

# ADVANCES IN RADIOSURGERY

## LETTER FROM THE DIRECTOR



Radiosurgery was first developed more than a half century ago to treat a small vascular brain lesion. The goal was to deliver a large dose of precisely focused radiation.

Radiosurgery, which is completed in one treatment session, or stereotactic body radiation therapy (SBRT), which is completed in several sessions, requires reliable positioning and immobilization for accurate targeting. Progress in the technology of positioning devices and radiation beam intensity modulation have allowed for radiosurgery to be used safely and effectively. Over the years and decades that followed, radiosurgery was refined so that it could be applied for a variety of tumors and benign conditions in the brain.

Our team at Henry Ford Hospital pioneered radiosurgery for the treatment of spine tumors and, in 2000, successfully began its application. In addition, we have applied radiosurgery or SBRT effectively to lung, liver and other organs where the tumor can be clearly defined and targeted.

In our mission to further the development of cancer treatments, there has been a constant effort to find new indications for radiosurgery. Since radiosurgery is a non-invasive procedure and requires a limited number of hospital visits, it also can be used for treatment of critically ill patients, when other treatments cannot.

In this newsletter, I will introduce the use of radiosurgery or SBRT for head and neck tumors. Our Henry Ford radiosurgery team has published its experience, which showed excellent tumor control with improvement of symptoms and quality of life following treatment. I am confident that there is a subset of head and neck cancer patients who can benefit from radiosurgery or SBRT.

I am very proud of Henry Ford's radiosurgery program, and our multidisciplinary team of experts. With our ongoing effort, I believe that we will continue to improve the delivery of radiosurgery and pioneer new applications.

*Samuel Ryu, M.D.*  
*Director of Radiosurgery*  
*Josephine Ford Cancer Center*  
*Henry Ford Health System*



**JOSEPHINE FORD  
CANCER CENTER**  
*Radiosurgery*

## RADIOSURGERY AND SBRT FOR HEAD AND NECK CANCERS

Most head and neck cancers tend to involve the neck nodes which, even when the primary tumor still may be very small, elevates the cancer to a higher stage. The chance of systemic metastasis, however, is rather uncommon. Therefore, the main goal of head and neck cancer treatment is for tumor control of local (primary-site) and regional (lymph node-bearing) areas. To achieve this goal, multidisciplinary oncologic treatment is used with surgery, radiotherapy and chemotherapy. The choice and technique of these treatments rely primarily on the natural course of the particular head and neck cancers.

Radiosurgery for primary or recurrent head and neck cancers is under exploration. Stereotactic radiation was used as a part of radiotherapy for nasopharyngeal cancers to raise the radiation dose to the primary tumor site. We have reported the targeting accuracy 1.4 mm using image-guided radiosurgery/SBRT in patients with head and neck cancers.

Radiosurgery or SBRT can be an attractive treatment for recurrent tumors after previous treatments with surgery, radiation and chemotherapy. One example of such treatment for a highly malignant tumor is shown in Figure 1. This patient had melanoma, recurrent in the neck in front and below the voice box. Surgery of this tumor was not feasible. Radiation also was limited due to the previous radiotherapy to the neck, and chemotherapy did not control this tumor. This patient received four sessions of SBRT treatment to the tumor mass. The patient did not experience any complications. This tumor disappeared after one month as shown in the follow-up CT scan. The tumor disappeared and the larynx was preserved.

FIGURE 1

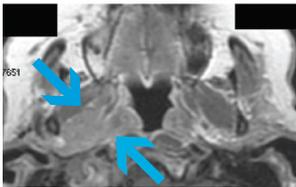


Figure 1. Example of SBRT for progressive melanoma in the neck.

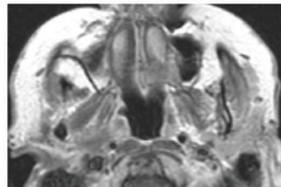
# RADIOSURGERY

Another example of SBRT for head and neck cancer can be treatment of benign and other low-grade malignant tumors. Shown below in Figure 2 is a slow-growing tumor called adenoid cystic carcinoma. This patient developed a recurrent tumor involving the parapharyngeal area below the skull base. The tumor was unresectable and the patient refused any other treatment. After six sessions of SBRT, the patient did not report any side effects. A follow-up CT scan after four months of radiosurgery showed complete disappearance of the tumor.

FIGURE 2



Before SBRT



After 4 Months

*Figure 2. Adenoid cystic carcinoma of the parapharyngeal area disappeared after SBRT.*

These examples represent only two case studies. Many of our patients have been treated safely for head and neck cancer with excellent outcomes, and our clinical experiences have been published in otolaryngology and radiation oncology journals.

When properly selected and correctly executed, radiosurgery or SBRT can have an important role in achieving local tumor control in malignant, or benign, primary and recurrent tumors. An additional benefit is that there is no or minimal complication as radiosurgery is given only to the clearly defined target tumor.

It is important to note that radiosurgery or SBRT of head and neck cancer must be highly individualized. Careful patient selection and treatment method is the most crucial first step. The selection process is complex and requires oncologic expertise of the clinical symptoms, shape and location of the tumor, as well as the functional status of the patient. This treatment decision must be made in a multidisciplinary setting with the input of many expert opinions.