Epilepsy Action Australia

FACT SHEET:

Diagnosing Epilepsy

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To diagnose epilepsy, your doctor will look at your symptoms, seizure and medical history and may order some tests to help determine why you have had a seizure. A good eyewitness account of your seizure or event is extremely useful for diagnosis.

This is a brief guide to the tests that help diagnose epilepsy. Not everyone will need every test. If you are unsure why your doctor has suggested certain tests and not others, then it is best to ask.

The EEG

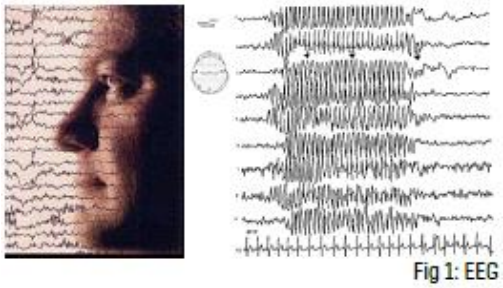


Fig 1: EEG

An electroencephalogram (EEG) is a recording of the brain's electrical rhythms, so it looks at how the brain is working.
It is a simple, painless and harmless procedure.
Small discs called electrodes are placed on the surface of the scalp and held in place with temporary paste, glue, or sometimes a special cap. The electrical activity of the brain is recorded and may reveal changes or rhythms that are helpful in diagnosing epilepsy.

An EEG can take up to one hour. You need to be relaxed with your eyes closed for most of the test but may be asked to open and close your eyes, breathe deeply for a few minutes and be exposed to a flashing light. These methods may provoke brain wave changes on the EEG.

An EEG done while asleep can give helpful additional information. You will be advised to have a lot less sleep the night prior to the test. This is called a sleep deprived EEG.

While many people with seizures or epilepsy have abnormal EEGs, many do not. An EEG is just a snapshot of time during the test, so it's possible for someone with epilepsy to have a normal EEG. Also, occasionally people have an abnormal EEG, but have never experienced a seizure.

EEG ambulatory monitoring

It is sometimes necessary to obtain a recording over several hours or days to record an event. This can be done in the home environment. A compact, portable EEG recorder may be worn.

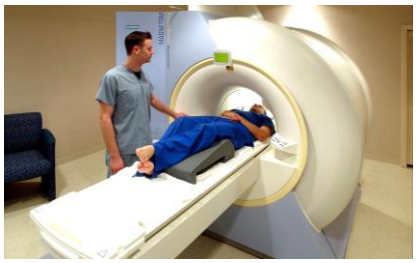
This records brainwaves while you carry out normal activities, day and night. You will also be asked to keep a diary of any symptoms experienced during this time. This test can be set up in the clinical setting, then you go home for a few days for the recording process and return to the hospital or clinic to have the device removed.

See Seer Medical for further information

EEG/video monitoring

Ideally it is best to have EEG and video recording at the same time. This combined information can be helpful to obtain an accurate diagnosis. Continuous monitoring may be needed for hours or days, depending on the frequency of symptoms and seizures.

In some cases, this can be done at home (see ambulatory monitoring). However, sometimes this monitoring often needs to be done in the hospital setting especially if there are plans to reduce medication is reduced, in order to induce seizures.



MRI scanning

Magnetic Resonance Imaging looks at the brain structure and produces clear and detailed images of the brain - using strong magnetic fields (no xrays). MRI may be able to detect lesions or abnormalities in the brain that could be causing seizures.

The MRI scanner is like a tunnel. This can be stressful for people who don't like confined spaces. There is usually a mirror to provide a view, and an intercom to communicate with the technician.

During the scan, the machine makes different loud thumping noises, like the beating of a drum, or drill. You need to be still during the scan and young children and people with an intellectual disability may require sedation or a light, general anaesthetic. The entire procedure takes 30-60 minutes.

Functional MRI (fMRI)

A functional MRI measures the changes in blood flow that happens when specific parts of the brain are working. Doctors may use a fMRI prior to surgery to identify the exact locations of critical functions; such as speech and movement, so the surgeon can avoid injuring those places during an operation.

Note on epilepsy diagnostic criteria:

Epilepsy is a disease of the brain defined by any of the following conditions:

1. At least two unprovoked seizures occurring more than 24 hours apart
2. One unprovoked seizure with a high probability of further seizures
3. At least two seizures considered reflex epilepsy, such as photosensitive epilepsy

Epilepsy is considered to be "resolved" for:

1. People who had an age-dependent epilepsy syndrome but are now past the age that further seizures are expected, or
2. People who have remained seizure free for at least ten years with no antiseizure medication for the last 5 years, and there is not a high probability of future seizures. (ILAE 2014)

References:

ILAE Official Report: A practical clinical definition of epilepsy. (2014) Epilepsia, 55(4):475–482

Mayo Clinic. Epilepsy Diagnosis https://www.mayoclinic.org/diseases-conditions/epilepsy/diagnosis-treatment/drc-20350098 Accessed Apr 2020

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