WHO IS ELIGIBLE FOR EPILEPSY SURGERY?

About 1/3 of patients with epilepsy continue to have seizures despite being on anti-seizure medications. Many patients with medication treatment-resistant seizures are eligible for surgery. The type of surgery and the outcomes vary significantly based on the patient’s particular epilepsy and history.

WHAT IS INVOLVED IN DETERMINING THE RISKS AND BENEFITS OF SURGERY?

A pre-surgical evaluation is performed to better understand a specific person’s risks and benefits, and determine the best type surgery for the patient. The goal of the pre-surgical evaluation is to determine where the seizures are originating from and where important areas in the brain such as language, sensation and movement are relative to the seizure onset zone. The studies typically take 2-3 months to complete in total.

Once the evaluation is complete the team of doctors- the epileptologist, neurosurgeon and neuro-psychologist will discuss your child and come up with a surgical plan. Once the plan is determined the family will be presented the surgical plan by the epileptologist and neurosurgeon.

PRE-SURGICAL EVALUATION (continued on back)

A pre-surgical evaluation is generally composed of a series of tests that will be tailored to your child’s specific needs. These are some of the tests that might be used to provide more information about your child’s seizures:

- **Video Electroencephalography (EEG):** This requires an admission to the hospital. Typically, the goal is to capture between 3-5 typical seizures. This usually requires that the patient’s seizure medications are lowered and then restarted again prior to admission. Children do require an IV- in case rescue medications, such as ativan are required to stop their seizures. The Video EEG is used to figure out electrically where the seizures are coming from. Typically the study takes between 5-7 days. For about 10% of children the video EEG can take more than one week to gather the needed data.

- **Magnetic Resonance Imaging (MRI) Scan:** A high resolution image of the brain is performed to look at the structure of the brain and help determine if there is a structural reason for seizures to be happening, such as a developmental abnormality or tumor. For many children sedation is required to obtain a high-quality MRI without movement.

- **Positron Emission Tomography (PET) Scan:** This study is sometimes performed under sedation, where tagged glucose is given by IV, between seizures to look for areas of the brain that are not metabolically symmetric. The region surrounding the seizure onset zone is identified because it uses less sugar than other parts of the brain.

- **Neuropsych testing:** A battery of tests performed by a specially trained psychologist to determine the strengths and relative weaknesses of the different parts of the brain. Examining patterns in cognitive functioning provides a better idea of where the seizures are coming from, and what would happen if a particular region of the brain was removed.
There are two types of epilepsy surgery. The first type is curative surgery where the goal is to remove the area in the brain where the seizures are coming from. The second type is palliative, where the goal is to significantly decrease the frequency of seizures.

**TYPES OF CURATIVE SURGICAL INTERVENTIONS**

1. The seizure onset zone is located far from functional brain areas involved in language or memory. A single stage surgical procedure can be performed where the seizure focus is removed from the brain followed by a post-operative recovery.

2. The borders of the seizure onset zone are not well understood or may be near important functional areas in the brain. A two or three stage procedure may be required, where the electrical activity of the brain is recorded under the skull to better determine the seizure zones and functional zones.

   - It may be determined that curative surgery has too high a risk of resulting in weakness or injury, and/or too low a likelihood of controlling the seizures. In this case, palliative surgery or non-surgical options, including a ketogenic diet are recommended.

**TYPES OF PALLIATIVE SURGICAL INTERVENTIONS**

1. **Vagus Nerve Stimulator (VNS)**—Involves implanting a device under the muscles in the chest that sends weak electrical signals along the vagus nerve up to the brain at regular intervals. These signals help prevent the electrical bursts in the brain that cause seizures.

2. **Corpus Callosotomy**—The corpus callosum is a band of nerve fibers located deep in the brain that connects the two halves (hemispheres) of the brain. It helps the hemispheres share information, but it also contributes to the spread of seizure impulses from one side of the brain to the other. A corpus callosotomy is an operation that severs (cuts) the corpus callosum, interrupting the spread of seizures from hemisphere to hemisphere.

**FREQUENTLY ASKED QUESTIONS**

**Q:** What is the likelihood of seizure freedom?

**A:** This varies based on the specific epilepsy and type of surgery performed. The risks and benefits of surgery will be discussed in detail once the pre-surgical evaluation is complete.

**Q:** Will my child still have to take medications?

**A:** Yes, typically for at least one year and sometimes longer. However, there is a strong possibility that the total number and doses of medications can be decreased prior to that.