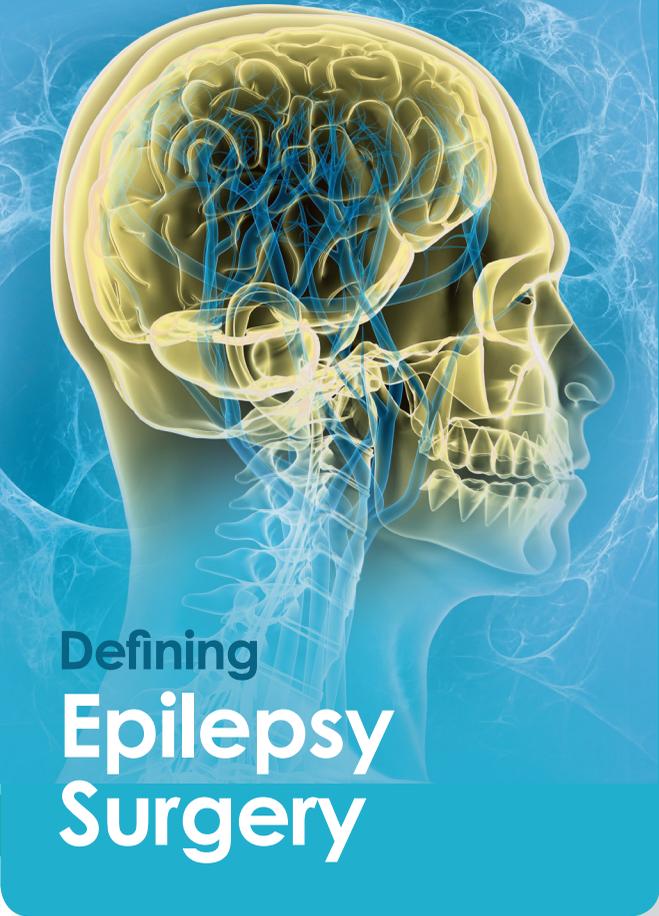


A GUIDE FOR PATIENTS & FAMILIES

EPILEPSY SURGERY: WHAT YOU NEED TO KNOW

Overall, medications work for about 70% of patients with epilepsy. When they do not work, surgery is a well-accepted and standard option for some types of epilepsy. Of the 30% of patients whose seizures cannot be controlled with medications, approximately half (more than 100,000 people in the U.S.) may be candidates for epilepsy surgery. Yet only about 3,000 epilepsy surgeries are performed annually in the U.S.



Defining Epilepsy Surgery

Doctors of USF Health

EPILEPSY SURGERY

This brief handout describes the essential facts you need to know about epilepsy surgery, and the testing that is usually involved. Keep in mind that you may not need all the tests described below.

Surgery is generally considered when medications fail to control the seizures.

How many medications should be tried before looking into surgery? The answer to this question has recently become clear: it is now known that if one fails 2 medications, then the chance of future success with any medications are less than 20%. If 3 or more medications have failed, then the chances of future success with any medications are less than 10%. Thus, if 3 medications have been tried without success, it is reasonable (and advisable) to look into the possibility of surgery.

Unfortunately, neurologists do not always inform their patients that surgery is an option, and many are not well informed about it. Thus, many patients who could benefit from surgery are unaware of that possibility for many years. In fact, patients have sometimes been given wrong (and scary) information about the risks and benefits of epilepsy surgery.

When surgery is considered, a complex evaluation is performed to make sure that the operation will 1) improve the seizures, and 2) not cause damage to essential functions (for example movements, speech, memory).

WHAT TESTS CAN I EXPECT?

Like other complex operations, such as organ transplants, epilepsy surgery involves a whole team of different specialists. It is directed by a neurologist specializing in epilepsy (an "epileptologist"), with input from other specialists including neuroradiologists, neuropsychologists, and of course neurosurgeons.

Prolonged EEG-video monitoring

This is the starting point for all potential surgery candidates (in fact it should be performed in all patients whose seizures are uncontrolled despite medications). With electrodes attached to the scalp, EEG (brain waves) and video are used to monitor the brain's activity and record seizures. This is usually done continuously (24 hours a day), and may last from a few hours to several days (in the hospital), depending on the time needed to record seizures. It is often necessary to decrease or stop medications in order to obtain seizures within a reasonable time.

Defining Epilepsy Surgery

EEG-video monitoring achieves the following:

- Confirms the diagnosis of epilepsy (it is the only way to make a positively certain diagnosis of epileptic seizures).
- Distinguishes between partial (or focal) epilepsy, where seizures are localized at onset, and generalized epilepsies, where seizures arise from the whole brain.
- If seizures are localized, it usually allows for localizing the zone of seizure onset, which is very important for surgery.

Imaging

MRI is the most accurate imaging technique, and is always necessary. Most patients with epilepsy have had normal MRIs, but subtle abnormalities are often found when MRI is performed specifically for epilepsy surgery (for example “mesial temporal sclerosis”). This is why we may repeat an MRI even though you have had some in the past.

SPECT (single photon emission tomography) is a nuclear scan performed during EEG-video monitoring (in the hospital). A tracer is injected IV at the beginning of a seizure, and a “snapshot” of the brain is taken.

PET (positron emission tomography) is very similar to SPECT, but is not taken during a seizure, so it is performed as an outpatient.

Neuropsychological testing

This extensive battery of tests is performed (outpatient) by a neuropsychologist to help analyze function of specific brain regions. It includes IQ and memory tests. It can be useful to confirm localization of seizure onset, and to predict (and prevent) possible neuropsychological side effects of surgery.

Wada test

This procedure is also called the intracarotid barbiturate (amytal, methohexital) test. It is performed during an angiogram, a standard neuroradiology procedure where a catheter is placed through the groin and dye is injected into the arteries that go to the brain (carotids). One hemisphere at a time is put to sleep with medication for several minutes. Language and memory are then tested (by the neurologist or neuropsychologist or both). The procedure is then repeated for the other side. It is used to localize areas of the brain that control language and memory function.

Invasive EEG (phase II) evaluation

This is only used when the above tests fails to pinpoint

the location of seizure onset with enough confidence. Only about 10% of surgery candidates require this phase. It involves placing electrodes inside the skull (directly in contact to the brain) over a specific region of the brain. Various techniques are available (depth, epidural, subdural electrodes). Some of these “invasive” electrodes also allow for localizing with precision the function of each area of cortex, so that critical area can be avoided during surgery, thus preventing complications on motor, sensory, visual, or language functions.

PUTTING IT ALL TOGETHER

Once all the information is obtained, the entire epilepsy program team convenes to review each case in detail. The team meets each week, and includes several neurologists/ epileptologists, neurosurgeons, neuroradiologists, neuropsychologists, nurse coordinators, and EEG technologists. All the results are reviewed, including history, exam, past history, EEG, videos, imaging, neuropsychological tests and Wada test. This is when the entire situation is discussed, and a plan is obtained with general agreement.

Surgery is most commonly performed to treat partial (localized) epilepsy, since only one limited area of the brain is involved. The most common operation is the resection (removal) of a specific area of cortex. By far the most common operation is an anterior temporal lobe resection (temporal lobectomy). This represents about 80-90% of all surgeries for epilepsy. Other areas can also be removed, most commonly parts of the frontal lobe.

When seizures are severe and arise from an extensive area of one hemisphere, one approach is to remove a large part of one side of the brain (hemispherectomy).

Another approach is to cut the nerve fibers connecting the two sides of the brain (corpus callosotomy). This is done to help seizures for patients who have intractable generalized seizures that result in frequent falls and injuries.

RESULTS AND OUTCOMES

Overall about 70% of patients who have epilepsy surgery become seizure free. However, in some circumstances, the chances of becoming seizure free are different for each patient, and can be reasonably predicted based on the results of the tests. For example, in cases where the results of EEG- video monitoring and MRI are in agreement, over 90% of patients become seizure-free with a temporal lobe resection.

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Experts in the
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Defining Epilepsy Surgery

RESULTS and OUTCOMES continued

Many patients are completely free of seizures, while others may find their seizures reduced by varying degrees. Some patients get off medications, while others may have to continue to take medication. It is rare that surgery is not helpful at all because we do not recommend it if the chances of success are low. Complications are extremely rare, and the postoperative course is usually simple. After surgery, patients typically go home within 2 to 3 days.

CONCLUSIONS

Remember that there is a lot of wrong information going around on epilepsy surgery. Not all physicians (including neurologists) are up-to-date on the progress made in this field. Epilepsy surgery is “standard of care” and is performed at all major (usually university-affiliated) medical centers. There is plenty of literature, books and information available, if you need more detailed information. Please see our web site at epilepsy.usf.edu, where the “epilepsy surgery book” is continuously updated with descriptions and patient testimonies.

ADDITIONAL READING

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