

Evaluation for Epilepsy Surgery

What is pre-surgery evaluation?

Surgery is one of the therapies to treat epilepsy. In order to decide if surgery will be helpful for you, your doctor needs to evaluate the results from several medical tests. This handout describes several tests – your doctor will decide which of these tests are appropriate for you. You may not need all of these tests. After you complete the tests your doctor recommends, our specialists will review your case in our weekly Refractory Epilepsy Conference. All providers involved with your care review and discuss your test results and come up with a recommendation on the preferred treatment for your epilepsy. The entire evaluation process could take between 6 to 12 months, depending on the complexity of the case. Some of the tests require a hospital admission, and some are done in the outpatient clinic.

Prolonged Video- Electroencephalogram (EEG) Monitoring

This test records seizures using video and EEG. This helps to determine the type of seizures and the location in your brain where the seizures start. Sometimes the results indicate that surgery will not be helpful, for example, if seizures come from more than one location in the brain).

You will be admitted to the hospital to do the test and it typically lasts 3-7 days. If you do not have frequent seizures, we may decrease or stop your medicines. This may cause you to have more frequent or more intense seizures than usual. On admission an EEG will be recorded in the Epilepsy Laboratory until you can go to your room. You will have an IV in your arm so you can receive medicines rapidly, if needed. We encourage family and friends familiar

with your clinical events to stay with you during your monitoring. You may have occasional redness, irritation, or skin breakdown under some EEG leads.

You play an important role in the safety and the success of your monitoring.

Please follow these guidelines:

- Stay in bed and on camera.
- Press the event button to mark when a seizure happens.
- Call for help to and from the bathroom.
- Keep bedside rails up.

Magnetic Resonance Imaging (MRI)

If you have not had a recent MRI scan, we will do a new scan to evaluate for changes in your brain that may cause epilepsy. Sometimes, this scan will also include functional MRI (fMRI) - a special type of MRI that can map areas of your brain involved in different activities that you perform in the scanner, such as speaking or reading, or moving your hand.

Single Photon Emission Computerized Tomography (SPECT) Imaging

A SPECT scan helps to identify the location in the brain where your seizures start. SPECT scans are done between 8AM and 3:30PM, Mon-Fri, usually during another video-EEG monitoring admission.

This test is not necessary for everyone having an epilepsy surgery evaluation. The results of other tests, like the MRI and the seizure recordings (EEG), help us decide when it is needed.

First brain scan

An EEG technician will inject a radioactive tracer into your IV during a seizure. This will go to your brain where it will be absorbed in areas of increased brain

blood flow. Once you have recovered from your seizure, we will transport you to the Nuclear Medicine Department where a brain scan will be done.

Second brain scan

You will receive a second injection of radioactive tracer during a time when you **are not** having a seizure, usually about 24-hours after your first scan. If you are discharged home after the first brain scan, it is also possible to do the second brain scan as an outpatient.

The results of these two scans, your MRI and EEG recording help to identify the area in the brain where your seizures begin.

Positron Emission Tomography (PET) Imaging

This is a different imaging technique done **in between seizures**. This test measures chemical activity in the brain and can be helpful to determine the area of brain where seizures start. For this test you will have an IV. We will use the IV to inject radioactive tracer that will go to your brain where it will be absorbed in areas that are chemically active. Between seizures, the area of the brain involved in seizures typically shows low activity in PET imaging.

This test is not necessary for everyone having an epilepsy surgery evaluation. The results of other tests, like the MRI and the seizure recordings (EEG), help us decide when it is needed.

PET imaging is done as an outpatient. An EEG is recorded during the PET scan, to be certain there are no seizures during the test.

Neuropsychometric testing

You will have a full day of testing with our psychologists to evaluate your memory, language and spatial abilities, fine motor skills, attention and mood.

These tests may indicate a problem in a specific brain area. This can be very helpful in determining the areas in the brain that are involved in your seizures. This test will be done in the outpatient Neuropsychology Clinic.

Speech-Language Pathology Evaluation

This 1-to 2-hour test evaluates your speech and language to see if the seizures have affected your speech or language abilities such as understanding of spoken language, ability to repeat words and sentences, name pictures, recall words, answer questions, reading and writing. The results of this test will also serve as baseline level of your abilities and together with the memory testing will help to determine the areas in the brain that may be involved in your seizures.

Social work evaluation

Your pre-surgical process includes addressing your psychological and social needs in order to make the experience of having epilepsy surgery as successful as possible. You and the social worker will discuss the impacts of epilepsy on your quality of life, support network, goals for surgery, financial resources and other needs. The first assessment with our social worker will give you the opportunity to discuss non-medical needs and other concerns you may have. Our social worker specializes in psychosocial issues of epilepsy, resources, community programs and patient education.

Wada Test

The Wada test is usually done after our Refractory Epilepsy Conference determined that surgery may be helpful to you. This test determines the areas of your brain that are involved in speech, memory and learning, and is important to minimize the risk of affecting these capabilities during possible future surgery. Wada test is done in the outpatient neuroradiology suite. Plan to

spend around 8 hours to complete the test. A blood test is required before the Wada procedure.

You will be awake during the Wada test and an EEG will be recorded during the procedure. We will inject local anesthetic (numbing) drug into the skin near the artery in your leg. Then we will place a thin tube (a catheter) into the artery and carefully position it into the arteries that carry blood to your brain. We will use the catheter to inject a dye that helps to identify the position and course of brain blood vessels. Next we will inject (through the catheter) a fast-acting anesthetic medicine that will put one side of your brain to sleep for a few minutes. During the time your brain is asleep your neuropsychologist and epilepsy doctor will test your strength, speech, memory and learning.

The entire procedure takes less than two hours. When the test is done we will remove the catheter and apply pressure until there is no bleeding. You will need to stay in bed in the recovery area, keeping your leg straight, for at least four hours.

Frequently Asked Questions

Is the radiation dangerous?

No. The two SPECT injections and the PET injection provide similar radiation exposure as receiving a chest CT scan. For PET, the radiation dose disappears quickly. For SPECT, half of the radiation dose leaves your body in your urine in the first 2-hours after the test. Body fluids are considered a source of radioactive exposure for 72-hours following a SPECT.

Why do you require a pregnancy test?

Women who are of childbearing age must take a pregnancy test before receiving a SPECT or PET injection. Pregnant women and women who are breastfeeding should not have SPECT or PET scans.

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