Disparities in Treatment of Patients With High-risk Prostate Cancer: Results From a Population-based Cohort

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OBJECTIVE To assess the variation in primary treatment of high-risk prostate cancer (PCa) by different hospital characteristics in the United States.

MATERIALS AND METHODS We used the National Cancer Data Base to identify patients diagnosed with pretreatment high-risk PCa from 2004 to 2011. The primary outcomes were different forms of primary therapy or watchful waiting (WW) across different types of hospitals (community, comprehensive cancer community, and academic hospitals). Multivariable logistic regression analyses were used to test for differences in treatment by hospital type.

RESULTS During the study period, we identified 102,701 men diagnosed with high-risk PCa. Overall, the most common treatment was radical prostatectomy (37.0%) followed by radiation therapy (33.2%) and WW (8.5%). Compared with white men with high-risk PCa, black men had lower adjusted odds ratios (OR) for surgery at comprehensive community (OR: 0.64; P <.001) and academic (OR: 0.62; P <.001) hospitals. Similarly, black men were also more likely to be managed with WW at community (OR: 1.49; P <.001), comprehensive cancer community (OR: 1.24; P <.001), and academic (OR: 1.55; P <.001) hospitals, as well as with radiation therapy at comprehensive cancer community (OR: 1.27; P <.001) and academic hospitals (OR: 1.23; P <.001).

CONCLUSION Disparities in the use of WW and different primary treatments among patients with high-risk PCa persisted across different types of hospitals and over time. Our findings highlight a significant racial disparity in the use of curative therapy for high-risk PCa that should be urgently addressed to ensure that all men with PCa receive appropriate care across all racial groups and cancer care facilities. UROLOGY 95: 88–94, 2016. © 2016 Elsevier Inc.

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Disparities in health outcomes continue to have many adverse consequences for vulnerable patient populations in the United States.[1] Yet there is little evidence to suggest that racial disparities in health care are improving, in particular for cancer where minorities are often diagnosed with more advanced stage and have worse survival.[2] One example of racial disparities in health care is prostate cancer (PCa), which is the most commonly diagnosed male malignancy affecting 240,000 newly diagnosed men and responsible for 30,000 cancer-related deaths in the United States.[3] Despite the widespread adoption of prostate-specific antigen (PSA) screening leading to a greater incidence of localized PCa,[4] minority patients continue to present with higher rates of advanced-stage cancer or cancer-related mortality.[5,6] Moreover, several studies have also demonstrated that black patients are less likely to receive primary treatment or receive poorer quality of care for localized PCa.[7-9]

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Against this backdrop, approximately 15% of men are diagnosed with clinicopathologic features consistent with high-risk PCa—PSA > 20 nanograms per milliliter (ng/mL), ≥T2c, or Gleason 8-10.[10] It is also essential to recognize that patients diagnosed with high-risk PCa have a clinically aggressive malignancy that is associated with a cancer-specific mortality ranging from 20% to 30% at 15 years.[11] Clinical guidelines recommend primary therapy with surgery with possible adjuvant radiation, radiation therapy with androgen deprivation therapy (ADT), or primary ADT.[12] Although racial disparities have been shown with African American men having less access to high-quality care, such as treatment by high-volume surgeons or hospitals with robotic surgery,[13,14] the degree to which these disparities are reduced once vulnerable patient populations achieve access to high-volume, academic medical centers is largely unknown. It is currently unknown if increasing access to tertiary medical centers will provide an opportunity to ameliorate disparities in the treatment of clinically aggressive PCa, especially considering the need for multimodal treatment and greater access to advanced treatment technologies. It is also necessary to investigate whether racial disparities in the treatment of high-risk PCa are improving. We therefore assessed the national trends in the treatment of high-risk PCa by racial groups and investigated whether racial disparities in treatment exist across different types of hospitals in the United States.

MATERIALS AND METHODS

Study Population

We used data from the National Cancer Data Base (NCDB) hospital-based cancer registry jointly sponsored by the American Cancer Society and the American College of Surgeons. The NCDB is a joint program of the Commission on Cancer of the American College of Surgeons and the American Cancer Society. The NCDB represents a nationwide, facility-based, clinical surveillance data set that currently captures approximately 70% of all newly diagnosed malignancies in the United States. Data reported to the NCDB are retrospective, and no patient or physician identifiers are collected.

To identify the patient population, we identified patients aged 40-80 years with a primary diagnosis of non-metastatic localized high-risk PCa diagnosed from 2004 to 2011 (n = 105,266). High risk was defined by PSA ≥ 20 ng/mL, clinical T2c or worse, or Gleason 8-10.[15] Primary curative treatment was classified in accordance with the National Comprehensive Cancer Network guidelines and included radical prostatectomy (RP), external beam radiation therapy (XRT), brachytherapy (BRT), and ADT. We excluded cases where it is unknown whether treatment was administered as well as patients who received other treatment such as immunotherapy, hematologic transplants, or endocrine procedures (n = 1679). Patients who did not receive any surgery, radiation therapy, or androgen deprivation from date of diagnosis to last follow-up at the end of 2011 were then coded as patients receiving watchful waiting (WW).

Classification of hospital type was made in accordance with the Commission on Cancer designation through the NCDB.[16] Hospitals were classified as either community hospitals (CCP), comprehensive cancer community hospitals (CCCP), or comprehensive cancer academic hospitals (ACAD). Programs classified other than CCP, CCCP, or ACAD were excluded from the analysis (n = 886). A total of 102,701 patients were included in the final analysis.

Outcomes and Patient and Hospital Covariates

The primary outcome was receipt of primary therapy with RP alone, RP and adjuvant or salvage XRT, XRT alone (with or without ADT), BRT alone (with or without ADT), XRT and BRT, or WW. We also conducted a secondary analysis further classifying patients who received XRT alone (with or without ADT) as those who received intensity-modulated radiation therapy (IMRT) versus conventional external beam radiotherapy (EBRT). Race was classified as non-Hispanic whites (white), African Americans, Hispanic whites (Hispanic), and other minorities, as designated by the NCDB. Additional covariates included geographic region, age at diagnosis, 2000 census tract annual median income, percentage of adults in the patient's zip code who did not graduate from high school, insurance status, patient location (rural, metro, and urban), Charlson-Deyo comorbidity score, and year of diagnosis. Clinical characteristics included PSA levels, Gleason scores, clinical T stage, and nodal metastasis. Covariates were chosen a priori to analysis and included factors that could potentially influence treatment received.

Statistical Analysis

Bivariate associations of race and primary treatment received were tested by the Pearson chi-square test. Temporal trends in different primary treatments or WW were assessed by Wilcoxon rank sum tests and multivariable logistic regression with interaction terms between treatment modality and year of treatment. We then constructed multivariate logistic regression models stratified by type of hospital to enumerate odds ratios (OR) for receipt of each primary treatment or WW, adjusting for patient and clinical characteristics. Stata SE version 13.0 (College Station, Texas) was used to perform all statistical analyses. A 2-sided P value of <.05 was used to determine statistical significance.

RESULTS

In our analytic cohort, a total of 102,701 patients were diagnosed with high-risk PCa from 2004 to 2011 in the NCDB. As shown in Table 1, a majority of PCa patients received their medical care at CCCP (55.4%), whereas a third were at ACAD (33.8%). Most patients were white (72.7%), lived in a metro location (76.6%), and had limited comorbidities (84.6%). Table 2 presents the clinicopathologic characteristics of the patient population with clinically aggressive PCa. A third of the patients had clinical T stage ≥2c, 57.2% had PSA >20, and 23.7% had Gleason scores from 8 to 10. More than a third (34.4%) of patients had RP alone, whereas 2.5% had RP and adjuvant XRT. Another third (31.0%) of the patients had EBRT, whereas 6.7% had BRT. Overall, the 2 most commonly used primary therapies in the cohort of patients with high-risk PCa were RP (37.0%) and XRT (33.2%).

On bivariate analysis, primary treatments varied markedly by race (Table 2). For example, RP was performed in a greater percentage of white men (39.8%) with high-risk PCa compared with black (27.5%) and Hispanic (31.9%) men (both P <.001). Furthermore, although the