

Some people with epilepsy have seizures that are resistant to medications. For this group, there are other some treatment options available to manage epilepsy and control seizures. One of these is surgery.

This is general information about epilepsy surgery. Institutions will vary in their practices and approach, so it is best to speak to your neurologist or epilepsy nurse at the hospital you are attending.

Why epilepsy surgery?

Epilepsy surgery offers a chance to be seizure-free or at least to have fewer seizures. Surgery may also allow your antiseizure medications to be reduced – although ongoing antiseizure medication is sometimes necessary. This will depend on your circumstances.

People who may be eligible for epilepsy surgery are generally those who are still having seizures despite trialing many medications. This is mainly;

1. People with focal onset seizures (which may or may not develop into tonic clonic seizures) .
2. People who have debilitating tonic or atonic seizures, otherwise known as “drop attacks”.
3. People who have a structural lesion causing their seizures.

Your neurologist will be able to tell you if your type of epilepsy is suitable for surgical evaluation.

Surgery may be considered when:

- Seizures are found to be resistant to medication and the person has trialed 2 or more appropriate medications and still having seizures
- Seizures start from one small region of the brain
- Seizures are particularly debilitating or dangerous such as tonic, atonic seizures (drop attacks) and status epilepticus (very long seizures)
- Seizures are occurring frequently, making normal life impossible
- The cause of seizures requires surgery, e.g. a tumour or abnormal brain tissue

Pre-surgical evaluation

There is an extensive pre-surgery evaluation. This is to help to pinpoint the area in the brain where the seizures begin, and to determine whether surgery is possible without causing harm or impairment.

The pre-surgical evaluation includes a medical and seizure history and an array of different tests. Some tests are done before hospital admission, and in hospital video electroencephalogram (VEEG) is done for several days to record seizures.



The tests in the pre-surgical workup include:

Video/Telemetric EEG (electroencephalogram)

This is a continuous recording of your brain waves (EEG) and video monitoring for a period of several days. The aim is to record a number of seizures on EEG and at the same time record what you physically do during seizures to help find the seizure focus.

Being monitored can be a difficult and frustrating time as it can often take days for a seizure to occur. You will need someone (family or friend) to be with you 24/7 during this time for safety reasons.

There can be a waiting list of several months for this VEEG process, depending on the centre.

Tips:

- Changing clothes is easier by wearing tops that button or zip up at the front or back.
- Bring into hospital items that do not need to be attached to a power source such as books, journals, games and puzzles. You may use electronic devices but the battery will need to be charged away from the monitoring equipment.
- Watching television or videos and having lots of visitors can also help.
- If you smoke, consider giving it up before admission or purchase nicotine patches. You will not be able to smoke at any stage during the admission.
- Chewing gum will not be allowed as it interferes with the EEG.

Neuroimaging (brain scans)

MRI – Magnetic Resonance Imaging

MRI uses a magnetic field and radio waves to record detailed pictures of the brain, which is effective in identifying some brain abnormalities seen with epilepsy. The scanner is like a tunnel and makes loud thumping noises. Most MRI scanners are equipped with mirrors, microphones and music so you will be able to relax or communicate with the technician. The MRI may last from 30-60 minutes and uses no radiation.

Tip:

It is important to notify the technician prior to the MRI if you are stressed by confined spaces as a short acting relaxant can be given.

fMRI – Functional Magnetic Resonance Imaging

This is a technique for measuring brain activity by detecting the changes in blood oxygenation and flow that occur in response to brain activity – when a region of the brain is more active it uses more oxygen and to meet this increased demand blood flow increases to that area.



PET – Positron Emission Tomography

PET looks at how the brain works by measuring (glucose) metabolic activity, so you need to fast beforehand. The region of the brain where the seizures originate often has less metabolic activity - unless a seizure occurs during the uptake of the radioactive substance, which will increase the activity in this area. For this reason, EEG is also recorded during the PET scan.

The scan itself takes approximately 30-45 minutes and it is important that you remain quiet but awake during this scan. On most occasions a video/telemetric EEG will be performed 30 minutes prior to the scan and simultaneously with the PET scan, so the whole procedure can take over 2 hours.

Women of reproductive age will be routinely tested for pregnancy prior to this test. It will not be performed if the woman is pregnant due to the radioactivity exposure

SPECT – Single Photon Emission Computerised Tomography

If more information is needed about where your seizures are coming from this scan is performed. A SPECT scan examines blood flow within the brain. A radioactive substance is injected into the bloodstream and carried to the brain. Usually two of these scans are done if surgery is being considered:

- one when you are not having a seizure here the blood flow in the brain tissue should be reduced in the area of the seizure focus.
- and the other immediately after a seizure (the injection is actually given during the seizure) The blood flow should increase in this area during a seizure The scan takes about 30 minutes.

Once these scans are all completed, they will be viewed by your Neurologist and compared for consistency.

Neuropsychological Evaluation

This evaluation helps to determine which regions of the brain may be associated with or affected by the seizures. It gives an indication of which parts of the brain, if any, are not functioning well.

The neuropsychologist will test your mental functions such as memory, problem-solving, attention, learning, language, behaviour and personality. There are no invasive procedures, no pain, no needles, or electrodes. The neuropsychologist may also ask you about your family and medical history. Testing may take 6-8 hours to complete, often in blocks of 2-3 hours when you are functioning well and there is no pass or fail.

Tip:

Let the neuropsychologist know if you are feeling overtired or have had a recent seizure. It is important the neuropsychologist knows when your last seizure occurred or if you feel like you may have a seizure on the day as it can affect results.

WADA Test

This test is not commonly performed. It helps to assess how well the temporal lobes will support good memory function after surgery. WADA requires an angiogram, which will be explained to you by the doctor.

Because the WADA test is complex and an angiogram carries a risk of complications, a thorough explanation and consent is necessary



Invasive monitoring

Sometimes, even video EEG results may be inconclusive and further monitoring may be necessary. In this situation electrodes are implanted directly into the brain, or on the surface of your brain.

This is a major surgical procedure. After the electrodes are implanted, there will be another period of video-EEG monitoring to record seizures. The type of electrodes and surgery varies and will be fully explained to you prior to the test and you will be asked to complete a consent form.

Surgery – who decides and when?

Usually there is a meeting of all the professionals involved in your pre-surgical work-up where all the test results are discussed and compared. Surgery will not be performed unless all the professionals involved are confident that you will obtain significant benefit.

The decision to operate is only made after all the tests are done and is based on the results of tests, a joint decision by the team, and you wanting to proceed with surgery. Your chances of successful surgery and risks for complications will be explained to you by the surgeon.

At any stage during the pre-surgical work-up you can decide that you do not want to have surgery. Also be prepared that surgery may not be an option for you.

The goal of epilepsy surgery is to improve your quality of life by stopping or reducing the frequency of seizures, without causing neurological impairment.

The surgery

Preparing for surgery

When you are about to have surgery, it is important to:

- Stay healthy
- Talk to your family and friends about the surgery
- Take your medications as prescribed by your doctor
- Stop smoking
- Stay well informed through the surgical process by being in touch with the hospital professionals
- Ask for assistance from them if you have any questions about the surgery and post-surgery time
- Speak to someone who has had the surgery if possible.
- Ask lots of questions

The operation

The surgery is done by a neurosurgeon and can take a few hours. Afterwards, you may spend the first night in intensive care and then about five days in a ward. The area around the incision site and sometimes the eyes can be puffy and numb.

As with most surgery there are risks like infection and haemorrhage (bleeding). Common symptoms straight after surgery are numbness around the incision site, dizziness, unsteadiness, nausea, vomiting, headache, jaw ache, swelling, bruising, blurred vision and short-term depression.



After surgery

Discharge from the hospital following surgery is usually after about seven days.

The scar from the surgery should be kept clean and dry. It is important to let the surgeon know if it is red, swollen or painful. Hair washing is okay, but it is not advisable to use hair dyes for a few weeks after surgery.

It is important to rest following surgery, gradually increasing activity over the next couple of weeks. Increase exercise gradually but avoid exhaustion and overdoing it.

All contact sports should be avoided for 12 months while the skull bone is healing.

Some time off work to recover will be necessary. How long will depend on how you are feeling and the type of job you have. It is best to discuss this with your surgeon or neurologist.

The neurologist may change your medications on discharge from hospital or at follow-up appointments.

Regular follow-up appointments with the Neurologist and the Neurosurgeon will be arranged. You may also be asked to see the Neuropsychologist to retest and assess any possible changes.

Some people experience mild depression following surgery, but this is temporary and should resolve within 3-6 months. If you feel you are experiencing depression, you should notify your Neurologist immediately.

Life after surgery

Up to 60-70% of people become seizure free after surgery. Not having seizures can cause big changes to life, such as relationship dynamics, employment options and choices. Often this is a time people make life-changing decisions. Although a lot of these adjustments are positive, some people encounter difficulties adapting. Do not be afraid to seek help if you feel you are not coping, as this can be a normal response.

Not all people who have epilepsy surgery are seizure-free following surgery, but there is usually a significant decrease in seizures. Some people may have some seizures immediately after surgery, but this does not mean that the surgery has not been successful.

The driving licensing authority enforces no driving for 12 months after surgery. This will be extended if you have any seizures.

Speak to the neurologist before drinking alcohol or taking other medications or drugs.

For more comprehensive details about the above procedures, speak to your doctor. Often the hospital providing the service will have their own information handouts.

References

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