

Study finds more targeted form of radiation improves survival in patients with head and neck cancers

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Patients with cancers of the head and neck who received intensity-modulated radiation therapy (IMRT) - a technology designed to more precisely target cancer cells and spare nearby tissue - experienced improved outcomes, as well as reduced toxicities, compared to patients receiving conventional radiation therapy, according to new research from The University of Texas MD Anderson Cancer Center.

The study, published in the journal *Cancer*, is the first to document this finding in a large population-based group, as well as the first to suggest IMRT could improve outcomes in head and neck cancer patients.

"Previous studies indicated that patients treated with IMRT did better when it came to treatment-related side effects, however these studies were not designed to examine survival," said Beth Beadle, M.D., Ph.D., assistant professor in MD Anderson's Radiation Oncology. "The survival data was not well-known because IMRT is intended to spare normal tissues but still deliver radiation to the tumor so previous models assumed it was equivalent survival at best."

IMRT employs multiple beams of radiation that allows oncologists to provide a dosage that conforms to the tumor, often at varying intensities, while limiting exposure to surrounding tissue.

Since being approved in 1999 for the treatment of head and neck cancer,

IMRT use has substantially increased due to its advantages in being able to target complicated tumors while minimizing patient side effects such as xerostomia (chronic dry mouth), dental complications, fibrosis and range of motion impairments.

Researchers on the population-based retrospective study used the Surveillance, Epidemiology and End Results (SEER) Medicare database, compiled by the National Cancer Institute, to identify 3,172 patients treated for head and neck cancer between 1999—2007 who received either conventional radiation therapy or IMRT.

In total, 1,056 patients were treated with IMRT and 2,116 were treated with [conventional therapy](#). All head and neck cancer subtypes were included, with the most common, squamous cell carcinoma, accounting for 91.2 percent. The primary outcome was cause-specific survival (CSS), which reflects the chances of dying from head and [neck cancer](#) after 40 months of follow-up.

To account for differences in the patient population with those being treated with IMRT possibly representing a different cohort due to the evolution of treatments, researchers used propensity scoring to create a matched comparison. This scoring model takes into account age at diagnosis, gender, race/ethnicity, income and education, among other factors.

Results Show Outcomes Improved

Beadle and colleagues found that patients treated with IMRT had a statistically significant improvement in CSS compared to those treated with conventional therapy, 38.9 percent vs. 18.9 percent, respectively.

Although propensity scoring matched patients for known variables, the researchers noted there was still a possibility for bias in the two

treatment groups as a result of unmeasured variables. To account for this, an instrumental variable model was used that also demonstrated IMRT increased survival.

"From a scientific perspective, the findings support the use of IMRT and suggests we can provide excellent care while optimizing cancer outcomes and reducing toxicities," Beadle said. "At a more global level, with concerns about health care financing and resource allocation, IMRT is more expensive than conventional [radiation therapy](#), but the data suggest it's worth it."

The authors note a separate and recent study (Yong et al.) that examined the cost effectiveness of IMRT in the treatment of oropharynx cancer found reason to support its use. Despite increased upfront costs, the study found IMRT could avoid a case of xerostomia with an incremental cost of \$4,532.

Beadle said additional work is required to more closely examine the cost-effectiveness of IMRT. However, she noted that if the therapy can reduce or eliminate subsequent disease recurrences, or treatment-related side effects, the cost impact could be favorable.

With observational studies, the authors said limitations do exist including the uncertainty of Medicare claims data and the absence of data for younger patients. Additionally, the authors note there was an absence of human papillomavirus (HPV) status, which may affect tumor control.

More information: "Improved survival using IMRT in head and neck cancers: A SEER-Medicare analysis." Beth M. Beadle, Kai-Ping Liao, Linda S. Elting, Thomas A Buchholz, K. Kian Ang, Adam S. Garden, and B. Ashleigh Guadagnolo. *Cancer*; Published Online: January 13, 2014 DOI:10.1002/cncr.28372

Provided by University of Texas M. D. Anderson Cancer Center

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