

# Epilepsy

Symptoms and Treatments Guidebook



**Advent Health**



## Our Epilepsy Experts Are Here for You

You're in the most caring and capable hands. AdventHealth treats more neuroscience patients and performs more neurosurgical procedures than any other hospital system in the nation. We work hard to reduce or eliminate your seizures with innovative, effective treatment options aimed at improving your quality of life in every respect.

An article in the Journal of the American Medical Association reports risk of premature death is lower in patients who receive specialized epilepsy care from an epileptologist in an epilepsy center.\* Our multidisciplinary approach to care helps assess seizures from a variety of perspectives, so we can gain a precise understanding of your condition and make an accurate diagnosis.

This guidebook can help you learn more about what causes epileptic seizures, potential treatment options and why AdventHealth's epilepsy program may be the right choice for you or your loved one.



## Understanding Epilepsy

Epilepsy is a neurological disorder characterized by recurring seizures caused by abnormal electrical impulses within the brain. It is one of the most common central nervous system disorders, affecting about one in every 100 people in the United States. It can be challenging to diagnose and treat because it affects individuals in different ways and includes over 300 different subtypes and syndromes.

Epilepsy is not a psychiatric or psychological problem. It is not cognitive impairment or developmental delay, although patients with these conditions may also have epilepsy.

Seizures occur when the normal electrical impulses in the brain become abnormal and disrupt brain activity. They can vary in intensity from very mild to severe. A person who experiences two or more unprovoked seizures should have a comprehensive examination

for epilepsy.

Epileptologists (neurologists specializing in epilepsy) divide seizures into two main categories: focal onset seizures that begin in one specific area of the brain (also called “partial seizures”), and generalized seizures (“gran mal”) that occur on both sides of the brain. Medicine can generally control seizures in about 70% of patients, but other treatment options, including surgery, may be needed to eliminate the source of seizures if medication alone can’t manage them.

Recent advances in the treatment of epilepsy and seizure disorders have the potential to significantly improve your quality of life and may provide lifelong relief. We’re here to help design a treatment plan tailored to you that gives you the best chance at total freedom from your seizures.

## Types of Epileptic Seizures

Epileptic seizures are classified according to the cause and starting location of a person’s seizures. Focal seizures (formerly called partial seizures) begin in one specific area of the brain, while generalized seizures are initiated on both sides of the brain. See below for further details on seizure categories.

Generalized Onset	Characteristics
Tonic-clonic seizures “Grand Mal seizures”	<ul style="list-style-type: none"> <li>• Tonic phase — arms and legs stiffen; breathing may stop causing blueness in the lips and face. Sweating and paleness may also occur.</li> <li>• Clonic phase — face and limbs begin to twitch and jerk, breathing returns but may be erratic</li> <li>• Incontinence and biting of the tongue may occur, turning patient on one side can help keep the airway open and help protect from movement injuries</li> <li>• Headache, fatigue and confusion may follow the episode</li> </ul>
Myoclonic	<ul style="list-style-type: none"> <li>• Sudden brief muscle contractions (jerks or twitches of your arms and legs) on both sides</li> </ul>
Clonic	<ul style="list-style-type: none"> <li>• Repeated or rhythmic, jerking muscle movements, usually affect the neck, face and arms</li> </ul>
Atonic “Drop Seizures”	<ul style="list-style-type: none"> <li>• Sudden loss of muscle tone, which may cause you to suddenly collapse or fall down</li> </ul>
Tonic	<ul style="list-style-type: none"> <li>• Tonic seizures cause stiffening of your muscles. These seizures usually affect muscles in your back, arms and legs and may cause you to fall to the ground</li> </ul>
Non-Motor (Absence or “Petit Mal seizures”)	<ul style="list-style-type: none"> <li>• Sudden, brief loss of awareness, vacant staring for a few seconds at a time, ends abruptly, may occur dozens of time per day</li> </ul>
Focal Aware (“simple partial”)	<ul style="list-style-type: none"> <li>• Affects movement, experience or sensation but not the consciousness or memory; can cause sudden feelings of fear, anger or joy as well as skin sensations, ringing or buzzing in the ears and unpleasant tastes or smells. Sensations of familiarity or unfamiliarity (déjà vu or jamais vu)</li> </ul>
Focal with impaired awareness (“complex partial”)	<ul style="list-style-type: none"> <li>• Affects different parts of the brain than focal aware seizures, causing loss of ability to communicate, control movements or speech. Producing nonsensical words or phrases, going into a trance-like state and loss of memory regarding what happened during the seizure is also possible.</li> </ul>

## Causes of Epilepsy

There are many reasons why epilepsy might develop. These include oxygen deprivation at the time of birth, an imbalance of nerve-signaling chemicals (neurotransmitters) and genetic factors. Sometimes, the reason epilepsy develops is unknown. Some of the more common causes of epilepsy are:

- Brain infection (encephalitis, meningitis)
- Brain tumor
- Congenital or developmental malformation of the brain
- Degenerative neurological disorder (Alzheimer's)
- Genetic disorders including gene mutations and chromosomal anomalies
- Prenatal or birth-related brain injury/oxygen deprivation
- Stroke
- Traumatic head injury

## Can Epilepsy Be Prevented?

While epilepsy cannot be prevented, some actions can reduce the risk of the condition both before and after birth. Adequate prenatal care and nutrition, early identification of a high-risk pregnancy and addressing problems such as high blood pressure or an infectious disease in the mother can help prevent brain damage and complications during a baby's delivery that can lead to epilepsy. In addition, proper vaccinations during childhood can protect against infections that may cause epilepsy.

To safeguard yourself and your child from head injuries that might lead to epilepsy, always wear your seatbelt, use proper child car seats, and wear a helmet during activities like bicycling or playing contact sports.

Finally, genetic testing may increase the chances of preventing epilepsy before a child is even born. By identifying known genetic disorders that give rise to causes of epilepsy, it may be possible that early medical intervention can prevent seizures from starting.

## Managing Seizures

There are several ways that someone with epilepsy can reduce their risk of experiencing a debilitating seizure. These include properly managing underlying medical conditions, initiating medical care as soon as possible after the first seizure occurs and paying attention to certain situations or environments that can make you more susceptible to seizures.

### KNOW YOUR EPILEPSY TRIGGERS

A "trigger" is something that often occurs before the onset of a seizure. Learning the common triggers for an epileptic seizure may help you avoid certain situations or be better prepared for a seizure when it occurs. Each patient is unique — not all have triggers that precipitate a seizure. While every patient is different, typical triggers include the following:

#### Common Causes

- Alcohol consumption
- Forgetting to take your anti-epileptic medicine
- Having a fever (children)
- Lack of sleep, poor quality sleep, poor sleep hygiene
- Taking certain over the counter and prescribed medications
- Upsetting or emotionally stressful events

#### Rare Causes

- Being surprised or touched unexpectedly
- Changes in hormones during the menstrual cycle
- Music
- Rapidly flashing lights or on-screen images (very rare — only in certain epilepsy subtypes)
- Sudden changes in temperature (such as a hot shower)



## Signs and Symptoms of Epilepsy

Recurrent seizures are the signs of epilepsy. Some people with epilepsy experience characteristic signals (auras) just before a seizure, or may have only auras without a seizure. They may have a tingling sensation, smell odors that are not present, experience auditory hallucinations such as ringing in the ears or have sudden changes in emotion. Auras are usually actually focal seizures without loss of awareness. Symptoms that indicate someone is having a seizure are:

### Common Symptoms

- Confusion
- Drooling
- Loss of consciousness
- Memory loss
- Numbness or tingling in the extremities
- “Out-of-body” sensation
- Posturing of head, body or extremities
- Rapid eye movement
- Sensation of suddenly being in a familiar or unfamiliar place or situation
- Sudden drop to the ground
- Teeth clenching
- Tongue biting
- Uncontrollable muscle movements

### Rare Symptoms

- Hearing bells or ringing
- Unusual smells, tastes or emotions
- Weakness and overwhelming sleepiness

If you experience the symptoms of a seizure, however brief, it’s important to seek medical evaluation by a qualified health professional. Seizures can cause brain damage, car accidents and injuries to yourself or others or even unexpected death. Keep a record of when you experienced your symptoms, as well as their type and severity, and share this information with your doctor.

## How Epilepsy is Diagnosed

Diagnosing epilepsy requires close observation and intensive tests. Not all seizures are related to epilepsy and some symptoms arise from events that are not epileptic. Doctors use an array of tests for epilepsy that include examinations, brain scans and laboratory tests. These include the following:

### COMPREHENSIVE SEIZURE HISTORY AND PAST MEDICAL HISTORY

Your doctor will need to know whether you've experienced seizures in the past, and if so, the extent of your symptoms in detail.

### NEUROLOGICAL PHYSICAL EXAMINATION

This testing measures basic intellectual function, reflexes and motor abilities to assess if you may have underlying neurological problems precipitating your seizures.

### NEUROPSYCHOLOGICAL TESTING

This testing measures in-depth intellectual capability, reflexes, motor skills and behavior trends that may provide clues to your condition.

### BRAIN IMAGING

These painless exams allow your medical team to see inside your brain to evaluate its activity and function.

We use 3T MRI imaging, EEG monitoring and nuclear medicine brain spectroscopy to develop highly detailed views of the brain's structures and give our specialists the clearest understanding of each patient's condition.

### SEIZURE MONITORING

AdventHealth Tampa's Epilepsy Monitoring Unit provides 24/7 monitoring by an EEG technologist using state-of-the-art diagnostic equipment. Experienced neurologists, technologists and nurses work collaboratively to optimize patient care and provide for patient comfort.

Epileptologists will provide more in-depth evaluation, treatment of co-morbidities, monitoring of medication side effects, pre-surgical evaluation and post-surgical care for patients with epilepsy. Epileptologists can also prescribe and utilize deep brain stimulation, dietary therapy, vagus nerve stimulation, responsive neurostimulation or surgery.

### ELECTROENCEPHALOGRAM (EEG)

This is a brief, non-invasive test that measures electrical activity in the brain to reveal potential abnormalities.

### VIDEO ELECTROENCEPHALOGRAM OR CONTINUOUS ELECTROENCEPHALOGRAM (VEEG OR CEEG)

This is an extended, usually 1- to 5-day, non-invasive test that measures electrical activity in the brain with the intention of capturing events and correlating them with EEG abnormalities and clinical signs. Sleep deprivation and withdrawal of medications may be used to precipitate events. In addition, motor testing, photic stimulation and hyperventilation are tested on a daily basis to provoke events.

## WADA TEST

Often done as a follow-up to video EEG monitoring, this 1- to 2— hour procedure helps determine how close a patient’s seizure focus is to areas of the brain that are essential to motor skills, speech and memory. It will also predict how speech, memory and motor skills may be affected by resective or lesional surgery.

It begins with a thin catheter device being threaded from an artery in the groin area up into the brain, where X-rays are taken following the injection of a fluoroscopic material. Next, one side of the brain is anesthetized, which results in the opposite side of the body losing all strength for up to 5 minutes. During this time, the patient is asked to perform certain tasks such as reading, identifying shapes and answering questions in order to assess their speech and memory.

Because the femoral artery is accessed for this test, the patient is required to lie flat for 4 to 5 hours following the test.

## BLOOD TESTS AND LUMBAR PUNCTURE

Blood tests can be performed to screen for genetic and metabolic disorders, conditions such as diabetes, anemia, infections and poisoning that may be related to your seizures. Other tests for epilepsy may look at your kidney and liver function or require examination of your spinal fluid.

## EVOKED POTENTIAL TEST

This test is usually a non-invasive method of measuring how your brain relays and receives body sensations, such as when something presses on your finger or a weight is placed on your arm or leg. They also measure what areas of the brain are associated with motor skills, sensation, visual abilities, hearing and comprehension.





## Know Your Treatment Options

The risk of brain damage accompanies every seizure. Therefore, early diagnosis and treatment of seizures is essential and can translate to improved outcomes. Thankfully, a broad spectrum of treatment and management options is currently available to help epilepsy patients like you or your loved one, including anticonvulsive and other medications, advanced surgical therapies and multiple nerve stimulation and ablation procedures. Treatment options are tailored according to the patient's individual circumstances and may include the following:

### MEDICATIONS

For about two-thirds of people with epilepsy, the most effective treatment option is antiepileptic medication, which may be used alone or in combination with other therapies. Depending on how well you respond, your doctor may adjust your dosage or change your medications. More than 20 types of antiepileptic medications are now available.

### SURGICAL INTERVENTIONS

When seizures always begin in a specific area of the brain, and medication alone does not control them, surgery may be considered as a treatment for epilepsy. Location is critical, as doctors prefer not to perform surgery in areas of the brain used in everyday behavior, speech, language and the senses. In the most common surgery, a temporal lobe resection, a neurosurgeon removes the small part of the brain where seizures start. Other procedures seek to prevent seizures from spreading from one area of the brain to another. Your doctors will talk to you about which surgical procedure may be appropriate for you.

- Corpus callosotomy
- Electrode grid placement
- Functional hemispherotomy
- Laser ablation
- Resective surgery
- Temporal lobe resection

## The Advantage of Advanced Technology

### COMPUMEDICS

The Neurodiagnostics Services Department at AdventHealth Tampa is powered by a complete suite of next-generation technology provided by Compumedics, a world leader in neurological monitoring and brain research systems.

State-of-the-art software and equipment provide unprecedented precision in diagnosing and localizing seizure activity. Currently, no other EEG system on the market can provide such precise diagnostic data. AdventHealth Tampa is a national showcase site for this advanced technology.

### DENSE ARRAY EEG

AdventHealth Neuroscience Institute Tampa was the first in Florida to offer dense-array EEG, which features a 256-electrode sensor net that captures brainwave activity with much more precision and area than the 18 to 24 electrodes utilized in traditional EEGs. A sophisticated geodesic monitoring system uses 11 cameras to produce a detailed image of the brain's electrical activity. When combined with the patient's MRI, a three-dimensional model is created to help pinpoint abnormal activity.

### SOURCE LOCALIZATION EEG (CURRY)

Source localization EEG shows the actual seizure focus of interest in patients with focal onset epilepsy when the focus can be determined unequivocally from surface electrodes. The patient and other physicians can then see where the seizures are originating from in the brain.

If the patient is going to have surgery, then the source localization aids in the removal of only the diseased area of the brain, leaving the normal brain behind.

### SOURCE LOCALIZATION EEG USING SURFACE AND DEPTH EEG (CURRY AND ROSA)

Source localization EEG with electrocorticography shows the actual seizure focus of interest in patients with focal onset epilepsy when the area arises deep in the brain. The patient, epileptologist and epilepsy neurosurgeon can then see where the seizures are originating from deep in the brain. If the patient is going to have surgery, then the source localization aids in the removal of only the diseased area of the brain, leaving the normal brain behind.



## A Comprehensive Epilepsy Center Designed With You in Mind

At the AdventHealth Neuroscience Institute Tampa, our Comprehensive Epilepsy Center provides advanced diagnostic and treatment services for children and adults with uncontrolled seizures, including:

- Medication management
- Neuropsychological testing and evaluation
- Non-pharmacologic interventions
- Resective and lesional epilepsy surgery
- Treatment of status epilepticus
- Vagus nerve stimulation (LivaNova)

Accredited by the National Association for Epilepsy Centers (NAEC), the Comprehensive Epilepsy Center offers complex forms of intensive neurodiagnostic monitoring as well as extensive medical, neuropsychological and psychosocial treatment. A multidisciplinary team that includes epileptologists, neuropsychologists, neuroradiologists, epilepsy neurosurgeons and ancillary staff meets regularly to review every seizure-related case to achieve consensus on the best course of treatment for each patient. The outcome of this review is communicated to the referring physician and the patient and is documented in the patient's medical record.

## EPILEPSY MONITORING UNIT

AdventHealth Tampa is the first hospital in the Tampa Bay area to create a dedicated Epilepsy Monitoring Unit (EMU) featuring private rooms solely dedicated to 24/7 video, audio and EEG monitoring of epilepsy patients. The EMU is staffed around the clock with specially trained nurses and technicians who are led by a team of epileptologists, neurosurgeons and neurophysiologists. Advanced equipment allows staff to closely monitor their patients at all times, whether at the bedside, from the nurse's station, from the long-term monitoring control room or from custom-built mobile workstations that allow nurses to move from room to room while keeping an eye on multiple patients at once.

## LONG-TERM MONITORING

The long-term monitoring control room is the primary data hub of the Comprehensive Epilepsy Center. Sophisticated software and equipment allow for the display, recording and secure storage of high-definition video, audio and EEG data. A bank of monitors displays information for up to 24 patients at the same time. This not only includes patients in the epilepsy monitoring unit and intensive care unit, but patients in other areas in the hospital can also be monitored with specialized mobile equipment placed at the bedside. Telemedicine technology also allows us to provide long-term monitoring services for patients at other AdventHealth hospitals. The long-term monitoring control room is staffed 24 hours a day by specially trained neurodiagnostic technologists. Information gathered from long-term monitoring allows our team to accurately diagnose seizure problems and design individualized treatment plans for our patients.



## Care Coordination Makes the Difference

Our Comprehensive Epilepsy Center provides the highest quality care for epilepsy patients throughout their lifetime — from infancy through adolescence, adulthood and the golden years. Through each stage of your health journey, you can count on your epilepsy care team to answer questions, help schedule appointments, explain treatments, direct you to community resources and provide emotional support. When you need assistance with your care or that of your loved one, think of our medical team as your advocates who will ensure your medical care is always in alignment with your values, needs and goals.

### **Walgreens Specialty Pharmacy on the AdventHealth Tampa Campus**

Walgreens provides pharmacists knowledgeable in epilepsy medications, interactions and potential side effects. They can also obtain prior authorizations for medications, provide medication home delivery and assist with medication preparations appropriate for patients on ketogenic diets and modified Atkins diets.

### **Reach Out Today.**

**We know you may have many questions and concerns about your treatment options. To learn more about how we can help, please call to speak to a care navigator 000-000-000.**

*\*JAMA Neurol. 2019;76(11):1352-1358. doi:10.1001/jamaneurol.2019.2268*

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