

Gamma Knife Radiosurgery for Arteriovenous Malformation

Welcome to Northwestern Memorial Hospital's Gamma Knife® Center. Please take a few minutes to review this brochure. It will help you prepare for Gamma Knife surgery for your arteriovenous malformation (AVM).

The Gamma Knife is not actually a knife. Rather, it is an instrument that uses targeted radiation to perform brain surgery. The Gamma Knife allows the neurosurgeon to focus 192 beams of radiation just on the area being treated. Alone, each beam is too weak to cause any damage to the normal brain tissue. The Gamma Knife is extremely precise. It uses 3-D planning to shape the radiation dose to the size and shape of the affected area. The Gamma Knife is used only on the brain. It is used to treat:

If you have any questions, please ask your neurosurgeon or nurse.

Brain tumors

- Acoustic neuroma/schwannoma
- Glial tumors/primary brain tumors
- Meningioma
- Metastatic brain tumors
- Pituitary tumors
- Skull-based tumors

Functional disorders

- Trigeminal neuralgia
- Parkinson's disease
- Epilepsy

Vascular disorders

- Arteriovenous malformation (AVM)

About the treatment

Most people only need 1 Gamma Knife treatment session. The treatment begins early in the morning and lasts most of the day. It involves 4 phases:

- Head frame placement
- Magnetic resonance imaging (MRI) or magnetic resonance angiography (MRA)
- Planning
- Treatment

The Gamma Knife team consists of a neurosurgeon, radiation oncologist, radiation physicist and registered nurse. Together, the team provides care tailored to your specific needs.

Before surgery

The Gamma Knife nurse will meet with you or call you. They will review what to expect before and on the day of treatment, including:

- Pre-procedural lab work
- Pre-procedural imaging
- Head frame placement
- Imaging studies
- Treatment planning
- Gamma Knife treatment
- Head frame removal
- Follow-up care

The nurse will also:

- Answer any questions that you have
- Collect your insurance information (pre-certification of insurance coverage is needed.)

5 to 7 days before surgery

You will be required to complete the following tests before surgery:

- MRI or MRA imaging of the brain
Plan to arrive at Galter Pavilion, 201 East Huron Street , 4th floor at _____ on _____.
- Blood work
Plan to have blood work at Arkes Pavilion, 676 North Saint Clair Street, 2nd floor (no appointment needed).

Night before surgery

Do not have anything to eat or drink after midnight the night before your procedure. If you need to take medication, take it with sips of water.

Day of surgery

Plan to arrive at _____ on _____.

Follow these instructions:

- Eat a light breakfast and take your routine morning medications.
- Wear comfortable clothing. You may wear your own slacks during this treatment if they do not have metal in them. Do not wear anything with metal, including undergarments.

- Do not wear any makeup.
- Leave all valuables at home, including jewelry.

If you will be taking a medication to relax before the treatment, you cannot drive. Arrange for transportation to and from the hospital.

Be sure to bring:

- A list of allergies (including iodine or X-Ray contrast).
- A list of all your current medications (prescription, over-the-counter and herbal).

You may want to bring a laptop or iPad, phone/phone charger, book or other forms of entertainment. You may use these while you wait during the planning phase of the treatment.

Please come to Galter Pavilion, 4th floor. Parking is available for patients and visitors in the garage at 222 East Huron Street, across from Feinberg and Galter pavilions. For a discounted rate, please bring your parking ticket with you. Your ticket can be validated at the Customer Services Desks on the 1st and 2nd floors of Feinberg and Galter pavilions, and the 1st floor of Prentice Women's Hospital.

- Check in at the reception desk on the 4th floor (located between Feinberg and Galter pavilions).
- Tell the receptionist that you are having Gamma Knife surgery.

The nurse from the Gamma Knife Department will take you to the Radiology Department.

Head frame placement and imaging

When you arrive in the Radiology Department, we will ask you to change into a hospital gown and hospital pants. We will give you non-slip socks to wear.

Your family will be directed to wait in the lobby on the lower concourse of Galter Pavilion.

The nurse will review the procedure with you, answer any questions and show you the Gamma Knife head frame in detail. They will ask you to sign consent forms. They will insert an IV (into the vein) line. The IV will be used to give contrast (dye) and fluids during the surgery.

The neurosurgeon or neurosurgery resident will place the Gamma Knife frame on your head. The frame will have special markers on its surface. They will use these markers to map the exact location of your Gamma Knife surgery.

The frame will be held firmly in place by 4 pins: 2 on your forehead and 2 on the back of your head. No hair will be shaved from your head and no incisions will be made. Your healthcare team will clean the pin sites with alcohol. They will inject numbing medication into the area. This will help you to be comfortable during the frame placement. You will feel pressure as the pins are put in place. This is normal, and the pressure will subside. The frame will remain on your head until after your surgery.

Next, you will have an angiogram in Interventional Radiology. Once completed, the nurse will take you on a stretcher to the Gamma Knife Center in the Radiation Oncology Department in the lower concourse of Galter Pavilion. Most patients will need to lie flat for the next 2 to 6 hours. During this time, the nurse will check the puncture site along with your blood pressure and pulse.

You will have a CT scan in the Gamma Knife Center in the Radiation Oncology Department.

Planning phase

After the imaging phase, the planning phase will take place in the Gamma Knife Center. The Gamma Knife team will use a computer to plan your specific radiation treatment. The planning phase may take an hour or more, depending on the size and shape of the area being treated. During this time, we will make sure you are as comfortable as possible. Your family is welcome to wait with you.

Surgery

After the planning phase, the treatment or surgery phase will begin. The nurse will help you lie on the Gamma Knife treatment table. The team will position your head to direct the radiation to the targeted area of your brain, and your frame will be secured to the table. When your head is in the correct position, the team will make sure you are as comfortable as possible. You may receive medication to help you relax at this time.

Then, the team must leave the room to avoid exposure to the radiation. During the entire Gamma Knife treatment, the physician and nurse will monitor you through a camera. You will be able to talk to the staff through a 2-way intercom. You may listen to music if you like. The staff will check your blood pressure and heart rate. The length of surgery will depend on your specific treatment plan.

After surgery

When your treatment is over, the nurse will remove the head frame. They will apply antibiotic ointment, gauze and Band-Aids® to each pin site. Some patients may have slight bleeding at the pin sites. The nurse may apply pressure to the site for a short time to stop the bleeding.

You will recover in the Gamma Knife area for about 1 hour. You may have a headache from the frame removal. The nurse can give you medication such as acetaminophen (Tylenol®) for the pain. You may also have swelling above your eyes. This is caused by the numbing medication used during the frame placement. The swelling lasts only a short time. The nurse will apply ice packs to your forehead and to the back of your head to help prevent the swelling. It is important to continue to use the ice packs after you go home.

Please arrange for someone to drive you home after the surgery.

Follow-up care

Before you leave the hospital, your neurosurgeon will give you discharge instructions. This will also include guidelines for care after an angiogram. The full effects of Gamma Knife surgery do not happen right away, which makes follow-up care very important. This care includes neurosurgeon visits and imaging studies such as MRI or CT scans. Please call your Gamma Knife neurosurgeon's office at 312.695.8143 (TTY: 711) to make your follow-up appointments as instructed.

When to call the neurosurgeon

A small number of people have side effects from Gamma Knife surgery.

Call your neurosurgeon if you have:

- New onset of severe headaches
- Weakness in your arms or legs
- Numbness
- New seizures
- Vision changes

There is some risk with every surgery. The risk varies with each person and the problem being treated. The risks of Gamma Knife surgery are low compared with traditional brain surgery. Most side effects are temporary. Your surgeon will discuss the benefits and risks involved in your surgery with you. Please ask your neurosurgeon if you have any questions or concerns.

We welcome your questions

We are happy to talk with you and answer your questions about Gamma Knife surgery. The Gamma Knife nurses are on hand to talk with you on weekdays between 8:30 am and 4:30 pm. Please call us at 312.926.5070 (TTY: 711).