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New Standards Needed for Radiation Therapy

Modern radiation techniques result in substantial variation between the prescribed dose and the actual dose of radiation delivered to the tumor, according to a study published online February 26 in the *Journal of the National Cancer Institute*. As a result of this newly uncovered trend, the authors are calling for national guidelines for intensity-modulated radiation therapy (IMRT).

IMRT systems are designed to deliver the prescribed dose of radiation to a tumor while sparing surrounding tissues. IMRT does this by delivering many small beams of radiation that are individually controlled. Because of the complexity of the system, radiation oncologists and physicists rely on special software and equipment to deliver the planned dose over the treatment area.

In the current study, Indra J. Das, Ph.D., and colleagues at the University of Pennsylvania in Philadelphia reviewed the data for 803 patients who were treated with IMRT for brain, prostate, or head and neck cancer at one of five institutions between October 2004 and July 2006. The researchers determined the minimum, maximum, and median radiation doses delivered over the targeted region by using the planned dose for each patient and measuring the actual amount of radiation in plastic or water that radiologically resembles tissue.

By comparing the measured dose to the planned dose, the investigators discovered that 369 patients (46 percent) received a maximum dose delivered to some portion of the tissue that was more than 10 percent above the prescribed dose. (Ten percent is the typically acceptable level of variation.) Moreover, the minimum dose delivered to the tumor site in 506 patients (63 percent) was more than 10 percent below the prescribed dose.

“We found that in IMRT the prescribed dose rarely corresponded to the planned, or delivered, dose,” the authors write. “Dosimetric variations between the prescribed dose and the recorded dose could be reduced by establishing international and/or national guidelines.”

In an accompanying editorial, John Willins, Ph.D., and Lisa Kachnic, M.D., of the department of radiation oncology at Boston Medical Center and Massachusetts General Hospital commend the authors for putting together an important dataset that provides a new window into the clinical application of IMRT.

The editorialists endorse the authors’ call for guidelines in IMRT. “Widespread use of IMRT planning standards would not only facilitate multicenter clinical trials but would also provide clinicians with solid guidance in their everyday practice on the question of what constitutes a ‘good’ IMRT plan,” they write.

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