Twenty-five years of Gamma Knife radiosurgery at the University of Pittsburgh

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In August 2012, UPMC Presbyterian will celebrate the 25th anniversary of the installation of the first dedicated 201-source cobalt 60 Gamma Knife in the United States. Since that time, the field of radiosurgery has grown dramatically.

The field of radiosurgery was established by Lars Leksell in 1951 as an adjunct to the treatment of deep brain lesions otherwise not accessible to more conventional neurosurgery. His primary interest was in the creation of brain lesions for the management of trigeminal neuralgia and behavioral neurosurgery in an era when pharmacological management was almost nonexistent. Since its inception, the application of stereotactic radiosurgery (SRS) has expanded and transformed. The Gamma Knife is most commonly used now for metastatic tumors of the brain and treatment of benign neoplastic or vascular lesions such as AVMs. Since the year 2000, SRS has achieved an additional role in the management of benign and malignant spinal tumors.

In 1987, the field of stereotactic radiosurgery was in its infancy with less than 2,000 patients having been treated worldwide. Since that time, Elekta, the manufacturer of Gamma Knife radiosurgery technology estimates that more than 700,000 patients have undergone SRS worldwide during the last 33 years. The total number of LINAC-based SRS procedures is not known. The market research firm IMV has provided data that 32,335 US patients underwent LINAC or Gamma Knife SRS in 2009 and that the average increase in volume is approximately 10% per year.

The Center for Medicare and Medicaid services (CMS) SRS CPT codes. We asked her to compare those numbers to the current numbers of CPT codes submitted for craniotomy for tumor, not meningioma, during the same interval (1993-2011). As shown in figure 1 below, in 2003, the number of submitted CPT codes for radiosurgery (then code number 61793) exceeded the number of codes submitted for craniotomy for tumor (not meningioma).

Annually, our center performs approximately 650-700 frame-based stereotactic radiosurgical procedures using the Gamma Knife. Currently approximately 40% of these cases represent single or multiple metastatic tumors. The application of SRS for the management of brain cancer has changed the paradigm completely in the management of such cases.

(See L. Dade Lunsford, MD, talk about why the Gamma Knife has caused a shift in the paradigm of how neurosurgeons and oncologists care for patients with brain metastases in a Discovery Channel.com video at discoveryhealthcare.discovery.com/physicianed/physicianed.html)

We know that radiosurgery results in significantly less toxicity to the brain; can be repeated as needed in the face of the development of new disease; does not impact the management of patients’ ongoing chemotherapy for systemic disease; and, finally, is (continued on back cover)