



MedStar Georgetown  
University Hospital



## CyberKnife Program

*Offering Hope to People Who Have Cancer  
With a Proven, Effective Treatment*

Knowledge and Compassion  
**Focused on You**

# CyberKnife® at MedStar Georgetown University Hospital

MedStar Georgetown University Hospital is a leader at treating cancerous and non-cancerous tumors with CyberKnife®. Nearly a decade after establishing one of the first CyberKnife stereotactic radiosurgery systems in the United States, we have treated more than 4,000 people—that's an average of 170 sessions monthly. This high volume makes our specialists among the most experienced CyberKnife experts in the world. Combined with a Jesuit tradition of *cura personalis*—caring for the whole person—MedStar Georgetown's CyberKnife Program offers health, hope and improved quality of life to many people.

## Program Highlights

- Proven results published in scientific publications
- The area's most accomplished CyberKnife program, and one of the first in the nation
- The latest CyberKnife enhancements to decrease treatment time and improve patient comfort
- A pioneer of innovative approaches to provide CyberKnife treatment to more patients
- A major international CyberKnife training site for physicians
- Home to two CyberKnife systems

## When Surgery's Not the Answer

CyberKnife can reduce or destroy unreachable or inoperable tumors, anywhere in the body. It offers surgical precision, but with the following advantages:

- **No pain**—With CyberKnife, there is no anesthesia, incision, blood loss or recovery time.
- **No rigid head or body frame**—Unlike other systems, CyberKnife uses comfortable and flexible stabilizing devices, custom-designed to fit you.
- **No overnight hospitalization**—Since CyberKnife is an outpatient treatment, you can usually return home the same day.
- **No breath holding**—CyberKnife locks on its target regardless of tumor movement, so even patients undergoing treatment for lung cancer can relax and breathe normally during treatment.
- **Faster and more accurate**—Approaching its target from more than 1,400 angles, CyberKnife delivers high doses of radiation while avoiding surrounding healthy tissue.



CyberKnife with Synchrony simultaneously tracks both movement of the tumor and breathing patterns of the patient. The robotic arm adjusts and compensates for these movements, ensuring more accurate treatment.

## What is CyberKnife?

**Contrary to its name, CyberKnife does not require any incisions.** Rather, it is a radiation treatment that uses high-powered X-rays, computers, robotics and image-guidance technology to pinpoint small tumors.

FDA-approved for use anywhere in the body, CyberKnife is the only system of its kind that can accurately deliver radiation to moving tumor targets, even when a patient breathes. Its crossfire technique beams higher and more concentrated X-ray doses than other devices, while limiting exposure to healthy tissue nearby. CyberKnife's robotic arm can also approach tumors from virtually any angle—up to 1,400 positions in all—for unequalled flexibility and precision. The end result is a **treatment that can shrink or destroy many tumors or lesions that were once considered impossible to reach with other techniques.**

Always in the forefront of new technologies and approaches, MedStar Georgetown features advanced CyberKnife enhancements that take patient comfort and treatment effectiveness to the next level. Chief among them is the **Synchrony Respiratory Tracking System**, which improves treatment for soft-tissue tumors that move with breathing. Another accessory, the **Iris Collimator**, makes treatments faster.

For people with inoperable tumors or lesions, CyberKnife's key benefits include its ability to produce surgical results without anesthesia, incisions or hospitalization. As such, it poses fewer complications and risks than open surgery without blood loss, pain or recovery time.

## What to Expect

**Treatment with CyberKnife is tailored for each person**, depending upon the tumor's unique shape, size, type and location.

Before treatment, patients undergo between one and five planning sessions with CyberKnife's team of radiation oncologists and physicists. Computerized images of the tumor, surrounding tissues and other structures show the target's exact location and help our specialists determine the best approaches, radiation dosage as well as other details for the safest and most effective treatment.

Additionally, prior to treatment planning, patients with soft-tissue tumors have fiducials or markers implanted. These tiny gold seeds serve as a landmark for the team and help assure accuracy during the actual CyberKnife sessions. An outpatient procedure, fiducial implantation is minimally invasive and performed using local or general anesthesia.

During treatment, patients lie on a special table while CyberKnife's robotic arm delivers the radiation. Individual treatment sessions typically last about 60 minutes with most patients resuming regular activities after each visit. A full course of CyberKnife treatment is normally shorter than other forms of radiation therapy. Depending upon the type of tumor, patients will receive between one and five outpatient treatments—all within one to two weeks.

## Taming Trigeminal Neuralgia

*Needleworker Avoids Surgery and Risk of Double Vision*

By day, Bernadette Mathews is a federal proposal management executive. But when her day is done, she picks up her needles and starts her real life's work: counted cross-stitch, needlepoint, crochet and knitting. Without MedStar Georgetown's CyberKnife, she could have lost the ability to pursue both her profession and her passion.



Her troubles began with a strange tingling in her right cheek that soon became painful. When neither her regular physician nor dentist could identify the problem, she turned to MedStar Georgetown where she previously had successful knee replacement surgery.

Bernadette learned that a non-cancerous tumor was pressing on a particular facial nerve and causing her debilitating pain (called trigeminal neuralgia). She also learned that traditional

neurosurgery to remove the tumor could cause double vision, putting her career and pastime at risk.

The only other option was to try CyberKnife treatment, which Bernadette accepted immediately. Within a month of completing her treatment, her pain was gone.

*"CyberKnife was amazing—painless, noninvasive and without side-effects," Bernadette says. "It let me get back to my job and my needlework."*

## Brain, Spine and Skull-Base Tumors

CyberKnife was originally developed to treat brain and spine tumors, but without the rigid head frame required by other radiosurgery systems. Instead, brain tumor patients who are treated with CyberKnife wear a tailor-made, lightweight and open-mesh face mask. The result is a much more comfortable and noninvasive experience. CyberKnife also requires only one to five treatment sessions for brain and spinal tumors, as compared to 10 to 30 sessions with traditional forms of radiation therapy.

Since first installing the system in 2002, MedStar Georgetown has performed some of the most complex neurosurgery CyberKnife procedures on the East Coast. **Today, it is one of the highest volume neurosurgery CyberKnife centers in the nation with more than 1,500 brain, spine and skull-base treatments performed to date** for the following conditions:

- Arterial venous malformations
- Benign tumors:
  - Acoustic neuromas
  - Schwannomas
  - Meningiomas
  - Pituitary adenomas
- Chordomas of the spine and brain
- Functional disorders (trigeminal neuralgia)
- Intracranial tumors and lesions
- Malignant tumors (primary and metastatic)
- Spine cancer and spinal cord tumors

## One Patient, Two Diagnoses

*Quality of Life is Restored Twice With CyberKnife Treatments*



When Raymond Jiguere was diagnosed with a rare and inoperable brain tumor, his future looked bleak. Few treatment options existed for his condition anywhere in the country, let alone in his hometown of Plattsburg, New York. But his local doctor had heard that MedStar Georgetown University Hospital was achieving remarkable results with a brand-new technology—CyberKnife. For Raymond, it was his last best hope.

That was 10 years ago. Today, Raymond and his wife Loretta continue to thank MedStar Georgetown's CyberKnife team for his recovery and return to a normal life.

So when Raymond was diagnosed with prostate cancer, he returned to MedStar Georgetown for CyberKnife treatment once again. And once again, his treatment was successful and painless—just what the Jiguere's have come to expect.

Asked how his experience with a brain tumor and then prostate cancer has affected his life, Raymond says, *"I do everything. I am even back to work."*

"It took a lot to make the trips to D.C., first for the brain then prostate treatment sessions," Loretta admits. "But because of Georgetown and CyberKnife, I still have my husband."

## Head and Neck Tumors

From the outset, MedStar Georgetown has used CyberKnife to treat cancers that begin within or spread to the head and neck. Used alone or with IMRT (Intensity Modulated Radiation Therapy) and chemotherapy, CyberKnife attacks tumors located in the following areas:

- Eye and eye socket (orbit)
- Nasopharynx
- Sinus
- Nasal cavity
- Tongue
- Salivary glands
- Windpipe (trachea)
- Voice box (larynx)
- Lymph nodes in the upper part of the neck, and other sites

Before treatment, patients are outfitted with a custom-made, lightweight, open-mesh facemask to assure that the targeted tumor is in exactly the same position for each session.

In 2002, MedStar Georgetown pioneered the use of CyberKnife to re-treat patients whose head or neck cancers returned after traditional radiation. Since then, repeat radiation with MedStar Georgetown's CyberKnife has regularly improved patient outcomes when compared to re-irradiation with other therapies. With such results, our team has used this innovative technology to treat recurring head and neck tumors in patients around the world—the United States, Western and Eastern Europe and the Middle East—making the hospital a major international center for head and neck re-irradiation.

## Sailing Through Prostate Cancer

*Veteran Salutes MedStar Georgetown and CyberKnife*

Retired Navy captain, Fred Hallett, is on a mission. Three years after successful CyberKnife treatment for prostate cancer, he wants every man he knows to consider robotic radiosurgery when weighing options.

Fred wasn't always such a fan. In fact, he had never even heard of the innovative procedure when he was diagnosed in 2008. But he had heard enough stories about other prostate therapies that had side effects, long treatment periods and extended recovery timeframes. So, he was enthusiastic about trying a new and improved approach with CyberKnife, then only available at MedStar Georgetown.

After a mere five days of hour-long treatment sessions, CyberKnife's effectiveness was evident. Fred's first post-treatment test showed that his PSA levels dropped from a previous high of 9.3 to 2.



"I was stunned. I didn't think those results were possible in less than a year."

The experience turned him into a convert, and he started volunteering as a resource to other prostate cancer patients contemplating the procedure.

Today his PSA remains low, and he's feeling great. *"I am now more convinced than ever that CyberKnife is better than any other alternative out there."*

## Prostate Cancer

MedStar Georgetown University Hospital has the busiest and most experienced CyberKnife program for the treatment of prostate cancer in the world. To date, this expert team has treated nearly 500 men who had:

- Cancer that was confined to the prostate and had not spread to the bones
- Large prostates, which were not treatable by brachytherapy

Before treatment, the prostate is implanted with fiducials—tiny gold markers that help assure accuracy in both targeting the tumor and avoiding nearby healthy tissue.

CyberKnife treatment for prostate cancer offers distinct advantages, including:

- Proven results that are comparable to traditional radiation therapy as demonstrated by a five-year, multi-center study
- Only five treatment sessions compared to the 40 or more required with other forms of radiation therapy
- A preserved quality of life during and after treatment

Additionally, CyberKnife can be used in conjunction with conventional radiation therapy to boost treatment effectiveness for men with higher PSA and Gleason readings.

## Cancer-Free and Going Strong

### *CyberKnife Preserves Lung Tissue for Active Woman*

A full 20 years after quitting smoking, Roberta Juchnewicz developed lung cancer. After a successful treatment of radiation, chemotherapy and surgery, the retired nurse decided to move closer to her children and grandchildren in Washington, D.C.

She then chose MedStar Georgetown University Hospital for her follow-up care. This decision paid off when one of her routine CT scans revealed a growing spot.

A needle biopsy confirmed the worst: Roberta had developed a new lung cancer. But early-stage COPD (chronic obstructive pulmonary disease) and her prior irradiation limited her treatment options to either open surgery or CyberKnife, which MedStar Georgetown was just starting to use for lung cancer.

The new approach appealed to Roberta.



*“With open surgery, I could have lost an entire lobe of my lung. CyberKnife left me with the most amount of functioning tissue,”* says Roberta.

Two weeks after her last CyberKnife treatment, she resumed her water exercise class. Six years later, she is disease-free and able to maintain her active lifestyle. Comparing CyberKnife to her other alternatives, Roberta knows she made the right decision.

*“What’s the point of going through all types of treatment to save your life if you can’t live your life afterward?”*

## Lung Cancer

In 2006, MedStar Georgetown became one of the first centers to use CyberKnife for lung tumors. It was also the first hospital on the East Coast to adopt Synchrony software that allows patients to breathe normally during lung cancer treatment without holding their breath.

Today, MedStar Georgetown boasts one of the most experienced multi-disciplinary chest CyberKnife teams nationwide and the only one in the area to perform hundreds of lung treatments to date.

Before treatment, the lung tumor is implanted with tiny gold seeds that help assure the X-ray’s accuracy in pinpointing the target while protecting surrounding healthy tissue. During treatment, patients wear an elastic garment that comfortably molds to their body to help them lie still.

MedStar Georgetown’s CyberKnife team has successfully treated:

- Early lung tumors
- High-risk surgical patients including the elderly and those with severe emphysema
- Previously irradiated patients whose tumors have returned

In addition, CyberKnife can be used along with surgery and chemotherapy to attack one or two metastatic lung tumors—those that form when cancer starts in another part of the body and spreads to the lungs.

## Pancreatic and Other GI Cancers

MedStar Georgetown University Hospital is one of the most experienced CyberKnife sites in the nation for the treatment of both newly diagnosed and returning pancreatic cancers as well as liver tumors.

In addition, our CyberKnife experts are working with pancreatic specialists and medical oncologists to find new and more effective treatments for pancreatic cancer. A key project focuses on whether CyberKnife, given along with chemotherapy, can shrink newly diagnosed tumors. If successful, this novel approach may prolong and enhance the quality of life of people who have inoperable pancreatic tumors.



MedStar Georgetown's Department of Radiation Medicine is a leader in CyberKnife treatment.

## Is CyberKnife Right for You?

CyberKnife treats cancerous and non-cancerous tumors and lesions of the:

- Brain, spine and skull-base
- Head and neck, including ear, nose and throat
- Prostate
- Lung
- Gastrointestinal tract, including the pancreas and liver
- Breast
- Gynecologic tract, including the ovaries, uterus and vagina
- Other soft-tissue organs

CyberKnife may be your best option if:

- Your lesion or tumor cannot be treated through surgery or other radiation therapies.
- You have previously undergone extensive radiation treatments.
- You are elderly or have compromised health.

MedStar Georgetown's multidisciplinary team of physician specialists offers the most thorough evaluations and accurate diagnoses to learn whether you could benefit from CyberKnife. But if CyberKnife is not right for you, our combination of talent, technology and advanced treatments can help achieve the best possible results for your particular condition. Additionally, MedStar Georgetown's Lombardi Comprehensive Cancer Center—the D.C. area's only NCI-designated comprehensive cancer center and one of only 40 nationwide—provides access to the most promising new approaches through clinical trials.

For more information or to schedule an appointment, call  
**202-342-2400.**  
[medstargeorgetown.org/cyberknife](http://medstargeorgetown.org/cyberknife)

**MedStar Georgetown University Hospital** is a not-for-profit, acute-care teaching and research hospital with 609 beds located in Northwest Washington, D.C. Founded in the Jesuit principle of *cura personalis*—caring for the whole person—MedStar Georgetown is committed to offering a variety of innovative diagnostic and treatment options within a trusting and compassionate environment.

MedStar Georgetown's centers of excellence include neurosciences, transplant, cancer and gastroenterology. Along with the Magnet® nurses, internationally recognized physicians, advanced research and cutting-edge technologies, MedStar Georgetown's healthcare professionals have a reputation for medical excellence and leadership. MedStar Georgetown University Hospital—*Knowledge and Compassion **Focused on You.***

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