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Original Report

Evaluation of adherence to quality measures for prostate cancer radiotherapy in the United States: Results from the Quality Research in Radiation Oncology (QRRO) Survey

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Abstract

Purpose: The purpose of this survey was to test the feasibility of using proposed quality indicators to assess radiotherapy quality in prostate cancer management based on a 2007 stratified random survey of treating academic and nonacademic US institutions.

Methods and Materials: A total of 414 patients with clinically localized prostate cancer treated with external beam radiotherapy (EBRT) or brachytherapy were selected from 45 institutions. Indicators used as specific measurable clinical performance measures to represent surrogates for quality of radiotherapy delivery included established measures such as the use of prescription doses ≥75 Gy for intermediate- and high-risk EBRT patients and androgen-deprivation therapy (ADT) in conjunction with EBRT for patients with high-risk disease, and emerging measures, including daily target localization (image-guidance) to correct for organ motion for EBRT patients.

Results: Among the 354 patients treated with EBRT, the beam energy was recorded in 353 patients. One hundred sixty-seven patients (47%) were treated with 6 MV photons, 31 (9%) were treated with 10 MV, 65 (18%) received 15 MV, and the remaining 90 (26%) 16-23 MV. For intermediate- plus high-risk patients (n = 181), 78% were treated to ≥75 Gy. Among favorable-risk patients, 72% were treated to ≥75 Gy. Among high-risk EBRT patients, 60 (87%) were treated with ADT in conjunction with EBRT and 13% (n = 9) with radiotherapy alone. Among low- and

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intermediate-risk patients, 10% and 42%, respectively, were treated with ADT plus EBRT. For 24% of EBRT patients (85 of 354), weekly electronic portal imaging was obtained as verification films without daily target localization, and the remaining 76% were treated with daily localization of the target using various methods.

Conclusions: Adherence to defined quality indicators was observed in a majority of patients. Approximately 90% of high-risk patients were treated with ADT plus EBRT and ≈80% of intermediate- and high-risk patients received prescription doses ≥75 Gy, consistent with the published results of randomized trials.

Introduction

With societal demands for improving the quality of cancer care in the US, the importance of establishing quality indicators (QI) by which individual care can be assessed and compared with national practice is critical.[1-3] Such QIs can be derived from established clinical guidelines, results of clinical trials, expert consensus, and evolving QIs based upon rapidly emerging technologies. These QIs form the basis for assessing the quality of therapy and practice, as well as the identification of deficiencies, that could potentially benefit from practice improvement.

Since 1973, the Patterns of Care Study has conducted detailed retrospective surveys of national radiation oncology practice. This unique quality-improvement initiative has had a major positive impact on contemporaneous practice and has kept pace with dramatic alterations in the radiation oncology structural base and clinical processes.[4-7] With an interest in placing greater emphasis on quality of care, the Patterns of Care Study evolved into the Quality Research in Radiation Oncology (QRRO) under the auspices of the American College of Radiology. As part of this effort, QRRO investigators established QIs for various disease subsites based upon published guidelines such as those from the National Comprehensive Cancer Network (NCCN) as well as emerging QIs for processes involving emerging technologies. QRRO then initiated a national process survey for various disease sites to obtain the necessary benchmark data to facilitate the evaluation of quality of care in radiation oncology as practiced in the US.

The present study summarizes the results of a stratified random survey conducted by QRRO of prostate cancer patients treated in 2007 with external beam radiotherapy (EBRT) or brachytherapy collected from 45 academic and nonacademic institutions in the US. The purpose of this survey was to test the feasibility of using proposed clinical performance measures to estimate established and emerging quality indicators of radiotherapy treatment delivery in the treatment of prostate cancer among institutions surveyed.

Methods and materials

The survey design utilized a 2-stage stratified random sampling of radiation oncology facilities in the US (first stage) and further random selection of treated patients for localized prostate cancer (second stage) within that facility. Eligibility criteria for inclusion in the survey were as follows: (1) patients with biopsy-proven adenocarcinoma of the prostate; (2) treatment consisted of brachytherapy, EBRT, or combination thereof; (3) patients received their treatment during 1 year (2007); (4) the use of androgen-deprivation therapy (ADT) in conjunction with radiotherapy was acceptable if started no more than 6 months prior to initiation of radiation therapy; (5) patients who had a prior radical prostatectomy or were treated for recurrent-metastatic disease were excluded. Using this design and criteria, 414 patients with clinically localized prostate cancer treated with EBRT or brachytherapy were randomly selected from 45 institutions that participated out of 106 invited facilities.

Data were extracted on site at each of the facilities by highly trained QRRO research associates. All medical records, and radiotherapy charts and records, were carefully reviewed. Data collected included patient demographics and characteristics, clinical and pathologic factors, and treatment details including dosimetric information. For the purposes of data collection and analysis, prognostic risk groups were defined according to the criteria of the NCCN guidelines.[8]

Prior to the survey the members of the Genitourinary Committee of QRRO identified 6 QIs as specific measurable clinical performance measures (CPMs) that would be surrogates for quality of radiotherapy delivery for the treatment of prostate cancer. The methods used for developing these CPMs have been previously reported.[9] At the time this study design was conceived in 2006, we identified 3 CPMs that were considered established measures of quality (based upon level I evidence) and 3 emerging measures that also reflected quality of treatment delivery based on data from peer-reviewed published references (see Appendix 1: 2007 QRRO Clinical Performance Measures).

The CPMs[10] included the following:

1. Use of high-energy linear accelerators (≥6 MV) in men with nonmetastatic prostate cancer treated with EBRT (photons or protons).
2. Use of prescription doses of ≥75 Gy for intermediate- and high-risk patients treated with EBRT (for this analysis patients treated with hypofractionation regimens were excluded).
3. Use of ADT in conjunction with EBRT for patients with high-risk disease.