

Physician Update

NEWS FOR PHYSICIANS FROM JOHNS HOPKINS MEDICINE

FALL 2016



Epileptologist Joon Kang, below left, and neurosurgeon William Anderson, below right, are among the handful of practitioners in the nation using laser interstitial thermal therapy to treat epilepsy. The minimally invasive procedure, performed by surgeons using MRI guidance, involves threading a wire holding a laser applicator through a small skin incision and a small hole in the skull into the brain. At left, Anderson and on-site tech support Bryan Molter review a case.



Treating Epilepsy with a Laser Focus

PATIENTS WHO DON'T RESPOND to multiple medications for epilepsy often face a painful Catch-22—either continue to suffer from debilitating and dangerous seizures while hoping to be one of the rare minority who will eventually benefit from further medications, or undergo surgery to remove the seizure focus. This procedure typically involves an open craniotomy and comes with inherent risks, including the chance of deficits to speech, memory, vision, motor or sensory function.

“It’s not surprising that only about 5 percent of patients with intractable epilepsy undergo surgery annually,” says Johns Hopkins epileptologist **Joon Kang**. “This procedure is probably underutilized because patients are afraid of mortality or permanent morbidity from complications.”

However, a third option now available at Johns Hopkins could make epilepsy surgery more palatable to the thousands of patients who could benefit from it: a procedure known as laser interstitial thermal therapy, or LITT. Johns Hopkins is currently the only hospital in Maryland and the Washington, D.C., area that offers this

operation, joining a handful of other medical institutions across the country.

LITT, which has been approved by the U.S. Food and Drug Administration for other conditions since 2007 but has only been used for epilepsy in the past four years, involves threading a wire holding a laser applicator through a small skin incision and small hole in the skull into the brain. Using MRI guidance to precisely locate the seizure focus, surgeons, including Johns Hopkins neurosurgeon **William Anderson**, heat the affected tissue with the laser to temperatures that permanently destroy it. The risk of damage to nearby tissues is low because the surrounding cerebrospinal fluid wicks heat away.

“It’s an extremely targeted approach,” Anderson says.

This focused procedure has a number of benefits, he adds. Because it’s minimally invasive, patients avoid the large, visible scar, potentially deformed skull, severe postoperative pain and long recovery times that typically accompany the traditional open surgery. With LITT, the surgical wound is typically closed by a stitch or two, and most patients spend

just a single night in the hospital. They’re able to return to their normal activities within a week, compared to the four to six weeks most patients need to recover from a craniotomy. And because the procedure is so targeted, Anderson says, the risk of functional and cognitive deficits drops significantly.

Compared to the open procedure, LITT has a slightly lower success rate, caution Kang and Anderson—about 50 to 60 percent of patients become free of disabling seizures, compared to 60 to 70 percent of patients undergoing traditional surgery. However, they say, experience amassed by centers offering LITT is gradually improving this procedure. Additionally, patients who have LITT can still undergo an open procedure if the minimally invasive one isn’t successful.

“We’re very excited to be able to offer this new procedure,” Anderson says. “It’s a paradigm shift in how we treat patients with epilepsy.” ■

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Treatment with TORS, Less Radiation

IN 2013, COMMERCIAL REALTOR Henry Hanna, 69, noticed a small lump under the right side of his jaw. The pea-sized mass was barely noticeable, completely invisible underneath his full beard. But despite its unobtrusive nature, the lump would be life-changing—a needle biopsy performed by his local head and neck surgeon showed that it was HPV-related squamous cell carcinoma. He suggested that Hanna go to Johns Hopkins head and neck surgeon **Christine Gourin** for definitive care.

Although Hanna presented with a neck mass, the location of his primary tumor was unclear. Most HPV-related oropharyngeal cancers arise from small primary tumors buried within the tonsils. But Hanna had his tonsils removed as a child. The best site to search, Gourin reasoned, was the lingual tonsils, located behind the tongue base. However, reaching the lingual tonsils would be a challenge with traditional surgery—nearly impossible through a transoral route and leading to significant morbidity when performed through the neck.

That's why Gourin recommended transoral robotic surgery (TORS). "With TORS, the robot allows you to see and operate around corners," she says. "It's perfectly designed for the base of the tongue and lingual tonsils."

Before Christmas that year, Gourin and her colleagues used TORS to resect Hanna's lingual tonsils as well as traditional surgery to remove lymph nodes in his neck. The lingual tonsil tissue appeared normal, so the primary site remained a mystery. However, because that tissue had been successfully removed with TORS, Hanna was now a candidate to receive a lower dose of radiation than he would have needed had his lingual tonsil tissue remained in place.

Being able to deliver less radiation is a game changer for relatively young, active patients such as Hanna, Gourin explains. "We know that a lower dose of radiation reduces the risk of long-term swallowing trouble, dental issues and thyroid problems," she says. "The effects of treatment have become increasingly important because patients with a good prognosis, like Mr. Hanna, are likely to live long enough to experience sequelae from treatment."

To further combat sequelae, Hanna, like other Johns Hopkins patients who receive oropharyngeal radiation, received speech and swallowing therapy. In his regular follow-up appointments, Gourin continues to recommend daily exercises to prevent future issues.

"I believe that you can never fully discharge from care patients who have had oropharyngeal cancers," she says. "The risk of developing late swallowing



With transoral robotic surgery, the robot allows the surgeon to operate around corners. "It's perfectly designed for the base of the tongue and lingual tonsils," says head and neck surgeon Christine Gourin.

problems never goes away."

More than two years out from his cancer diagnosis, Hanna continues to thrive and now counsels other men with the same diagnosis. "I have more enthusiasm for my life and work than before my diagnosis," he says. "I'm not looking to slow down." ■

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Root to Boot Replacement for Complex Aortic Disease

While Woody DelCorso was driving his car to work one day at age 20, his right lung suddenly collapsed for no apparent reason. It was the first clue that eventually led him to a diagnosis of Marfan syndrome. Now 39, DelCorso has had numerous surgeries at The Johns Hopkins Hospital to treat various symptoms of this condition, including valve-sparing aortic root replacement, installation of a pectus bar to correct his concave chest, emergency surgery to repair a dissected ascending aorta and another to repair his mitral valve.

"I know that I'm blessed to have had so many operations to save my life," DelCorso says.



James Black, shown holding the branched surgical graft for thoracoabdominal aortic replacement. He says Johns Hopkins is among a handful of the nation's medical centers that perform "root to boot" aortic replacement surgery for patients with complex aortic disease.

But his most extensive surgery to date, in April 2015, may have ended the need for future procedures to shore up his circulatory system. The operation was necessary to repair rapidly expanding thoracic abdominal aortic aneurysms. DelCorso had his descending aorta swapped with surgical graft, completing the replacement of his entire aorta.

"Now his risk for rupture is essentially zero," says **James Black**, Johns Hopkins Medicine's chief of the Division of Vascular Surgery and Endovascular Therapy, who performed DelCorso's latest procedure alongside cardiac surgeon **Duke Cameron** and other colleagues. "There's no more natural aorta left to develop aneurysms in the future."

Such "root to boot" replacement takes place only at a handful of medical centers across the country with the expertise to care for patients with complex aortic disease like DelCorso's, Black says. One of the riskiest aspects of such an extensive procedure, he explains, is the potential for paraplegia. Because the aorta supplies key circulation to vast swaths of the spinal cord in some patients, surgery to replace it could cut off the blood supply long enough to severely and permanently damage key nerves.

As a precaution before surgery, DelCorso, like others who undergo this procedure at Johns Hopkins, required an arteriogram performed by the hospital's neuroradiology team. Imaging revealed that DelCorso was in the one-third of patients whose aorta predominantly supplies circulation to the spinal cord. Armed with this information,

Black and other members of the surgical team planned the operation using techniques that would avoid interruption to the spinal cord's blood flow. For additional protection, the surgeons implanted a spinal drain to reduce pressure in the spinal column in the days following the procedure. They also used deep hypothermia during the operation itself, a technique that has proven useful in a variety of other medical circumstances to protect tissue from damage by slowing its metabolism.

DelCorso's procedure was ultimately successful, and his entire aorta was replaced with no subsequent damage to the spinal cord. "I would anticipate that he'll have a completely normal life span, with no future risk of aortic rupture," says Black.

For DelCorso and hundreds of other patients with complex aortic disease who seek help at The Johns Hopkins Hospital, adds Black, positive outcomes like these are a testament to the team approach and detailed protocols the hospital has developed to care for these patients, gathered through many years of experience.

"This is one of the most major operations that our hospital can provide, and we do it on a routine basis with a routine recovery for most patients," Black says. "To be able to deliver this type of care to so many patients while building on a legacy of treating complex aortic disease is one of my favorite parts about practicing medicine here." ■

Information: 410-955-5165

International inquiries: +1-410-502-7683

An ECMO Record?

JOHNS HOPKINS PEDIATRIC burn/trauma surgeon **Dylan Stewart** remembers 7-year-old Reese Burdette well. Seriously burned in a house fire in 2014, she suffered significant injuries—including an infection and bleeding in her lungs—from smoke inhalation so bad that she rapidly deteriorated and suffered a cardiac arrest during her first week in the pediatric intensive care unit (PICU). Stewart told the girl’s parents that ECMO, or extracorporeal membrane oxygenation, a pediatric heart-lung bypass treatment that would provide oxygen for her body and hopefully allow her lungs to heal, was likely her only chance of survival. But ECMO, he warned the parents, is not designed for patients like Reese. That’s because ECMO requires anti-coagulation therapy, which puts patients with open burns at significant risk of bleeding and infections.

“She kept bleeding into her chest, and she had a fair amount of bleeding in her burns,” says Stewart. “We couldn’t ventilate her, so our last possibility was to put her on ECMO.”

The parents agreed. Stewart was hopeful—he knew that the four-

bed ECMO program in the Johns Hopkins Children’s Center, staffed by deeply experienced and highly skilled intensivists, offered the latest innovations in ECMO technology. But Reese’s lung damage was so severe that Stewart still doubted a good outcome. What happened next would astonish not only Stewart, the Johns Hopkins ECMO team and the PICU staff, but the ECMO community nationwide.

Prior to Reese’s experience, the longest period of time a patient at Johns Hopkins had been treated with ECMO was 45 days. Reese was on traditional ECMO for 60 days. Then, due to heart failure in her right ventricle, she was supported by a ventricular assist device (VAD) with an inline oxygenator—a makeshift lung of sorts because Reese still needed oxygen—for another 491 days. In total, Reese was managed by the ECMO/VAD team for 551 days.

“Across the country, people are using ECMO longer, but that length of support has never been done,” says critical care medicine specialist **Kristen Nelson**, director of Johns Hopkins’ pediatric VAD program. “Reese has become very well-known at



In the ECMO/VAD suite, from left to right, PICU Medical Director Ivor Berkowitz, ECMO Director Melanie Bembea and ECMO/VAD coordinator John Young.

ECMO and VAD meetings across the country because of how long she was on support.”

So how was Reese able to survive that journey? There were many factors at play. One was the ECMO team’s use of smaller and more biocompatible circuits and pumps that allow patients to undergo ECMO therapy without the necessity of anti-coagulation therapy, reducing the risk of life-threatening bleeding for patients with burns like Reese. Another factor was what Stewart calls “meticulous ECMO maintenance” and “phenomenal infection control.”

“The fact that the cannulas stayed in for as long as they did without her getting an infection is a testament to her care in the PICU,” says Stewart.

Lessons learned? “Reese has helped open up more capabilities and possibilities in treating patients like her, which will benefit not only us but other centers and their complex patients,” says Nelson. “We can share the experience.” ■

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PSYCHIATRY

Behavior Change Linked to Alzheimer’s Disease Onset

There’s no mistaking that Alzheimer’s disease poses a major threat: Some 5.3 million Americans live with the disorder—a number likely to double over the next 20 years as baby boomers age.

Well aware of that, a team of Johns Hopkins psychiatrists has spent years teasing out which early patient symptoms foreshadow an Alzheimer’s diagnosis. Certain signs of functional loss (problems driving, forgetting to pay bills) or slips in cognition (word loss, forgetfulness) seem most reliable.

Now, growing evidence suggests that psychiatric (behavioral) symptoms can also be Alzheimer’s predictors. “For many years, we’ve been working backward—treating Alzheimer’s as a purely cognitive disease,” says **Paul Rosenberg**, associate director of the Johns Hopkins Memory and Alzheimer’s Treatment Center. “But behavioral changes can be widespread and disabling,” and pose the greatest challenge to caregivers.

“So, when I hear a spouse say, ‘My husband has never been a worrier, and now he frets over everything,’ or, ‘He used to be interested in everything and now has no get-up-and-go,’ I have good reason to think Alzheimer’s is involved.”

The scenario is common enough that Johns Hopkins scientists, working with an international consortium, have coined the term mild behavioral

impairment (MBI) to describe neuropsychiatric symptoms that can accompany, and possibly even predate, Alzheimer’s cognitive lapses.

In recent clinical studies, Rosenberg, Memory Center Director **Constantine Lyketsos** and colleagues used the Neuropsychiatric Inventory Questionnaire to reveal trends in several psychiatric symptoms. For example, they found newly irritable or apathetic seniors 30 to 40 percent more likely to develop Alzheimer’s. “It wasn’t so surprising seeing MBI in people already mildly cognitively impaired,” says Rosenberg, “but that risk also applies to those who appear cognitively fine.”

The biology underlying Alzheimer’s behavioral symptoms is far from clear. But, surely, damage to specific nerve circuits is involved. And they likely overlap other, better-known Alzheimer’s pathways, Rosenberg adds, such as those for salience—the ability to judge something’s importance.

As for therapy, present research hopes to shed light on how behavioral interventions work. For now, to alleviate symptoms, Rosenberg favors lifestyle changes, like stress reduction programs, yoga and exercise, over traditional psychiatric approaches.

Rosenberg’s “big-picture dream” is to nail down who’s at risk for Alzheimer’s. “Our best chance of making a difference,” he says, “is to assess as

early as possible.” The near future should bring far fewer expensive brain scans and pedigree searches. Instead, he says, “We expect to combine cognitive tests, gene assays and other low-tech ways to diagnose Alzheimer’s.”

Mild behavioral impairment, of course, will be part of the mix. ■

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Paul Rosenberg and colleagues have found that behavioral change can accompany—and even predate—Alzheimer’s better-known cognitive lapses.



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901 S. Bond St./ Suite 550
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William Baumgartner, M.D.

Johns Hopkins Medicine Vice Dean for Clinical Affairs;
President, Clinical Practice Association

Marketing and Communications

Dalal Haldeman, Ph.D., M.B.A., Senior Vice President
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Call 410-614-5044 or email jkovals1@jhmi.edu.

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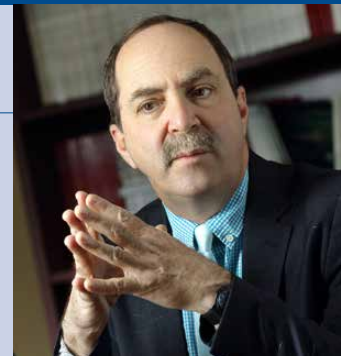
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