Advance Neuroscience Technology

MEG (Magnetoencephalography)

The future of neuro-medicine is here. Cook Children's MEG technology lets us see the brain in a whole new way. The MEG is a noninvasive imaging unit that enables our specialists to see the electrical activity going on in your child's brain.

There are a lot of imaging technologies that scan the brain, but the MEG is designed to measure even the most subtle brain activity. This amazing tool helps the doctors to determine the correct treatment for epilepsy and other brain disorders such as tumors. The brain creates magnetic fields which the MEG is able scan with pinpoint accuracy, reading the activity of tiny neurons deep in the brain. In the case of epilepsy, the MEG can see exactly where a seizure occurs and to evaluate and explore surgical options. Should surgery be required, MEG technology allows our surgeons to accurately locate important functions like speech so they know how to navigate the brain.

What is MEG?

MEG is a highly sensitive way to record the magnetic fields generated by the brain. This safe test helps localize where seizures occur, as well as important functions like language and motor skills. Used along with MRI, PET and EEG tests, MEG helps our neurosurgeons know exactly where to operate on the brain to retain a patient's quality of life.

Why is MEG performed?

In the evaluation of epilepsy, MEG is used to localize the source of seizure activity in the brain. In patients with brain tumors or other lesions, the MEG is used to map the exact location of normal tissue near the lesion helping our doctors to plan more precise surgery, resulting in minimal weakness or loss of function for our patients.

MEG vs. EEG

The recorded brain activity is called a magnetoencephalogram (MEG) and is similar to an electroencephalogram (EEG). The MEG measures magnetic fields and activity in the brain produced by neurons, while an EEG records electrical activity. Both MEG and EEG are more sensitive than PET and SPECT scans to rapid changes in brain activity.

How is MEG different?

- MEG is a very high resolution device that can identify an area of localized activity with an accuracy of millimeters.
- MEG provides a direct measure of brain function. Other brain imaging techniques like MRI, PET and SPECT are secondary measures of brain function that measure properties like blood flow, metabolism or structural integrity.
- MEG is a completely non-invasive test. Injections of isotopes or exposure to x-rays or magnetic fields are not required so children and infants can be studied repeatedly.

What does the MEG do?

MEG provides a non-invasive measurement of the magnetic fields generated by brain activity. MEG measures small electrical currents inside the neurons of the brain. These currents produce small magnetic fields. It is used for pre-surgical evaluation of patients with epilepsy and brain tumors. MEG generates a highly accurate representation of the magnetic fields produced by the neurons.

- The MEG assists doctors with pre-surgical planning by non-invasively locating areas of seizure activity in the patient's brain.
- The MEG helps doctors assess brain activity as it relates to the patient's cognitive function.

How long does MEG test take?

The MEG test will take between 1 hour and 2 1/2 hours. During this time, the patient is asked to remain as still as possible and not move his or her head. Some children may have difficulty remaining still. In these cases, your doctor will recommend having one of our Child Life specialists sit with your child during the testing. Our specialists are highly-skilled at easing a child's fears and anxieties.

How do you to prepare for MEG tests?

- There are different preparations depending on the exact type of test your child will have.
- You child's health care provider will determine if your child will need sedation for this procedure. Our radiology staff will go over instructions with you prior to the test.
- Regular medicines should be continued. Medicines can be taken with a small amount of water.
- On test day, the patient will be asked to wear comfortable clothing without any metal like zippers, snaps or metallic paint accents.
- The patient should not wear any jewelry, make-up, hair products, nail polish, hearing aids or removable dental work. Metallic objects are not allowed in the MEG lab.

Note: If the patient has a vagus nerve stimulator (VNS), pacemaker or similar device, they may not be able to have MEG. Please ask your doctor.

What can you expect?

After arriving, you and your child will be taken to the MEG lab. The technologist will explain the procedure. A Child Life specialist will be available to accompany and assist your child during the MEG test if needed. Child Life can provide preparation and support before and during the test.

Need help referring a patient?
Please call the International Patient Services department at +1-682-885-4685,
send faxes to +1-682-885-2557, or email international@cookchildrens.org