which is a fainting spell caused by a lack of blood flow to the brain. Syncope can be caused by treatable cardiovascular disease.

Types of seizures

Seizures are classified as either generalized, focal, or unknown onset. Focal seizures arise from one part of the brain and include simple partial and complex partial seizures. Generalized seizures involve the entire brain and include generalized tonic-clonic, absence, myoclonic, as well as tonic, clonic, and atonic seizures.

Generalized onset seizures

If you have this type of seizure, the whole brain is involved and you lose consciousness. The seizure may then take one of the following six forms:

- **Tonic-Clonic Seizure** ("grand mal"): you become rigid, and may fall if standing. Your muscles switch between periods of spasm (tonic) and relaxation with jerking motions (clonic). You may bite your tongue. Your breathing is labored and you may urinate or defecate involuntarily.
- **Tonic Seizure:** your muscles generally stiffen without rhythmical jerking. This stiffening or rigidity also involves the breathing muscles and you may cry out or moan.
- **Clonic Seizure:** your muscles jerk rhythmically without stiffening.
- **Atonic Seizure** (drop attack): your muscle control is suddenly lost, causing you to fall if you are standing.

- **Myoclonic Seizure:** your arms and legs jerk abruptly. These seizures often occur soon after you wake up, either on their own or with other forms of a generalized seizure.
- **Absence Seizure ("petit mal"):** your consciousness is briefly interrupted, with no other signs, except perhaps for a fluttering of your eyelids. These seizures happen most often in children.

Focal onset seizures

If you are having a focal seizure, the disturbance in brain activity begins in a distinct area of your brain. The nature of these seizures is usually determined by the function of the brain area involved. For example, if the motor cortex area is affected, then your arm or leg may jerk uncontrollably. Focal seizures were previously called "partial." There are three types of focal seizures:

- **Focal Aware Seizure:** you do not lose consciousness and are aware, but may be unable to respond. Your arm or leg may rhythmically twitch or you may experience unusual tastes or sensations, such as a feeling of "pins and needles," in a distinct part of your body. If a focal seizure develops into another type of seizure, it is often called a "warning" or "aura." Focal aware seizures (previously called simple partial seizure) are brief and the person goes on with their activity when it is over.
- **Focal Impaired Awareness Seizure:** the seizure usually begins with a blank or empty stare, and your awareness changes, even though the seizure does not involve convulsions. You may fiddle with clothes, smack your lips, wander around, and generally be confused. This type of seizure usually lasts 2–4 minutes and involves the temporal lobes of the brain, but may also affect the frontal and parietal lobes. The person has no memory of the seizure and may feel tired or confused afterwards. It is often preceded by an aura or warning. (Previously called complex partial seizures.)
- **Focal to Bilateral Tonic-Clonic Seizure:** is a focal seizure that starts in one area and then spreads to involve the whole brain, causing body stiffness (tonic) and jerking movements (clonic). The old term for this type is secondarily generalized seizure.

What treatments are available?

Your doctor may prescribe a drug called an *antiepileptic drug*, or *anticonvulsant*, used to treat seizures. These drugs are taken every day, sometimes several times a day, for as long as needed. The drugs help control the seizures. There are over two dozen medications for seizures. Common anticonvulsants include Dilantin (phenytoin), Tegretol (carbamazepine), Depakote

For friends and family

What to do during a seizure

Most of the time a seizure lasts less than 3 minutes, so by the time an emergency medication is ready to be given, the seizure is over. The most important thing during a seizure is for you to stay calm and protect the person having a seizure.

The following guidelines apply to tonic-clonic seizures (convulsions, grand mal) or complex partial seizures.

1. Cushion the head. Banging the head against a hard surface during a seizure may lead to head trauma. Use any available soft object, and, if needed, use your foot.
2. Loosen tight neckwear to ease breathing.
3. Turn the person onto his/her side. This position helps the tongue fall to the side of the mouth, leaving the airway clear for normal breathing.
4. Do not insert any object into the person's mouth. An object in the mouth will not prevent tongue biting, nor will a person swallow his/her tongue, as some people think. In fact, if an object is placed into the mouth, you may cause more harm by breaking teeth or losing the object in the throat, causing choking.
5. Do not restrain a person during a seizure unless there is a danger. They may become aggressive if you do so. Allow them to do what they want to do. Talk to them in a soft voice to reassure them.

Afterward, tell the person that he/she has had a seizure and make sure they're breathing normal. Check the person's awareness by asking a few questions, such as, "Where are you?" or "What is the day today?" If a tonic-clonic seizure has occurred, inform the doctor.

When to Call 911

1. The seizure lasts longer than 5–10 minutes (status epilepticus). Timing the seizure with a watch is helpful because a brief seizure may seem longer than it really is.
2. Two or more seizures occur together.
3. There are injuries from the seizure.
4. It is the first seizure the person has ever had.
5. The person is pregnant.

If you have any suspicion that something is wrong, **CALL**. It is better to call too frequently than to avoid calling.

(valproic acid), and phenobarbital. Several recent medications, such as Lamictal (lamotrigine), Neurontin (gabapentin), Cerebyx (fosphenytoin), Keppra (levetiracetam), and Felbatol (felbamate), have been approved since 1993 for the treatment of seizure disorders. These drugs may be used alone or in combination with each other when seizures are difficult to control.

Your doctor may prescribe anticonvulsants briefly after you have had brain surgery, head trauma, or a cerebral hemorrhage. If you have no seizures, the dosage of the drug is usually tapered until it is stopped within a short time. However, that time period may vary, based on your condition and specific problem.

As with all drugs there are side effects and drug interactions. Most common side effects include fatigue, drowsiness, nausea, and blurred vision. Also, these drugs may reduce the effectiveness of birth control pills.

What can I do if medications don't control my seizures?

If medications do not control your seizures, then surgery in the portion of the brain responsible for your seizures (e.g., brain resection, disconnection, or stimulation) may treat the condition. If this is the case, you should discuss this option with your doctor (see Epilepsy Surgery).

Clinical trials

Clinical trials are research studies in which new treatments—drugs, diagnostics, procedures, vaccines, and other therapies—are tested in people to see if they are safe and effective. Research is always being conducted to improve the standard of medical care and explore new drug and surgical treatments. You can find information about current clinical investigations, including their eligibility, protocol, and participating locations on the web: the National Institutes of Health (NIH), www.clinicaltrials.gov, sponsors many trials; private industry and pharmaceutical companies also sponsor trials. www.centerwatch.com

Sources & links

If you have more questions, please contact New England Neurological Associates at 978-687-2321.

Links

Epilepsy Foundation www.epilepsy.com

Glossary

anticonvulsant: a drug that prevents or stops convulsions.

arteriovenous malformation (AVM): a congenital disorder in which there is an abnormal connection between arteries and veins without an intervening capillary bed.

epilepsy: a chronic disorder marked by repeated seizures causing a sudden loss or change of consciousness and convulsions or muscle spasms.

generalized seizure: a seizure involving the entire brain.

partial seizure: a seizure involving only a portion of the brain.

seizure: uncontrollable convulsion, spasm, or series of jerking movements of the face, trunk, arms, or legs.

status epilepticus: a seizure that lasts more than 5 minutes and requires immediate medical attention due to lack of oxygen to the brain.

syncope: a fainting spell caused by an abrupt reduction of blood flow to the brain.

tumor: an abnormal tissue that grows more rapidly than normal tissue; a tumor may be either benign (non-cancer) or malignant (cancer).



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reviewed by > Maureen Gartner, RN and George Mandybur, MD, Mayfield Clinic, Cincinnati, Ohio

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