

'CUTTING' OUT CANCER *without a knife*

STEREOTACTIC RADIOSURGERY WITH
TOMOTHERAPY MAKES RADIATION
MORE POTENT—AND PRECISE

Mitchell Weiss, M.D., with the
hospital's TomoTherapy machine.

CANCER IS A DEADLY ENEMY—particularly when it has spread from one organ to another. In these cases, where previously doctors often had no good treatment options, a technology called stereotactic body radiosurgery now offers new hope for keeping that enemy at bay.

“Stereotactic” means the system localizes a tumor in three dimensions, and “radiosurgery” hints at its power. “Where traditional radiation uses a low daily dose for five to seven weeks, this approach applies a high dose in very few treatments, trying to completely ablate—or destroy—the tumor,” explains

Mitchell Weiss, M.D., chairman of radiation oncology at Monmouth Medical Center and a former chief resident at Memorial Sloan-Kettering Cancer Center in New York. “That’s why the term radiosurgery was coined. It essentially means doing surgery with a radiation beam rather than with a scalpel. And it

can get to remote places in the body that would be very difficult for a surgeon to reach.”

At Monmouth’s Institute for Advanced Radiation Oncology, stereotactic radiosurgery is now performed using a system called TomoTherapy, which employs a large donut-shaped computed tomography (CT) scanner through which the patient passes.

“TomoTherapy is a marriage of a CT unit and a linear accelerator, a device that creates high-energy X-ray beams,” explains Rita Saible, chief therapist in the radiation oncology unit. It takes fresh images of the anatomy that allows doctors to see the location of the tumor immediately before treatment to make any necessary adjustments. Then it delivers radiation beams in a helical 360-degree pattern into the patient’s body in different computer-chosen directions and intensities to kill cancer cells and leave healthy tissue intact. Although the TomoTherapy system can administer traditional radiation doses as well and stereotactic body radiosurgery can also be applied using other systems, the technique and

**TomoTherapy
creates a CT image
just seconds before
delivering highly
concentrated doses
of radiation.**

the technology are an ideal match. The hospital has the only TomoTherapy unit in Monmouth or Ocean counties.

“To destroy tumors with these high doses of radiation, we have to be able to immobilize the patient and localize the tumor very well,” says Dr. Weiss. The patient is kept stationary in a custom-made mold so that his or her position can be consistent throughout treatment. “TomoTherapy provides an added verification that we’re accurately targeting the tumor and adequately sparing the normal structures.”

Stereotactic radiosurgery for the body and brain using TomoTherapy is significantly improving the delivery of radiation in many parts of the body. For example:

THE LIVER

“The liver is an ideal application for TomoTherapy because it moves a lot as the patient breathes, so the system’s real-time imaging becomes a big advantage,” says Dr. Weiss. While tumors originating in the liver still usually require surgery, he explains, cancers that have spread to the liver from other parts of the body can often be treated with the virtual “knife” of radiosurgery.

Belmar resident and business executive Diana Conforth, 54, recently underwent treatment for breast cancer, which, years after her initial treatment, had spread to her liver. “The procedure wasn’t painful at all and had no side effects and I felt less claustrophobic than getting an MRI [magnetic resonance image],” she says. “And it’s much less invasive than going under the knife.”

“Previously our option might have been to remove the affected portion of her liver,” says Dr. Weiss of Conforth’s treatment. “But that would have required a long recovery period, which would have delayed her chemotherapy for months. This way we were able to do the treatment in a week and get her back to chemo.”

THE SPINE

Another patient recently treated with TomoTherapy at Monmouth had cancer near the spinal cord. “This individual had no more surgical options left and had already been treated with radiation,” says Dr. Weiss. “Because of the precision of stereotactic radiosurgery, we were able to re-treat, possibly sparing that patient from ending up paralyzed in a wheelchair.”

THE LUNGS

At press time, Monmouth hadn’t yet treated a lung-

cancer patient with the new short-course, high-dose approach, according to Dr. Weiss. But it had used TomoTherapy on a person who received lower radiation doses thanks to a key benefit of the system: Given the way lungs are constantly in motion, verification of the tumor’s location immediately before treatment allowed doctors to spare more normal tissue.

Still, says Dr. Weiss, “I think the big advantage of TomoTherapy for lung cancer patients will be in allowing us to go to dose levels higher than we were able to use before—hopefully improving outcomes.”

THE BRAIN

Patients with brain tumors will benefit from TomoTherapy’s precise targeting of high radiation doses—potentially as much as 10 times as high as those traditionally employed. And for treating metastatic brain cancers, those that have spread to the brain from elsewhere, the system offers a procedural advantage.

“It lets us target the tumor with very high doses—doses that in the past would have required the neurosurgeon to attach a surgical frame to the head to hold it in position, necessitating injections to numb the scalp,” says Dr. Weiss. “Also, if there are two or three or four lesions in the brain, with TomoTherapy we can treat all of those lesions at once without having to treat the whole brain—and without that surgical frame. Treatment time for three lesions might have taken an hour and a half the old way, after the long preparation. Now the patient is on the table for five to 10 minutes.”

THE HEAD AND NECK

A big leap forward in treating cancers of the head and neck with radiation came a few years ago with the introduction of intensity-modulated radiation therapy (IMRT), which uses computer-controlled X-ray accelerators and allows doses to conform to a tumor’s shape, says Dr. Weiss. Stereotactic radiosurgery with the TomoTherapy equipment is actually a form of IMRT.

“TomoTherapy will be even better at helping patients retain the function of their salivary glands and the health of their mouth and throat,” says Dr. Weiss. ■

For more information about TomoTherapy or other services at the Institute of Advanced Radiation Oncology at Monmouth Medical Center, or for a referral to a cancer specialist, please call 1-888-724-7123 or visit www.mmccancer.com.