NEW INDICATIONS FOR STEREOTACTIC RADIOSURGERY- METASTATIC MELANOMA TO BRAIN

by Gil Lederman M.D.

Over the forty year history of stereotactic radiosurgery there have been many advances. Initially used only for so-called benign diseases such as arteriovenous malformations, stereotactic radiosurgery is now well-suited and in fact shown to be effective for many other processes as well - malignant and benign.

Much of the appeal of stereotactic radiosurgery involves the fact that it is, in our hands, a non-invasive technique delivering high radiation doses precisely to abnormalities within the head while minimizing impact on the normal, healthy brain.

Using the new pin-less head frame avoiding the discomfort and potential complications of its "pin into the skull" style predecessor, many options have opened. These include the ability to fractionate radiosurgery - dividing the dose into more than one treatment for purposes of normal tissue protection and, as well, the ability to give concurrent, repeated chemotherapy.

The fact that there are no pins in the skull means that potential complications such as tearing of the skin, infection, bleeding and even bone fractures need not occur any longer. This should be one large incentive for this new breed of sophistication.

Further new technology includes the use of MRI to help localize lesions that were otherwise difficult to see by high resolution CT (computerized tomography) scan alone. Using MRI as well as CT should enhance treatment results especially in the more complex situations.

Stereotactic radiosurgery is revolutionizing the care of many abnormalities within the head. Once thought hopeless diseases are often successfully treated using stereotactic radiosurgery. Diseases included in this category are those as diverse as acoustic neuromas and brain metastases.

A recently published report by Somaza et al outlines the effectiveness of stereotactic radiosurgery for metastatic melanoma. Because the brain is a significant location site for metastatic melanoma and the brain is such a sensitive organ, ineffective treatment often results in dire neurologic consequence.

For that reason, stereotactic radiosurgery has been used for metastatic melanoma as well as other types of cancers that have spread to the brain. The rationale of treatment is that high doses of radiation can be delivered to the metastasis while the normal brain receives essentially no radiation. Thus, there is a large therapeutic ratio and this allows the delivery of heretofore unheard-of radiation doses safely and effectively.

The authors evaluated twenty-three patients with metastatic melanoma undergoing stereotactic radiosurgery. Patients ages ranged from 24 to 77 years. Patients received whole brain radiation prior to radiosurgery and nineteen of the twenty-three patients underwent radiosurgery immediately after standard radiation.

Of the twenty-three patients, 32 brain metastases were treated. Four patients had multiple metastases ranging from 2 to 4 in number. The results were defined by imaging studies. All patients (100%) had either no growth in the tumor or shrinkage in the size of the tumor.

No patient had any increase in the size of the brain metastases after stereotactic radiosurgery. Furthermore, the edema or swelling around the brain metastases was unchanged or decreased in 100% of the patients evaluated and had increased in none.

The authors wrote, "No mortality or neurologic deterioration was caused by radiosurgery. No patient died or developed a new or progressive neurologic defect from growth of a tumor managed with radiosurgery."

Further, the authors noted that "Eight of fifteen patients who had neurologic deficits at the time of radiosurgery had subsequent marked improvement."

Thus, highly promising treatment has turned in successful data. A control rate of 100% is excellent news for those with metastatic melanoma. Because the treatment is non-invasive and the new head frame requires no screws in the head for stability, the location allows for fractionated therapy thereby improving the tolerance and versatility of this treatment.

Metastatic melanoma as well as other cancers metastatic to the brain and acoustic neuromas, meningiomas, arteriovenous malformations and primary brain tumors, stereotactic radiosurgery is finding its role in the ever-increasingly sophisticated medical system.

There is no reason to believe that metastatic melanoma often considered one of the most aggressive tumors will behave differently than other metastatic cancers. The role of stereotactic radiosurgery is to help protect vital brain function while minimizing impact on the normal functioning brain. The appeal in our hands using fractionated stereotactic radiosurgery is that it is a non-invasive technique with no pins in the head, no cutting and no bleeding. The success rate using high dose radiation treating the lesion has been great. While we do not advocate stereotactic radiosurgery in lieu of standard whole brain radiation, we believe that the addition of the non-invasive fractionated stereotactic radiosurgery will improve the control rate of metastatic melanoma to brain as well as other malignancies that have spread here.

The potential is great.

In fact, radiosurgery has changed the view of radiobiologists to the disease. Large fraction has dramatically improved outcome compared to standard external beam radiation therapy. Some superb treatment results are in those patients with metastatic melanoma to the brain.

Indeed, fractionated stereotactic radiosurgery (using the precision of radiosurgery while dividing the dose) produces markedly superior results to standard radiation alone.

Body radiosurgery, a new treatment approach, also remains an important treatment modality for those with metastatic melanoma - with treatments in body locations as diverse as lung, liver and elsewhere - opening up new possibilities using high dose fractionated stereotactic radiosurgery in lieu of surgery or chemotherapy.