Original Study

Patterns of Care of Node-Positive Prostate Cancer Patients Across the United States: A National Cancer Data Base Analysis

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Abstract

Guideline recommendations for treatment vary widely for node-positive prostate cancer. Across the United States, 46.0% and 31.4% of patients received androgen deprivation therapy alone and radiotherapy, respectively, for clinical node-positive disease. For patients with pathologic node-positive disease, 60.3% and 17.0% received no adjuvant therapy and radiotherapy, respectively. Randomized trials are needed to define optimal care for node-positive prostate cancer patients.

Background: Twelve percent of newly diagnosed prostate cancers in the United States are node-positive. In a setting of disparate treatment guideline recommendations for node-positive disease, this study describes the treatment patterns for clinical node-positive (cN^+) and pathologic node-positive (pN^+) patients across the United States. **Materials and Methods:** Using the National Cancer Data Base, men diagnosed with cN^+ or pN^+ disease were identified from 2006 to 2011. For each cohort, the proportion of patients who received radiotherapy (RT), androgen deprivation therapy (ADT), and other treatments was analyzed. Multivariable logistic regression models were used to examine patient and clinical factors associated with use of definitive treatment (RT or prostatectomy) in cN^+ patients, and postprostatectomy RT in pN^+ patients. **Results:** A total of 8464 cN^+ and 4890 pN^+ patients were identified. For cN^+ disease, ADT alone was the most common treatment used (3892 patients, 46.0%) followed by RT with or without ADT (2657 patients, 31.4%). Men with older age, higher prostate-specific antigen at diagnosis, or higher biopsy Gleason score were less likely to receive curative treatment (RT or prostatectomy), whereas those with higher clinical T stage were more likely. For pN+ disease, 2948 patients (60.3%) received no adjuvant treatment and 833 patients (17.0%) received RT following prostatectomy. Patients with older age, negative margin, and comorbidities were less likely to undergo RT after prostatectomy, whereas those with higher pathologic T-stage were more likely. **Conclusion:** Many patients with cN^+ or pN^+ prostate cancer do not receive RT, despite the possibility of long-term control and cure. Randomized trials are needed to guide treatment decisions in this patient population.

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Introduction

Node-positive disease represents approximately 12% of newly-diagnosed prostate cancer patients in the United States,[1] and the proportion of node-positive disease is likely to increase with the decline of routine screening for prostate cancer. The current staging system categorizes node-positive prostate cancer as stage IV, although clinically, it is considered a distinct entity from prostate cancer with distant metastases. Multiple retrospective studies suggest that some of the node-positive patients can achieve long-term survival with aggressive treatment incorporating radiotherapy (RT) in the definitive (clinical node-positive [cN^+])[2-5] as well as adjuvant (pathologic node-positive [pN^+])[6-8] settings. However, to date, there is a lack of prospective clinical trial data on the role of RT for this group of patients.

Published guidelines recommend either RT with long-term androgen deprivation therapy (ADT) or long-term ADT alone in cN^+ prostate cancer patients.[9] For patients after radical prostatectomy who were found to have pN^+ disease, recommended options include ADT alone, ADT with RT, or observation.[9] In the setting

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Table 1 Patient Characteristics

	cN^+ Patients (n = 8464)	pN^+ Patients (n = 4890)
Age, y		
<55	1076 (12.7)	869 (17.8)
55-64	2719 (32.1)	2266 (46.3)
65-74	2683 (31.7)	1626 (33.3)
≥75	1986 (23.5)	129 (2.6)
Race		
Non-Hispanic white	5412 (63.9)	3568 (73.0)
Non-Hispanic black	1636 (19.3)	568 (11.6)
Hispanic	572 (6.8)	213 (4.4)
Other/unknown	844 (10.0)	541 (11.1)
Region[a]		
South	2286 (27.0)	1134 (23.2)
Central	3016 (35.6)	1872 (38.3)
Northeast	1852 (21.9)	946 (19.4)
West	1310 (15.5)	938 (19.2)
Insurance		
Private	3015 (35.6)	2997 (61.3)
Medicare	3979 (47.0)	1532 (31.3)
Medicaid/other government	685 (8.1)	189 (3.9)
Unknown/uninsured	785 (9.3)	172 (3.5)
Median Income in Census Track		
<$30,000	1339 (15.8)	520 (10.6)
$30,000-$35,999	1478 (17.5)	740 (15.1)
$36,000-$45,999	2270 (26.8)	1332 (27.2)
≥$46,000	2991 (35.3)	2093 (42.8)
Unknown	386 (4.6)	205 (4.2)
Proportion Without High School Degree in Census Track		
<14% (best quartile)	2753 (32.5)	1975 (40.4)
14%-19.9%	1892 (22.4)	1125 (23.0)
20%-28.9%	1846 (21.8)	940 (19.2)
≥29% (worst quartile)	1586 (18.7)	644 (13.1)
Unknown	387 (4.6)	206 (4.2)
Charlson–Deyo Comorbidity Score		
0	6855 (81.0)	4043 (82.7)
≥1	1609 (19.0)	847 (17.3)
Prostate-Specific Antigen at Diagnosis		
<4	416 (4.9)	492 (10.0)
4-9.9	1094 (12.9)	2035 (41.6)
10-20	1218 (14.4)	1095 (22.4)
>20	4958 (58.6)	893 (18.3)
Unknown	778 (9.2)	375 (7.7)
Biopsy Gleason Score		
≤6	244 (2.9)	170 (3.5)
7	1319 (15.6)	2065 (42.2)
8-10	5181 (61.2)	2492 (51.0)
Unknown	1720 (20.3)	163 (3.3)
Clinical T Stage		
1	1721 (20.3)	NA
2	2145 (25.3)	NA
3-4	3501 (41.4)	NA
Unknown	1097 (13.0)	NA
Pathologic T Stage		
2	NA	869 (17.8)
3-4	NA	4006 (81.9)
Unknown	NA	15 (0.3)
Margin Status After Prostatectomy		
Negative	NA	2563 (52.4)
Positive	NA	2272 (46.5)
Unknown	NA	55 (1.1)

Data are presented as n (%).
Abbreviations: cN^+ = clinical node-positive; pN^+ = pathologic node-positive.
[a]Region defined as follows: South (DC, DE, FL, GA, MD, NC, SC, VA, WV, AL, KY, MS, TN), Central (IL, IN, MI, OH, WI, IA, KS, MN, MO, ND, NE, SD, AR, LA, OK, TX), Northeast (CT, MA, ME, NH, RI, VT, NJ, NY, PA), and West (AZ, CO, ID, MT, NM, NV, UT, WY, AK, CA, HI, OR, WA).

of these broad and divergent recommendations, the practice patterns for node-positive prostate cancer across the United States are not well characterized. Therefore, the goal of this study was to describe the uses of definitive and postprostatectomy RT for cN^+ and pN^+ patients, respectively, across the United States. We used the National Cancer Data Base (NCDB), the largest cancer registry in the United States, which captures data on approximately 70% of incident cancers in the country.[10]

Materials and Methods

Data Source

The NCDB is jointly maintained by the American College of Surgeons Commission on Cancer and the American Cancer Society, and data are collected from approximately 1500 Commission on Cancer-accredited cancer centers across the United States.[11] It contains data on cancer diagnosis; for prostate cancer, this includes prostate-specific antigen (PSA) at diagnosis, biopsy Gleason score, and clinical stage. It also contains information on treatments received and date of each treatment. If a patient had a radical prostatectomy, then pathologic stage and margin status are also recorded. Other patient information available include age at diagnosis, race, insurance status, Charlson–Deyo comorbidity score, regional-level sociodemographic measures such as education level and household income of the patient's postal zip code, and treatment facility information including the region of country.

Patient Cohort

Men who were diagnosed with prostate adenocarcinoma from 2006 to 2011 were included for analysis. We identified 9570 patients with cN^+ disease at the time of diagnosis. Patients were excluded if the date of their RT, surgery, or ADT was missing. This resulted in a total of 8464 men in the cN^+ cohort. Primary