



EPILEPSY SURGERY: GUIDELINES FOR PATIENTS

PHASE 1: PRESURGICAL EVALUATION

Types of Surgery

- Temporal lobectomy is the most frequent type of surgery performed for seizures.
- Surgery is usually done for complex partial seizures or secondarily generalized seizures.
- “Extra temporal” surgery removes a part of the brain outside of the temporal lobe.

When To Consider Surgery

- When three or more anti-seizure medications have not controlled your seizure activity.
- Your seizure type is complex partial or secondarily generalized.
- Your seizure focus (where your seizures start) can be localized.
- The area (focus) can be safely removed.

Benefits Versus Risks Of Surgery

Benefits

- Patients who have temporal lobectomies have a 70% chance of being essentially seizure free.
- Patients who have extratemporal surgery have a 50% chance of being essentially seizure free.
- In most surgeries, it is better to have surgery at a younger age.
- May be able to decrease the number of medications you take after one to two years.
- Some people (about 50%) are able to discontinue anti-seizure medication completely.

Risks

- With any surgery there are risks that the physician will discuss with you if you are a candidate for surgery.
- Less than 1% of patients have a serious unexpected complication (like stroke or death).
- About 15% of patients have a temporary or mild complication
- Examples of temporary complications are headaches or depression for 6 months after surgery.
- Examples of mild permanent complications include mild memory difficulties or a change in peripheral vision

Questions To Consider

- What are your goals for surgery?
- What are your risks for injury with seizures?
- How do your seizures affect your quality of life?
- How do you think your life would be different if your seizures were controlled?

Tests Prior To Surgery

In general, testing is done to clarify your type of seizure and to localize the “seizure focus”, where they start in your brain. No one test alone gives enough information for surgical treatment; therefore, several tests are conducted.

- **MRI (magnetic resonance imaging)**
Provides a visual image of your brain.
 - It is a painless procedure.
 - You will lay flat on a narrow table inside the opening of a large magnet. You will need to lie still while the scan is completed. You will hear loud humming/whirring sounds.
- **Routine EEG**
 - An EEG records the electrical activity of the brain. A routine EEG, in between your seizure activity, gives clues to the type of seizure and location.
 - This is usually performed at the beginning of your hospitalization.
- **Video/EEG Intensive Monitoring**
 - Your electrical brain activity, along with a video recording of your seizure activity can usually provide a definitive diagnosis of your seizure type.
 - It usually localizes the seizure focus.
 - It is important to record your brain waves before, during and after a seizure.
 - The video picture makes the interpretation of your EEG more accurate.
- **Neuropsychological Testing**
 - This is a battery of tests that look at different areas of the brain; including memory, IQ, motor and speech tests.
 - These tests can help locate your seizure focus because sometimes the area where the seizure starts doesn't work as well as the rest of the brain. This is not always true; there can be just a slight difference.

Everyone has areas of the brain that are stronger or weaker than others, but in people with seizures the weaker area often corresponds with the seizure focus.

- **SPECT Scans**

Ictal (Seizure) SPECT Scan

- In general, blood flow increases in the area of the brain where the seizure begins.
- 90 seconds or less after the onset of your seizure, the nurse will inject a small amount of a radioactive tracer (very low dose of radioactivity) into an I.V. in your arm. A scan is performed up to 6 hours after the injection to identify the area of increased blood flow during your seizure. This is a painless procedure.
- You will go downstairs to Nuclear Medicine for this scan. You will lie on a narrow table while a huge camera scans your head; it takes approximately 45 – 60 minutes. The radioactive tracer does not cause you to feel abnormal in any way or give any common side effects.

Interictal SPECT Scan

- The radioactive tracer will be injected when no seizure activity has occurred for several hours or more.
- A comparison of the ictal and interictal SPECT scans may reveal a focal area of abnormal blood flow indicating the seizure focus.

PET Scan

- Similar to SPECT scan but PET measures brain sugar metabolism or activity rather than blood flow. This test also requires a radioactive tracer.
 - Like blood flow, in between seizures the seizure focus usually uses less blood sugar than the rest of the brain, indicated by decreased radioactivity in that area.
 - It is only performed in between seizures, not during seizure activity, because the radioactive tracer only lasts a few minutes and could not wait for a seizure to occur.
 - To prepare, you have to be NPO (nothing by mouth), including no caffeine, no sugar, and no chewing gum for four hours before the injection of the tracer. After the injection, you need to sit quietly for an hour. Otherwise the experience is basically the same as the SPECT scan.
- Wada Test (also called an intracarotid sodium amobarbital test)
 - Almost every patient gets this test prior to surgery.
 - It is used to determine which side of the brain controls language and the strength of memory in each side of the brain separately. In temporal lobe epilepsy, the affected side usually has poor memory because the temporal lobe controls memory. If the temporal lobe is not working properly then memory is bad in that side of the brain.
 - You arrive the day before the Wada test for a check up at the Epilepsy Clinic and blood work. The morning of your test you should arrive at the EEG lab at 07:00AM for the application of scalp EEG electrodes. The test is usually over by noon.
 - The test is similar to a cardiac catheterization except that the physicians are looking at the brain instead of the heart. A team of physicians and nurses will monitor you very closely. A very small incision is made, usually on the right side of your upper thigh, and a thin catheter tube is inserted and guided through your body up to the blood vessels that go to your brain. You will be injected with anesthesia that numbs one side of your brain. The physicians will ask you questions and ask you to remember a few simple things to test the half of the brain that is awake. The medication wears off in about 5 minutes and the procedure is repeated to test the opposite half of your brain.
 - Under most circumstances, the radiologist can place an Angioseal plug in the blood vessel and you can sit up and walk in about an hour. This can't be done in some cases and you must lie flat for six hours and cannot bend the leg on the side of the incision. You will be allowed to turn on your side, with your leg remaining straight, after 1-2 hours. You will be transferred to a unit, usually 6 Central or 6 West, where the nursing staff will monitor you during the 6-hour period. They will assess the incision, take your blood pressure, pulse, and respirations, check your neurological status. Most patients are discharged to home the same day. If you live far away, you may need to spend the night in Charlottesville.
 - Epilepsy Surgery Committee
All your tests will be reviewed by a committee of epilepsy neurologists, neuropsychologists, and neurosurgeons to determine if you are a candidate for surgery.

PHASE 2: INTRACRANIAL MONITORING

- When the Phase 1 evaluation reveals the seizure focus, then you can proceed to removal of the seizure focus (Phase 3 below) without any other tests. However, if the Phase 1 evaluation does not clearly indicate which brain region to remove, then Phase 2, intracranial monitoring is indicated.
- Intracranial electrodes are wires surgically placed inside the skull onto the surface of the brain or into the brain. The electrodes remain in place until a sufficient number of seizures are captured to figure out where the seizure focus is located.

- Whether to proceed to Phase 2 is a joint decision between you and your physician; you always have the final decision.
- There are different types of electrodes that can be applied.
 - “Subdural” electrodes are placed on the surface of the brain. They are typically arrayed as:

Strips: 4 to 8 electrodes in a strip of plastic 2-4 in. long, placed through a small 1 inch burr hole in the skull.

Grids: 20 to 64 electrodes in a 4x4in. rectangular piece of plastic, placed through a large hole that requires lifting a piece of skull bone.
 - “Depth” electrodes are in the form of a single wire that is placed into the “depth” of the brain.

May require a stereotactic frame to be placed on your head and an MRI performed to obtain a three dimensional picture of your brain to know exactly where to place the electrodes.

The brain itself does not feel pain so the electrodes themselves do not hurt, although the incision to place them may hurt for a few days.
- The type of electrodes and where they are placed depends on results or your earlier testing and which areas of the brain need to be looked at more closely.
- Once the electrodes are placed, you will be in the Epilepsy Monitoring Unit to record seizures exactly as in Phase 1.
- Sometimes, the physicians will do cortical mapping and this will be explained to you.
- Sometimes the final surgery to remove the seizure focus is done when the electrodes are removed, and sometimes at a later date.

PHASE 3: SURGICAL REMOVAL OF THE SEIZURE FOCUS

- Your length of stay will vary; each person is an individual and responds differently to surgery. Usually, patients spend 1-2 nights in the Neuroscience Intensive Care Unit where you will be monitored very closely. Afterwards, you will be transferred to the Epilepsy Monitoring Unit to complete your stay. When the physicians are confident you are doing OK you will be discharged to home.
- After surgery you can expect to experience a headache, facial swelling, bruising, broken blood vessels, difficulty opening your mouth, and some blurry or double vision. If the surgery occurred on your dominant language side, you may have difficulty speaking at first; a few people haven’t been able to talk at all for a few days. You are also at a slightly increased risk of having a seizure right after surgery. You can usually get out of bed briefly the day after your surgery. Remember, you are an individual and may or may not experience the above symptoms. As with any surgery, you will need lots of rest and a quiet environment.
- When you are discharged to home, you will still continue to need lots of rest. Do not lift anything that is heavier than 10 lbs for six weeks. You should continue to take your anti-seizure medication as prescribed by your physician. Usually you can return to work or school after six weeks. Again, everyone has a slightly different experience.
- Most of your recovery will occur within the first six weeks.

If you have any concerns, questions, anything you do not understand, please feel free to discuss it with your nurse or physician. They will be glad to assist you in your care.