# Epilepsy: an Overview

## Description/Etiology

Seizures are episodes of sudden, excessive electrical discharges within the brain that result in alterations in consciousness, sensory or motor activity, and/or behavioral changes. Recurrent, unprovoked seizures constitute epilepsy. Seizures can be generalized or partial (also called focal). *Generalized seizures* affect both hemispheres of the brain and always result in loss of consciousness, while *partial seizures* affect a small area of the brain and may or may not result in loss of consciousness. (For more information on seizure types, see the series of *Quick Lessons* and *Evidence-Based Care Sheets* on epilepsy.)

Common types of seizures and their typical manifestations are as follows:

- **Generalized seizures**
  - Tonic-clonic: stiffening, convulsions, loss of consciousness, incontinence, irregular breathing or gagging; the patient might emit a cry or sigh from air forced out of the lungs
  - Tonic: stiffening, loss of consciousness; the patient might emit a sigh or cry out
  - Clonic: convulsions, irregular breathing or gagging, loss of consciousness
  - Atonic: sudden loss of muscle tone, loss of consciousness
  - Absence: glazed expression, head nodding, brief (< 1 minute)
  - Myoclonic: sudden, powerful muscle contraction; very brief (< 1 second)

- **Partial seizures**
  - Simple partial: awareness is unaffected; the patient might experience a strange smell or taste, nausea, anxiety, lip smacking, or jerking movements of an extremity
  - Complex partial: altered awareness, glazed expression, wandering, undressing, incoherent speech

A person with epilepsy can experience multiple types of seizures and the manifestations of each seizure can differ. Some seizure manifestations can be mistaken for other conditions (e.g., psychiatric disturbances, fainting, daydreaming) and misdiagnosis is common. Diagnosis of epilepsy is made based on electroencephalography (EEG; i.e., recording of the electrical activity of the brain), laboratory test results, and patient history. Although most cases of epilepsy are idiopathic (i.e., without an identifiable cause), others have an identifiable cause. Neurological damage due to stroke or trauma, bacterial or viral infection, chemical toxicity (e.g., lead poisoning), fever, brain tumors, and metabolic disorders increase susceptibility to epilepsy. Treatment for any obvious cause should be administered alongside treatment to control or reduce seizure activity.

Treatments for epilepsy include antiepileptic drugs (AEDs; e.g., phenytoin, carBAmazepine, gabapentin, valproate), neurosurgery (e.g., for removal of intracranial tumors or focal areas generating seizures), and prevention of injury (e.g., from tongue biting or falling). In some cases, a vagus nerve stimulator (i.e., a generator under the clavicle that delivers electrical signals to the brain) can be implanted to reduce the incidence of seizures. Adjuncts to treatment include education about the need for strict adherence to the antiseizure medication regimen and avoiding possible triggers of a seizure (e.g., alcohol, flashing lights, sleep deprivation), and consumption of a ketogenic diet (i.e., a high-fat, low-protein, low-carbohydrate diet that induces systemic ketosis, which has an antiepileptic effect on the brain).
Facts and Figures
In 2015, 1.2% of the United States population, including 3 million adults and 470,000 children, had active epilepsy (Zack et al., 2017). About 200,000 new cases of epilepsy are diagnosed in the U.S. each year; 45,000 of these are in children aged < 15 years. Epilepsy is the third most common brain disorder in older adults, after stroke and dementia. About 70% of patients with epilepsy will become seizure-free with appropriate initial treatment. Sudden unexpected death occurs in 1:1,000 adults and 1:4,500 children with epilepsy each year.

Risk Factors
Most cases of epilepsy are idiopathic, but any insult to the brain increases the risk for epilepsy. In infants and children, perinatal factors, such as eclampsia, placental abruption, and breech delivery, increase risk. Family history of epilepsy is associated with a 3-fold increase in risk.

Signs and Symptoms/Clinical Presentation
Symptoms of epilepsy range from mild to severe (see Description/Etiology, above). Some patients experience headache, mood alterations, lethargy, and/or myoclonic jerking in the hours preceding a seizure. Seizures can be followed by a period of confusion, drowsiness, muscular pain, and headache.

Assessment
› Patient History
  • Injury, trauma, infection, or other insult to the brain might be identified. Patient might have a history of staring or altered awareness without loss of consciousness
› Laboratory Tests
  • CBC and chemistry panel can be ordered to identify a cause for seizures (e.g., elevated WBC indicating infection)
› Other Diagnostic Tests/Studies
  • EEG is the primary diagnostic tool for assessment of epilepsy; it assists in locating the area of abnormal electrical activity and in identifying the type of seizure
  • CT scan of the brain is typically included as part of the initial evaluation
  • MRI of the brain can reveal lesions causing epilepsy

Treatment Goals
› Control Seizure Activity and Reduce Risk of Injury
  • Observe for alterations in consciousness or motor activity; report all abnormalities (even mildly unusual ones) to the treating clinician
  • Administer AEDs, as prescribed; monitor treatment efficacy and notify the treating clinician of poor response and intractable seizures
  • Reduce potential seizure triggers (e.g., stressful situations, flashing lights). Allow for adequate sleep and encourage a nutritious diet
  • Prevent seizure-related injury through vigilant monitoring and by instituting seizure precautions, per facility protocol (e.g., use of padded side-rails); place the patient in a side-lying position to drain oral secretions during seizure activity (see Red Flags, below)
  • Follow facility pre- and post-treatment protocols if patient becomes a candidate for neurosurgery or generator implantation. Reinforce pre- and post-treatment education and verify completion of facility informed consent documents
    – Monitor for complications of surgery (e.g., bleeding, increased intracranial pressure, infection); seizures might still occur following surgery; report complications, including continued seizure activity, to the treating clinician
    – Assess for pain and administer analgesic medication, as prescribed, for postsurgical pain
  • Request referral to a registered dietitian for evaluation and education about a ketogenic diet, as appropriate
› Provide Emotional Support and Educate
  • Assess anxiety level and coping ability of the patient and family; encourage discussion about epilepsy, potential complications, treatment option risks and benefits, individualized prognosis, and the need for ongoing medical surveillance
  • Request referral to a social worker for identification of local resources for in-home assistance and Internet sources for support groups (e.g., http://www.epilepsy.com)
Food for Thought

› The terms “grand mal” and “petit mal,” used to describe types of seizures, were first used in 1838. These terms have been replaced with “tonic-clonic” and “absence,” respectively.

› Discontinuance of antiseizure medications can be considered in adults who have been seizure-free for 2 years; if seizures recur, treatment is reinitiated.

Red Flags

› During a seizure, the primary concern is maintaining a patent airway; assist the patient to the floor, position in a side-lying position, and lean the head against the lower forearm, allowing the mouth to hang downward to enable gravity to clear secretions.

› Status epilepticus is a medical emergency characterized by a prolonged state of either unbroken seizure activity or repetitive discrete seizures without a period of recovery between seizures; status epilepticus carries a risk of brain damage and death (for more information, see Quick Lesson About … Status Epilepticus).

› Certain AEDs are associated with increased risk of congenital malformations when used during pregnancy.
  • Cochrane reviewers found evidence of increased risk of congenital malformation associated with in utero exposure to carbamazepine, PHENobarbital, phenytoin, topiramate, and valproate (Weston et al., 2016).

› Suicide rates are 3 times higher in persons with epilepsy than in the general population.

What Do I Need to Tell the Patient/Patient’s Family?

› With adherence to an antiseizure medication regimen, most patients with epilepsy can completely control or greatly reduce the number of seizures experienced.

› All family members and friends should learn about the signs and symptoms of epilepsy, and how to respond during a seizure.

› Patients with epilepsy should refrain from driving unless seizures are well-controlled with medication; see http://www.epilepsy.com/driving-laws for more information on driving restrictions for patients in the U.S.

References


