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Prostate cancer severity among low-income, uninsured men

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Abstract

Purpose—The proportion of American men with organ-confined, low-risk prostate cancers has increased significantly over the last two decades. Whether this trend also applies to men at the extremes of socioeconomic disadvantage remains unknown. We therefore evaluated trends in prostate cancer severity among an ethnically diverse cohort of low-income, uninsured men served by a state-funded public health program in California.

Materials and Methods—We performed a retrospective cohort study of 570 disadvantaged men enrolled in the California program from 2001 through 2006. Using routinely collected clinical variables, we defined two measures of cancer severity: 1) the proportion of enrollees with metastases at diagnosis; and 2) the proportions of men with non-metastatic tumors whose cancers had low-, intermediate-, or high-risk features at diagnosis. We performed bivariate analyses to assess time trends in cancer severity.

Results—Prostate-specific antigen levels at diagnosis exceeded 10 ng/mL for 51% of enrollees; 50% of men had a Gleason score ≥ 7 ; and 43% had a clinical T stage $\geq T2$. Nineteen percent of disadvantaged men had metastatic cancer at the time of diagnosis; this proportion remained stable over time ($p=0.66$). Among men with non-metastatic cancers, 24% had tumors with low-risk features; the proportion of low-risk cancers did not increase over time ($p=0.34$).

Conclusions—Unlike the broader US population, the proportion of disadvantaged men with organ-confined, low-risk prostate cancers has not been increasing. Thus, while much attention focuses on potential overdiagnosis and overtreatment of men with screen-detected prostate cancers, our findings suggest that—for low-income, uninsured men—underdetection and undertreatment remain significant concerns.

Keywords

Prostate cancer; socioeconomic; public assistance; uninsured

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All analyses, interpretations, and conclusions herein are those of the authors and not the State of California.

Introduction

Coincident with the widespread adoption of prostate-specific antigen (PSA) screening, the proportion of American men diagnosed with organ-confined, low-risk prostate cancer (as defined by PSA level, clinical T stage and Gleason score) has increased significantly over the last two decades.¹ Prostate cancer-specific mortality has declined in synchrony with this risk migration, raising the prospect that early diagnosis coupled with aggressive treatment yields improved survival for patients with localized prostate cancer.² What remains largely unknown, however, is whether these encouraging population-level trends also apply to socioeconomically-disadvantaged men with prostate cancer.

The population served by California's IMPACT (Improving Access, Counseling and Treatment for Californians with Prostate Cancer) program provides an opportunity to address this question empirically. Initiated in 2001, IMPACT provides free and comprehensive prostate cancer treatment to uninsured Californian men with incomes below 200% of the Federal Poverty Level.^{3,4} Based on preliminary clinical observations,⁴ we hypothesized that—in contrast to the broader population—the prevalence of non-metastatic prostate cancers with low-risk features has not increased over time among the disadvantaged men served by IMPACT. To test this hypothesis, we evaluated trends in prostate cancer severity at diagnosis among this ethnically-diverse cohort of low-income, uninsured men.

Material and Methods

IMPACT program eligibility requirements include California residency, biopsy-proven prostate cancer, lack of health insurance, and a household income at or below 200% of the Federal Poverty Level. As part of an established research study, we collected demographic information and prostate cancer-related clinical variables for all men enrolled in IMPACT between its inception in 2001 and June 2006. We included in the current analysis only those men for whom initial treatment (radical prostatectomy, external beam radiation therapy, brachytherapy, and/or androgen deprivation therapy) was administered during or within the 6 months preceding IMPACT enrollment. Excluding enrollees who had undergone primary treatment long before program enrollment (most of whom had only post-treatment PSA values available for review) allowed us to estimate more precisely the cancer severity at diagnosis. The University of California, Los Angeles Office for Protection of Research Subjects approved all consent and data collection protocols, and all are HIPAA-compliant.

For this study, we employed two measures of cancer severity. First, we used all available clinical data (e.g., clinician notes, bone scan results) to classify each subject as having localized/regional or metastatic prostate cancer at diagnosis. Next, for those with non-metastatic tumors, we used the pre-treatment PSA level, clinical T stage, and Gleason score to categorize each subject's cancer as low-, intermediate-, or high-risk based on the classification described by D'Amico et al.⁵

We then performed bivariate analyses to assess time trends in cancer severity among program enrollees. Because of potential biases introduced by prolonged time lapses between diagnosis and IMPACT enrollment in some cases, we also repeated our analyses after excluding men for whom the interval between diagnosis and program enrollment exceeded 6 months (n=122). Finally, given established associations between race/ethnicity and prostate cancer severity, we also performed sensitivity analyses to determine whether our principal findings changed when we stratified by race/ethnicity. All statistical testing was two-sided at the 5% significance level (SAS v9.1, SAS Institute, Cary, NC).

Results

From its inception in 2001 through June 2006, 772 men enrolled in IMPACT. Our analytic sample comprised the 570 men (74% of all enrollees; median age 61 years, range 42–88) who received their initial treatment for prostate cancer during or within the 6 months preceding program enrollment. Excluded and included cases did not differ in age, race/ethnicity, income, marital status, or year of enrollment (data not shown, p -values > 0.05). For men in the analytic sample, the median time elapsed from diagnosis to program enrollment was 2 months (range 0–119 months).

A majority (79%) self-identified as being of a racial/ethnic minority group, including 49% Hispanic and 18% African-American (Table 1). Pre-treatment PSA levels exceeded 10 ng/mL for 51% of enrollees; 50% of men had a biopsy Gleason score ≥ 7 ; and 43% had a clinical T stage $\geq T2$ (11% T3 or T4) (Table 1). Among these clinical variables, only pre-treatment PSA level changed over time; the proportion of cases with PSA < 10 ng/mL at diagnosis increased from 42% in 2001 to 68% in 2006 (p -value for trend = 0.02) (Table 2).

Overall, 19% had metastatic cancer at diagnosis. As presented in Table 2, the proportion of men harboring metastases at the time of program enrollment did not decrease over time and ranged in value from a nadir of 10% in 2005 to a peak of 22% in 2003 ($p=0.066$).

Among 463 IMPACT enrollees presenting with localized/regional prostate cancer (81% of the analytic sample), 24% had tumors with low-risk features. In terms of temporal trends, the proportion of men with low-risk cancers at enrollment ranged from 14% (2001) to 35% (2003) and was stable throughout the study interval ($p=0.34$) (Table 2).

In sensitivity analyses that excluded cases with a time lapse of more than 6 months between diagnosis and IMPACT enrollment, the trend toward an increasing proportion of men with PSA < 10 ng/mL at diagnosis was no longer statistically significant ($p=0.21$); otherwise, our principal findings did not change substantively. Furthermore, the proportion of patients with metastatic disease at enrollment and the distribution of non-metastatic cases by D'Amico risk group classification did not differ significantly by race/ethnicity.

Discussion

Our findings provide new insight concerning the epidemiology of prostate cancer among American men at the extremes of socioeconomic disadvantage. Unlike the broader US population¹, organ-confined, low-risk prostate cancers did not increase over the last half-decade among low-income, uninsured men enrolled in California's IMPACT program. In 2006, for instance, only 1 in 5 new enrollees had a cancer with low-risk features based on PSA level, Gleason score, and clinical T stage. In contrast, among the more-affluent, better-educated, and largely-insured population participating in the Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE), the proportion of men presenting with low-risk prostate cancers increased progressively from 30% of those diagnosed from 1989 through 1992, to nearly half of men (45.3%) diagnosed from 1999 through 2001.¹

Likewise, the annual proportion of IMPACT enrollees with metastases at presentation did not decrease over time, ranging from 10% (2005) to 22% (2003) during the first five years of the program. Although statistical comparisons are not possible, the 19% prevalence (overall) of metastases at diagnosis among IMPACT enrollees is substantively higher than the 4% prevalence of distant disease among men with incident prostate cancers reported to the Surveillance, Epidemiology, and End Results (SEER) registries from 2000 through 2005.⁶ The consequent inference from these data is that disadvantaged men appear to bear a disproportionate burden of prostate cancers that are incurable at the time of diagnosis.

Our principal findings serve to clarify some of the challenges (and opportunities) faced by public-assistance programs designed to reduce cancer-related disparities. Without question, IMPACT enables eligible men to receive previously unattainable—and high quality—prostate cancer care.^{3,4} Moreover, individual program participants are highly satisfied with IMPACT services and providers.^{7,8} From a population perspective, however, the persistent preponderance of metastatic and higher-risk localized cancers suggests that more-comprehensive strategies are needed to eradicate socioeconomic disparities in prostate cancer-specific morbidity and mortality.

Although we lack specific data regarding pre-enrollment screening practices among IMPACT participants, PSA-based screening is used infrequently by low-income Californians.⁹ Likewise, other investigators have demonstrated in population-based samples that the working poor and men with intermittent or no insurance coverage less frequently receive prostate cancer screening examinations.^{10,11} Because IMPACT participants are, by definition, poor and uninsured prior to enrollment, the higher-risk tumor characteristics among our study cohort may primarily reflect a lack of access to early-detection programs. The relevant policy question, therefore, is whether public-assistance programs that focus on a single domain in the cancer control continuum (in this case, treatment) represent an optimal strategy for addressing prostate cancer disparities across socioeconomic strata.

For low-income women in California, state-specific adaptations of the National Breast and Cervical Cancer Early Detection Program (NBCCEDP)¹², and the complementary Breast and Cervical Cancer Treatment Program¹³, provide publicly-funded infrastructure that links access to both early detection and treatment for disadvantaged female cancer patients. Although the effect of these programs on survival disparities is yet to be determined, at least one evaluation demonstrated that the NBCCEDP increased utilization of screening tests among low-income African-American and Hispanic women, and closed the gap in screening disparities between non-Hispanic white and African-American women.¹² Ultimately, if PSA-based screening is shown to benefit survival¹⁴, then the optimal policy approach to eliminating prostate cancer disparities may well involve the development and linkage of public assistance programs focused on both early detection and comprehensive treatment.

It is important also to consider different explanations for the absence of a risk migration among IMPACT enrollees. It is possible, for instance, that the disproportionate number of IMPACT participants with metastatic and high-risk localized/regional cancers reflects disease progression due to significant time delays between diagnosis and program enrollment. Such delays would represent an alternative (and important) access barrier. In this study, however, we explicitly measured cancer severity at the time of diagnosis (not at the time of program enrollment). Moreover, for men in the analytic cohort, the median time elapsed from diagnosis to program enrollment was only 2 months, and sensitivity analyses that excluded men with prolonged delays confirmed our principal findings. It is also plausible that biological and/or environmental differences could explain the greater prevalence of metastases and higher-risk localized tumors among the disadvantaged men served by IMPACT; however this remains a topic of substantial debate that cannot be addressed with data from the current study.¹⁵

We additionally recognize that our findings are preliminary and need validation in future studies that explicitly compare cancer severity among low-income, uninsured men with that observed for population-based samples.^{1,16} Furthermore, longer-term mortality and quality-of-life data are needed to clarify whether the disproportionate burden of higher-risk cancers actually translates into more prostate cancer-attributable death and suffering among low-income, uninsured men.

Conclusions

In contrast with the broader US population, we observed a persistently high prevalence of metastatic and higher-risk localized/regional prostate cancers among low-income, uninsured men served by California's IMPACT program. This observation suggests that public-assistance strategies aimed at attenuating socioeconomic disparities in prostate cancer outcomes may require more than high-quality treatment programs. Moreover, while much attention now focuses on potential overdiagnosis and overtreatment of men with screen-detected prostate cancers,^{16,17} our findings serve as a reminder that, for disadvantaged men, underdetection and undertreatment of prostate cancer remain significant concerns.

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