Stereotactic Spine Radiosurgery: A New Treatment Option for Spine Tumors

The American Cancer Society estimates that nearly 1.4 million people will be diagnosed with cancer in 2006. Over the course of their illness, the majority of patients will develop skeletal metastases with the spine being commonly affected as the third most frequent site of metastases after lung and liver. While these spinal lesions can be found incidentally, 10-30% of cancer patients have symptomatic spinal metastases – often significantly impacting a patient’s quality of life.

Spinal metastases present with pain in 80% of patients, usually 7-15 weeks before the onset of neurological symptoms. Initially, the neck or back pain is typically a dull ache progressing slowly to more acute, persistent pain. Untreated, these tumors can cause destruction of the vertebral body with loss of spine stability and often compression of the spinal cord or nerve roots. This is associated with disabling pain, neurological dysfunction and ultimately paralysis. The goal in the treatment of these patients is early diagnosis in order to control the consequences of these metastatic lesions and optimize the patient’s quality of life. Treatment options include surgery (both open and minimally invasive), conventional radiation therapy, chemotherapy, pain management and now a ground-breaking, non-invasive treatment known as stereotactic spinal radiosurgery as a standalone treatment or as an adjunct to other treatment modalities. Just as cranial radiosurgery has revolutionized the treatment of many benign and malignant brain tumors, stereotactic spinal radiosurgery promises similar results for various spinal tumors.

At Cleveland Clinic we offer stereotactic spine radiosurgery using the Novalis® Shaped-Beam (BrainLAB, Inc) system to deliver a high dose of conformal radiation. Using this novel treatment approach in conjunction with recent advances in computer processing, digital imaging, spine immobilization and motion tracking, we can now treat benign and malignant tumors that affect the spine. With as little as a single session given on an outpatient basis, a small volume encompassing the tumor is very precisely targeted while minimizing the dose to adjacent critical structures such as the spinal cord. This technique allows a highly selective radiation dose to be delivered to the tumor resulting in effective pain or tumor control while at the same time minimizing the radiation to adjacent normal structures thereby decreasing both the acute and delayed morbidity related to the treatment. While the majority of patients treated have lesions due to metastatic disease, benign spine tumors are also effectively treated with this approach.

The most common indication for treatment is pain. Pain relief is achieved in greater than 90% of patients after stereotactic radiosurgery, often within a few days to weeks. Other indications for the procedure include: 1) initial tumor treatment, 2) treatment after surgery for residual tumor, 3) radiation boost following conventional treatment for more radioresistant tumors, 4) progression after other treatment modalities such as surgery, conventional radiation and chemotherapy have failed.

This treatment option results in several distinct and significant advantages in that this is a non-invasive outpatient procedure with no recovery time. The rapid pain control significantly and meaningfully improves patient quality of life in most patients. As well, given the negligible dose of radiation to the fascia and skin, radiosurgery can be undertaken soon after open surgery. Moreover this single treatment modality results in little hospital-based treatment time in patients who can often be quite debilitated and have a limited life expectancy.

In summary, stereotactic spine radiosurgery is an exciting and novel treatment offered at Cleveland Clinic for tumor control, palliation of pain, prevention of pathological fractures prior to excessive metastatic destruction of the vertebral body and for stopping the progression or reversing certain neurological deficits due to benign or malignant spine tumors. This new and effective treatment is rapidly becoming an important part of the treatment options we provide to patients with spine tumors.

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