Study examines adverse effects among different radiation therapies for prostate cancer

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In an analysis of three different types of radiation therapy used to treat localized prostate cancer, compared with conformal radiation therapy, intensity-modulated radiation therapy (IMRT) was associated with fewer diagnoses of gastrointestinal adverse effects, hip fractures, and receipt of additional cancer treatments but more erectile dysfunction, while proton therapy was associated with more gastrointestinal adverse effects than IMRT, according to a study in the April 18 issue of *JAMA*, a theme issue on comparative effectiveness research.

Ronald C. Chen, M.D., M.P.H., of the University of North Carolina at Chapel Hill, presented the findings of the study at a *JAMA* media briefing at the National Press Club.

"Prostate cancer is the most common malignancy in men, with more than 200,000 diagnoses and 30,000 deaths per year. Recent advances in technology have led to costlier treatments such as minimally invasive radical prostatectomy, intensity-modulated radiation therapy, and proton therapy. The adoption of these technologies resulted in a $350 million increase in health care expenditures in 2005 alone," according to background information in the article. Various organizations have called for comparative effectiveness research of localized prostate cancer treatments. "The clinical benefit from these newer treatments is unproven, and comparative effectiveness research examining different radiation techniques is lacking," the authors write.

Dr. Chen and colleagues conducted a study to examine the comparative adverse effects and disease control outcomes after different radiation techniques in a recent cohort of prostate cancer patients. Specifically, the researchers compared IMRT, which has been rapidly adopted and is currently the most commonly used technique, with the older conformal radiation therapy; and compared proton therapy, the use of which also has increased, with IMRT. The population-based study used Surveillance, Epidemiology, and End Results-Medicare-linked data from 2000 through 2009 for patients with localized prostate cancer. The primary outcomes measured were rates of gastrointestinal adverse effects (such as rectal bleeding or diarrhea) and urinary adverse effects, erectile dysfunction, hip fractures, and receipt of additional cancer therapy - as an indicator for disease recurrence.

The use of IMRT vs. conformal radiation therapy increased from 0.15 percent in 2000 to 95.9 percent in 2008. In the propensity-score adjusted analysis (n = 12,976), the researchers found that men treated with IMRT were less likely to receive a diagnosis of gastrointestinal adverse effects and hip fracture but more likely to receive a diagnosis of erectile dysfunction. Also, IMRT patients were nearly 20 percent less likely to receive additional cancer therapy.

In a propensity score-matched comparison between IMRT and proton therapy (n = 1,368), IMRT patients had a 34 percent lower risk of gastrointestinal adverse effects. There were no significant differences in rates of other adverse effects or additional therapies between IMRT and proton therapy.

"Proton therapy is a high-profile, high-cost prostate cancer treatment. Since 2007, multiple proton facilities have been built, and direct-to-consumer advertising is likely to lead to a substantial increase in use," the authors write. "Overall, our results do not clearly demonstrate a clinical benefit to support the recent increase in proton therapy use for prostate cancer."

The researchers add that the findings that patients receiving IMRT were less likely than those receiving conformal radiation therapy to undergo additional cancer treatments is consistent with the use of IMRT to deliver dose-escalated treatment, resulting in improved cancer control, as demonstrated by randomized trials. "Taken together, these results suggest that IMRT facilitated radiation dose escalation without compromising acceptable long-term morbidity."

"Comparative effectiveness research in localized prostate cancer treatments is needed because of the large number of men with this disease and the continued trend of a rapid increase in use of newer and costlier treatments with unproven clinical benefit," the authors write.

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