

Seizures and epilepsy



Your brain uses finely tuned electrical networks and signals to function and communicate. If something goes wrong with the brain's electrical system, it can lead to seizures.

At Healthscope, our brain specialists offer state-of-the-art care for people living with epilepsy or seizures. We have technologies and advanced procedures to support accurate and timely diagnosis and seizure management.

About seizures and epilepsy

What is a seizure?

A seizure occurs when electrical activity in the brain suddenly becomes uncoordinated. This can lead to altered behaviour, movement, sensation, memory and consciousness. Anyone can have a seizure, and not everyone who has a seizure will be diagnosed with epilepsy.

Types of seizure

Seizures are divided into three main groups according to:

- where they start in the brain
- whether they involve any movement
- whether the person is aware during the seizure.

1. Focal onset seizures

This type of seizure starts in a small area of the brain (the 'focus') and sometimes spreads to other areas. Previously known as partial seizures, focal onset seizures are further described by whether the person is aware of what's going on.

In a focal aware seizure (formerly known as a 'simple partial seizure'), the person is aware. They may experience altered sensations such as an unpleasant smell or butterflies in the stomach. These seizures sometimes involve involuntary motor (movement) activity or behaviours, such as jerking movements or pointing.

In a focal impaired awareness seizure (formerly called a 'complex partial seizure'), the person seems dazed or confused. They may perform unusual repetitive actions, such as making strange sounds or fidgeting movements.

2. Generalised onset seizures

This type of seizure affects both sides of the brain from the outset. They may lead to confusion, loss of consciousness and movement patterns such as jerking, stiffness, convulsions or loss of muscle control. There are various types of generalised onset seizures including:

- tonic-clonic seizures (formerly known as grand mal seizures) – this type of seizure involves sudden muscle stiffening followed by symmetrical, rhythmic jerking movements.
- tonic seizures – which involve stiffening of the person's body, legs and arms. This type of seizure often happens while someone is asleep.
- clonic seizures – this rare type of seizure involves repetitive, rhythmic jerking movements of both sides of the body. Clonic seizures are more common in infants.
- myoclonic seizures – which involve very brief sudden jerks of a muscle or muscle group, usually in the upper body.
- atonic seizures – sometimes known as 'drop seizures', atonic seizures involve a sudden reduction or loss of muscle tone.
- absence seizures – these seizures involve a brief loss of awareness and activity, which is sometimes mistaken for daydreaming. They do not cause altered movements.

3. Unknown onset seizures

In some people, it's not known where seizures start in the brain. This may be because the seizures occur while the person is alone or asleep.

Other types of seizure include:

- febrile seizures (febrile convulsions) – which are caused by a high fever in young children.
- psychogenic non-epileptic seizures – these look like epileptic seizures but do not involve the same changes on electroencephalogram (EEG) testing. They are believed to be a complex physical response to significant psychological trauma or distress.

What is epilepsy?

Epilepsy is a long-term brain disorder in which a person experiences repeated seizures. Epilepsy is believed to affect about 3% of Australians. There are many different types of epilepsy, and a person with epilepsy may have one or more types of seizure. Epilepsy most often starts either in childhood or after the age of about 60.

Seizure symptoms

Symptoms of a seizure will depend on which part of the brain is involved. They include:

- loss of consciousness or responsiveness
- confusion or disorientation
- tingling or numbness
- saliva (drool) coming out of the mouth
- raised heart rate
- hallucinations
- difficulty thinking
- eyes rolling upwards.

Many types of seizure also involve motor (movement) symptoms, such as:

- muscle stiffening (tonic) or jerking (clonic) movements, or both
- loss of muscle tone or 'floppiness'
- falling over if the person is standing
- repetitive movements such as chewing or fiddling with clothing
- tremor or shaking
- unusual postures.

Seizures typically last between one and three minutes and stop of their own accord. If someone has a seizure that lasts for more than five minutes, call 000 (triple zero) and ask for an ambulance.

What causes epilepsy and seizures?

Many different things can cause epilepsy, although the cause is unknown in about 50% of people. Causes of epilepsy include:

- genetics – epilepsy can run in families or result from genetic changes that happen for the first time
- brain infections – certain viruses and organisms can affect the brain's electrical activity
- autoimmune conditions – disruption to immune system function can sometimes affect brain function
- altered metabolism – problems with how the body breaks down food or makes energy can affect brain function
- trauma – a head injury can traumatise the brain and lead to seizures
- structural brain issues – some people are born with irregularities in the brain (or develop them in later life) that make them more prone to epilepsy.

Other causes of seizures include:

- brain tumours
- stroke
- other brain diseases, such as Alzheimer's disease
- some prescription medications
- electrolyte imbalances
- withdrawal from some substances
- lack of oxygen at birth.

Referral for seizure and epilepsy management

If you're experiencing seizures or have been diagnosed with epilepsy, your GP might refer you to a neurologist for expert assessment and treatment.

To start your treatment with us, ask your GP for a referral to one of our experienced neurological specialists.

Your doctor can address the referral to a specific specialist, or simply to 'Dear Doctor'.

Seizure prevention

It's not always possible to prevent seizures. However, some people find it helpful to avoid certain triggers, such as:

- flashing lights
- excessive alcohol or illicit drugs
- extremes of blood sugar
- lack of sleep
- severe stress
- high fever.

How is epilepsy diagnosed?

If you've experienced seizures or your doctor suspects you may have epilepsy, you will need a thorough assessment. The following tests can help you and your healthcare team reach a diagnosis and plan appropriate treatment.

Physical examination

Your doctor will conduct physical tests to see how your nervous system is working. For example, they might look at your muscle strength, walking, co-ordination, balance, vision, sensation, and reflexes.

Blood tests

Blood tests can detect underlying factors such as electrolyte imbalances, infections, and altered immune system function.

Genetic tests

Genetic testing might be recommended for some inherited types of epilepsy.

Electroencephalography (EEG)

This test involves placing electrodes over the scalp to measure electrical activity in the brain.

CT (computerised tomography) scan

This test uses x-rays to take multiple images of your brain, which a computer puts together to provide detailed pictures.

MRI (magnetic resonance imaging)

In an MRI scan, the machine uses a powerful magnet, radio waves and a computer to generate detailed, cross-sectional images.

SPECT (single photon emission computerised tomography) scan

This test takes three-dimensional images of blood flow through the brain. When performed during a seizure, it shows increased blood flow in the brain region where seizures begin.

PET (positron emission tomography) scan

This imaging test looks at metabolic activity in the brain. In people with epilepsy, it can help doctors find where seizures are originating from.

How are seizures and epilepsy treated?

Treatment for seizures or epilepsy will depend on various things, including the cause and severity of symptoms. Your age and general health will also be considered. Your specialist will talk to you about the options and help you decide on the best treatment approach.

Non-surgical treatment for epilepsy and seizures

In many people, seizures can be managed using conservative measures. Non-surgical management options for epilepsy include:

Medications

Medications known as antiepileptic drugs are the first line of treatment for almost everyone who has experienced multiple seizures. These medications do not 'cure' epilepsy, but they are highly effective at controlling seizures in about 70% of people. Anti-epileptic medications work by helping to stop brain cells from sending excessive and chaotic electrical signals.

Many different types of antiepileptic drugs are available. Your doctor will work with you to find an option to best suit your needs.

Diet therapy

In some people with particular types of epilepsy, following a specific diet may help with seizure control. These diets include the ketogenic and modified Atkins diet. Your neurologist can talk about whether dietary therapy may be suitable for you.

Surgical treatment for epilepsy

In some cases, surgery might be recommended for seizure management. Procedures used to manage epilepsy include:

Surgical resection

In this procedure, surgeons remove the section of the brain that is responsible for starting the abnormal electrical activity.

Surgical disconnection

These procedures involve cutting nerve pathways that connect parts of the brain to prevent abnormal electrical activity from spreading.

Nerve stimulation

In this procedure, surgeons implant a small device (similar to a pacemaker) next to the vagus nerve in the chest. This device sends weak electrical impulses via the vagus nerve to the brain to help reduce seizure frequency and intensity. This is an option if medication has not helped and surgery is not suitable.

Recovery after epilepsy treatment

After surgery for epilepsy, it will typically be a few weeks or months before you can get back to your usual activities. While recovery time can vary from person to person, here is a guide to what you can expect.

Hospital stay

Most people need to stay in hospital for monitoring for a few days after epilepsy surgery. The length of your hospital stay will depend on the procedure and your post-operative progress.

Medications

You might need to take medications to help with pain, to prevent infection, and to control any remaining seizure activity.

Physical recovery

After brain surgery, many people need rehabilitation to restore or improve physical function and independence. You may have physiotherapy to help with mobility, strength, balance, coordination and flexibility.

Cognitive recovery

Some people experience changes to their cognitive (thinking) function after brain surgery. These changes can include difficulties with concentration, memory, attention, and problem-solving. Working with an occupational therapist can support your cognitive recovery.

Speech and language therapy

If your epilepsy treatment affected the brain areas involved in speech and language, you might need speech therapy to regain or improve your communication skills. Speech therapists can also help with swallowing difficulties.

Emotional and psychological support

Living with epilepsy or seizures can be very challenging – emotionally and mentally as well as physically. Seeing a mental health professional such as a psychologist or counsellor may help to support your recovery.

Follow-up

You will have regular follow-up visits with your healthcare team to monitor your recovery, manage any complications, and adjust treatment as needed.

It's also important to remember that epilepsy is a chronic condition that requires ongoing management.

In some people, gaining control over seizures can be complex and challenging. A team of specialists – such as neurologists, neurosurgeons, nurse practitioners, clinical neuropsychologists, neuroradiologists and allied health professionals – may be involved in your care.

Along with managing any further seizures, recovery could involve therapies to improve your function and enhance your quality of life. Your healthcare team will work with you and your loved ones to develop a personalised management plan.

Sources

Information provided and reviewed by A/Prof Andrew Davidson, Neurosurgeon at Melbourne Private Hospital.

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