Using an intraoperative MRI (iMRI) significantly reduces the need for early reoperation or repeat sedation for postoperative scans in children with brain tumors according to a study published online in the American Journal of Neuroradiology.

Physicians at Le Bonheur evaluated data from 194 patients who underwent intraoperative MRI-guided surgery over two years. Additional tumor was resected after scanning in 21 percent of patients. Among the patients with a preoperative goal of gross resection, 93 percent achieved this goal. The 30-day reoperation rate was less than 1 percent. None of the patients required additional postoperative MRI imaging during the same hospital stay.

"iMRI is an invaluable tool for me," said co-author Paul Klimo, MD, chief of Pediatric Neurosurgery. "We are now able to leave the OR with the knowledge of whether a tumor was completely resected or not. If not, then it is almost always because the residual tumor cannot be safely resected. Almost all of my tumor operations are done using it."

The early tumor reoperation rate was reduced from 8 percent to less than 1 percent at Le Bonheur with the use of iMRI.

"We’ve found that successful implementation of an iMRI program requires teamwork. At Le Bonheur, we collaborate on all cases. Each is reviewed by the neuroradiologist and the neurosurgeon before operation to identify the goals and intended approach. All scans are interpreted with the neuroradiologist in the operating room, providing real-time consultation," said co-author Asim Choudhri, MD, director of Neuroradiology.

Five neurologists and two neuropsychologists have joined the Neuroscience Institute. In January, Robin Morgan, MD, will return to Le Bonheur after practicing in another state for a few years. Morgan has 25 years of experience in pediatric neurology. She specializes in general pediatric neurology, neonatal neurology, tics and Tourette’s Syndrome. Morgan completed a child neurology fellowship at the Medical College of Virginia. Morgan will see patients in Memphis and in Tupelo, Miss., and serve as an assistant professor at UTHSC.

Ehab Dayyat, MD, specializes in general pediatric neurology and pediatric sleep medicine disorders. His research interests include cognitive behavioral deficit induced by obstructive sleep apnea as well as the link between epilepsy and sleep. With special interest in narcolepsy and restless leg syndrome. Dayyat finished a post-doctoral research fellowship in sleep medicine and neurobiology before starting his pediatric residency at the university of Louisville. Dayyat comes to Memphis after completing a clinical neurophysiology fellowship at the University of Texas Southwestern in Dallas. Dayyat serves as an assistant professor at UTHSC.

Swati Karmarkar, MD, will start a multidisciplinary clinic for children with cerebral palsy. Neurologists will collaborate with therapists, orthopaedic surgeons, neurosurgeons and developmental pediatricians, and work towards a goal of coordinated care for these patients. Karmarkar will also care for children with neurodevelopmental disabilities, stroke, movement disorders and epilepsy. She completed a child neurology residency at Washington University School of Medicine and St. Louis Children’s Hospital in St. Louis, Mo. Her research interests include phenotypic characterization of children with cerebral palsy and quality improvement projects. Karmarkar will serve as an assistant professor at UTHSC.

Sarah Weatherspoon, MD, has special interests in epilepsy in infancy and epilepsy surgery. She comes to Memphis after completing a clinical neurophysiology fellowship and child neurology residency at Cincinnati Children’s Hospital Medical Center. Weatherspoon will serve as an assistant professor at UTHSC.

Pediatric Neuropsychologists Nicole Shay, PhD, and Christen Holder, PhD, see patients both in the hospital and outpatient clinic.

Shay specializes in working with pre-school-aged children. She comes to Memphis from Rhode Island Hospital and Brown University’s Warren Alpert Medical School where she served as a clinical assistant professor. Shay earned a Doctor of Philosophy from University of Iowa and completed a post-doctoral fellowship in pediatric clinical neuropsychology at Nationwide Children’s Hospital in Columbus, Ohio. Holder specializes in Spina Bifida, high-risk newborns, head injury and hematologic/oncology/tumors. She completed a pediatric neuropsychology fellowship at the University of Arkansas for Medical Sciences and Arkansas Children’s Hospital. She has a doctorate from the University of Texas at Austin.

Case Study: Craniosynostosis
Early surgery minimizes abnormal skull shape

At his 6-month well-child checkup, Daniel Malone’s head circumference measured larger than most babies his age.

“We initially thought maybe it was genetic,” said Daniel’s mom, Natasha.

By the time Daniel turned 1, though, his skull was still growing abnormally. His pediatrician ordered an MRI scan, which showed that his skull’s sagittal sutures had closed prematurely. Daniel had craniosynostosis, a condition that occurs when the skull’s sutures close too early, leaving little to no room for the skull to expand and allow for the brain to grow. If left untreated, the birth defect could cause his head to continue to grow abnormally. The Malones, who live in Bartlett, Tenn., were referred to Le Bonheur/Semmes Murphey Neurosurgeon Frederick Boop, MD.

Daniel needed a cranioplasty to remove the affected suture and reshape his skull. The multidisciplinary surgery was scheduled for the day after Christmas with Boop and Robert Wallace, MD, a Le Bonheur pediatric plastic surgeon.

Daniel’s mom, Natasha, and father, Bryan, were nervous about the procedure but knew their son was in good hands.

“At this point, Daniel was 15 months old and had just started walking. I didn’t want to surgery to affect his development,” said Natasha. “I had heard great things about Dr. Boop and Dr. Wallace, though.”

The younger the child, the better for this type of surgery, says Boop.

“The surgery offers the chance for the children to grow up with a normal appearance. When done at an early age, they have no remembrance of the surgery and tolerate it very well,” Boop said.

Daniel remained at Le Bonheur for three days following surgery to recover.

Now 19 months old, Daniel is doing well post-surgery. He loves to play with his two older siblings and became a big brother this summer.
Real-time MRI guidance technology will give pediatric neurosurgeons at Le Bonheur Children’s better options for deep brain stimulation, MRI laser ablation and other MRI-delivered placement.

New Clearpoint technology at Le Bonheur allows for surgery inside the MRI scanner, allowing for sedated pediatric patients to remain inside the MRI scanner while neurosurgeons operate. Semmes Murphey Neurosurgeon Karl Sillay, MD, is especially interested in using the technology to offer deep brain stimulation for children with medically refractory dystonia, a pediatric movement disorder.

“We have amazing technology at Le Bonheur,” said Sillay. “Couple that with our qualified neurologists and other neuroscientists – and we are able to offer expert care for these children.”

Adults often undergo deep brain stimulation while they are awake, so surgeons can better understand how each individual brain is organized. Children can be more difficult to treat awake – as they are often too young to communicate or uncompliant. The new Clearpoint technology will allow surgeons to monitor brain activity and function, even if it shifts, during the procedure.

Neuroscientists have started seeing potential candidates for the deep brain stimulation. Once the patient is referred to a Le Bonheur neurologist, he or she will undergo imaging. Team members will then conference together to determine the best course of treatment for each child.

Using MEG to improve infantile spasms outcomes

A new grant will allow neurologists and clinical neuroscientists to study the use of Magnetoencephalography (MEG) in improving outcomes for infantile spasms. Infantile spasms are devastating to the child, both in terms of developing intractable seizures, and perhaps more importantly, in terms of developing significant cognitive impairment. Traditionally, routine EEG has been utilized to diagnose infantile spasms, and then to guide therapy. Children who have resolution of hypsarrhythmia and normalization of their EEG have the best chance for a good cognitive outcome, and those who do not often have significant cognitive delays.

The team believes that MEG improvement in the first couple of weeks will predict response to therapy, and if it does, provide a biomarker for future studies. The researchers also will determine if improvement seen in MEG (or lack of improvement) will be more predictive of cognitive outcome than standard EEG.

During the two-year study, 40 children will undergo serial MEG recording sessions: one at diagnosis of infantile spasms, one after two weeks of treatment and four more sessions at 6, 12, 18 and 24 months after diagnosis. EEG will be recorded at the same time, and that data will be used for clinical evaluation and all treatment decisions. MEG data will be used for the quantitative spectral and connectivity analyses in order to enable specificity of regional changes in brain activity.

Questcor Pharmaceuticals, Inc. has funded this study.

Family honors daughter with annual lecture for neurologists

Alex Paciorkowski, MD, received the Kayden R. Vinson Distinguished Scholar Award and Lecture at the 8th annual Greater Mid-South Pediatric Neurology Symposium in April. Paciorkowski is an assistant professor at the University of Rochester Medical Center. The lectureship was established by Jason and Jessica Vinson in honor of their four-year-old daughter Kayden who is a Le Bonheur patient. Kayden was diagnosed with generalized myoclonic epilepsy. She has made great strides in development after corpus callosotomy surgery and weekly therapy. The Vinson family raises funds to support the Neuroscience Institute through an annual soccer tournament and 5K run in Memphis.

Save the date: Neurology update

The 9th annual Greater Mid-South Pediatric Neurology Update is set for April 24-25, 2015, at The Westin Memphis, Beale Street. The seminar has been designed to encompass state-of-the-art practices and trends in treating pediatric neurology patients. Faculty who are both clinically and academically oriented will address relevant issue and provide valuable information and insight into situations commonly presented to subspecialists in pediatric neurology. This will be performed using case-based learning and didactic lectures with time for questions and answers. For more information or to register, visit www.methodistmd.org or call 901-516-8933.

Institute recognized by US News & World Report

Once again, US News & World Report has named Le Bonheur Children’s Neuroscience Institute among the top neurology/neurosurgery programs in the country.

Le Bonheur was also recognized in six other specialties – cardiology/heart surgery, neonatology, nephrology, orthopedics, pulmonology and urology.

Grant funds Parkinson’s research

Clinical Neuroscientist Shalini Narayana, PhD, received a grant from the Michael J. Fox Foundation to study non-invasive brain stimulation for voice therapy in patients with Parkinson’s disease. Narayana is director of the transcranial magnetic stimulation (TMS) lab at Le Bonheur and will lead the joint University of Tennessee Health Science Center and University of Memphis project.

Patients with Parkinson’s disease frequently suffer from speech and voice disorders that adversely affect their communication and quality of life. Medications that help other symptoms of Parkinson’s disease are not effective in treating speech and voice symptoms, but intensive voice therapy has been shown to be helpful. Non-invasive brain stimulation has gained recognition as a useful treatment tool, approved by the US Food and Drug Administration, for treating depression and migraine.

The researchers hope to demonstrate that non-invasive brain stimulation will speed up the improvements in speech and voice quality, and that the improvement in communication will be long lasting. It is expected that non-invasive brain stimulation will improve voice box function as well as strengthen the connections between brain areas that are engaged during speaking.

Grant funds Parkinson’s research