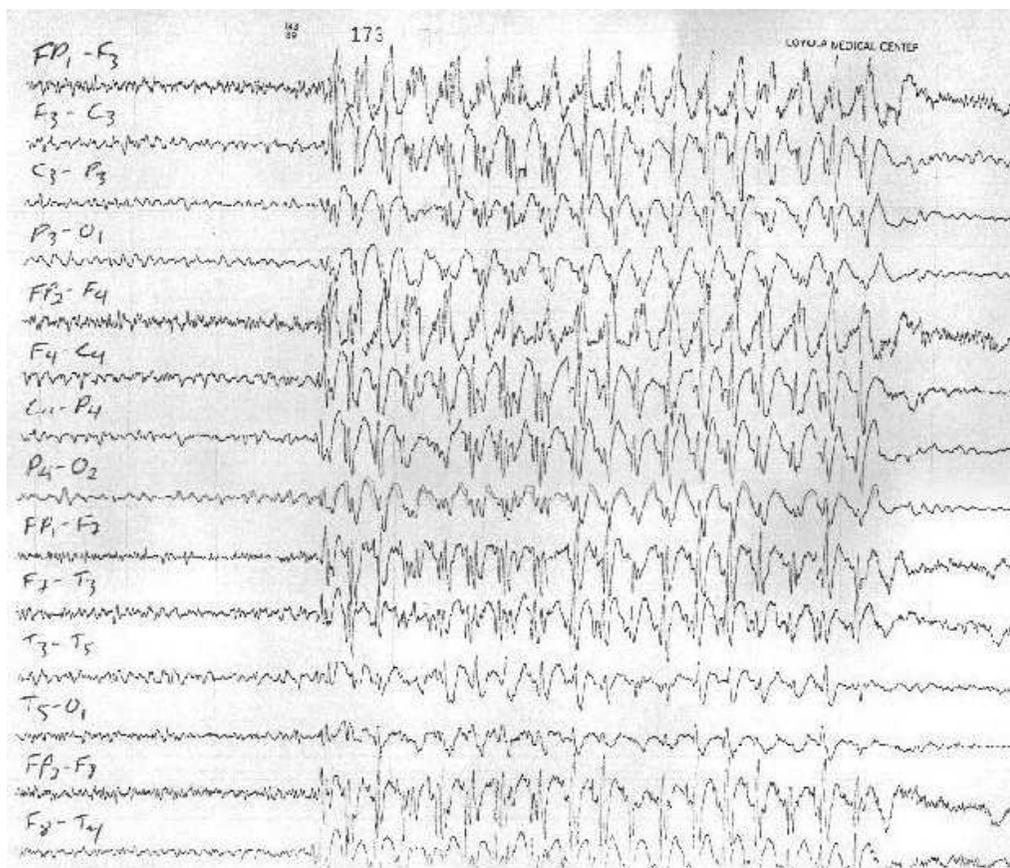


Seizures

Definition

- Paroxysmal disorder of cerebral function characterized by sudden, brief attacks of altered consciousness, motor activity, sensory phenomena, or inappropriate behavior caused by excessive discharge of cerebral neurons.
- Seizures may occur from withdrawal from long-term use of alcohol, hypnotics, or tranquilizers and patients occasionally simulate seizures.
- In many disorders, single seizures occur.



Epilepsy

Episodes that are recurrent are called epilepsy. In epilepsy, seizures are rarely induced by external factors, such as sound, light, and touch.

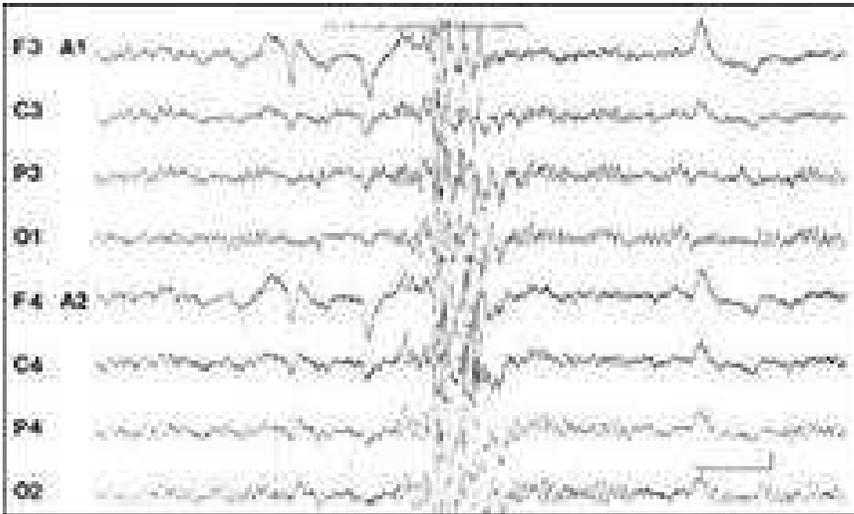
Epilepsy is classified etiologically as:

- symptomatic, indicating that a probable cause exists
- idiopathic indicating that no obvious cause exists

- Unexplained genetic factors probably underlie most idiopathic cases and a family history increases the risk three fold.

It should be appreciated that:

- an isolated, nonrecurring attack may occur during a febrile illness or after head trauma
- with a sufficient stimulus (e.g., convulsant drugs, hypoxia, hypoglycemia), even the normal brain can discharge excessively, producing a seizure.
- this does not qualify as epilepsy.



Types

The clinical manifestations of a seizure depend on its type which may be:

- Partial, or Generalized
- Simple, or complex

Partial

• the excess neuronal discharge is contained within one region of the cerebral cortex.

Generalized

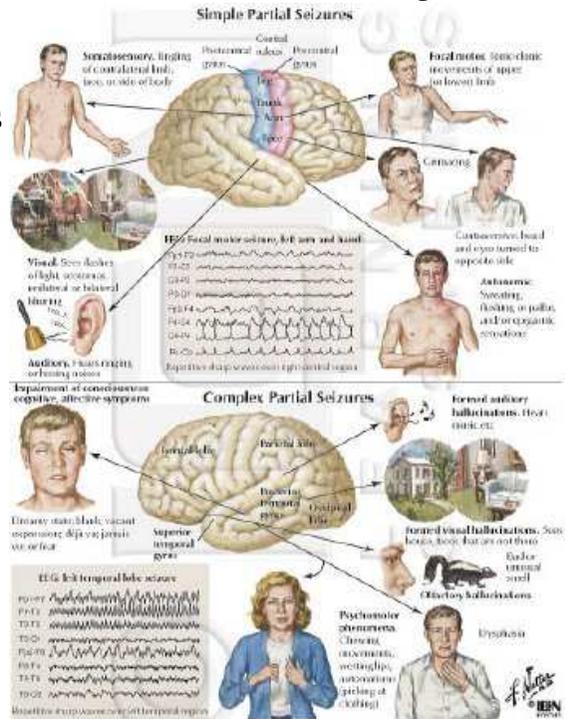
• the excess discharge spreads bilaterally and diffusely involves the entire cortex

Simple

• No loss of consciousness

Complex

• Loss of contact with surroundings



Definitions

Auras

- sensory or psychic manifestations immediately preceding complex partial or generalized tonic-clonic seizures.

Postictal state

- may follow a seizure - characterized by deep sleep, headache, confusion, and muscle soreness

Simple partial seizures

- consist of motor, sensory, or psychomotor phenomena without loss of consciousness.

Complex partial seizures

- brief loss of contact with surroundings. The patient may stare, perform automatic purposeless movements, utter unintelligible sounds. Complex partial seizures most commonly originate in the temporal lobe.

Absence seizures

- manifested by a 10-30 second loss of consciousness and eyelid fluttering. Patients do not fall; they abruptly stop and resume activity after the seizure, with no knowledge of the attack. They are genetic and occur predominantly in children. Without treatment, they are likely to occur many times a day.

Generalized tonic-clonic seizures

- typically begin with an outcry; they continue with loss of consciousness and falling, followed by tonic, then clonic contractions of the muscles of the extremities, trunk, and head. Urinary and fecal incontinence may occur. Seizures usually last one to two minutes



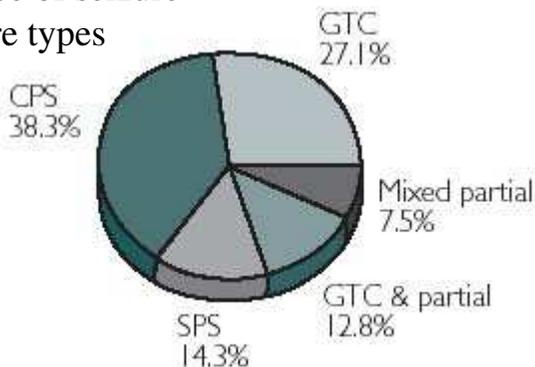
Frequency/Type

Incidence

- Birth to 20 yr - 1%
- 3% of population will have epilepsy by 75 yr
- 10% of population will experience one lifetime seizure

Type

- 90% have generalized tonic-clonic seizures
- 25% experience absence seizures
- 18% experience complex partial seizures
- Majority have one type of seizure
- 30% have two or more types



CPS = complex partial seizure; GTC = generalized tonic clonic;
SPS = simple partial seizure.

Emergency care

Emergency treatment is supportive

Assess:

- Airway
- Breathing
- Circulation

Usually gentle management of airway will be appropriate

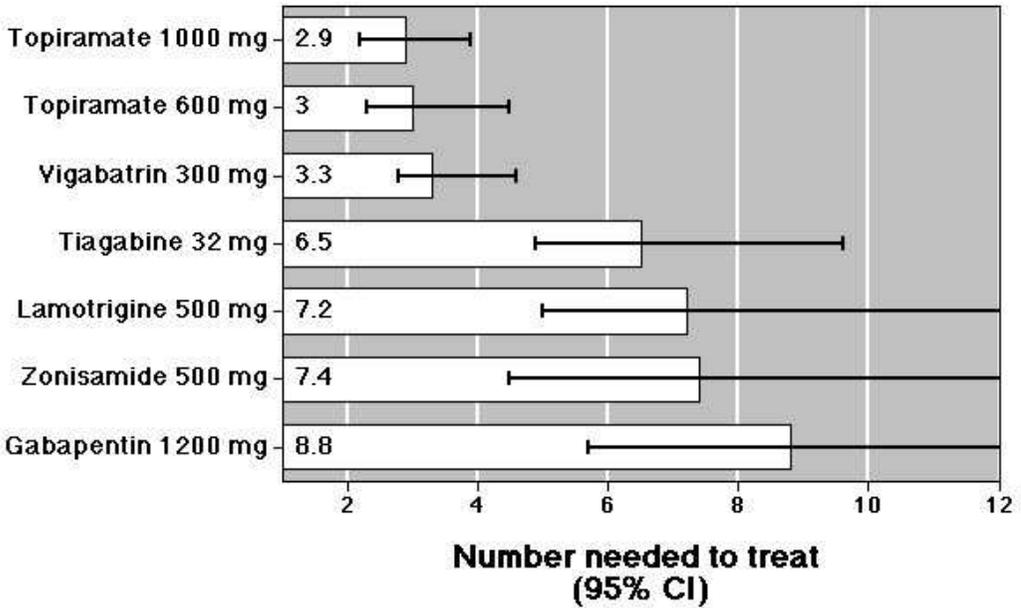
- Clear area
- Prevent self-injury
- Transfer to emergency room if no established, pre-existing history of seizure

The Recovery Position



Treatment

Relative effectiveness of antiepileptics compared with placebo as add on treatments for at least 50% reduction in seizure frequency



Basic concepts

- Do not treat if uncertainty in diagnosis. There may be 30% error rate with diagnosis.
- Do not assume that everyone with proven epilepsy will warrant treatment.
- Seizures arising from alcohol, other metabolic or drug-related causes, or sleep deprivation, should not be routinely treated.
- Seizures as a result of head injury should be treated, but later withdrawal of medication should be considered
- A diagnosis of unprovoked generalized tonic-clonic seizures should be offered treatment after first seizure if associated with previous myoclonic and/or absence seizures.
- Antiepileptic (AED's) drugs are the first line of treatment and have effects that include alteration in ion transport, decreased synaptic transmission, membrane stabilization, neurotransmitter inhibition.

Diagnostic work-up

Electroencephalography is the measurement of the electrical activity of the brain by recording from electrodes placed on the scalp.

- The resulting traces are known as an electroencephalogram (EEG) and represent an electrical signal (postsynaptic potentials) from a large number of neurons.
- In clinical use the EEG is a "gross correlate of brain activity" Electrical currents are not measured, but rather voltage differences between different parts of the brain. (Wikipedia)
- -ve EEG does not exclude seizure disorder.
- Sleep deprivation may identify positive spike formations.

Imaging

CT Scan of brain

- Indicated routinely in work-up of new tonic-clonic seizures

MRI of brain

- Superior in evaluation of temporal lobes of brain



Implications for athletics

Only NCAA reference is covered under "Participation by the Student-Athlete with Impairment"

However, there is valuable advice from Hughston Sports Medicine Foundation:

To the athlete:

- Consider risk of injury sport poses and whether you have physical impairments that would limit athletic participation

Type and timing of seizures

- Whether there are seizures at all and interval since last seizure
- Medications taken and potential side effects
- Enthusiasm for the sport



Specific sports

- Endurance sports, such as running and cross-country skiing, are unlikely to precipitate seizures and no special precautions needed.

- Contact and collision sports (such as football, hockey, or soccer) do not seem to create additional risk for seizures.



- Swimming, rowing, sailing require that an experienced swimmer or lifeguard is on hand to observe. Lifejacket or "buddy" system should be used. Frequent seizures require physician consultation



- Boxing - risk is not clear. Severe head trauma is known to precipitate seizures, but no conclusive evidence that cumulative trauma of boxing increases seizure risk.

- Mountaineering - extreme caution is required in climbing because of risks to athlete and others.

- With frequent seizures, no participation in biathlon, archery, shotgun, rifle, pistol, or other target-shooting sports.

- Gymnastics - a seizure in gymnastics, especially balance beam and uneven bars etc., imposes increased risk of cervical spine injury, quadriplegia, or death due to a fall.

- Scuba and Sky diving - International League Against Epilepsy recommends against participation.

Wikipedia

Seizure - From Wikipedia, the free encyclopedia

This article is about epileptic seizures. For non-epileptic seizures, see Non-epileptic seizure. For the legal term, see Search and seizure.

A seizure is a temporary abnormal electro-physiologic phenomena of the brain, resulting in abnormal synchronization of electrical neuronal activity. It can manifest as an alteration in mental state, tonic or clonic movements, convulsions, and various other psychic symptoms (such as *déjà vu* or *jamais vu*). It is caused by a temporary abnormal electrical activity of a group of brain cells. The medical syndrome of recurrent, unprovoked seizures is termed epilepsy, but some seizures may occur in people who do not have epilepsy.

The treatment of epilepsy is a subspecialty of neurology; the study of seizures is part of neuroscience.

Signs and symptoms

Seizures can cause involuntary changes in body movement or function, sensation, awareness, or behavior. A seizure can last from a few seconds to status epilepticus, a continuous seizure that will not stop without intervention. Seizure is often associated with a sudden and involuntary contraction of a group of muscles. However, a seizure can also be as subtle as marching numbness of a part of the body, a brief loss of memory, sparkling or flashes, sensing an unpleasant odor, a strange epigastric sensation or a sensation of fear. Therefore seizures are typically classified as motor, sensory, autonomic, emotional or cognitive.

In some cases, the full onset of a seizure event is preceded by some of the sensations described above. These sensations can serve as a warning to the sufferer that a full tonic-clonic seizure is about to occur. These "warning sensations" are cumulatively called an aura.[1]

Symptoms experienced by a person during a seizure depend on where in the brain the disturbance in electrical activity occurs.

Recent studies show that seizures happen in sleep more often than was thought. A person having a tonic-clonic seizure may cry out, lose consciousness and fall to the ground, and convulse, often violently. A person having a complex partial seizure may appear confused or dazed and will not be able to respond to questions or direction. Some people have seizures that are not noticeable to others. Sometimes, the only clue that a person is having an absence seizure is rapid blinking or a few seconds of staring into space. It is commonly thought among healthcare providers that many seizures, especially in children, are preceded by tachycardia that frequently persists throughout the seizure. This early increase in heart rate may supplement an aura as a physiological warning sign of an imminent seizure.

Types

Seizure types are organized according to whether the source of the seizure within the brain is localized (partial or focal onset seizures) or distributed (generalized seizures). Partial seizures are further divided on the extent to which consciousness is affected (simple partial seizures and complex partial seizures). If it is unaffected, then it is a simple partial seizure; otherwise it is a complex partial seizure. A partial seizure may spread within the brain - a process known as secondary generalisation. Generalized seizures are divided according to the effect on the body but all involve loss of consciousness. These include absence, myoclonic, clonic, tonic, tonic-clonic, and atonic seizures.

Following standardization proposal published in 1970, out-dated terms such as "petit mal", "grand mal", "Jacksonian", "psychomotor", and "temporal-lobe seizure" have fallen into disuse. See the main article 'Seizure types' for further information.

Diagnosis

Determining whether a seizure occurred

Differentiating a seizure from other conditions such as syncope can be difficult. In addition, 5% of patients with a positive tilt table test may have seizure-like activity that seems to be due to cerebral hypoxia.[1]

Physical examination

A small study found that finding a bite to the side of the tongue was very helpful when present[2]"

sensitivity of 24%, specificity of 99%

EEG

An isolated abnormal electrical activity recorded by an electroencephalography examination without a clinical presentation is called subclinical seizure. They may identify background epileptogenic activity, as well as help identify particular causes of seizures.

Investigation of underlying cause

Additional diagnostic methods include CT Scanning and MRI imaging or angiography. These may show structural lesions within the brain, but the majority of those with epilepsy show nothing unusual.

As seizures have a differential diagnosis, it is common for patients to be simultaneously investigated for cardiac and endocrine causes. Checking glucose levels, for example, is a mandatory action in the management of seizures as hypoglycemia may cause seizures, and failure to administer glucose would be harmful to the patient. Other causes typically considered are syncope and cardiac arrhythmias, and occasionally panic attacks and cataplexy. For more information, see non-epileptic seizures.

Management

The first aid for a seizure depends on the type of seizure occurring. Generalized seizures will cause the person to fall, which may result in injury. A tonic-clonic seizure results in violent movements that cannot and should not be suppressed. The person should never be restrained, nor should there be any attempt to put something in the mouth. Potentially sharp or dangerous objects should also be moved from the vicinity, so that the individual is not hurt. After the seizure if the person is not fully conscious and alert, they should be placed in the recovery position.

It is not necessary to call an ambulance if the person is known to have epilepsy, if the seizure is shorter than five minutes and is typical for them, if it is not immediately followed by another seizure, and if the person is uninjured. Otherwise, or if in any doubt, medical assistance should be sought.

A seizure longer than five minutes is a medical emergency.

Relatives and other caregivers of those known to have epilepsy often carry medicine such as rectal diazepam or buccal midazolam in order to rapidly end the seizure.

Safety

A sudden fall can lead to broken bones and other injuries. Children who are affected by frequent drop seizures may wear helmets to protect the head during a fall.

The unusual, aggressive behavior sometimes resultant from the chaotic brain activity of a seizure can be misinterpreted as an aggressive act. This may invoke a hostile response or police involvement, where there was no intention to cause harm or trouble. During a prolonged seizure, the person is defenseless and may become a victim of theft.

A seizure response dog can be trained to summon help or ensure personal safety when a seizure occurs. These are not suitable for everybody. Rarely, a dog may develop the ability to sense a seizure before it occurs.[6]