

# **RADIOSURGERY NEW YORK**

## **Fractionated Stereotactic Brain Radiosurgery**

Fractionated stereotactic radiosurgery represents the leading technologic edge for patients with benign and malignant brain tumors. Work pioneered by experts at Radiosurgery New York and presented at national and international medical meetings continues to show the efficacy and safety compared to other methods of treatment.

From its inception more than 40 years ago its continued improvement and refinement, stereotactic radiosurgery has succeeded in precisely delivering radiation to tumors in a non-invasive manner.

In the hands of the experienced doctors at Radiosurgery New York radiosurgery is totally non-invasive – even avoiding the pins in the skull of other methods of radiosurgery. Currently our experts have performed more than tens of thousands radiosurgery procedures.

For patients with either newly diagnosed or recurrent brain tumors whether standard radiation, surgery or chemotherapy has been previously administered, fractionated stereotactic radiosurgery is a new and exciting treatment option. Fractionated stereotactic radiosurgery represents an advanced age of medical science in which patients with benign and malignant tumors once considered impossible or difficult to treat can receive effective, non-invasive therapy. This approach is free from any anesthesia, hospital stay, surgical convalescence or pins into the skull associated with other procedures.

Fractionated stereotactic radiosurgery non-invasively directs precisely-guided beams of radiation from many hundreds of different angles all to converge on the tumor. By focusing these beams from so many different positions, the effects on the normal healthy brain are minimized while the target receives the desired prescribed treatment. We have extensive experience utilizing this technology – we use non-invasive stereotactic head frames to help stabilize the patient and tumor, yet it is performed in a precise and comfortable manner. Compared to other technologies, we have much to offer each patient – including experience, data and comfort. There are reasons for the technology we employ and we are happy to share this with you. If all your questions are not answered, please call, come in or e-mail your concerns so that we can address all directly.

One of the primary differences between standard radiation and fractionated stereotactic radiosurgery is that standard radiation radiates large amounts of normal healthy brain – compared to radiosurgery which is focused on the tumor. Radiation of healthy brain usually cannot be construed as desirable and may, in fact, lead to complications. Radiosurgery represents the opposite end of the spectrum from standard radiation; we precisely direct radiation with more effective doses of treatment. We don't always use the highest doses. In certain disease, we believe we use the lowest biologic doses to main delicate cranial nerves. Our experience helps guide us to the best use of the dose.

### ***How does fractionation of radiosurgery help the patient?***

Radiation oncologists believe that higher doses of radiation are more beneficial in curing disease, in general, than lower doses. However, higher doses cannot be given innocuously. Essentially, all tumors are surrounded by normal tissue. It is the presence of the normal tissue that limits the amount of radiation that can be safely administered.

Fractionation allows healthy, surrounding tissues to repair radiation effects in a way that single fraction radiosurgery cannot. Fractionation, therefore, exploits the difference between normal tissues and tumors thus resulting in a safer and superior outcome. That is why fractionated radiosurgery is so important. Fractionation protects normal, surrounding brain.

For patients with brain tumors, the desired treatment is one that produces the most appropriate and beneficial doses of radiation delivered to the tumor while minimizing effects to the normal healthy brain. Fractionated stereotactic radiosurgery helps us achieve this goal most elegantly.

## ***What are most common uses of fractionated stereotactic radiosurgery?***

### **Primary Brain Cancers**

Malignant primary tumors including astrocytomas and glioblastomas as well as metastatic cancers to the brain are frequently treated at Radiosurgery New York. These cancerous conditions have been – and are – extensively studied by our experts.

Because of close collaboration with medical oncology, our studies combining special radiation – enhancing well-tolerated chemotherapeutic agents – such as Taxol, have been regularly evaluated and continue to show marked benefit compared to standard treatment or standard single short radiosurgery – with statistical significance – for those with newly diagnosed as well as recurrent small as well as large primary brain tumors – like glioblastomas, astrocytomas and other aggressive cancers. We have approximately 33% longer survival by combining certain chemotherapy with fractionated stereotactic radiosurgery for recurrent high grade primary brain tumors like glioblastoma multiforme. We can improve outcome in patients with single or multiple sites of disease compared to those who might otherwise receive standard radiation or radiosurgery.

Benefits of fractionation are numerous. For malignant tumors, there is more likely protection of the healthy tissue while maintaining – or improving – efficacy of treatment. In fact, studies by our experts at Radiosurgery New York of malignant primary brain tumors such as astrocytomas, gliomas, and glioblastomas shows markedly improved survival rates years after treatment compared to single fraction radiosurgery or other methods of treatment. Furthermore, there is a much lesser need of subsequent operation or intervention.

### **Brain Metastases**

Brain metastases mean the cancers that have started in another part of the body spread via the bloodstream to the brain. Our work shows benefit from fractionated stereotactic radiosurgery for patients with single or multiple metastases – even those not successfully treated with prior surgery or radiation. Fractionated stereotactic radiosurgery allows us to treat even larger cancers or those in the most delicate parts of the brain (like the brainstem area or by delicate critical nerves) – with a greater degree of safety than other methods of standard radiosurgery.

For patients with brain metastases, the appeal of radiosurgery is that, in certain instances, it eliminates the need for whole brain radiation. Whole brain radiation radiates the normal healthy tissues. Many patients come to us with newly diagnosed tumors specifically to avoid standard therapy and unnecessary side effects. Other patients come to Radiosurgery New York with brain metastases that have remained or grown despite standard radiation or prior surgery.

### **Head & Neck cancers**

Radiation-enhancers have been shown to be highly effective in head and neck cancers, as well. Taxol is not particularly effective by itself for malignant brain tumors, but is an especially important agent in sensitizing the tumor – or making the cancer more susceptible – to the effects of fractionated stereotactic radiosurgery.

Cancers of the head and neck area continue to be treated with unique approaches by our expert physicians with high response rates in general. These cancers include the nasopharynx, maxillary sinus and other primary sites within this crucial area of the body. Many patients come to us for treatment after standard radiation, chemotherapy or surgery failed to work.

### **Benign Tumors – meningiomas, acoustic neuromas, etc.**

Benign tumors represent particularly important area. Their treatment is being revolutionized by the introduction of fractionated stereotactic radiosurgery. The most common benign tumors include meningiomas and acoustic neuromas. Other neuromas and schwannomas are well-treated with a high degree of confidence.

Fractionation for benign tumors like acoustic neuromas means the toxicity of treatment is markedly diminished or eliminated compared to single fraction radiosurgery or open surgery. For example, with open surgery the vast majority of patients with acoustic neuromas lose hearing and many lose facial function – a marked physical and psychological calamity. With fractionated stereotactic radiosurgery, the likelihood of facial paralysis is essentially unheard of as is trigeminal neuropathy. Audiographic evaluation shows that about 90% of our patients maintain hearing while having an exceptionally high success rate with this approach. Of course, all treatment is administered as outpatient therapy – adding to this attractive treatment option.

Our group has the largest experience worldwide treatment of acoustic neuromas. The beauty of our program is the great number of people treated and the excellent results. Over 90% keep hearing at beyond five years and about 80% keep the same level or even better hearing after treatment. About 20% have documented improved hearing. Severe damage to delicate cranial nerves – like the trigeminal and facial is essentially never seen although less than 1% has had subtle changes – usually transient. Many call fractionated stereotactic radiosurgery with us a treat not just a treatment. What is so special is our experience, data, low biologic dose, timing and follow-up.

Patients with meningiomas come for fractionated stereotactic radiosurgery especially when located around crucial blood vessels and nerves. Frequently tumors remain after surgery. Commonly meningiomas grow and are difficult if not impossible to totally resect surgically. Other people simply do not want surgery with the associated hospitalization and convalescence. Fractionated stereotactic radiosurgery can be used primarily in place of surgery or when surgery has failed to adequately treat the tumor and patient.

Meningiomas are usually – but not always – benign tumors. They sometimes can be aggressive or even malignant. We see people with meningiomas who have just been diagnosed with no treatment and as well, those with recurrent meningiomas after surgery. What is interesting is that when we treat ‘virgin’ tumors, the control rate is very high – about 95%. When we treat recurrent tumors the control rate is also high but not equal to the ‘virgin’ case – at about 85%. It may be that more aggressive tumors recur and then are seen by our group – or perhaps surgery has a deleterious effect on the tumor and pattern of spread. This data should cause anyone with meningiomas to thoroughly investigate all options.

### **Arteriovenous Malformations**

Arteriovenous malformations – entangled blood vessels – remain an important indication for radiosurgery and patients are treated with especially close neuroradiologic collaboration. Treatment of AVM's requires angiography at the time of treatment to best define the shape, contour and size of these potentially fatal weakened blood vessels. Success rate – meaning obliteration of arteriovenous malformations – is high using radiosurgery – a time-proven technique.

### **Pituitary Tumors**

Pituitary tumors, another benign condition, are commonly treated successfully using fractionated stereotactic radiosurgery. By fractionation, the important nerves to the vision (optic nerves and chiasm) are protected while highly effective non-invasive therapy is administered. Many prefer fractionated stereotactic radiosurgery to standard radiation, open surgery or prolonged use of medicines.

Of course, many other tumors are treated by Radiosurgery New York. Our group has experience with many more unusual tumors such as craniopharyngiomas, chordomas, hemangioblastomas, oligodendrogliomas, ependymomas, glomus tumors, medulloblastomas and many others.

### ***How is radiosurgery carried out?***

For each patient, a custom-fitted head frame is constructed by our skilled staff. This takes approximately 30 minutes. The next step is imaging studies using the non-invasive head frame as a frame of reference. Physicians and physicists create a unique treatment plan for each patient which is then re-confirmed and double and triple-checked by the involved physicians and physicists. Multiple quality assurance steps

check and re-check each action – from head frame creation to imaging, planning, head frame placement and treatment.

Because treatment is totally non-invasive, patients maintain their normal function throughout this process. Patients are completely awake and alert throughout the entire painless procedure.

Furthermore with fractionated stereotactic radiosurgery there is, in general, the avoidance of any hospitalization. It is for this reason and the strong voices from successfully treated patients that enthusiasm has been stimulated globally for the fractionated stereotactic radiosurgery approach at Radiosurgery New York. Many times, previously treated patients are our most ardent supporters – passing on to friends and family a new treatment option tip.

How does one consider their candidacy for the fractionated stereotactic radiosurgery program at Radiosurgery New York?

Every week our physicians review submitted cases from around the world for consideration of fractionated stereotactic radiosurgery. We attempt to make the best decision based upon most effective and least invasive techniques available. Included in this group of researchers are radiation oncologist, medical oncologists, neuroradiologists, neuro-oncologists, neuropathologists, neurosurgeons, neuro-oncology researchers as well as other health care professionals.

We have a large group of experts on hand to answer your questions. More specific questions are individually answered by our physicians based on your exact situation.

If interested, one should send in appropriate records and current radiographic scans to our Brain Radiosurgery Conference. There, on a weekly basis, all submitted material is reviewed and each patient is considered individually for best treatment. If questions arise at any time, call our staff and experts at Radiosurgery New York.

Our radiosurgery work continues to be evaluated and updated by our research group and our current results are presented at national and international meetings.

For more information on fractionated stereotactic radiosurgery for brain tumors and other innovative treatment methods, for a free videotape and information packet or to register for one of our monthly Brain Tumor Seminars, please contact Radiosurgery New York or e-mail us.

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