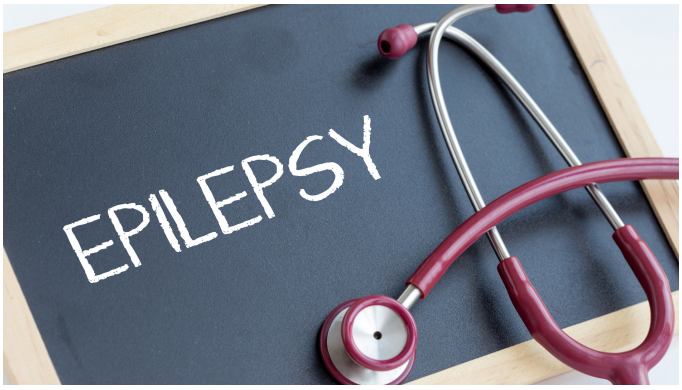
Patient Education

Epilepsy (Advanced)

by: NeuroCare.AI

What is Epilepsy?

Epilepsy is a neurological brain disorder in which **clusters of neurons** in the brain fire signals abnormally. It affects the mind that causes odd sensations, behavior, convulsions, and loss of consciousness. It is also known as a common serious brain disorder characterized by recurrent epileptic seizures.



80% are treatable with modern medicines & surgical treatment programs.

20% might get benefit from available treatment today.

1 in 100,000 Americans experiences epilepsy.

Seizure vs. Epilepsy

A seizure is when there is **an abnormal excessive or synchronous brain activity that results in a transitory occurrence of symptoms or signs.** This can cause unusual behaviors, body movements, and sensations. It can cause a person to lose consciousness, convulse, fall, stay still for a period of time (staring spell), or turn pale.

According to ILAE (International League Against Epilepsy):

Seizures vs. Epilepsy

- **Seizure is symptom and epilepsy is a disease** similar to cough is a symptom and pnemonia is a disease.
- Seizure is a **sudden and short interruption** in the normal transmission of electrical impulses in the brain.
- Epilepsy can be ruled out as a diagnosis when the patient has **two or more seizures lasting for about 24 hours apart** not caused by another condition.
- A **minimum of two unprovoked (or reflex)** seizures occur greater than 24 hours apart.
- **One unprovoked (or reflex) seizure and a likelihood of further seizures** with the general recurrence risk (at least 60%) after two unprovoked seizures over the next decade.

Signs and Symptoms

1.Aura (Pre-seizure) - An aura can precede a seizure attack. It is like a **warning that the seizure is coming.** It is not experienced by all epileptic patients. These are stereotypical events right before the seizure attack. Examples include the strange smell

2. Seizures - **Uncontrolled jerking** of the whole or part of the body is considered a hallmark sign of epileptic seizures. However, seizures in epilepsy can be more subtle and sometimes confused for other disorders. Patients of epilepsy can suffer from:

- ***Seizure with Loss of awareness:*** This could be brief and limited to just a few seconds to complete loss of consciousness. The complete loss of consciousness can be accompanied by tongue biting, urinary leakage, etc.
- ***Seizures without loss of awareness:*** In these repetitive motor movements generally not the whole but part of the body is affected and patients do not lose awareness.

3.Post-seizure - The patient does experience a lot of **exhaustion, and grogginess** and in times of convulsive seizures muscle pain is noted as well.

Other Symptoms - Patients with epilepsy do have an increase in neurophysiological symptoms like depression, anxiety, and agoraphobia (fear of open or public places). Patients experiencing high intensity and frequency of seizures may develop cognitive disabilities.

What are the different kinds of Seizures?

Although the term “epilepsy” technically refers to any disorder that includes these sudden attacks, in common usage, it refers to disorders characterized by having multiple unprovoked seizures. The symptoms of an epileptic episode will usually be the same from episode to episode, since epileptic seizures tend to be the same type. Doctors generally classify seizures as either **focal or generalized**, based on how and where the abnormal brain activity begins. The hemisphere of the brain which is involved will determine the side of the body the seizure affects.

3 Operational Classification of Seizures

Focal Seizure

Focal seizures remain **localized to one hemisphere of the brain** and do not involve both hemispheres.

Generalized

Generalized epilepsy **affects the brain bilaterally (meaning, it affects both sides of the brain).** Symptoms typically don't come on during sleep and can occur any time during the day (during any activity).

Unknown

If the **beginning of a seizure is not known,** it's called an "unknown onset seizure."

Generalized Seizures

Motor Seizures

Tonic-Clonic Seizures. The person loses consciousness, stiffens, and falls to the floor. Breathing stops for about a minute and may be followed by repeated jerking movements of the arms and legs (tonic phase) and then the entire body (clonic phase). This is sometimes referred to as **"grand mal seizures."**

Tonic Seizures. This typically cause stiffening of body muscles, generally those in the back, legs, and arms. This may be accompanied by opening the eyes widely and staring, and afterward, some people are dazed for a short period.

Myoclonic Seizures. This causes jerks or twitches of the upper body, arms, or legs. If a person has a sudden jerk or twitch, they may be able to feel it, but they have no control over it. The seizure may stop after a few seconds or eventually spread throughout the whole body.

Atonic Seizures. This type of seizure causes a sudden loss of muscle tone, leading to a fall or nod off, sometimes without warning. Because atonic seizures disrupt activities without impairing consciousness, most people have no memory of the event.

Non-Motor (Absence) Seizure

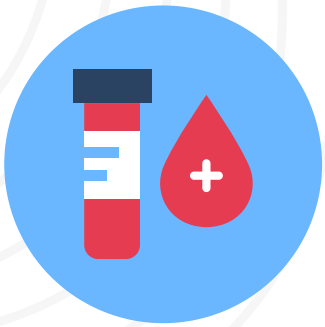
A brief seizure with no loss of consciousness during which a person may appear to be staring into space (epileptic stare). The person may have jerking or twitching muscles and lose control of urine or stool (incontinence). It is sometimes referred to as a **petit mal seizure**.

Secondarily generalized seizures

These are usually partial seizures evolving into generalized seizures, most often with tonic-clonic convulsions. Although secondary or "secondarily generalized" seizures are similar to the first one, they don't tend to have any distinctive features.

Epilepsy Diagnostic Investigation

1. Laboratory Testing



a. Blood Test. If a patient is diagnosed with epilepsy, a doctor may send the patient to a geneticist. This health care professional will examine the results of blood tests and possibly genetic testing to determine if there is a mitochondrial disorder or another medical condition that may be causing or triggering the seizures.

b. Cerebrospinal fluid test. Cerebrospinal fluid tests measure glucose, lactate, cell count, and proteins such as albumin, IgG, IgM, and IgA. Most often performed when a patient has their first seizure to rule out potentially life-threatening factors such as infection.

2. Electroencephalogram (EEG) Monitoring

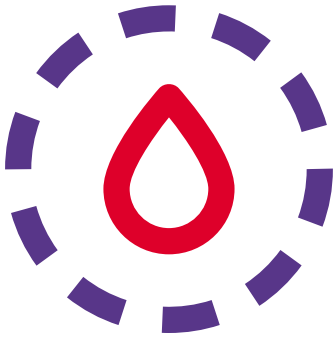
The most common test is an electrodiagnostic procedure that **records brain wave patterns from many locations on the scalp.** Because the electrical activity of each brain hemisphere is distinct, seizures usually show up as abnormalities in one or both hemispheres.

3.Brain Scans

Brain imaging procedures do not diagnose brain tumors, cysts, or other brain abnormalities. They can be used to locate them, determine their size and shape, evaluate their effects on the surrounding tissue, and discover how they may have affected brain function.

- **CT and MRI scans** would reveal brain structures that could be used to identify brain tumors, cysts, and other abnormalities.
- **PET and functional MRI (fMRI)** can both be used to monitor brain activity and detect abnormalities in how it functions.
- **SPECT** is a newer brain scan that is sometimes used to pinpoint seizure foci in the brain.

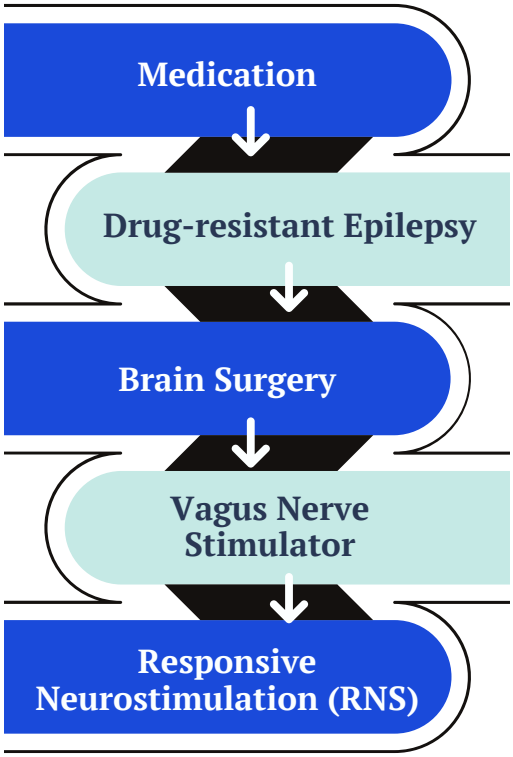
4.Other Tests



After the doctor measures the patient's reflexes, muscle tone, and strength, another **series of developmental, neurological, and behavioral tests** will be given to the patient. The test results may help determine if epilepsy is a factor in your symptoms in some cases. Or the doctor might perform specialized tests to help make that determination.

Treatment for Epilepsy

The first step in finding the proper treatment for epilepsy is a complete medical history and physical examination. For some people with epilepsy, taking medications does not control seizure activity. Many of these people have intractable epilepsy and need alternative therapies. Brain surgery is a proven treatment for intractable epilepsy, but only if performed by a neurologist adequately trained and experienced in this type of surgery.



Medication is the first-line of therapy and in most case one medication (monotherapy) is enough. However in some cases more than one medication is used (combination therapy).

Drug-resistant epilepsy is defined as “Failure of adequate trials of 2 tolerated, appropriately chosen and used antiepileptic drugs (whether as monotherapies or in combination) to achieve sustained seizure freedom”.

Brain surgery may help control seizures if doctors determine that a brain region that causes seizures is small enough in area and specialization to spare. It may also be possible to disconnect the communication between two brain regions responsible for seizure activity.

A device that goes in your chest called a **"vagus nerve stimulator"** is available to help control seizures. This is an electro-physiological device that works by stimulating the vagus nerve, and it's been used for years as a treatment for epilepsy.

Responsive Neurostimulation (RNS) is a device implanted in the brain without the need of removing brain tissue to prevent seizures before they start. Detection of certain epileptiform patterns activates the RNS system to deliver short electrical impulses. It is a reversible procedure and the implant can be removed at any time.

More About Epilepsy

Epilepsy on Intellectual Capacity

- It is essential to understand that **epilepsy (and seizures) are not caused by mental illness or mental retardation.** Most people with mental retardation do not develop epilepsy unless there is another lesion or an underlying cause, such as a brain tumor that causes both mental retardation and seizure disorder.

Epilepsy on Physical and Mental Impairment

- **Epilepsy has nothing to do with personality, behavior, or cognitive functioning.** Having epilepsy does not make a person immune to further physical and mental impairment; just because you have had a seizure doesn’t mean you are already or will become mentally deficient (mentally handicapped, mentally ill).

Epilepsy in Daily Life

- It is normal to be curious about epilepsy. It's a sign of caring because most people with brain disorders are stigmatized. Most people with epilepsy can lead outwardly everyday lives. **Approximately 80% have a favorable prognosis, and some may go months or years between seizures.** However, daily life for people with epilepsy and their families can be somehow affected by seizures. Interruptions in consciousness, loss of control of body movements or emotions, and the effects on how people feel about themselves and their abilities are some of the challenges for people with epilepsy.

Conclusion

Living with epilepsy and seizures isn't always easy, but it doesn't have to stop you from living and enjoying life. People with epilepsy continue their daily routines, despite their condition. They drive to work, go out with friends or family, or enjoy hobbies they've always wanted. Recent medical advances have increased the availability of treatment options and better seizure control for most people with epilepsy. Research is always ongoing, and promising new insights, treatments, and even cures are being pursued—still, many unknowns, such as the exact causes of epilepsy currently under investigation. Life doesn't have to stop when seizures do—but living well will require you and your family to learn how to manage this disorder, reduce the risks of injury, and avoid medical emergencies while taking seizure medication correctly.