Epilepsy Surgery

What is Epilepsy?

Epilepsy or recurring seizure activity is the most common neurologic disorder in children. Seizures are abnormal movements or behaviors due to excessive firing of neurons in the brain. Up to 5% of children and adolescents experience a seizure early in life. Medications or special diets may be recommended by our Neurology team to control your child's seizures. In approximately 20-30% of children, the epilepsy becomes medication resistant, or the side effects of the medication become intolerable.

Children differ from adults in the causes and treatments for their epilepsy. Children tend to have sites outside the temporal lobe associated with their seizures. They also can have multiple areas of the brain involved, making diagnosis difficult. When epilepsy affects the developing brain, it can disrupt critical times for development and learning. The developing brain, however, retains great potential for recovery of function after surgery (called plasticity).

Causes of childhood epilepsy include cortical dysplasia, hemispheric abnormalities, tuberous sclerosis, areas of previous trauma, and vascular malformations.



How is Epilepsy diagnosed?

A thorough evaluation will be conducted to search for the focus of your child's epilepsy. This includes neurological examination and history, neuropsychological assessment, MRI of the brain, EEG (electroencephalogram) and video EEG. You child may stay in the hospital for several days while seizures are observed and recorded. We also may recommend a SPECT scan or functional MRI to help localize the seizures and functional brain areas. ECOG or electrocorticography can be used during surgery to record seizures directly from the brain surface. Sometimes grids (see below) or depth electrodes are implanted and the child monitored in the hospital while recordings are taken. Neuropsychological assessment evaluates preoperative and postoperative cognitive functioning and learning abilities. Specific brain areas can be evaluated and the risk of surgical intervention to these vital functions determined.

What are the treatment options?

When medications or special diets fail to control seizures adequately, surgery for children can dramatically reduce the number and severity of seizures children suffer. We offer the full spectrum of epilepsy procedures from resections to vagal nerve stimulator placement (VNS). The best results for resections are obtained in surgery for a single, easily identifiable focus in the brain. Results are still good for more diffuse areas causing seizures, however, a more extensive work-up may be necessary. One stage surgery refers to resection of a brain lesion or area of dysplasia with or without placing electrodes on the surface of the brain (ECOG electrocorticography). Outcomes for one stage procedures, especially if a MRI lesion is present, are excellent. Two stage surgery refers the implantation of grids or depth electrodes in the brain to more closely monitor seizures outside the operating room. Eloquent areas of brain, such as language and motor areas, can be mapped with this two stage procedure as well. A "map" is then created, with functional areas to be spared and the seizure focus to be resected, to guide the neurosurgery team in the OR. **Corpus Callosotomy** refers to the transaction of the bridging fibers crossing from one side to the other. Atonic or drop attacks respond best to this type of procedure. A complete or partial callosotomy can be performed, depending on the child's preoperative verbal function.

VNS or vagal nerve stimulator offers patients who are not candidates for resection an alternative. Electrodes are wrapped around the vagus nerve in the left side of the neck and connected to a small generator. Seizures are reduced in severity and frequency in most patients (more than 50% reduction in 50 – 75 % of patients). The results of VNS appear to be durable over time.



placement

OUR PEDIATRIC EPILEPSY PROGRAM

The Pediatric Epilepsy Center at Arnold Palmer Hospital is designated a Level 3 Epilepsy Center, by the National Association of Epilepsy Centers. We are the only site designated Level 3 in Central Florida. The team consists of Neurology, Neurosurgery, EEG Technicians, Therapy/Rehab Specialists, Radiology and Nuclear Medicine, Intensive Care Team, Pediatric Anesthesiology, Social Work and Child Life services. Our team's goal is to improve the quality of life of every child evaluated by our team.



Grid placement for epilepsy surgery