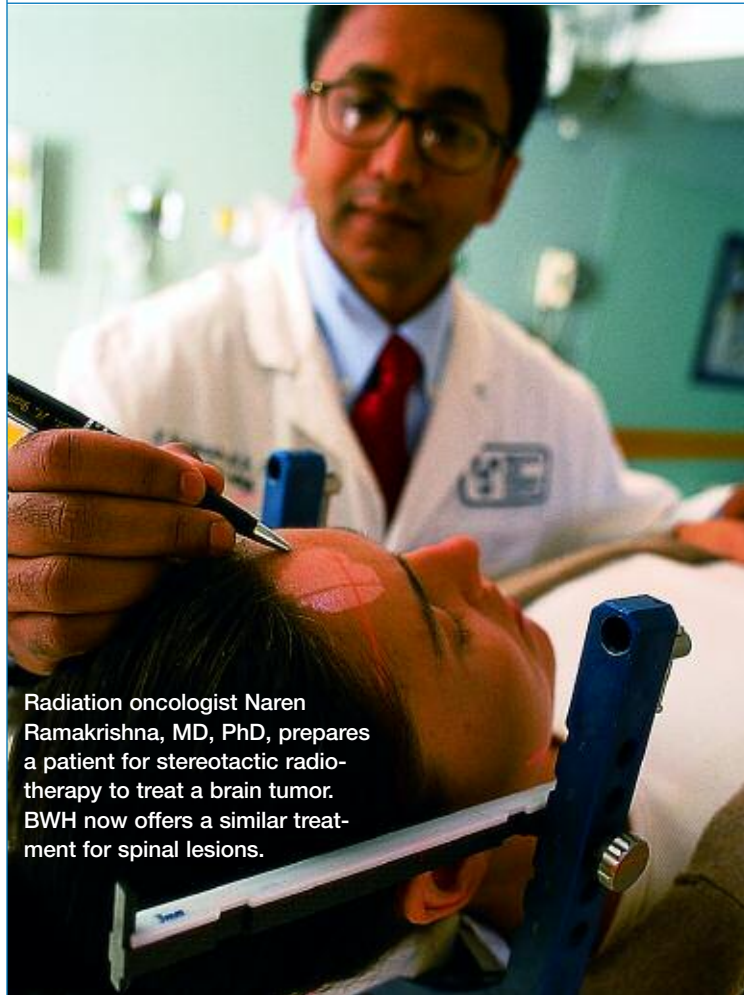


Setting aside the scalpel

A PIONEER IN STEREOTACTIC RADIOSURGERY FOR BRAIN TUMORS, BWH NOW TACKLES SPINAL LESIONS WITHOUT INCISIONS, BLOOD OR ANESTHESIA



Radiation oncologist Naren Ramakrishna, MD, PhD, prepares a patient for stereotactic radiotherapy to treat a brain tumor. BWH now offers a similar treatment for spinal lesions.

stereotactic radiosurgery, a procedure in which a single large dose of radiation is delivered using multiple narrow, precisely targeted beams fired from a linear accelerator. These beams converge to destroy a tumor or treat another abnormality without permanently damaging adjacent healthy tissue.

Fearing the possible loss of speech and other faculties, and eager to avoid the large incision and long recovery associated with opening the skull, Rogers opted for radiosurgery. A few hours later, she walked out of the hospital, her tumor essentially destroyed.

That was in 1988. Since then, BWH neurosurgeons and radiation oncologists have built one of the nation's premier radiosurgery programs for the brain. Now they are once again pushing the boundaries of radiosurgery, this time conquering tumors on or near the delicate spinal cord without scalpels or incisions.

“Because some spinal lesions are too deep in the spinal column or firmly attached to delicate structures like nerves, conventional surgery is not a viable option. Now we have something to offer these patients.”

PETER BLACK, MD, PhD

“The spine can be injured by conventional radiation therapy and surgery,” says BWH radiation oncologist Naren Ramakrishna, MD, PhD, chief of Central Nervous System Radiation Oncology, who launched the spinal radiosurgery/radiotherapy program in February 2006. “Stereotactic radiosurgery/radiotherapy limits the spread of radiation and does a better job of sparing healthy tissue.”

And the non-invasive nature of radiosurgery means that patients suffer little pain, avoid the risks associated with anesthesia and head home the same day.

The procedure will be godsend for select patients. “Because some spinal lesions are too deep in the spinal column or firmly attached to delicate structures like nerves, conventional surgery is not a viable option,” says Black, the hospital's chairman of

Neurosurgery. “Now we have something to offer these patients.”

However, spinal radiosurgery is labor-intensive. Ramakrishna says that planning the procedure can take as long as eight hours, but the treatment itself lasts little more than a half hour. Guided by advanced imaging and targeting software, the treatment team, which includes a radiation oncologist, neurosurgeon and medical physicist, visualizes the tumor and adjacent nerves, blood vessels and other structures. They then program the radiosurgery system to move in multiple directions around different axes so that the radiation conforms to the tumor's shape.

Ramakrishna also performs fractionated stereotactic radiotherapy, in which smaller doses of radiation are given over multiple days. This allows for “gentler”

treatment of a tumor that is close to a delicate structure. If a tumor abuts a nerve, for example, it is almost impossible to hit the tumor without affecting the nerve. Spreading out smaller doses allows the nerve or other structure to recover between treatments. The tumor, however, receives direct hits of radiation and isn't proficient at repairing its DNA, so it cannot rally. So far, five patients with spinal lesions have been treated at BWH, and all of them have had fractionated stereotactic radiotherapy.

The decision to use radiosurgery/radiotherapy for spinal lesions is determined by the hospital's tumor board, which includes radiologists, surgeons, neurosurgeons and radiation oncologists. Ramakrishna says the tumor board examines imaging scans of every patient to determine the best way to attack the tumor.

Although spinal radiosurgery/radiotherapy is still in its infancy, Black says it will be as important to the treatment of spinal lesions as radiosurgery has been for brain tumors. Patients undergoing radiotherapy for brain tumors have a greater than 80 percent chance of tumor control after treatment, and early indications are that radiosurgery/radiotherapy will be just as effective for spinal lesions.

Despite its promise, radiosurgery will not completely replace traditional “open” procedures. To treat brain tumors, BWH neurosurgeons still perform about 600 craniotomies a year, compared to about 140 radiosurgery procedures.

“Radiosurgery is an important adjunct and alternative in some cases and it will continue to grow,” says Black. “We recommend the best procedure for each individual patient. It's not one-size-fits-all.” ♦



After his prostate cancer spread to the spine, this patient opted for spinal radiotherapy. Spinal scans (above) show radiation oncologists the exact location of the tumor. At right, an artist's rendering illustrates a spinal radiotherapy procedure in progress, with the beams of radiation converging on the tumor.

