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Electric Scalp Device Prolongs Survival in Deadly Brain Cancer

BY KEVIN MCCULLOUGH

A device attached to a patient's scalp that delivers a continuous dose of low-intensity electric fields improves survival and slows the growth of a deadly brain tumor, according to a new clinical trial led by a Northwestern Medicine scientist and published Dec. 19 in the journal JAMA.

The new treatment for glioblastoma uses alternating electric currents called tumor-treating fields (TTFields), which are delivered through an array of insulated electrodes that are affixed to a patient's shaved scalp.

Except for occasional breaks and weekly electrode changes, patients wear the device at all times. The electrodes are connected via a cable to a small battery-powered device and continually deliver an electrical field to brain tissue.

Combining the TTFields therapy with standard maintenance chemotherapy allowed for a significant improvement in both progression-free and overall survival in patients with recently diagnosed glioblastoma.

Patients who received TTFields did better than patients who did not: the median survival time for those receiving the TTFields therapy was 20.9 months versus 16.0 months for patients who did not, with a substantially higher fraction of patients alive at two, three or four years after diagnosis.

"This trial establishes a new treatment paradigm that substantially improves the outcome in patients with glioblastoma, and which may have applications in many other forms of cancer," said lead study author Dr. Roger Stupp, professor of neurological surgery and of medicine at Northwestern University Feinberg School of Medicine and Northwestern Medicine chief of neuro-oncology in the department of neurology.

"With TTFields therapy combined with radiation and temozolomide chemotherapy, up to 43 percent of glioblastoma patients will survive longer than two years," Stupp said. "In a disease where, until 2004, the great majority of patients died within one year, this is yet another example how systematic and interdisciplinary research will benefit patients in everyday care."

Previous research had demonstrated that TTFields will inhibit tumor growth and selectively affect dividing cells, ultimately leading to cancer cell death and tumor growth inhibition.

In the study, 695 patients were randomly assigned to either receive the TTFields in combination with temozolomide, a chemotherapy drug, or the chemotherapy drug alone. Overall, 466 patients received the TTFields-chemotherapy combination, and 229 received the chemotherapy treatment alone.

There was no difference in the rate of adverse events between the two groups, except for mild to moderate skin irritation on the scalp, which was experienced by slightly more than half of patients receiving the TTFields therapy.

Roger Stupp, MD, Chief of Neuro-oncology in the Department of Neurology, was the lead author of the study that found a device adhered to a patient's skull, delivering electric fields, prolongs survival in a deadly brain cancer.

Stupp collaborated with an international team of investigators from 83 medical centers in North America, Europe, the Republic of Korea and Israel. The TTFields device used in the study is marketed as Optune by its manufacturer Novocure, Inc., which funded the study.

Patient Travels 10,000 Miles to Northwestern Medicine's Proton Center

Dale Newman's long journey from Adelaide, Australia, to the Northwestern Medicine Chicago Proton Center began with a 2015 motocross crash. A CT scan taken after the crash revealed a brain tumor in his left temporal lobe. The tumor slowly grew, and in 2017 surgeons were able to remove one-third of the mass, but more treatment was necessary.

Concerned about potential side effects of standard radiation, Dale's wife Amber searched online for other options. In an online brain tumor support group, she met someone who would alter the future course of Dale's treatment: Ann Marie Kappa. Kappa had undergone proton therapy at the Northwestern Medicine Chicago Proton Center for a brain tumor, and she encouraged Amber to send Dale's scans to the center.

Proton therapy involves an advanced form of radiation using protons — heavy, positively charged atomic particles — instead of standard X-rays.

"Proton therapy is particularly suited to the complexity of treating brain tumors. Protons deposit much of their energy directly in the tumor and then stop, whereas conventional radiation continues to deposit the dose beyond the tumor," says Vinai Gondi, MD, a radiation oncologist and director of clinical research at the Northwestern Medicine Chicago Proton Center.

Dale, Amber and their children, 11-year-old Josh and 8-year-old Ella, traveled 10,000 miles and settled into an extended stay hotel for two-and-a-half months of treatment.

"Dale wasn't going to be around if he didn't get this treatment," says Amber. "It is worth every sacrifice if Dale is still here to teach his kids to drive, and walk his daughter down the aisle."

The family developed a special bond with Jennifer Jefferis, RN, clinical intake coordinator at the Northwestern Medicine Chicago Proton Center, who made the Chicago area feel more like home by helping enroll Josh and Ella at the local elementary school, scheduling transportation, and connecting the family to area attractions.

"Not only are our international patients going through an extremely emotional and challenging time in their lives, but they are also doing it so far away from home without the support of nearby friends and family," says Jefferis. "Whatever we can do to make them feel extra special and comfortable brings me great joy and satisfaction."

The friendship Kappa and Amber cultivated online blossomed as Kappa and her family welcomed the Newmans with open arms — hosting holiday dinners, organizing site-seeing trips, and going on frequent shopping excursions.

After completion of Dale's proton treatment on December 29, the family headed to Disneyland and plans to return home to Australia on January 15. Dale will receive follow-up treatment in Australia.

"I'm hoping for the best outcome from this treatment and look forward to a positive future," says Dale. "I want our children to remember the new places, unique experiences, and the people who will be our friends for life."

Read more about this story on the *Daily Herald* website http://www.dailyherald.com/news/20171227/how-one-glen-ellyn-mom-supported-an-australian-family-through-tumor-treatment?utm_source=morning%20alert&utm_medium=email&utm_content=article%20column&utm_campaign=Morning%20Alert%2012%2F28%2F2017 and watch a video from NBC 5

Northwestern Memorial Hospital Surgeon First in Illinois to Repair Damaged Aorta with “Frozen Elephant Trunk” Graft

BLUHM CARDIOVASCULAR INSTITUTE AT NORTHWESTERN MEMORIAL HOSPITAL

CHICAGO – Phillip Lonergan has hiked the Himalayas, the Alps, the Pyrenees and the Rockies, but an aortic aneurysm — a potentially deadly bulge in the largest artery in the body — threatened to be the toughest challenge of his life.

S. Chris Malaisri, MD

Now, the Chicago-based graphic designer is on his way to exploring new trails after a first-in-Illinois procedure where Northwestern Medicine cardiac surgeon S. Chris Malaisrie, MD co-director of Northwestern Medicine’s Thoracic Aortic Surgery Program and an associate professor of surgery-cardiac surgery at Northwestern University Feinberg School of Medicine. Repaired and stabilized his damaged aorta with an investigational device known as a “frozen elephant trunk” graft because of its shape and stiff material.

The Thoraflex™ Hybrid Device is used to repair an aorta damaged from either an aortic aneurysm, or a bulge or ballooning in the aorta’s wall, or dissection, which is a tear in the aorta’s wall. The aorta runs from the heart through the chest and abdomen, carrying oxygen-rich blood to the body.

The frozen elephant trunk graft is designed to repair the damage in one surgery when previously, surgeons required two separate procedures to make the complicated repair.

“This device makes the procedure easier for the patient and reduces the amount of time the patient is on the heart-lung machine during surgery,” said Dr. Malaisrie. “It’s a potential breakthrough in the surgical treatment of arterial disease, and we are pleased to be part of this clinical trial investigating its efficacy.”

Lonergan’s aortic bulge happened in 2010, and was repaired successfully at the time at Northwestern Memorial Hospital. However, the repair wasn’t permanent and in 2016 Dr. Malaisrie told him he qualified for a clinical trial investigating the frozen elephant trunk device. Lonergan said he always knew he would need additional surgery on the aorta, and was pleased there was an investigational option.

“I’ve known this was coming for six years,” he said. “Everybody here at Northwestern Memorial Hospital has been great, from the surgeon and probably dozens of other staff who saved my life in 2010 to Dr. Malaisrie, who extended it and spared me an additional surgery. I looked at this clinical trial as my chance to give back to medicine.”

“This has helped me get back on my feet,” he added. “Now, I want to see more of the United States, and maybe travel to the Middle East.”

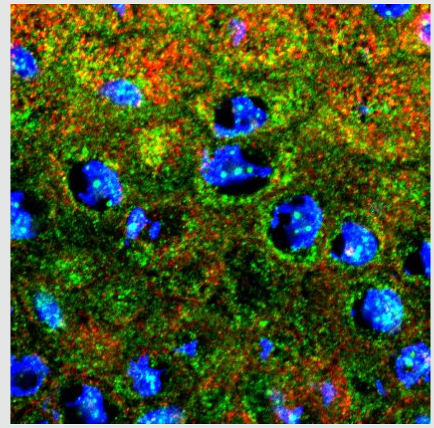
The Thoraflex™ Hybrid IDE study will enroll as many as 80 participants in 14 centers in the United States. Northwestern Medicine hopes to enroll 10 individuals. Dr. Malaisrie has performed nine surgeries as part of the trial. The Bluhm Cardiovascular Institute is part of the Northwestern Medicine health system, with multiple sites of care in Chicago and the region. Northwestern Memorial Hospital currently is ranked first in in the United States for heart failure survival, second in the United States for the survival of stroke and in the top 10 for the survival of heart attack, the three most dire cardiovascular health threats. Northwestern Memorial Hospital’s heart and heart surgery program is ranked seventh nationally and first in Chicago, Illinois and the surrounding states by U.S. News & World Report. For more information or to make an appointment with a cardiovascular specialist, please call 312.926.1089.

Getting Under The Skin at Northwestern Medicine

BY BRIDGET KUEHN

The body's largest organ, the skin plays an essential role in maintaining health. It acts as both a protective barrier and a sensor linking the body to the outside world. Yet many unanswered questions remain about how genetic mutations, diseases or even common treatments can harm the skin.

"Skin is the first barrier and line of defense against many environmental stressors, including ultraviolet — UV — radiation, mechanical stress and infectious agents," explains Kathleen Green, PhD, the Joseph L. Mayberry, Sr., Professor of Pathology and Toxicology, and a professor of Dermatology.



Above: Three-dimensional reconstructed normal human skin (raft culture) showing the overlay of insulin-like growth factor receptor (green), caveolin-1 (red) and DAPI-stained neclei (blue). Image courtesy of Duncan Dam, PhD, a postdoctoral fellow in the lab of Amy Paller, MD, Chair of Dermatology.

Faculty members in Northwestern's Department of Dermatology are working hard to better understand the fundamentals of skin biology and to bring those discoveries to the forefront of skin treatment. Their research extends from deciphering the genetic and molecular basis of deadly skin cancers, to trying to avoid harmful side effects of treatments like glucocorticoids, to preventing disease-related complications like neuropathy.

Department Chair Amy Paller, MD, MSc, GME, explains that she and her colleagues have been shifting increasingly toward more translational work. This includes leveraging genetic and molecular discoveries to develop new treatments or repurpose old ones.

"We've gone from a department where scientists in the lab are making important discoveries in basic biology to one in which our scientists are using human tissues and applying their discoveries to disease," says Paller, also the Walter J. Hamlin Professor of Dermatology.

EXAMPLE OF CUTTING EDGE RESEARCH AT NORTHWESTERN MEDICINE'S DERMATOLOGY DEPARTMENT

Kathleen Green, PhD is collaborating with Pedram Gerami, MD, who directs the dermatology department's melanoma program and the Skin Cancer Institute within the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. Together they are studying molecular changes in the keratinocytes that surround abnormal moles and very early stage melanomas. So far, their studies have shown that DSG1 lacks a nest of epithelial cells that surround the pigment-producing melanocytes or melanoma cells. Now they're trying to figure out how these desmoglein-deficient cell neighbors might promote the conversion of moles to melanoma and to create a biomarker panel to test for such cellular changes to predict progression to melanoma.

While the work is currently in the very early stages, Green hopes it might one day lead to ways to prevent melanoma. "There could be something topical people could put on moles to prevent transformation into melanoma," she says. "That is the ultimate goal."

Seeing patients with cutaneous T-cell lymphoma (CTCL) suffer from symptoms, including intractable itching, motivated Jaehyuk Choi, MD, PhD, to make the disease his research focus. A type of cancer involving the immune system, cutaneous T-cell lymphoma first manifests in the skin. To improve care for his patients, he's turned to genomic techniques to identify mutations that lead to the disease. "Cancer is fundamentally a genetic disease," says Choi, the Ruth K. Freinkel, MD, Research Professor and an assistant professor of Dermatology and of Biochemistry and Molecular Genetics.

Mutations in DNA set cancer in motion and cause a host of metabolic, immunologic and transcriptomic changes in a cell. Choi's studies have begun to yield a high-resolution map of all the mutations that occur in patients with CTCL. Currently, many patients with the disease go undiagnosed for years, in part because physicians don't have specific tests to identify it. Choi hopes his studies will lead to more personalized care based on finding specific mutations that characterize an individual's lymphoma.