Analysis shows increased use of hypofractionated whole-breast irradiation for patients with early-stage breast cancer

Treatment influenced by type of facility, patient’s travel distance to cancer center

Fairfax, Va., December 9, 2014—The use of hypofractionated whole-breast irradiation (HF-WBI) for patients with early-stage breast cancer increased 17.4 percent from 2004 to 2011, and patients are more likely to receive HF-WBI compared to conventionally fractionated whole-breast irradiation (CF-WBI) when they are treated at an academic center or live ≥50 miles away from a cancer center, according to a study published in the December 1, 2014 issue of the International Journal of Radiation Oncology • Biology • Physics (Red Journal), the official scientific journal of the American Society for Radiation Oncology (ASTRO).

An analysis of randomized trials¹ demonstrated that patients with early-stage breast cancer who are treated with breast-conserving surgery and adjuvant whole-breast irradiation have improved survival and a lower risk of tumor recurrence compared to patients who are not treated with radiation therapy. Patients are commonly treated with CF-WBI; however, several recent randomized trials²–⁵ have confirmed that patients treated with HF-WBI have similar disease-free

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and overall survival rates as those treated with CF-WBI. CF-WBI delivers a total dose of 45-50 Gy in 25-28 daily fractions of 1.8-2.0 Gy over five to six weeks, while HF-WBI uses a shorter treatment course and a lower total dose and number of fractions, delivering a total dose of 39-42.5 Gy in 13-16 daily fractions of 2.5-3.2 Gy over three to five weeks.

This study, “Adoption of Hypofractionated Whole-Breast Irradiation for Early-Stage Breast Cancer: A National Cancer Data Base Analysis,” is a retrospective review of 113,267 early-stage breast cancer patients in the National Cancer Data Base (NCDB) from 2004 to 2011 who were treated with radiation therapy and were eligible to receive HF-WBI, and examines the use of HF-WBI compared to CF-WBI and the factors, including facility type and patient’s distance from the radiation treatment center, that influenced which type of WBI the patient received.

The NCDB, a joint program of the American College of Surgeons’ Commission on Cancer and the American Cancer Society established in 1989, is a nationwide, facility-based data set that contains retrospective data on 70 percent of all newly diagnosed cancers in the United States.

The study identified data from early-stage breast cancer patients included in the NCDB from 2004 to 2011 who received adjuvant WBI and who were eligible to receive HF-WBI according to current guidelines and randomized trials. Eligible patients were age 50 or older at the time of diagnosis; had a first and only diagnosis of breast cancer; had pathologic stage T1-2 N0 breast cancer, based on the American Joint Committee on Cancer TNM staging classification; were treated with breast-conserving surgery; and did not receive chemotherapy. In this study, HF-WBI was defined as a fraction dose of ≥2.2 Gy and ≤4.0 Gy, and CF-WBI was defined was a fraction dose >1.5 Gy and <2.2 Gy. Regional radiation therapy total dose was limited to 40-66.4 Gy, and boost doses were limited to <21.6 Gy.

Patients who received regional nodal radiation therapy; who received brachytherapy, stereotactic radiation therapy and treatments delivered with electron, neutron or proton beams; who received fewer than 10 or more than 50 fractions; or who received radiation therapy as palliative care were not included in the analysis.

The study identified 113,267 female, early-stage breast cancer patients who were eligible for analysis. Of those patients, 11.7 percent (13,271) received HF-WBI, and 88.3 percent (99,996)
received CF-WBI. Based on the data used in this study, 5.4 percent (677) of patients treated in 2004 received HF-WBI compared to the 22.8 percent (3,809) of patients treated in 2011 who received HF-WBI. While the use of HF-WBI increased, the use of CF-WBI decreased; however, CF-WBI was still prescribed for a majority of patients, with 94.6 percent (11,735) of patients receiving CF-WBI in 2004 and 77.2 percent (12,876) of patients receiving CF-WBI in 2011.

The study also examined factors that may have influenced whether a patient received HF-WBI or CF-WBI. Of the 113,267 patients who met the study criteria, 62.5 percent (70,801) of patients received treatment at a non-academic comprehensive community cancer center; 24.8 percent (28,137) of patients were treated at a community cancer program; 11.6 percent (13,174) of patients had treatment at an academic center; and 1.0 percent (1,155) of patients were treated at other types of facilities. Of the patients treated at non-academic comprehensive community cancer centers, 10.3 percent (7,313) received HF-WBI compared to 17.3 percent (4,830) of patients who had treatment at academic centers (odds ratio (OR) 0.51, 95 percent confidence interval (CI) 0.48-0.53). HF-WBI was delivered to 7.7 percent (1,018) of patients treated at community cancer programs compared to the 17.3 percent (4,830) of patients treated at academic centers (OR 0.38, 95 percent CI 0.35-0.42).

Based on the study data, distance from the cancer-reporting facility to the radiation therapy center also proved to be a factor in whether a patient received HF-WBI or CF-WBI. The NCDB data does not include the distance from a patient’s residence to the treatment center. For this study, the distance was calculated from the cancer-reporting facility to the treatment center. A distance of ≥50 miles was classified as long distance. Of the eligible patients included in this study, 92.2 percent (104,442) of patients lived <50 miles from the treatment center; 4.2 percent (4,813) lived ≥50 miles from the treatment center; 3.5 percent (3,996) of patients did not have distance travelled data available. HF-WBI was more frequently prescribed to patients who live ≥50 miles from the treatment center (16.1 percent, n=775) compared to patients who live <50 miles from the treatment center (11.5 percent, n=11,957) (OR 1.57, 95 percent CI 1.44-1.72).

Independent variables included in the study were patient age, race, type of primary health insurance, median income in patient’s zip code of residence by quartile, degree of rurality, urban
influence of the patient’s residence, as classified by the U.S. Department of Agriculture Economic Research Service, and the Charlson/Deyo comorbidity score. Cancer-related covariates evaluated were year of cancer diagnosis, tumor differentiation, size, estrogen receptor and human epidermal growth factor receptor 2 assay results, and surgical margins.

“Recently reported, long-term follow-up from randomized trials confirm that hypofractionated radiation therapy for breast cancer is equivalent to longer courses of radiation therapy. As a result, recent clinical guidelines such as ASTRO’s “Fractionation for whole-breast irradiation: An American Society for Radiation Oncology (ASTRO) evidence-based guideline” and ASTRO’s Choosing Wisely® recommendations support the use of hypofractionated radiation therapy for breast cancer,” said James B. Yu, MD, MHS, co-author of the study and assistant professor in the Department of Therapeutic Radiology at Yale School of Medicine in New Haven, Connecticut. “This study demonstrates that many physicians are focused on providing high-quality treatment that is cost-effective and convenient for patients even prior to these guidelines. At the same time, the results suggest that more education on guideline recommendations and clinical trial results would be beneficial for those physicians who may be hesitant to prescribe hypofractionated radiation therapy for appropriate patients.”

The December 1 edition of the Red Journal also contains two additional studies on hypofractionated radiation therapy for breast cancer and an editorial that examines the data and offers insight into the results of the three breast cancer studies. Reshma Jagsi, MD, DPhil, et al’s study, “Adoption of Hypofractionated Radiation Therapy for Breast Cancer After Publication of Randomized Trials,” documents the use of HF-WBI from 2004 to 2010 based on data from Surveillance, Epidemiology and End Results (SEER)-Medicare-linked database. A second study by Jagsi et al, “Choosing Wisely? Patterns and Correlates of the Use of Hypofractionated Whole-Breast Radiation Therapy in the State of Michigan,” examines the use of HF-WBI in a consortium of radiation oncology practices in Michigan. In an accompanying editorial, Yvonne M. Mowery, MD, PhD, and Rachel C. Blitzblau, MD, PhD, emphasize the importance of identifying factors that prevent wider use of HF-WBI for early-stage breast cancer patients and the need for radiation oncologists to evaluate practice patterns compared to clinical trials and guideline
recommendations.

For a copy of any of the three study manuscripts and the editorial, contact ASTRO’s Press Office at press@astro.org. For more information about the Red Journal, visit www.redjournal.org.

ABOUT ASTRO

ASTRO is the premier radiation oncology society in the world, with nearly 11,000 members who are physicians, nurses, biologists, physicists, radiation therapists, dosimetrists and other health care professionals that specialize in treating patients with radiation therapies. As the leading organization in radiation oncology, the Society is dedicated to improving patient care through professional education and training, support for clinical practice and health policy standards, advancement of science and research, and advocacy. ASTRO publishes two medical journals, International Journal of Radiation Oncology • Biology • Physics (www.redjournal.org) and Practical Radiation Oncology (www.practicalradonc.org); developed and maintains an extensive patient website, www.rtanswers.org; and created the Radiation Oncology Institute (www.roinstitute.org), a non-profit foundation to support research and education efforts around the world that enhance and confirm the critical role of radiation therapy in improving cancer treatment. To learn more about ASTRO, visit www.astro.org.

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