

Gamma Knife® Patient Treatment Guide

What to expect from this noninvasive treatment option for certain brain tumors and other neurological disorders



Cleveland Clinic: The Right Choice for Care

Through a multidisciplinary approach to care, Cleveland Clinic specialists in the Neurological Institute and Taussig Cancer Institute collaborate to explore all available surgical and medical treatment options, thus ensuring that patients receive the best care possible.

Cleveland Clinic's neurology and neurosurgery programs were named among the country's best in *U.S. News & World Report's* 2010 "America's Best Hospitals" survey. In addition, we hold top ranking for these programs in Ohio. Taussig Cancer Institute has also been named among the top cancer programs nationwide and best in Ohio.

Both institutes house physicians, scientists and researchers focused on the study and treatment of brain tumors. While there are many brain tumor treatment options, Cleveland Clinic's experienced and expert Gamma Knife® Center team offers innovative solutions for even the most complex diagnoses.

Would You Like a Second Opinion?

If you would like a second opinion from a Cleveland Clinic brain tumor specialist, we offer secure online medical second opinions through our MyConsult service. To learn more about MyConsult, please visit clevelandclinic.org/myconsult or call **800.223.2273, ext. 43223**.



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On the cover: Cleveland Clinic neurologists and oncologists use advanced imaging techniques to precisely map your Gamma Knife treatment.



Cleveland Clinic Gamma Knife Center®

The Cleveland Clinic Gamma Knife Center is a state-of-the-art radiosurgery treatment center that combines innovative technology with medical expertise to offer patients diagnosed with a brain disorder a less invasive alternative to conventional brain surgery.

Since 1997, we have treated more than 3,000 patients with Gamma Knife radiosurgery, a computer-guided therapy that delivers targeted radiation to a specific location in the brain. This outpatient procedure is nearly painless and requires no incisions.

The most common diagnosis for Gamma Knife radiosurgery is brain metastases, which afflict nearly one-quarter of cancer patients. Other conditions that can be treated with Gamma Knife technology are primary and benign brain tumors, trigeminal neuralgia and arteriovenous malformations.

Gamma Knife treatment is a well-established and widely recognized option in use around the world, and is approved for use in the United States by the Food and Drug Administration. Worldwide, more than 30,000 patients undergo Gamma Knife treatment each year.

Advantages of Gamma Knife Treatment

For appropriate patients, the Gamma Knife offers many advantages over conventional neurosurgery, including:

- *minimally invasive procedure with no incision*
- *an option for some tumors located deep in the brain that cannot be reached safely by traditional brain surgery*
- *an outpatient procedure that rarely requires an overnight hospital stay*
- *safe, effective treatment with a low complication rate*
- *lower risk than conventional brain surgery*
- *little or no post-treatment discomfort or pain*
- *rapid return to normal activities, without the need for physical therapy or other rehabilitation*
- *covered by most insurance companies and Medicare*

Gamma Knife radiosurgery delivers targeted radiation to a specific location in the brain. This outpatient procedure is nearly painless and requires no incisions.

Advanced Gamma Knife Treatment

Cleveland Clinic is one of only a few medical centers in the United States to offer the most technologically advanced Gamma Knife model available: Elekta's Leksell Gamma Knife Perfexion™. This upgraded model allows for treatment of a wider range of lesions, increased patient comfort and reduced treatment time.

Gamma Knife Perfexion concentrates 192 high-energy radiation beams at the target area in the brain. The dose of radiation along any one of the beams is too small to cause harm but, at the point where the beams converge, the radiation dose is intense, damaging or destroying the tumor or abnormality or causing changes that interrupt abnormal brain circuits in disorders such as trigeminal neuralgia. Because the beams are precisely pinpointed on the target, radiation exposure to surrounding brain tissue is minimal.

What to Expect before Your Treatment Session



A family member or friend will need to accompany you on the day of your Gamma Knife procedure and drive you home after the treatment. A Gamma Knife Center nurse will call you the day before your procedure to confirm arrival time and answer any remaining questions.

You should not eat or drink after midnight the evening before your procedure. We recommend that you wash your scalp/hair the night before your Gamma Knife radiosurgery and wear your hair loose. Do not use any clips, pins, bands, hair spray or styling products. Avoid the use of cosmetics, too.

The day of the procedure, wear slip-on shoes; comfortable pants, slacks or shorts; and a button-up or zip-front shirt with loose-fitting or short sleeves. Shirts that fit over your head are not recommended because you will have a frame placed on your head, which will make it difficult for you to change clothing during your procedure.

What to Expect during Your Treatment Session

When you arrive at the Cleveland Clinic Gamma Knife Center, a specially trained nurse will prepare you for the procedure. An IV will be inserted to administer medication that will help you relax during the procedure. You will change into a hospital gown, receive a local anesthetic and be fitted with a head frame weighing about two pounds, which will remain on throughout the procedure. You will feel some pressure but little pain during this fitting process. The purpose of the head frame is to allow the target in the brain to be precisely pinpointed and imaged.



Either prior to or just after you are fitted with your head frame, a magnetic resonance imaging (MRI) and/or computerized tomography (CT) scan will be performed. These scans will provide your physician with the most up-to-date mapping of your brain so that s/he can pinpoint the exact location of the target areas.

Next, a computerized mapping of your treatment is planned out by your neurosurgeon and radiation oncologist, which can require up to a few hours to complete.



During this time, you can remain in our waiting area with family or friends. Ample seating and television access provide a comfortable environment.

Once the treatment plan has been completed, you will be asked to lie down and the head frame will be secured to the robotic Gamma Knife bed, which slides into the Gamma Knife Perfexion machine. Radiation is then delivered directly to the target area through openings inside the machine. For added comfort, you can bring a compact disc or listen to the radio during your procedure. The treatment phase can range in length from 15 minutes to three hours.

When your treatment is complete, your head frame and IV will be removed and our staff will review discharge instructions with you and your companion. You will be asked to remain at the Cleveland Clinic Gamma Knife Center for observation for one to two hours. It is recommended that someone stay with you the first night after treatment to monitor you for any side effects from the procedure.

What to Expect **after** Your Treatment Session



For most conditions, results of Gamma Knife treatment develop over time, ranging from a few weeks to two years, because the Gamma Knife shrinks tumors and affects cells gradually. Patients are often monitored with MRI and/or CT scans until the full treatment effect is observed.

The Gamma Knife has proved to be a very effective means of controlling some tumors and other brain disorders. Depending on the condition, success rates can be as high as 70 percent to 90 percent; however, there is no guarantee of individual results. Outcome depends on the size, location and type of lesion, as well as your personal medical history. You should discuss your expectations with your physician before treatment.

Potential Side Effects

As with any surgery, there are risks and potential side effects with Gamma Knife radiosurgery.

These side effects could include:

- minimal discomfort, headache or pain the day after radiosurgery. Non-aspirin pain medication, such as ibuprofen or acetaminophen, is recommended if you have this level of discomfort.
- infection at the head frame's pin sites. It is recommended that you keep these areas thoroughly clean following your procedure.
- brain swelling, for which there is a slight risk after the procedure.

If you experience nausea, vomiting, severe headaches, visual changes, difficulty speaking, seizure or any other symptoms unusual for you, please contact your physician immediately or go to the nearest emergency room.

Medical Concierge Service

This special service is for our out-of-state patients.

Just like the concierge at a fine hotel, Cleveland Clinic's Medical Concierge will help facilitate and coordinate your Cleveland Clinic experience and your visit to Cleveland, Ohio. Your Medical Concierge will provide the following complimentary services:

- assistance coordinating multiple appointments
- scheduling or confirmation of airline reservations, in cooperation with Cleveland Clinic's Travel Services
- assistance with hotel and housing reservations, providing discounts when available
- arrangement of taxi or car service between the airport and hotel
- information on leisure activities for family members

A Medical Concierge will meet and accompany you to your appointments, upon request. If your visit includes a hospital stay, your Medical Concierge can arrange for private nursing, if desired.

For more information on Cleveland Clinic's Medical Concierge services, call **800.223.2273, ext. 55580**; email medicalconcierge@ccf.org; or visit clevelandclinic.org/concierge.

Make an Appointment Now

If you would like to set up a consultation with a Burkhardt Brain Tumor Center specialist, please call **866.588.2264** or visit clevelandclinic.org/myappointment.

Rose Ella Burkhardt Brain Tumor and Neuro-Oncology Center

Part of Cleveland Clinic's multidisciplinary Neurological Institute, the Burkhardt Brain Tumor Center is a nationally recognized leader in the diagnosis and treatment of primary and metastatic tumors of the brain, nerves and spine and their effects on the nervous system. The center collaborates with the Taussig Cancer Institute to provide innovative solutions for these complex problems, utilizing the latest technology, including intraoperative MRI, stereotactic radiosurgery, convection-enhanced delivery and laser interstitial thermal therapy.

Still Have Questions?

If you still have questions about the Cleveland Clinic Gamma Knife Center or other brain tumor treatment options, please visit clevelandclinic.org/braintumor.

Access to Cleveland Clinic's Expertise at the Click of a Mouse

Patients are always welcome to travel to Cleveland, Ohio to reach our world renowned Cleveland Clinic physician specialists for a second opinion; however, we recognize the challenges surrounding arrangement of travel, time off of work and time away from family which is why we offer an easier, just as effective way, of getting a medical second opinion from our experts.

Cleveland Clinic's **MyConsult**[®] Online Medical Second Opinion offers expert opinions for over 1,000 life-threatening and life-changing diagnoses. **MyConsult**[®] connects patients with the diagnostic expertise of world renowned physician specialists who will review the patient's individual situation, answer their questions and provide a comprehensive report that they can share and discuss with their family and physician. Based on the medical second opinion patients receive from Cleveland Clinic, they can decide to travel to Cleveland Clinic for their treatment, or if they would like, stay in their hometown and receive treatment locally.

There are few decisions in life as important as those that impact your health. With Cleveland Clinic's **MyConsult**[®] Online Medical Second Opinion program, patients can be confident that they will have the information needed to make the best decision for themselves, and those who love them, without the time and expense of travel.



To learn more or to register to use **MyConsult**[®], log onto www.elevelandclinic.org/myconsult



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This Gamma Knife Patient Guide is for medical education purposes only. It should not replace independent advice or information from a physician about the appropriateness or risks of this procedure for a given patient.

The multidisciplinary Neurological Institute, one of 26 institutes at Cleveland Clinic, is internationally known for superior diagnosis and treatment of neurological disorders ranging from the common to the most complex. More than 300 specialists combine clinical expertise, academic achievement and innovative research to accelerate transfer of investigational therapies unavailable elsewhere, for the benefit of adult and pediatric patients. The institute is committed to improving outcomes while treating patients with compassion and respect.

Cleveland Clinic is a nonprofit multispecialty academic medical center, consistently ranked among the top hospitals in America by *U.S. News & World Report*. Founded in 1921, it is dedicated to providing quality specialized care that integrates research and education.