Cleveland Clinic

Novel Surgery for “Inoperable” Brain Tumors

A Patient Guide to NeuroBlate™

ROSE ELLA BURKHARDT BRAIN TUMOR AND NEURO-ONCOLOGY CENTER

Pioneering a Promising Surgical Treatment

A brain tumor diagnosis is overwhelming under any condition, but it can be worse if surgery is not an option. When tumors are in hard-to-reach brain areas or are close to areas that control vital functions, traditional surgery may be too risky.

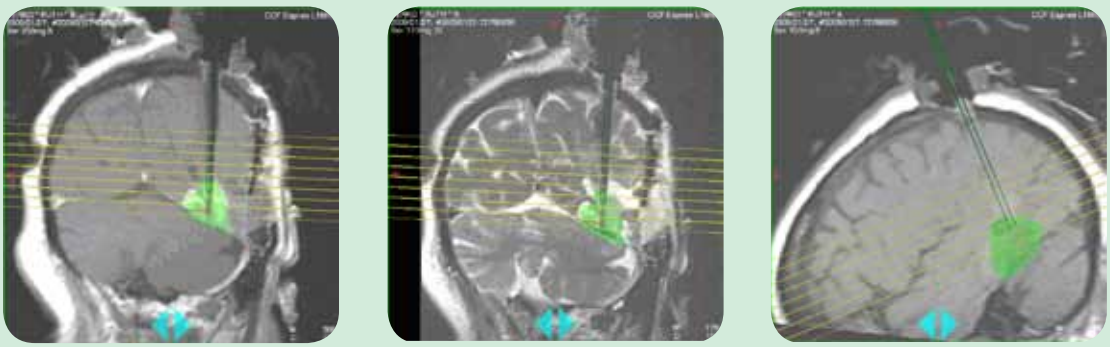
Now, however, Cleveland Clinic neurosurgeons have a potentially life-extending surgical option for patients with brain tumors once considered inoperable. If you have been told that you have an inoperable primary or metastatic brain tumor, this brochure outlines important information for you.

The Cleveland Clinic Difference

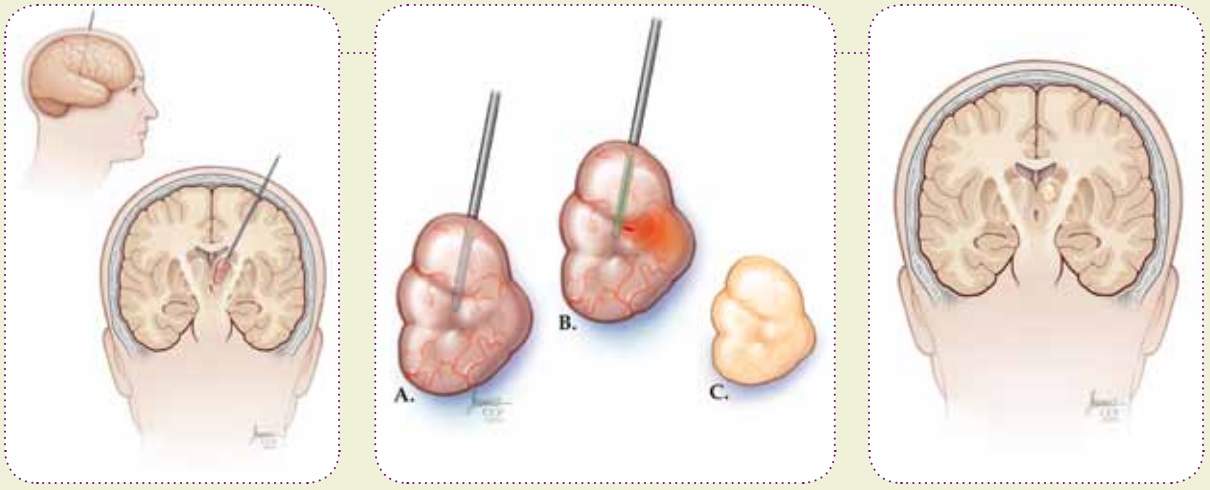
Our nationally renowned Rose Ella Burkhardt Brain Tumor and Neuro-Oncology Center was first in the world to test the device known as AutoLITT® that used a specially designed laser probe to heat and destroy brain tumors. Based largely on favorable results from this trial, the AutoLITT system earned Food and Drug Administration clearance for use in neurosurgery in May 2009. In 2012, NeuroBlate™, the second generation system, was introduced. It offers even further enhanced neurosurgical capabilities over the previous AutoLITT system.

In addition to piloting the testing of both versions of this system, Burkhardt Brain Tumor Center physicians wanted to ensure that patients receive the highest-quality imaging available during brain surgery. The center was among the first worldwide to integrate the laser system with the latest intra-operative magnetic resonance imaging (MRI) technology.

MRI scans produce detailed images of internal organs without the use of radiation. Our leading-edge MRI unit generates high-resolution images in real time in a neurosurgical operating room that incorporates the NeuroBlate system. This innovation allows physicians to see and direct the progress of tumor destruction as it happens, thereby increasing the likelihood that tumors will be completely treated.



The tip of the NeuroBlate laser probe (dark line) is seen within a malignant brain tumor (highlighted in green) in these intraoperative MRI images of the brain.



Progression of the NeuroBlate procedure. ***Left****: The NeuroBlate probe is inserted into a malignant tumor in the brain's thalamus region.* ***Center****: Stages of the tumor during treatment. A, before treatment; B, as laser-directed heat "cooks" the tumor; C, after treatment.* ***Right****: The brain within days or weeks of surgery, when the treated tumor shrinks as cancer cells die.*

Destroying Cancer Cells with Laser-Directed Heat

Laser interstitial thermal therapy (LITT) transmits heat to coagulate, or "cook," brain tumors from the inside out. This technology is not new in cancer treatment, but early approaches posed challenges with limiting the laser energy only to tumors. With Monteris Medical Inc.'s NeuroBlate system, the surgeon can "steer" and monitor the effects of the laser beam, thus sparing surrounding healthy tissue.

Unlike conventional open surgery, this therapy is minimally invasive. It takes place with the patient in an MRI machine because the laser system is guided, positioned and monitored with MRI.

How It Works

If NeuroBlate is appropriate for you, here is what will happen during the procedure:

- You will be placed under general anesthesia. With great precision, a thin, high-intensity laser probe will be inserted through a small hole in your skull, deep into your brain. The tip of the probe emits laser energy sideways, heating and destroying brain tumor tissue in one direction while cooling to remove heat and protect normal tissue in neighboring areas.
- Each burst of laser energy lasts from 30 seconds to a few minutes. The laser generates heat up to 160 degrees Fahrenheit, which is sufficient to coagulate and kill the tumor cells.
- On a computer screen, your surgeon will monitor the tumor destruction as it occurs. He or she can remotely plan and control the procedure, steering heat directly to tumor tissue. An advance known as MRI thermometry measures temperature in and around the tumor, providing valuable feedback to the surgeon throughout the procedure.

After surgery, you will remain in the hospital for one or two days, which is typically half the time you would have been hospitalized after conventional surgery.

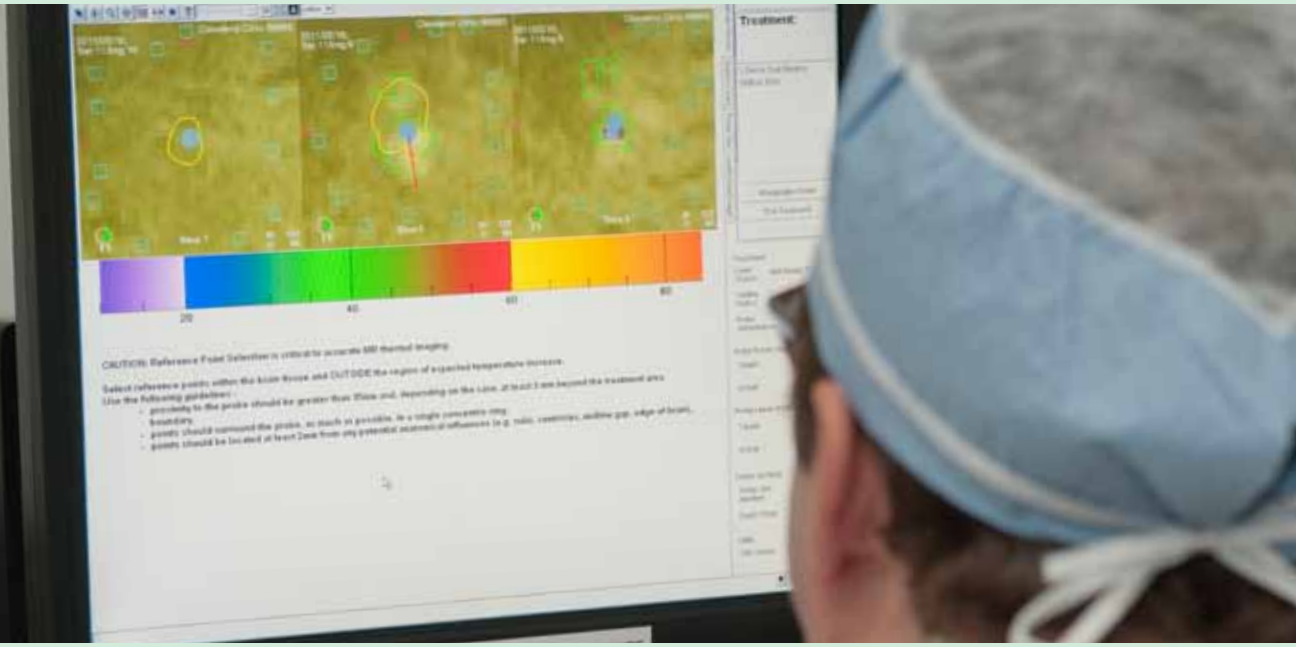
Any type of brain surgery poses some risk. The primary risk with NeuroBlate is some temporary swelling around the treated area, which usually is managed with medication.

Harnessing Talent and Technology for Patients' Benefit

In the hands of the Burkhardt Brain Tumor Center's skilled, experienced neurosurgeons, the NeuroBlate system offers hope to brain tumor patients whose treatment options were limited. This thermal therapy:

- Is less invasive than even the most minimally invasive open operations
- Enhances patient safety
- Promotes quicker recovery
- Has the potential to help some patients whose tumors had been considered too risky to treat, whose tumors did not respond to alternate treatments or who had otherwise been deemed poor candidates for surgery
- Offers a therapeutic option when radiosurgery fails
- May allow for multiple treatments
- Is less costly than traditional surgery

The combination of NeuroBlate with our intraoperative MRI capability streamlines the procedure within a single room. Conversely, at sites without this upgrade, the surgical portion is done in a conventional operating room and the patient must be transported to a diagnostic MRI suite. At Cleveland Clinic, the integration of technologies represents a significant advance in patient safety, reduced procedure time and better outcomes.



Guided by feedback from the intraoperative MRI system, the neurosurgeon can visualize and precisely control laser treatment in real time.

Talk with Us

To date, glioblastoma multiforme has been the focus of NeuroBlate at Cleveland Clinic. The treatment is one among a number that we use to attack this most aggressive form of brain cancer. However, NeuroBlate can address other types of malignant and benign brain tumors. With each patient, the Burkhardt Brain Tumor Center and Cleveland Clinic Taussig Cancer Institute collaborate to explore all available medical and surgical options.

If you are interested in NeuroBlate as a treatment option for you or someone you love, please contact us toll-free at **888.273.1409** to arrange a consultation with a Burkhardt Brain Tumor Center physician. To learn more about the procedure, please visit us online at **clevelandclinic.org/neuroblate**.

A ceiling-suspended MRI scanner can be moved into the operating room where NeuroBlate procedures are performed, allowing for imaging of tumor destruction as it occurs.

The Rose Ella Burkhardt Brain Tumor and Neuro-Oncology Center

Cleveland Clinic's Burkhardt Brain Tumor Center is a national leader in the diagnosis, treatment and research of primary and metastatic tumors of the brain, spine and nerves and their effects on the nervous system. The center's multidisciplinary team records approximately 9,000 outpatient visits and performs some 950 surgical procedures annually. More than 25 percent of new brain tumor patients travel to Cleveland Clinic from states outside Ohio and from countries around the world, seeking the advanced, individualized care for which we are known.

The Burkhardt Brain Tumor Center is part of Cleveland Clinic's Neurological Institute, which is ranked by *U.S.News & World Report* among the best neurology and neurosurgical programs nationwide. We also hold top ranking for these programs in Ohio. The center works closely with Cleveland Clinic Taussig Cancer Institute, recognized by *U.S.News & World Report* among the country's leading cancer hospitals and also top ranked for cancer care in Ohio.

clevelandclinic.org/neuroblate