

Seizures

History of Seizures

Seizures, Seizure Disorder, and Epilepsy are medical terms used to describe abnormal electrical activity in the brain that leads to uncontrollable sensory or motor experiences. *Epilepsy* is the term used when a person suffers repeated seizures. We have not discovered an exact cause of seizures, although experts have identified several phenomena that trigger them. Medical science is still attempting to pinpoint specific causes. Though there remains much work to be done in searching for cause and, hopefully, cure, we have come a long way.

As early as 400 B.C., documents were written which describe what we now call seizure activity. Since little was known about anatomy and physiology, seizures were thought to be contagious, and people who suffered from them were often separated from the community in the same way that Lepers were, or, even worse, were punished for having seizures. Some societies, including the ancient Romans, believed that seizures were caused by evil spirits or demons. Some well-known people throughout history have suffered from seizures, including Alexander the Great, Pope Pius IX, Russian Author Fyodor Dostoyevski, Artist Vincent Van Gogh, and Roman Emperor Julius Caesar. Some myths persist to this day about seizures.

We now know that Epilepsy is not contagious and that it is not due to demonic possession, but there are people who believe that it (along with other illnesses such as AIDS) is a punishment for some wrong committed. False. The same

What Seizures Are

Seizures result from a problem with an organ: the brain. The brain is made up of billions of neurons (nerve cells), which communicate or interpret information that comes into the brain from our senses (sensory, as in taste and smell) and send information from the brain to our body (motor, as in moving your arm). Different areas of the brain are responsible for different functions. For example, the occipital lobe in the back of the brain is where visual images are registered and interpreted. Electronic signals move quickly along the neurons in

goes for the misconception that Epilepsy is a mental illness. It is not, although a person with a mental illness can also have Epilepsy and vice-versa. Another myth is that people with Epilepsy are disabled, which is also not true. People who experience seizures can have careers and families like anyone else. Often, seizure activity can be controlled quite well with medication. Then there is the idea that someone having a seizure will swallow his tongue, or that we must place a wallet or some other object in the person's mouth to prevent him or her from biting off his tongue. Again, this is false. Finally, there are some who believe that anyone having a seizure must be sent to the emergency room. As we shall see, there are instances when this is necessary, but not all seizure activity mandates a 911 call. Today, at least 1% of the population suffers from seizure activity, and there are some groups of people who tend to be more at risk than others, including those with Intellectual Disabilities, Cerebral Palsy, Autism, Alzheimer's Dementia, and people who have had Cerebrovascular Accidents (Strokes). Notice that the one thing all of them have in common is that the brain is the focus of their illnesses.

Special points of interest:

- Seizures have been documented since 400 B.C.
- Epilepsy is not a mental illness
- There is no risk of anyone swallowing their tongue while having a seizure
- Not all seizures are cause for going to the ER

the brain, but they do so in an organized and controlled manner. Seizure activity occurs when these electronic signals become disrupted or begin to fire in a disorganized and sometimes overwhelming manner. A seizure can be considered an "electrical storm" in the brain, resulting in involuntary changes in sensation, awareness, body movement, function, and even behavior (including sudden, unprovoked aggressive behavior toward others). How seizures manifest depends on what areas of the brain are affected.

Seizures: Causes

It is not clearly understood whether there is a cause, or multiple causes, of seizures. Among the possible causes are genetic factors (such as Down Syndrome and Neurofibromatosis); infections (such as meningitis or encephalitis); lack of oxygen before or at birth (also can cause Cerebral Palsy); Stroke; Brain Tumors (rarely); head trauma; and abnormal levels of substances such as blood sugar, sodium, or toxins. Please note that these are all due to genetic factors, injuries, or disease processes. In up to 70% of Epilepsy cases in children and adults, *no apparent cause can be found*. This is called Idiopathic Epilepsy (“idiopathic” means something that arises spontaneously without an apparent cause).

Seizures: Phases

Seizure activity can occur by itself, or it can occur in phases. There are three phases that may happen when a person has a seizure. The first is the *aural phase*. Auras may come in the form of visual disturbances (seeing flashing lights, distorted images, or experiencing tunnel vision), auditory changes (hearing voices or noises), smells, tastes, or strange sensations like tingling in an extremity. Usually an aura is the same for the person each time, and this is a way that individual can tell that he/she is about to have a seizure. An aura may happen seconds before a seizure or up to an hour before the actual seizure. This can prepare the staff ahead of time so they can take proper precautions for an individual.

Commonly Identified Types of Seizures

A seizure can be considered *partial* if the seizure activity occurs in only *one* hemisphere of the brain. In a *Simple Partial* Seizure, the person is aware of what is happening but cannot control it. These occur in a localized area of the brain and produce symptoms related to that area. People with simple partial seizures do *not* experience auras or post-ictal phases. An example of a Simple Partial Seizure would be a person who experienced a twitch of the side of his face or of his little finger.

In a *Complex Partial* Seizure, the person’s level of consciousness changes and he or she may not remember what has happened. These seizures usually last 30 seconds to two minutes, and often begin in the frontal or temporal lobe of the brain, thus affecting alertness and awareness. These seizures are also known as “Psychomotor Epilepsy,” and often begin with a blank stare and a disengagement from surroundings, followed by lip-smacking, chewing, mumbling, or disorganized movements such as picking at clothing. Sometimes Complex Partial Seizures cause a person to scream, run, leave the building, or make flailing movements with his arms or legs.

A *generalized* seizure is one in which it occurs in *both* hemispheres of the brain, in other words, the whole brain. Generalized seizures affect the whole brain and typically involve a change in level of consciousness. They include: Atonic Seizures, Myo-

The *ictal phase* is the seizure itself. “Ictal” is a Latin word meaning “blow” or “stroke.”

The *post-ictal phase* occurs following the actual seizure activity. This is characterized by drowsiness and, sometimes, confusion. The person may need to sleep for several hours so that the brain can recover. Caregivers should allow the individual to sleep.

It is important to remember that not all seizures have an aural or a post-ictal phase. They all do, however, have an ictal phase, as this is the actual seizure.

Seizures: Triggers

There are many conditions, internally and externally, which can provoke or trigger a seizure. *The number one trigger for seizure activity is a missed dose of one’s seizure medication*, so it is crucial that anyone who takes medications for seizures receives them consistently and on time. Other triggers for seizure activity include: stress, hormonal changes, lack of sleep/fatigue, illicit drug/alcohol abuse, sensitivity to light, toxic substances (for example, lead), dehydration, heat stroke, fever, and some medications. Medications/drugs that have been known to trigger seizures include Cipro, Levaquin, Flagyl, Ritalin, Wellbutrin (in doses >300 mg), Ultram, Thorazine, Haldol, Theophylline, and Cocaine. Also, withdrawal (sudden discontinuation) from the following medications may trigger seizures: Benadryl, Xanax, Klonopin, Valium, and Ativan.



clonic Seizures, Petit Mal Seizures (or Absence Seizures), and Grand Mal Seizures.

Atonic Seizures literally mean “without muscle tone.” When all of the muscles suddenly relax completely, the person falls. That is why Atonic Seizures are referred to as “Falling Disease,” or “Drop Seizures.” They usually last about 10-15 seconds and are generally resistant to medications. Obviously the concern for people with Atonic Seizures is the risk of injury from falls, and some people choose to wear protective head gear.

Myoclonic Seizures are characterized by sudden, brief, violent contractions and relaxations of muscles, usually on both sides of the body. These are often very brief, and may be mistaken for tics. These can occur at any age, but are most often associated with Lennox-Gastaut Syndrome, a disorder in which seizure

onset is usually between the ages of 2 and 6, and is characterized by multiple daily seizures, usually myoclonic (muscles contracting and relaxing) or tonic (muscles becoming rigid).

Petit Mal or Absence Seizures occur mostly in children 5-12 years old and stop spontaneously during the teen years. These typically last 5-10 seconds, and the alteration of consciousness is so brief that the child usually does not change position. He or she will be staring off into space, disengaged from the here and now. With Petit Mal Seizures there is no aura or post-ictal phase; the person usually resumes full activity immediately. “Petit Mal” is French and literally means “Little Bad.” As we shall see, this type of seizure activity can last much longer than a few seconds.

Grand Mal or Generalized Tonic-Clonic Seizures may and often do have auras

and post-ictal phases. These often begin with a tonic phase in which the muscles become rigid, and move into the clonic phase, characterized by rapid contractions and relaxations of muscles, which produce jerking-type movements of the extremities. There may be a cessation of breathing for a short time, and the lips can turn blue. The eyes may roll backward, and the person may vomit and/or become incontinent of bowel or bladder. These seizures often last from one to three minutes. “Grand Mal” is French for “Big Bad.”

People who have any type of seizure may actually be more aware of their surroundings during the seizure than had been previously believed. They may also be able to control the seizure to an extent and can even remember details from the seizure. It is not always true that someone experiencing even a Grand Mal seizure is totally unconscious.

Diagnosing Seizures

It is true for any illness that the more information the physician has, the better he/she is able to make the correct diagnosis. Because of the elusive and unpredictable nature of Epilepsy/Seizure Disorder, this applies all the more. It is important that the patient or staff be able to provide an accurate, detailed history regarding the patient’s seizures: when they began, frequency, duration, what kinds of manifestations occur (unconsciousness, bodily movements, post-ictal experiences such as confusion or fatigue), what triggers the seizures, etc. The physician will also perform a physical exam, including a neurological exam, and he will most likely order several diagnostic tests, including blood tests and imaging (MRI, CT Scan). There is currently no definitive diagnostic test for Epilepsy!

Probably the most helpful diagnostic tool in confirming the diagnosis of Epilepsy is the Electroencephalogram, or EEG, which measures the electrical activity of the brain by attaching wires to a person’s scalp. Sometimes the results of this test

will be completely normal if the patient is not actually experiencing a seizure when the test is performed. For this reason, if there are known triggers, such as bright lights or lack of sleep, the patient may be instructed to stay awake the night before the EEG, or he/she may be exposed to bright lights or another stimulus just before the test. This way, hopefully, information about exactly where in the brain the seizure is occurring and what level of activity is going on can be obtained. Yet the surface EEG still cannot always detect the focal area of the seizure. In fact, surface EEGs miss Temporal Lobe Seizures 80% of the time and miss Deep-Focus Amygdaloid Limbic Seizures 100% of the time!

Thus, confirming the diagnosis of Epilepsy/Seizure Disorder can be an elusive endeavor if the doctor relies heavily on technological wizardry. This is why the clinical picture is so important. Medicine is an art as much as it is a science. A good neurologist will want a complete, detailed history and will have a good reputation among other patient advocates (you may want to ask some of your cohorts about their

experience with a particular physician). The more information the patient and/or caregivers can provide, the better the chance that the doctor can come up with the proper diagnosis. Even without a confirming EEG result, a physician may opt to go ahead and treat the patient with an anticonvulsant medication and observe the response over time, as the potential benefit of controlling seizures would outweigh the possible side effects of the medication. As a direct caregiver and patient advocate, your importance cannot be emphasized enough!

When Seizures Don't Look Like Seizures

The types of seizures already described (Simple Partial, Complex Partial, Atonic, Myoclonic, Petit-Mal and Grand-Mal) are recognized because of certain involuntary movements of extremities or other body parts. Not all seizures manifest that way. Sometimes seizure activity can be mistaken for other conditions. In people with Intellectual/Developmental Disabilities, it can often be misinterpreted as a "change in behavior."

The truth is that any behavior can occur as a manifestation of a seizure. To repeat, *any behavior can occur as a manifestation of a seizure*. Sometimes medical experts cannot tell a seizure from a non-seizure episode!

One example of this is a condition called "Status Absence." This is a continuous seizure-state that can last for hours. The person may stare off into space, yet may still be capable of talking, eating, or may look like he/she is watching television. This is more common in elderly and may be mistaken for Dementia, or it could appear that the person is simply disengaging from his environment. Sometimes the individual can stay in the same position for several hours without moving. Eating may be extremely slow as the person chews and chews before swallowing each bite.

Frontal Lobe Seizures occur in the frontal lobe of the brain, directly behind the

forehead. Among other things, the frontal lobe is the part of the brain that helps us inhibit harmful or socially inappropriate behaviors. People with these types of seizures may become less focused and develop a glassy-eyed stare. They may exhibit repetitive movements like running in circles or make bicycling movements. They may be much less inhibited, screaming, swearing, or becoming very affectionate or sexual in nature while the seizure is occurring.

Temporal Lobe Seizures are named for those areas on the sides of the brain in which they occur. The temporal lobes are involved with interpreting visual information, verbal/language information, storing long-term memories, personality and emotional state, and sexual behavior. People who experience seizures in these areas may exhibit a change in speech quality or cadence (rhythm and speed of their talking), spontaneous singing, flashbacks to previous events in their lives, hallucinations, confusion, or perseveration (repeating words or phrases over and over). They also may experience Deja-Vu (the feeling of having been in the current situation or place before) or Jamais-Vu (the feeling of never having been in their current situation or place before, even though they have been there repeatedly). Before and/or after such seizures the person may show stubbornness, be obsessed with certain things, develop rituals, or display

heightened interest in religion, or in sex, and engage in unusual sexual behaviors.

The Limbic System (including the Hypothalamus, Amygdala and Hippocampus) is a set of structures deep inside the brain which is responsible for many functions, including emotions, particularly rage. People who have Limbic Seizures may become spontaneously aggressive without being provoked, and may punch, kick, claw, spit and yell for no apparent reason. Usually there is not a precipitating event. It is as though the person underwent an instant mood change. Limbic Seizures can easily be mistaken for "behaviors," and because a surface EEG will not register limbic seizure activity, they are extremely difficult to diagnose. What may appear to be "mood changes" throughout the day could actually be a series of Partial Limbic Seizures. A person could literally have hundreds of them in a day.

One can see how some of these signs or symptoms could be mistaken for those of dementia, anxiety, or schizophrenia. It is so vitally important to be observant and take note of such occurrences, and to mention these things to the individual's PCP. With the client's permission, filming the seizure and then sharing it with the person's physician could be extremely helpful. Often, there can be a physiological reason for what may otherwise be simply considered "behaviors."



Treating Seizures

The most common method of treating Seizure Disorder/Epilepsy is by the use of medications called *Anticonvulsants*. For approximately 50% of patients, this method is quite effective in controlling seizure activity. The physician will consider the type of seizure the patient has, the age, sex, lifestyle of the patient, and any other health conditions the patient has, as well as other medications prescribed, before he chooses a medication for treatment. Blood samples are drawn periodically to monitor the levels of the drug so that they are in the therapeutic range. Common anticonvulsants include Dilantin, Klonopin, Keppra, Topamax, Tegretol, Trileptal, and Depakote. Depakote toxicity can lead to an irregular heartbeat, so the physician may order an EKG periodically. Side effects of anticonvulsants commonly include drowsiness, lethargy, confusion, irritability, and nausea. Serious side effects include weakness, bleeding, bruising, sore throat, lack of appetite, persistent fever, and abdominal pain. It is important to notify the doctor immediately if these severe symptoms are present. It is very important that seizure medications be taken as prescribed, on time, and that doses are not skipped; again, the number one trigger for seizure activity is a missed dose of routinely prescribed seizure medication!

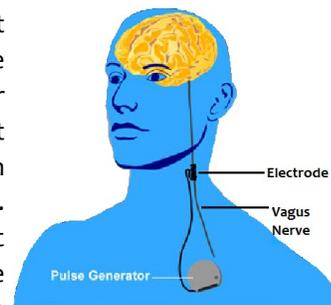
One medication that can be administered during a seizure is Diastat. Diastat is a benzodiazepine (Diazepam) which is given rectally as a gel using a pre-filled syringe. The advantages are that the medication is absorbed quickly through the rectal blood vessels, and that there is no risk of the patient choking as there would be if it were given by mouth. Diastat can reduce the severity and length of a seizure and may even stop the seizure altogether. Typically, Diastat is administered if the seizure goes beyond 5 minutes. Caregivers should periodically review the physician's orders and agency policies regarding Diastat administration; having those specifics committed to memory expedites the process of giving the drug, thus rendering first aid in a more timely manner.

About half of the people afflicted with Epilepsy either respond poorly or not at all to seizure medications. Other treatments are available.

A Vagus Nerve Stimulator (VNS) is a device that is surgically implanted; this is usually done as an outpatient procedure.

The Vagus Nerve is a cranial nerve that runs from the brain stem to the abdomen, and serves the throat, esophagus, heart, and lungs. The VNS consists of a generator that is

placed under the skin just beneath the collar bone (similar to a pacemaker generator) and electrodes that run under the skin and attach to the Vagus Nerve in the neck. The generator sends electronic pulses to the Vagus Nerve which can interrupt the



electrical storm in the brain, thus reducing or stopping the seizure. The VNS can be pre-programmed by the physician and/or can be stimulated with a magnet that the patient (or the patient's caregiver) carries at all times and uses at the onset of a seizure by passing it over the generator. For the first few days after VNS surgery, it is important to monitor the incision site(s) for signs of infection. There may be some hoarseness in the patient's voice, there may be a cough, and it is important to observe for signs of difficulty swallowing as the Vagus Nerve affects muscles in the throat. Notify the doctor of any problems.

The Ketogenic Diet is another method of treating Epilepsy. It is a ketone-producing diet. Ketones are formed when the body breaks down fat for energy. The Ketogenic Diet is a high-fat, low-carbohydrate diet, and instead of using glucose for energy, the body uses fat. It is believed that the high number of ketones helps to prevent or control seizures, but the exact mechanism by which this diet works is unclear. The diet provides 3-4 grams of fat for every gram of protein and carbohydrate; butter, heavy whipping cream, mayonnaise and oils are mainstays of this diet. About 50% of the children who go on this diet benefit from it. There are some risks, however. Since the patient receives few fruits or vegetables, it is important to supplement certain vitamins and minerals, especially vitamin D, calcium, iron, and folic acid. A Ketogenic Diet should only be followed under a doctor's care.

Other treatments for seizures (which are non-medical) include meditation, biofeedback, massage/bodywork, cranio-sacral therapy, chiropractic, and relaxation and stress management techniques. These methods may have a calming effect on the central nervous system.

Surgical procedures can be performed, but usually these are only done when all other attempts have not brought any substantial relief. Obviously there are risks involved, and this is not something to be taken lightly.

First Aid for Seizures

It is important to know what to do when someone experiences seizure activity. Of primary importance is the individual's safety. If possible, gently lower the person to the floor or ground to reduce the chance for injury.

- ◆ Remove the person's glasses and take any sharp objects out of the way. Remain with the person until the seizure is over.
- ◆ Place the person on his/her side. This will keep his airway open in case he should vomit. Never place the individual on his back, as this increases the risk of aspiration/choking. Never place anything in the individual's mouth.
- ◆ If Diastat is ordered, administer it as per your agency's protocols and/or the physician's orders.
- ◆ Remain calm and reassure the individual and bystanders that you have been trained in caring for people who have seizures. Stay with the individual but do not attempt to restrain him or her; this could cause an injury. Keep track of the time and document in the person's seizure log/journal how long the seizure lasted.
- ◆ During violent (Limbic) seizures, consider that an electrical storm is occurring in the person's brain; we must wait for it to pass. Do not attempt to restrain the person! Allow as much free movement as safely possible and block with firm, soft objects, such as couch cushions. Try to make the environment around the person safe, i.e., remove sharp objects, clutter, etc. Do not shout, attempt to grab, issue orders, or make reprimands; use reassurance and tell him/her, "No one will hurt you, you will be safe." Use containment, soothing sounds (or no sounds at all), gentle lighting (no fluorescent lights), and be cautious around the airway in order to prevent an injury. Following an aggressive, violent seizure, the individual may be exhausted and want to sleep. If you suspect that he incurred a serious injury, call 911.

Calling 911

There are times when calling 911 is necessary.

- ◆ If it is the person's first seizure, or if you cannot be sure that the person ever had a seizure before, call 911.
- ◆ If the seizure lasts longer than normal, or if the individual begins to recover from the seizure but then resumes seizure activity, call 911. Continuous or repeated seizures that go beyond the usual amount of time require emergency medical attention. When seizure activity persists continuously, or intermittently, for 20-30 minutes, it is called "Status Epilepticus," and can be fatal.
- ◆ If the person falls and is injured as a result of the seizure, call 911. Anytime someone receives a blow to the head as a result of a fall, or if he strikes his head on an object (table, chair, etc.) during a fall, there is a chance for brain or spinal cord trauma.
- ◆ Seizures, particularly Grand Mal Seizures, may cause a person to stop breathing for a brief period of time, but usually breathing resumes automatically. If breathing does not spontaneously resume after the seizure, call 911.
- ◆ If the individual is pregnant when she has a seizure, call 911.
- ◆ If the individual having a seizure is suspected to be dehydrated or in a state of heat exhaustion, or is Diabetic, call 911.

Conclusion

Remaining calm and knowing what to do in the event of a seizure are essential in maintaining the safety and well-being of your individuals. Remember that seizures can happen to anyone and that sometimes the way that they manifest can be subtle or can even look like features of a mental illness, emotional problem, or cognitive impairment. The better you know your individuals, the more capable you will be of detecting those things that "just don't seem right," and in turn, the better able you will be to help the physician provide the best care possible. If one of your individuals is exhibiting odd behaviors, document the information and share it with that person's doctor. You may be able to help improve his or her quality of life!

