

## Radiosurgery/Radiotherapy

### Radiosurgery

Radiosurgery is a procedure involving the delivery of a high dose of precisely aimed radiation beams. Although it is called surgery, no incision is made. Radiosurgery involves a single treatment, while radiotherapy involves the delivery of precisely aimed low-dose radiation over multiple treatments.

The UC Neuroscience Institute at University Hospital was the first in the world to offer LEXAR, an integrated system for stereotactic radiosurgery, stereotactic radiotherapy and intensity-modulated radiotherapy.

The Precision Radiotherapy Center in West Chester, Ohio, opened in September 2003 to provide another option for patients with tumors or other neurological disorders. Developed by the Mayfield Clinic and radiology specialists at UC Physicians, two nationally recognized neuroscience programs affiliated with the University of Cincinnati College of Medicine, Precision Radiotherapy was the region's first center to offer high-precision radiotherapy/radiosurgery for tumors and other abnormalities both inside and outside the brain. There are several types of radiosurgery and radiotherapy:

### Stereotactic radiosurgery

Stereotactic radiosurgery, also called SRS, delivers a high dose of radiation in one treatment session.

### Fractionated stereotactic radiotherapy

Fractionated stereotactic radiotherapy, treats the tumor with multiple treatments of low-dose therapy that are administered daily over many weeks. This treatment attacks the tumor while reducing the radiation exposure to nearby critical structures, such as the brain stem, eyes or optic nerves.

### Three-dimensional (3-D) conformal radiotherapy

Radiation oncologists at the UC Brain Tumor Center have participated in developing 3-dimensional conformal radiotherapy, an advanced technology for delivering radiation. With this therapy, radiation beams are manipulated by the computer to precisely conform to the shape of the tumor.

3-D conformal radiation treatments significantly spare normal brain tissue and allow much higher doses to be delivered to the brain tumor. For patients with tumors that are usually successfully treated with radiation (e.g., pituitary tumors, meningiomas, craniopharyngiomas) 3-dimensional conformal radiation should result in fewer early and late side effects. For patients with tumors that are often only partially responsive to radiation

(e.g., metastatic tumors, glioblastoma), 3-D conformal radiotherapy provides the ability to increase the tumor treatment dose without the risk of increased side effects.

Neuroscientists believe that 3-D conformal radiotherapy has the potential to significantly improve the outcome of patients who require radiotherapy.

### **Intensity modulated radiotherapy**

As an extension of 3-D conformal radiotherapy, intensity modulated radiotherapy, in some situations, can provide superior conformation of the radiation field when compared to stereotactic or 3-D conformal techniques.

### **Frameless radiosurgery**

Frameless radiosurgery is a technology that allows a patient to be placed for precise delivery of radiosurgery to the brain without having a head frame affixed to the skull. Instead of being immobilized by a frame, which is screwed into bone, the patient wears a comfortable, head-to-shoulder mask. This technique was pioneered by specialists at the UC Brain Tumor Center and the Precision Radiotherapy Center.