

A Systematic Review on Epilepsy and its Management

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Abstract

Epilepsy is a group of non-communicable neurological disorders characterized by recurrent epileptic seizures. Epilepsy is a neurological condition that causes unprovoked, recurrent seizures. A seizure is a sudden rush of abnormal electrical activity in your brain. A disorder in which nerve cell activity in the brain is disturbed, causing seizures. Epilepsy may occur as a result of a genetic disorder or an acquired brain injury, such as a trauma or stroke. During a seizure, a person experiences abnormal behaviour, symptoms and sensations, sometimes including loss of consciousness. There are few symptoms between seizures. Epilepsy is usually treated by medication and in some cases by surgery, devices or dietary changes.

Keywords: Epilepsy • Seizure • Generalized • seizures • Focal seizures

Introduction

Epilepsy is a long-term (chronic) disease that causes repeated seizures due to abnormal electrical signals produced by damaged brain cells. A burst of uncontrolled electrical activity within brain cells causes a seizure. Seizures can include changes to your awareness, muscle control (your muscles may twitch or jerk), sensations, emotions and behavior. Epilepsy is also called a seizure disorder. Anyone, of any age, race or sex, can develop epilepsy. In the U.S., about 3.4 million people have epilepsy. Of this number, 3 million are adults and 470,000 are children. There are 150,000 new cases of epilepsy in the U.S. each year. Worldwide, about 65 million people have epilepsy. The cells in your brain send messages to and receive messages from all areas of your body. These messages are transmitted via a continuous electrical impulse that travels from cell to cell. Epilepsy disrupts this rhythmic electrical impulse pattern. Instead, there are bursts of electrical energy – like an unpredictable lightning storm – between cells in one or more areas of your brain. This electrical disruption causes changes in your awareness (including loss of consciousness), sensations, emotions and muscle movements. NYU Langone specialists at the Comprehensive Epilepsy Center have expertise in recognizing the many types of epilepsy and seizure disorders affecting adults. Epilepsy is a neurological disorder in which a person has two or more unprovoked seizures that occur more than 24 hours apart. A seizure is an excessive surge of electrical activity in the brain that can cause a variety of symptoms, depending on which parts of the brain are involved. "Unprovoked" seizures are those that are not brought on by a clear cause, such as alcohol withdrawal, heart problems, or hypoglycemia, which is when a person has extremely low blood sugar levels. Seizures may be the result of genetics or a brain injury, but often their cause is unknown. The words "seizure disorder" and "epilepsy" are often used interchangeably. However, "provoked" seizures, such as those due to severe

hypoglycemia, are not considered to be forms of epilepsy. The type of seizure depends on which part and how much of the brain is affected and what happens during the seizure. The two broad categories of epileptic seizures are generalized. seizures (absence, atonic, tonic-clonic, myoclonic) and partial (simple and complex) seizures. Within these categories, there are several different types of seizures in children. Focal seizures take place when abnormal electrical brain function occurs in one or more areas of one side of the brain. Focal seizures may also be called partial seizures. With focal seizures, particularly with complex focal seizures, the child may experience an aura before the seizure occurs. The most common aura involves feelings such as déjà vu, impending doom, fear, or euphoria. Visual changes, hearing abnormalities, or changes in the sense of smell can also be auras. This type of seizure commonly occurs in the temporal lobe of the brain, the area of the brain that controls emotion and memory function. This seizure usually lasts one to two minutes. Consciousness is usually lost during these seizures. Losing consciousness may not mean that a child passes out--sometimes, a child stops being aware of what's going on around him or her. The child may look awake but have a variety of behaviors. These behaviors may range from gagging, lip smacking, running, screaming, crying, and/or laughing. When the child regains consciousness, he or she may complain of being tired or sleepy after the seizure. This is called the postictal period. Generalized seizures involve both sides of the brain. There is loss of consciousness and a postictal state after the seizure occurs. These seizures are characterized by a brief altered state of consciousness and staring episodes. Typically, the child's posture is maintained during the seizure. The mouth or face may move or the eyes may blink. The seizure usually lasts no longer than 30 seconds. When the seizure is over, the child may not recall what just occurred and may go on with his/her activities, acting as though nothing happened. These seizures may occur several times a day.

Signs and symptoms

Characteristics of seizures vary and depend on where in the brain the disturbance first starts, and how far it spreads. Temporary symptoms occur, such as loss of awareness or consciousness, and disturbances of movement, sensation (including vision, hearing and taste), mood, or other cognitive functions. People with epilepsy tend to have more physical problems (such as fractures and bruising from injuries related to seizures), as well as higher rates of psychological conditions, including anxiety and depression. Similarly, the risk of premature death in people with epilepsy is up to three times higher than in the general population, with the highest rates of premature mortality found in low- and middle-income countries and in rural areas. A great proportion of the causes of death related to epilepsy, especially in low- and middle-income countries, are potentially preventable, such as falls, drowning, burns and prolonged seizures.

Causes

Epilepsy is not contagious. Although many underlying disease mechanisms can lead to epilepsy, the cause of the disease is still unknown in about 50% of cases globally. The causes of epilepsy are divided into the following categories: structural, genetic, infectious, metabolic, immune and unknown. Examples include:

- Brain damage from prenatal or perinatal causes (e.g. A loss of oxygen or trauma during birth, low birth weight);
- Congenital abnormalities or genetic conditions with associated brain malformations;
- A severe head injury;
- A stroke that restricts the amount of oxygen to the brain;
- An infection of the brain such as meningitis, encephalitis or neurocysticercosis,
- Certain genetic syndromes; and
- A brain tumour.

Treatment

Seizures can be controlled. Up to 70% of people living with epilepsy could become seizure free with appropriate use of antiseizure medicines. Discontinuing anti-seizure medicine can be considered after 2 years without seizures and should take into account relevant clinical, social and personal factors. A documented etiology of the seizure and an abnormal electroencephalography (EEG) pattern are the two most consistent predictors of seizure recurrence. In low-income countries, about three quarters of people with epilepsy may not receive the treatment they need. This is called the "treatment gap". In many low- and middle-income countries, there is low availability of antiseizure medication. A recent study found the average availability of generic antiseizure medicines in the public sector of low- and middle-income countries to be less than 50%. This may act as a barrier to accessing treatment. It is possible to diagnose and treat most people with epilepsy at the primary health-care

level without the use of sophisticated equipment. WHO pilot projects have indicated that training primary health-care providers to diagnose and treat epilepsy can effectively reduce the epilepsy treatment gap. Surgery might be beneficial to patients who respond poorly to drug treatments.

Prevention

An estimated 25% of epilepsy cases are preventable. Preventing head injury is the most effective way to prevent post-traumatic epilepsy. Adequate perinatal care can reduce new cases of epilepsy caused by birth injury. The use of drugs and other methods to lower the body temperature of a feverish child can reduce the chance of febrile seizures. The prevention of epilepsy associated with stroke is focused on cardiovascular risk factor reduction, e.g. measures to prevent or control high blood pressure, diabetes and obesity, and the avoidance of tobacco and excessive alcohol use.