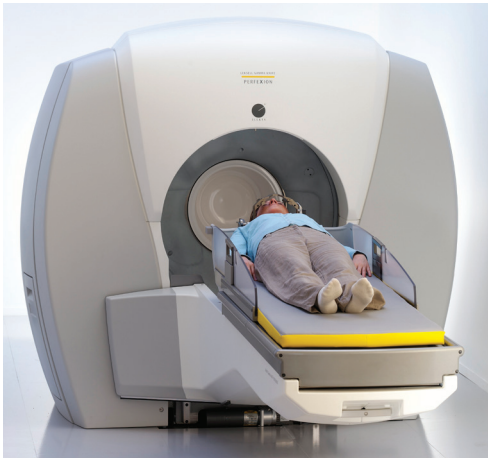
Benefits of Treatment with the Gamma Knife® Perfexion™

Treatment with the Gamma Knife® Perfexion™ has numerous benefits for patients including:

A Safe, Proven Treatment Option:
With over 40 years of clinical research and 700,000 patients treated worldwide, the Gamma Knife has a long, evidence-based clinical record in treating a variety of indications with fewer risks than open surgery in a single outpatient treatment session without general anesthesia. The Gamma Knife Perfexion also contains radiation shielding levels that are up to 100 times better than other technologies.

Dedicated Design:
The Gamma Knife Perfexion is solely designed for the treatment of brain disease, unlike other technologies which are designed to treat multiple areas of the body.



A Multidisciplinary Team:
Treatment with the Gamma Knife Perfexion requires a team of specialist including a neurosurgeon, radiation oncologist and radiation physicist to create each patient's customized treatment plan using the latest in advanced three dimensional computer planning software.

Accuracy:
In the brain, every millimeter counts. The Gamma Knife Perfexion is the most precise intracranial radiosurgical tool on the market with a guaranteed accuracy of better than 0.5 mm. A study of 189 installed systems based on 332 commissioning protocols proved an average accuracy level of 0.15 mm.

Treatment Flexibility:
The Gamma Knife Perfexion can be used as both a primary treatment option or in conjunction with other methods including surgery, other forms of radiation therapy and chemotherapy. Gamma Knife Perfexion treatment usually does not interrupt or impede chemotherapy. The Gamma Knife Perfexion also provides an excellent alternative treatment option for patients with inoperable or surgically inaccessible disease.

Quick Recovery:
Gamma Knife Perfexion treatment provides patients a rapid return to pre-treatment activities and lifestyle, requiring little or no rehabilitative services. Most patients resume activities in as little as 24-72 hours.

Insurance Coverage:
Gamma Knife Perfexion treatment is covered by most medical or health insurance companies, including Medicare. In cost comparison studies of the same indications, Gamma Knife treatment is typically less expensive than conventional neurosurgery by roughly 25 percent.

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Acoustic Neuroma

WHAT IS AN ACOUSTIC NEUROMA?

- Also called a vestibular schwannoma
- A benign, slow growing, primary brain tumor located on or around the 8th cranial or 'hearing and balance' nerve
- Represent about 8% of all primary brain tumors, affecting about 2 people per 100,000
- Typically occur in adults, particularly in their middle years of life
- Women are twice as likely to develop this tumor as men

SYMPTOMS:

Common symptoms include

- One-sided hearing loss
- Buzzing or ringing in the ear (tinnitus).
- A feeling of 'fullness' of the ear

LESS COMMON SYMPTOMS CAN INCLUDE:

- Dizziness
- Imbalance
- Vertigo

ADDITIONAL LESS COMMON SYMPTOMS CAN INCLUDE:

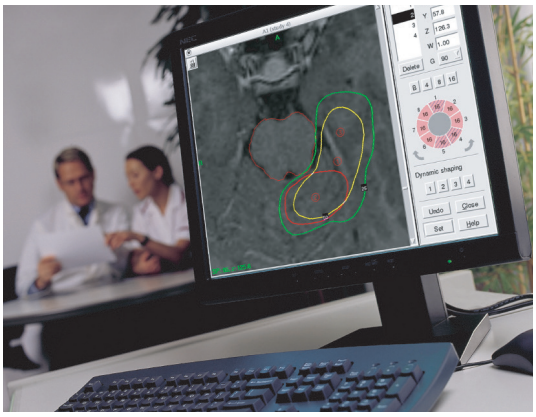
- Facial nerve function problems
- Difficulty swallowing
- Impaired eye movement
- Taste disturbance

DIAGNOSIS:

Most acoustic neuroma tumors are diagnosed through audiograms to confirm hearing loss, neurological exams, and imaging such as a MRI or CT scan.

GAMMA KNIFE TREATMENT OF ACOUSTIC NEUROMAS:

- Treatment Goal: Tumor control
- Over 63,000 cases treated
- Research reports long-term tumor control rates of 93-100%
- Typically reserved for smaller tumors of 3 cm or less
- Carries a much higher hearing preservation rate of 60-90%
- Helps preserve facial/trigeminal nerve function in more than 95% of patients.



HOW TO REFER A CASE FOR CONSULTATION

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Arteriovenous Malformation (AVM)

WHAT IS AN ARTERIOVENOUS MALFORMATION (AVM) IN THE BRAIN?

- Also called a Cerebral AVM
- An abnormal connection between arties and veins in the brain where the blood vessels lack the normal capillary structure of how healthy blood vessels transition oxygen-rich and oxygen-poor blood in and out of the brain
- Not limited to formation in the brain and can occur in other areas of the body, but they are most often found in the brain and spinal cord
- Believed to be congenital but may develop later in life
- Cause remains unknown
- More common in males than females
- Estimated to occur in one person per 100,000

SYMPTOMS:

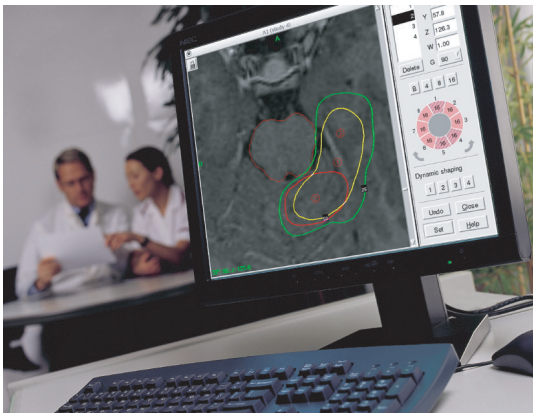
- Most are asymptomatic; typically discovered incidentally
- Headaches
- Seizures
- Intracranial hemorrhage (bleeding in the brain)
- Hearing a pulsing sound
- Weakness and numbness in the extremities
- Visual field changes

DIAGNOSIS

The diagnosis of an AVM is typically made through imaging studies including a CT, MRI and/or a cerebral angiogram.

GAMMA KNIFE TREATMENT OF CEREBRAL AVMS

- Treatment Goal: eliminate blood flow through abnormal blood vessels
- Treatment of the abnormal vessels causes them to swell, ultimately cutting off blood flow through them
- Over 71,600 AVMs have been treated
- Generally reserved for those less than 4 cm, asymptomatic with no history of hemorrhage, or are located in an eloquent or high risk surgical area of the brain
- Obliteration of blood flow typically occurs in 70-90% of patients over a period of one to six years
- Faster obliteration is typically seen in pediatric AVM cases
- Can be combined with microsurgery or embolization techniques



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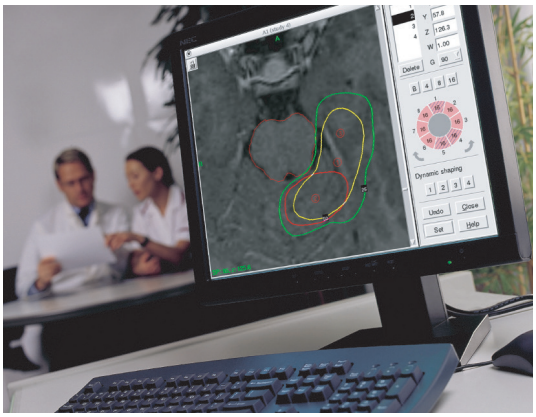
Brain Metastases

WHAT IS A BRAIN METASTASIS?

- Also referred to as a metastatic brain tumor or secondary brain tumor
- A brain metastasis is a brain tumor that develops when cancer cells from a primary cancer elsewhere in the body spread and form a new tumor site in the brain
- Metastatic brain tumors are the most common brain tumors to occur in adults
- Estimated that 20-40% of patients with a cancer diagnosis may develop metastatic brain disease at some point during the course of their primary disease
- Cancers of the lung, breast, skin (melanoma), colon, and kidneys are the most common cancers to spread to the brain
- Lung and colon cancer are more likely to produce multiple tumors



SYMPTOMS CAN INCLUDE:

- Cognitive changes
- Balance disturbances
- Headaches
- Seizures
- Weakness in arms or legs
- Changes in vision

DIAGNOSIS:

Tumors are typically found through an imaging scan of the brain, usually a CT or MRI.

GAMMA KNIFE TREATMENT OF METASTATIC BRAIN TUMORS

- Treatment goal: Tumor Control
- Over 252,400 cases treated
- Clinical research has shown local control provided by Gamma Knife treatment of brain metastases in any brain location generally exceeds 85%
- Highly effective in treating both single and multiple tumors in a single session
- Typically reserved for tumors that are less than 4 cm in size
- For some patients, clinical research suggests Gamma Knife should be considered as a first line therapy over other radiation techniques

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Meningioma

WHAT IS A MENINGIOMA?

- A benign, slow growing, primary brain tumor arising from the meninges, the 'coverings' of the brain
- Can occur anywhere along the meninges, but are more frequently found along the top and outer curve of the brain or at the skull base
- Represents approximately 20% to one third of all primary brain tumors
- Occurs most often in middle-aged women

SYMPTOMS

Symptoms can vary based on location and size of the tumor. The most common symptoms include:

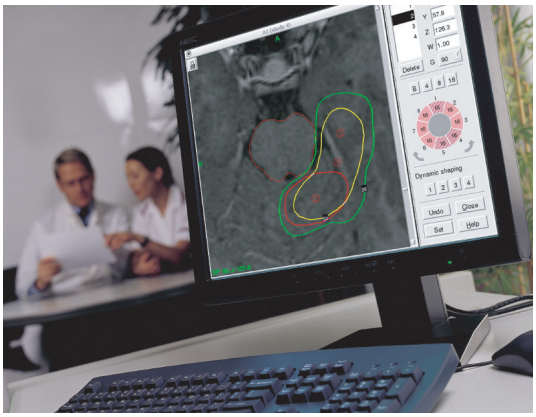
- Headache
- Weakness on one side of the body
- Seizures
- Visual field changes
- Personality and behavioral changes
- Confusion

DIAGNOSIS

Most meningiomas are diagnosed through neurological exams and imaging scans such as a MRI or CT.

GAMMA KNIFE TREATMENT OF MENINGIOMAS

- Treatment Goal: Tumor control
- Over 90,800 cases treated
- Typically reserved for tumors less than 4 cm and those not causing a multitude of symptoms
- 93-98% of patients experience long-term tumor control
- Results with Gamma Knife are equivalent to that of complete resection of tumors (Simpson Grade 1); Gamma Knife treatment provides superior control rates for subtotal resections (Simpson Grade 2, 3 and 4).
- Can also be used to treat residual tumor, the tumor resection area, or for tumor reoccurrence or regrowth after surgery



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Pituitary Adenomas

WHAT IS A PITUITARY ADENOMA?

- A typically benign, slow growing tumor on the pituitary gland
- Can be either "secreting" or "non-secreting" tumors; majority are secreting tumors
- Most grow in the front area of the gland
- Represent about 10-13% of all primary brain tumors
- More common in adults; with women being more likely to be affected by these tumors than men, particularly during childbearing years

COMMON SYMPTOMS

- Headache
- Visual field impairment
- Behavioral changes
- Hormonal imbalance

DIAGNOSIS

Pituitary tumors are often diagnosed through imaging scans such as an MRI or CT and blood work.

GAMMA KNIFE TREATMENT OF PITUITARY ADENOMAS:

- Treatment Goal: Tumor control
- Over 50,000 cases treated
- Usually reserved for residual tumor following surgery, recurring tumors, or those deemed inoperable or where surgery is inadvisable
- Clinical research supports tumor control rates with Gamma Knife treatment for both secreting and non-secreting tumors to be between 90-100%
- For secreting tumors, research reports about 50-60% of patients will achieve hormonal control/balance 12-60 months after treatment

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Primary Malignant Brain Tumors

WHAT IS A PRIMARY MALIGNANT BRAIN TUMOR?

- A fast growing, invasive tumor that develops from brain tissue
- These tumors typically lack distinctive boarders, and invade neighboring healthy brain tissue as they grow
- Many different types including astrocytoma, oligodendroma, ependymoma, and glioblastoma tumors
- Most occur in children or older adults, but can occur at any age

SYMPTOMS:

Symptoms of a primary malignant brain tumor vary based on the location of the tumor. Symptoms can include but may not be limited to:

- Headaches
- Seizures
- Vision and/or hearing loss
- Cognitive changes
- Changes in behavior or personality

DIAGNOSIS:

- A full neurological exam
- Imaging studies (such as CT or MRI)
- Laboratory testing
- A biopsy

GAMMA KNIFE TREATMENT OF MALIGNANT BRAIN TUMORS

- Treatment Goal: Tumor control
- Used in combination with surgery, chemotherapeutic treatment and other forms of radiation therapy
- Not typically considered as a first line therapy for these tumors
- Most commonly used for areas of residual or recurrent tumors
- Current clinical literature suggests treatment at time of progression of these tumors may lead to longer overall survival for some patients

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Trigeminal Neuralgia

WHAT IS TRIGEMINAL NEURALGIA?

- Also called 'tic douloureux' or the 'suicide disease'
- A chronic neurological disorder that causes sudden extreme, sporadic, burning , or shock-like facial pain lasting anywhere from a few seconds to a few minutes in duration
- Very debilitating as the attacks often worsen over time, with fewer and shorter pain-free periods
- Typically diagnosed in older adults over the age of 40, but it can affect anyone at any age
- More likely to occur in women than men; occurs more frequently in people with multiple sclerosis
- Most common cause is compression of the nerve by a blood vessel or tumor; For some patients the cause remains be unknown

SYMPTOMS

- Sudden, severe, electric shock-like, stabbing pain that is typically felt on one side of the face
- Felt across the forehead, cheek, or down the jawline
- Pain attacks can vary in duration, and episodes can last for days, weeks or months at a time and then disappear for months or years
- Pain can be triggered by contact with the cheek including shaving, washing the face, applying makeup, brushing teeth, eating, drinking, talking, or being exposed to the wind.

DIAGNOSIS:

- Can be difficult; often misdiagnosed
- Medical history
- A description of symptoms
- A physical exam
- A neurological exam
- Imaging studies such as MRI, CT

GAMMA KNIFE TREATMENT OF TRIGEMINAL NEURALGIA

- Treatment Goal: reduction in pain and medication; medication is the first line therapy
- Over 43,400 cases treated
- A high dose of radiation is given to the root of the trigeminal nerve
- Radiation damages the pain conducting fibers of the nerve, reducing or eliminating the pain
- Clinical evidence supports 78-94% pain relief within three months post treatment
- Long-term pain relief varies from 32-81% as reported by various treatment centers.
- Level 2 clinical evidence supports Gamma Knife to have the lowest rate of morbidity or associated sensory nerve dysfunction when compared to other treatments techniques
- Typically preserves facial sensations
- Can also be repeated; research reports a second treatment typically provides the same amount of pain relief the patient experienced after the first treatment

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