



Welcome to a Revolution in Neurosurgery

The Leksell Gamma Knife® is an effective, non-invasive alternative to traditional brain surgery exclusively designed for the treatment of malignant and benign tumors, vascular abnormalities and trigeminal neuralgia.

This highly sophisticated technology precisely directs focused radiation to specific targets in the brain. Typically performed in a single outpatient treatment session without general anesthesia, this proven technique helps patients avoid incision, scarring and long hospital stays while minimizing surgical complications.

Patients experience minimal pain and, in most cases, can resume their pre-treatment activities within a few days. It is one of the most advanced techniques in the treatment of disorders affecting the brain and its adjacent structures.

How The Gamma Knife Works

The Gamma Knife uses gamma radiation emitted from 201 radioactive sources to destroy a brain tumor, a blood vessel abnormality such as an arteriovenous malformation (AVM), or other abnormalities within or adjacent to brain tissue with extreme accuracy. Since each individual beam of radiation is a relatively low intensity, the brain surrounding the abnormal tissue is virtually unaffected. The full dose of radiation is focused only where the 201 beams intersect. This explains why side effects are rare and usually temporary. As the surgery is “bloodless”, the risks of post-operative complications, such as infection and hemorrhage, are minimized.

Gold Standard Treatment. The Gamma Knife has been in use for over 30 years, having treated more than 350,000 patients worldwide without a single mortality related to the procedure. It is not surprising that the Gamma Knife is regarded as the “gold standard” for stereotactic radiosurgery. The Yale-New Haven Hospital Gamma Knife Center is the only facility of its kind in Connecticut.

What You Need To Do Before Radiosurgery

The night before your treatment at home:

- Wash your hair and avoid using any hair products or sprays.
- DO NOT eat or drink anything after midnight.

Medications:

- Heart or blood pressure medications should be taken with a small sip of water on the morning of your treatment.

- **IMPORTANT** – On the day of your treatment, please bring with you any prescription medications, as well as a list of medications to which you are allergic.

The morning of your treatment at the Gamma Knife Center:

- You will need to remove all jewelry, eye glasses or contact lenses, wigs or hairpieces, makeup and nail polish. It's best to leave jewelry and valuables at home.
- You will change into a hospital gown and you will be encouraged to use the restroom.
- A nurse will start an intravenous (I.V.) line to deliver any medications or fluids you may require during the day.
- A mild sedative may be given to help you relax.

What To Expect The Day Of Your Procedure

The treatment begins with:

- The placement of a guiding device or stereotactic frame firmly fixed onto your head (*The stereotactic frame is a rectangular ring with four metal posts and corresponding metal pins.*)
- The skin being cleansed with alcohol and local anesthesia administered to numb the area.
- Four pins being attached to your skull (*The pain you will feel during the placement of the pins will last only a few minutes. The remaining tests and treatment will be relatively pain free.*)

- The stereotactic frame being placed with temporary ear bars to keep the device steady. They are removed once the frame has been attached to the skull.

The stereotactic frame will remain on your head until after the completion of the Gamma Knife treatment.

Imaging before the procedure:

After the stereotactic frame has been placed on your head, you will have imaging studies to help the Gamma Knife team plan your treatment. Typically this is done with magnetic resonance imaging (MRI); however you may also require an angiogram or computerized tomography (CT) scan. During the course of the imaging, a nurse and a doctor will be with you at all times. Upon returning to the Gamma Knife Center, a clear plastic helmet with many holes in it will be placed on your head over the frame in order to measure the configuration of your head. When the imaging studies have been completed, you will be allowed to rest, watch TV, listen to music or visit with family/friends at the center until it is time for your procedure to begin. **It will take up to two hours to calculate your treatment**, depending upon your diagnosis and complexity of the treatment plan.

The Gamma Knife procedure:

After the final plans for your individual treatment have been made, you will be brought into the Gamma Knife suite and transferred onto the treatment couch. Next, the stereotactic frame will be connected to a device known as a collimator helmet. The helmet has 201 holes through which the radiation beams will pass. The treatment begins when the doors of the radiation unit open and the head of the couch moves into the treatment position. You will hear a small click as the collimator helmet engages with the machine and you will not hear or feel the treatment.

During this time, you will remain in constant contact with the physicians and nurses via the use of an intercom system.

Your treatment will be observed at all times through television monitors. Upon completion of the treatment, the Gamma Knife couch will move back into its starting position. The number and length of treatments may vary from 30 minutes to over three hours, depending upon the size and number of areas to be targeted.

What To Expect After Your Treatment

When your treatment is completed, the frame will be removed. An antibiotic ointment will be applied to the pin sites followed by gauze and a head wrap. On rare occasion, there may be bleeding at a pin site that does not stop with pressure from the gauze. Should this occur, your doctor will use a stitch to close the pin site.

Some patients may experience a headache or feel nauseated for a few hours after the Gamma Knife treatment. Please inform the nurse if you experience either condition, so your physician can give you the proper care and/or medications to relieve the headache or nausea.

Side effects are rare because only the abnormality is targeted. The surrounding healthy brain tissue receives a minimal dose of radiation. When you are able to tolerate fluids by mouth, your intravenous line will be removed by the nurse.

Since Gamma Knife surgery never results in an immediate destruction of an arteriovenous malformation (AVM) or brain tumor, follow-up evaluations and imaging studies at regular intervals are essential in order to monitor your response to treatment. These will typically involve magnetic resonance imaging (MRI) or computerized tomography (CT) scanning, at the discretion of your doctor.

If you were treated for an AVM, a cerebral angiogram will be required following your treatment to confirm that complete obliteration has occurred. If you do not live in the New Haven area, you should make arrangements with your doctor to send copies of the actual films of all imaging studies (not just typed reports) to the Gamma Knife Center. This is important so that your doctor can determine whether your condition is responding to the treatment as expected.

Discharge Instructions

In the majority of instances, you will be able to leave the Gamma Knife Center after a period of observation. However, some patients may require an overnight stay; if so, you will be admitted to the Temple Recovery Care Center overnight to be discharged the next day. Your follow-up care will be coordinated with the doctor who referred you and the doctors involved in your treatment.

If you are discharged the day your procedure was performed:

- You should have a family member drive you home and stay with you that night.
- You may resume your normal diet and activities as tolerated.
- You may resume the medications prescribed by your doctor before the Gamma Knife treatment, unless your doctor tells you otherwise.
- You may gently shampoo your hair the day after treatment, however avoid scrubbing the pin sites until they have healed, which takes about a week.

Occasionally patients experience some persistent numbness or tingling of the scalp adjacent to the pin sites. The feeling is temporary and is usually gone within a few weeks.



Advantages

There are numerous advantages associated with the Gamma Knife treatment. It avoids the prolonged hospitalization of conventional surgery and effects general anesthetic. Many patients who would be unable to tolerate brain surgery because of their underlying medical condition can undergo Gamma Knife surgery with minimal risk.

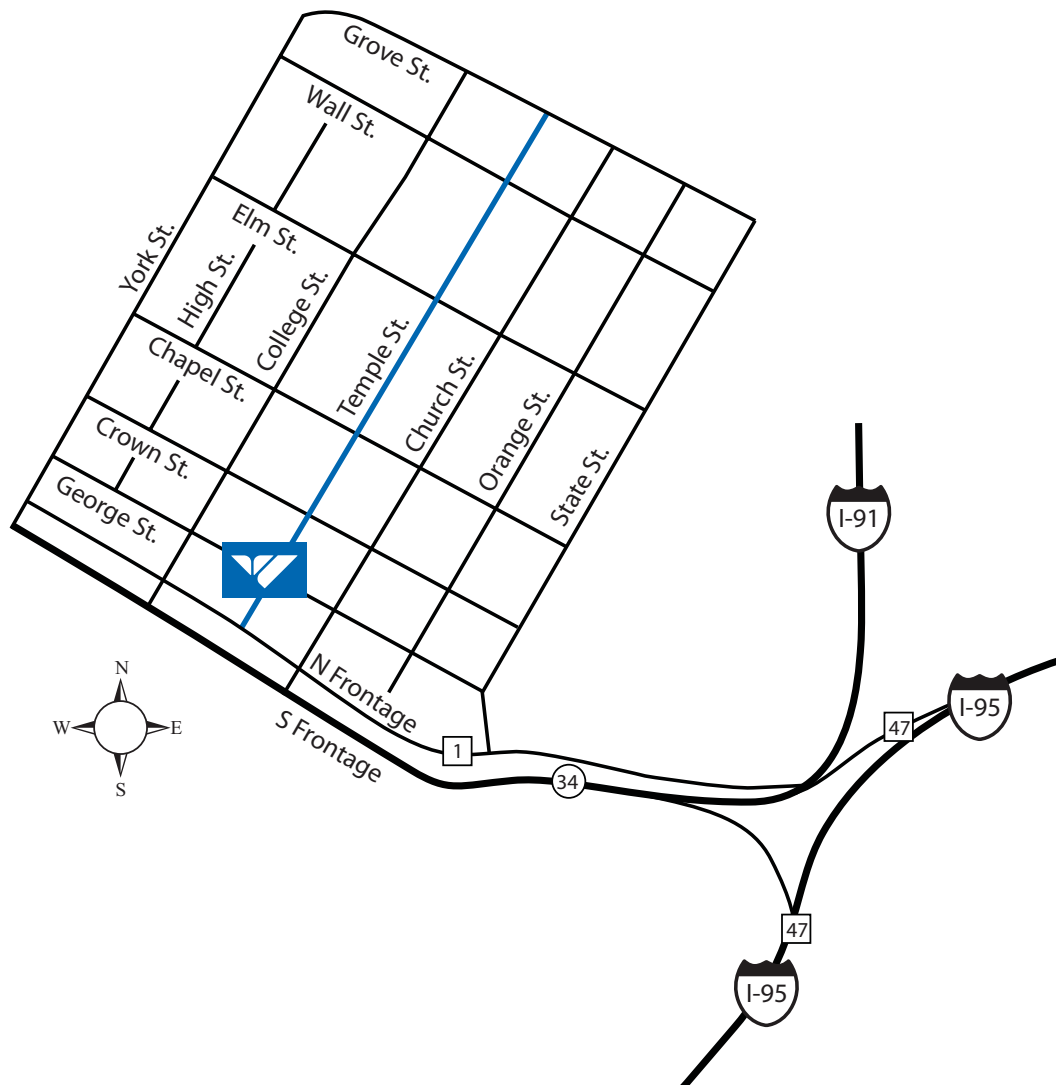
Side Effects

As with any operation, there may be some side effects after Gamma Knife surgery, depending upon the size, shape and location of the particular problem. Although these are unlikely to occur, it is important that you inform your doctor of any unusual symptoms such as a seizure, new onset of numbness, weakness, loss of balance, visual disturbance or severe headache.

Directions To The Facility

The Yale-New Haven Hospital Gamma Knife Center is located in the lower level of the Temple Medical Center, 40 Temple Street, New Haven, Connecticut. Free Parking is available adjacent to the Gamma Knife Center. Enter via ramp between Temple Medical Garage and Temple Medical Center.

- From North Haven: South on I-91, Exit 1.
- From Branford: South on I-95, Exit 47.
- From West Haven: North on I-95, Exit 47.
- From Derby-Ansonia: Route 34 to George Street.



Contact Information

If you have any questions or concerns that are not answered at our pre-operative visit, please feel free to call:

**Yale-New Haven Hospital
Gamma Knife Center
(203) 688-4040**

The Gamma Knife team is available to answer your questions **weekdays** between **8 a.m. and 4 p.m.** For emergencies, a doctor can be contacted at all times using the number above.



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