

Surgeons remove fibrillary astrocytoma in 14-year-old, preserve language functions

Michael Boyd had a seizure at school. At the Emergency Department radiologists found an abnormal spot, and the MRI confirmed the 14-year-old from Lebanon, Va., had a mass on his left frontal lobe. Physicians referred Michael to Niswonger's Children's Hospital in Johnson City, Tenn. There, doctors recommended Michael fly immediately 500 miles across the state to Le Bonheur Children's Hospital.

"They told us that Dr. Frederick Boop was the best. He had done many surgeries like this before," said mother Amy Boyd.

When the family arrived in Memphis, Michael's room was waiting. The doctors and nurses began to explain what was going to happen. Michael underwent a series of diagnostic tests – MRI, functional MRI, tractography, spectroscopy, magnetoencephalography (MEG) and transcranial magnetic stimulation (TMS) — all completed on his first day at Le Bonheur.

"Before they took him for each test, they spoke to all of us. They explained what each test was for and how it was going to help the doctors see and understand the tumor. Our biggest fear was not knowing how the tumor was attached," said Amy.

Michael had a fibrillary astrocytoma, a low-grade tumor that is not likely to spread to other parts of the body. Michael's tumor was located in the left frontal lobe, in an area which typically controls language functions. The tumor had an infiltrating appearance and might possibly impair functions as it grew.

Because of the tumor's high-risk location, the wide range of diagnostic tools available



Dr. Frederick Boop and Dr. Asim Choudhri review Michael Boyd's MRI scan.

at Le Bonheur gave Michael's surgical team important information.

"The goal is maximum lesion resection with minimal functional deficit," said Neuroradiologist Asim Choudhri, MD. "These images served as a road map and helped Dr. Boop remove as much of the tumor's margins

without impairing functions."

The surgical team used the intraoperative MRI.

"There came a margin in which the tissue of the tumor began to blend with the tissue of the normal brain and once we were unable to tell brain from tumor we felt it best to stop. If this small area starts to grow down the road he has several treatment options but for now we will just follow him by MRI," said Rick Boop, MD, chairman of the Department of Neurosurgery.

Four days after surgery, Michael was ready to go home. He experienced slurred speech and occasional headaches for a few weeks after surgery, but he's now returned to feeling like himself.

"He's doing great now. He told us that he felt he was doing better in school now since the tumor is gone," said Amy.

Michael will be monitored by physicians at St. Jude Children's Research Hospital, Niswonger's Children's Hospital and Le Bonheur.



Michael Boyd sees Dr. Frederick Boop five months after his brain tumor surgery.

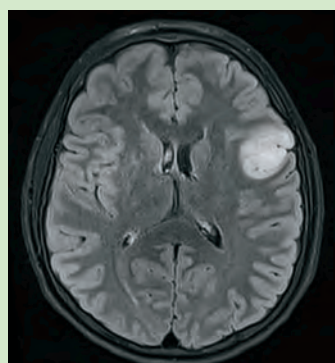
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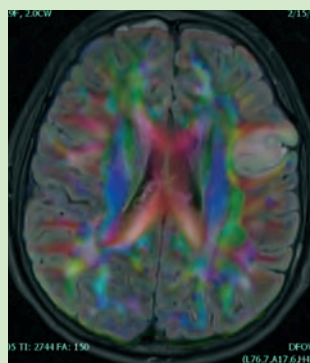
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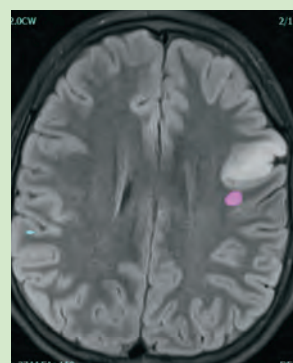
SCANS OF MICHAEL BOYD'S BRAIN TUMOR



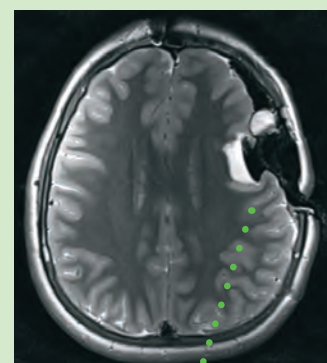
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2.



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1. Axial FLAIR MRI image

2. Axial FLAIR with Diffusion Tensor Imaging (DTI) overlay to show impact of the mass on adjacent nerve bundles

3. Axial FLAIR image with functional MRI (fMRI), with pink showing areas of expressive language (Broca's area)

4. Axial T2 image from intraoperative MRI (iMRI) showing resection cavity corresponding to the previously seen left inferior frontal lobe mass. A thin rim of lesion was left at the posterior rim due to the adjacent language activation centers. The remainder of the margins show no residual tumor.



Watch a video case study with Neuroradiologist Asim Choudhri, MD, at www.lebonheur.org/boyd

CLINICAL NEUROSCIENCES TEAM EXPANDS

Abbas Babajani-Feremi, PhD, and Amanda (Max) Adamson, PhD, have joined the Clinical Neurosciences team at Le Bonheur Children's Hospital.

Babajani-Feremi is a biomedical engineer with expertise in advanced signal-processing methods and will be part of the functional neuroimaging team. He also serves as an assistant professor in the division of Clinical Neurosciences, Department of Pediatrics at the University of Tennessee Health Science Center (UTHSC). He previously served as a staff scientist at Washington University School of Medicine, St. Louis, Mo. He received a PhD, in Biomedical (Electrical) Engineering from the University of Tehran in Iran. His research interests include signal and image processing; medical imaging; and brain connectivity analysis using functional neuroimaging techniques such as electroencephalography (EEG), magnetoencephalography (MEG), and functional magnetic resonance imaging (fMRI).

Adamson is a pediatric neuropsychologist and licensed clinical psychologist. She will focus on outpatient care. Adamson comes to Memphis from

The Center for Pediatric Neuropsychology, a private practice in Palm Beach Gardens, Fla. Adamson completed a postdoctoral residency in pediatric neuropsychology at Children's Healthcare of Atlanta. She received a PhD in clinical psychology from The University of Mississippi. During graduate school, Adamson completed a practicum at Le Bonheur.



Abbas Babajani-Feremi, PhD



Amanda Adamson, PhD

Training programs prepare neurologists, neurosurgeons

The Neuroscience Institute trains the next generation of pediatric neurologists and neurosurgeons through residency and fellowship programs.

The child neurology residency program has two spots each year. Namrata Shah, MD, and Amy McGregor, MD, serve as the program directors. The residents spend time at Le Bonheur Children's Hospital, the Newborn Center



Child Neurology Resident Elena Caron, MD, sees a patient in Le Bonheur's neurology clinic.

at the Regional Medical Center and St. Jude Children's Research Hospital.

The incoming class includes:

- Amy Law, MD, who completed medical school at the University of Louisville School of Medicine and a pediatrics residency at the University of Tennessee Health Science Center.
- Sunitha Nune, MD, who completed medical school at the American University of Antigua College of Medicine and pediatrics residency at Akron Children's Hospital.

The graduating class includes:

- Elena Caron, MD, who has accepted a one-year pediatric neuromuscular fellowship at The University of Texas Southwestern in Dallas, Texas. Dr. Caron will return in July 2014 to join the Neuroscience Institute.
- Yi Xie, MD, who has accepted a pediatric neurologist position at New York Methodist Hospital in Brooklyn, NY.

The pediatric neurosurgery fellowship is one of 25 training sites in the country. The program has trained 21 fellows, one each year. Frederick Boop, MD, is the program director.

- Mark Van Poppel, MD, completed his fellowship this summer. He has accepted a position at Carolina Neurosurgery & Spine Associates in Charlotte, NC.
- David Daniels, MD, PhD, is the incoming fellow. He comes to Memphis from Mayo Clinic.

In addition, Le Bonheur provides pediatric exposure to neurosurgery residents. Residents rotate for three months as a PGY-3 and again as a PGY-4 for a total of six months exposure to pediatrics during their training.

Orthopaedics and Neurosurgery teams partner to remove spinal tumors

At the age of 10, Mary Kaitlyn “Katie” Myers of Madison, Miss., was diagnosed with astrocytoma – an intramedullary tumor growing from inside her spinal cord.

“We noticed she was walking crooked,” said her mother, Donna Myers. A local orthopaedic surgeon ordered an MRI to find the cause of her atypical scoliosis. Scans revealed a spinal tumor.

Katie was sent to Le Bonheur Children’s Hospital in Memphis, Tenn., where the Myers family met with William Warner, MD, a Le Bonheur orthopaedic surgeon, and Frederick Boop, MD, chair of the Department of Neurosurgery at the University of Tennessee Health Science Center and co-director of the Neuroscience Institute.

Le Bonheur’s orthopaedic and neurosurgery teams provide comprehensive surgical care for pediatric spinal tumor patients.

“Our spinal cord tumor program, a combined program with St. Jude Children’s Research Hospital, is one of the busiest spinal tumor programs in the country. Working as a team with the neurosurgeons of Semmes-Murphey Clinic and the orthopaedic surgeons at Campbell’s Clinic, the program brings an unparalleled level of expertise to children with this rare disorder,” said Boop.

Katie needed surgery to resect the tumor and determine her prognosis.

“I didn’t believe it was happening,” said Katie, now 17, of her diagnosis.

“From the delicate micro-neurosurgery required to remove an intra-spinal tumor to the complexities of reconstructing a growing spine afterwards, the management of complex tumors of the spine requires a multidisciplinary team, not just for the surgery but for the post-operative care and rehabilitation needed for these children,” Boop said.

The surgery was a success, and doctors were able to remove all of the tumor. Katie remained at Le Bonheur for 5 days as she recovered from surgery and continued therapy at home to regain her strength and mobility.

Now a senior in high school, Katie continues to see Warner annually for checkups and is doing well. She loves to swim, ride bikes and go to the beach. She’s had two surgeries since her initial operation in 2006. The first one in 2007 was to stabilize a spondylolisthesis of the fifth lumbar vertebrae – a condition Warner detected during

her initial operation. The second in 2008 was to stabilize her spine due to progressive instability of her cervical spine after the tumor had been removed.

“I had the best care team at Le Bonheur,” said Katie. “The doctors and nurses have become my favorite people. They saved my life.”



Mary Kaitlyn “Katie” Myers of Madison, Miss., 17, was diagnosed with astrocytoma – an intramedullary tumor growing from inside her spinal cord. Now a senior in high school, Katie enjoys swimming and riding bikes.

IN BRIEF

Neurosurgeon named secretary of AANS

The American Association of Neurological Surgeons has named **Frederick Boop, MD, FAANS, FACS**, as its secretary. Boop is a professor and chairman of the neurosurgery department at the University of Tennessee Health Science Center and co-director of the Neuroscience Institute.



Frederick Boop, MD

Neuroradiologists share expertise

Neuroradiologists **Asim F. Choudhri, MD**, and **Matthew T. Whitehead, MD**, presented research at the American Society of Neuroradiology Annual Meeting. Choudhri made six presentations and served on the exhibit award committee; Whitehead made three presentations. Their collaborators included: **Harris L. Cohen, MD**, **James Wheless, MD**, **Amy McGregor, MD**, **Frederick A. Boop, MD**, **Paul Klimo Jr, MD**, **Stephanie Einhaus, MD**, and **C. Bruce MacDonald, MD**.



Asim F. Choudhri, MD



Matthew T. Whitehead, MD

Choudhri, also presented lectures, grand rounds and board reviews at Johns Hopkins University, University of Washington and Naval Medical Center San Diego.

Physicians influence concussion legislation

Tennessee Gov. Bill Haslam has signed legislation that requires Tennessee schools and youth athletic organizations to adopt concussion policies. The legislation is designed to ensure that parents, coaches and students are educated about the symptoms and implications of concussion and defines what health providers are authorized to release a youth athlete to resume exercise and play.

Dr. Paul Klimo, chief of the Division of Pediatric Neurosurgery at Le Bonheur Children’s and the University of Tennessee Health Science Center, and **Dr. Trey Eubanks**, pediatric surgeon and medical director of Trauma at Le Bonheur, worked with other advocates and groups including TMA, TNAAP, CHAT and Tennessee Disability Coalition to write the legislation. Klimo also served as a panelist on the University of Memphis’ Papasan Public Policy Forum to educate lawmakers in Nashville on this important topic.



Paul Klimo, MD

The legislation was overwhelmingly approved 93-3 in the House of Representatives and unanimously 30-0 in the state Senate. The law will go into effect on Jan. 1, 2014.

Experts share TSC knowledge

Research from **James Wheless, MD**, and **Roosbeh Rezaie, PhD**, was presented at the 2013 International Tuberous Sclerosis Complex Research Conference held in Washington, DC, this summer.

Wheless’ poster presentation, “A Novel Topical Rapamycin Cream for



James Wheless, MD



Roosbeh Rezaie, PhD

Treatment of Facial Angiofibromas in Tuberous Sclerosis Complex,” is also described in this newsletter on page 4.

Other presentations include the economic burden on families, humanistic burden in caregivers, health care resource utilization and patient-reported physical and mental health burden.

Pediatric Neurology Update held, 2014 event planned

The seventh annual Greater Mid-South Pediatric Neurology Update was held in May. More than 70 neurologists and other pediatric caregivers attended the conference. Attendees represented 20 different institutions from 15 states. Also, seven organizations were represented in the exhibition area.

Guest faculty included Jonathan W. Mink, MD, PhD, and Raman Sankar, MD. Mink is a professor of Neurology, Neurobiology & Anatomy, Brain & Cognitive Sciences, and Pediatrics and chief of the Division of Child Neurology at the University of Rochester Medical Center. Sankar is chief of Pediatric Neurology at University of California Los Angeles.

The eighth annual Update will be held in May 2014. For more information, visit www.methodistmd.org or call (901) 516-8933.

Brain Waves is a quarterly publication of the Neuroscience Institute at Le Bonheur Children's Hospital. The institute is a nationally recognized center for evaluation and treatment of nervous system disorders in children and adolescents, ranging from birth defects and learning and behavioral disorders to brain tumors, epilepsy and traumatic injuries.

Institute co-directors

Frederick Boop, MD

Andrew Papanicolaou, PhD

James W. Wheless, MD

Amanda Adamson, PhD

Adam Arthur, MD

Abbas Babajani-Feremi, PhD

Paras Bhattarai, MD

Asim F. Choudhri, MD

Nancy Clanton, PhD

Stephanie Einhaus, MD

Lucas Eljovich, MD

Julius Fernandez, MD

Stephen Fulton, MD

Masanori Igarashi, MD

Paul Klimo, MD

Amy McGregor, MD

Kathryn McVicar, MD

Robin L. Morgan, MD

Basanagoud Mudigoudar, MD

Michael S. Muhlbauer, MD

Shalini Narayana, MBBS, PhD

Brian Potter, Psy D

Roosbeh Rezaie, PhD

Robert Sanford, MD

Namrata Shah, MD

Matthew Whitehead, MD

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Topical cream demonstrates positive results for TSC patients

Researchers at Le Bonheur and the University of Tennessee Health Science Center have developed a topical cream to treat facial lesions associated with Tuberous Sclerosis Complex (TSC). The initial study follows the treatment of two patients and was published online in the *Journal of Child Neurology*.

TSC is a neurocutaneous disorder characterized by excess cell growth and proliferation, resulting in multi-organ hamartomatosis. Skin lesions occur in more than 90 percent of TSC patients and are more common in late childhood or adolescence.

Historically, the skin lesions have been resistant to medical and surgical treatments. Oral rapamycin has been used in TSC patients, but the side effects prevent its routine use without significant internal involvement.

Neuroscience Institute Co-director James Wheless, MD, collaborated with Hassan Almoazen, PhD, to create a novel rapamycin cream. The cream is easy to compound and apply, does not cause local or systemic side effects, and results in a dramatic improvement of facial angiofibromas.



Patient at baseline



Patient at 12 months of treatment

Memphis team to study new VNS device

Researchers at Le Bonheur are launching a new study of the latest Vagus Nerve Stimulation (VNS) device. The Memphis hospital is one of a few sites studying the Model 106 Generator by Cyberonics.

VNS is an adjunctive therapy in reducing the frequency of seizures in adults and adolescents with partial onset seizures not controlled by medication or who experience intolerable side effects.

The Model 106 Generator has a new feature that allows the generator to sense changes in the heart rate and deliver stimulation in response to those changes, automatically. This device uses cardiac-based seizure detection and Automatic Magnet Mode (AMM) technology.

The information obtained from patient self-reports (seizure frequency, severity, duration, intensity and post-ictal duration) during the course of study will be assessed to help establish the best clinical outcomes for the Model 106 Generator.

For more information, contact Clinical Research Coordinator Tracee Ridley-Pryor, RN, MSN, CCRC, at (901) 287-5338 or tracee.ridley@lebonheur.org.