Prostate Cancer Treatment in Black and White Men: The Need to Consider Both Stage at Diagnosis and Socioeconomic Status

Anthony P. Polednak, PhD

Hartford, Connecticut

Using data from the population-based Connecticut Tumor Registry, this study examined stage-specific treatment for prostate cancers diagnosed from 1988 through 1992 by age at diagnosis, poverty rate of census tract of residence, and race (black versus white). For local or regional stage prostate cancers, the prevalence of radical prostatectomy was less frequent among blacks than whites within three age groups, but race was not a statistically significant independent predictor when age and poverty rate were included in logistic regression models. For distant stage cancers, endocrine surgery was more prevalent in blacks than whites but race was not a statistically significant independent predictor in logistic regression models. Thus, both stage at diagnosis and socioeconomic status should be considered in studies of racial differences in prostate cancer treatment. (J Natl Med Assoc. 1998;90:101-104.)

Key words: prostate cancer ◆ African Americans ◆ blacks ◆ radical prostatectomy ◆ orchiectomy ◆ socioeconomic status

Prostate cancer is the most commonly diagnosed invasive cancer in US men, and incidence rates are higher in black than white men.[1] Black-white differences in treatment of prostate cancer also have been reported, but the interpretation of such differences is problematic. Data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program showed that use of radical prostatectomy for local/regional stage prostate can-

cer diagnosed from 1984 through 1991 varied greatly among the registries (lowest for Connecticut) and was lower in blacks than whites[2]; however, socioeconomic status was not considered.

Among male Medicare patients in New York State, the radical prostatectomy rate was lower for black than white men aged 65 to 69 years but stage at diagnosis was not available.[3] In a national study of elderly Medicare beneficiaries (90% with prostate cancer as the principal diagnosis), bilateral orchiectomy was more than twice as frequent in blacks than whites (even after controlling for median income of zip code of residence); however, stage at diagnosis was not available.[4] Distant (metastatic) stage at diagnosis, often treated by orchiectomy, is more common in black than white patients.[5]

This study from the Connecticut Tumor Registry, which is part of the SEER Program, compared stage-specific treatment among black and white prostate cancer patients residing in Connecticut. An "ecologic" indicator of socioeconomic status was

included in logistic regression analysis of stage-specific treatment by race.

MATERIALS AND METHODS

According to the 1990 Census, Connecticut's population of 3.3 million included approximately 274,000 blacks, who had a poverty rate of 25% (versus 5% for whites); the black population tends to be concentrated in the largest cities, with high poverty rates in the inner-city areas. While socioeconomic status is not strongly associated with the risk of prostate cancer in blacks or whites in SEER areas,[6] it may affect stage at diagnosis; black-white differences in treatment patterns could reflect differences in stage at diagnosis or differential treatment within stage at diagnosis.

Registry data on invasive prostate cancers among Connecticut residents were complete, and addresses had been census-tracked, for cancers diagnosed through 1992. The study included 9915 invasive cancers diagnosed in Connecticut residents from 1988 through 1992. Information on "race" is reported mainly from hospitals, but reliability (repeatability) may be high for blacks.[7]

Coding of stage and surgery[8] and completeness of reporting of invasive cancers to SEER registries, based on audits of hospitals,[9] are excellent for most cancers. For many decades, the Connecticut Tumor Registry has used a coding scheme for stage at diagnosis of invasive cancers, ie, local (confined to the prostate), regional (through the capsule or to regional lymph nodes), and distant (seminal vesicles or other structures such as bladder or rectum). The Connecticut Tumor Registry scheme is similar to the SEER "summary stage," except that extension to the seminal vesicles is coded as distant stage (versus regional in SEER).[5,10]

The present analyses combined local and regional stage cancers[2] because the increasing use of radical prostatectomy over time has resulted in the increasing detection of regional spread that was clinically unsuspected.[11] Stage is based on surgical pathology for those patients with surgery, especially radical prostatectomy (which often includes dissection of pelvic lymph nodes for staging), or on clinical findings. Lymph-node dissection is defined in SEER as removal and examination of at least four nodes.[12]

The first course of cancer-directed treatment, defined in SEER as any treatment within 4 months of initiation, includes SEER (and Connecticut Tumor Registry) site-specific (ie, prostate cancer-directed) surgery; radical prostatectomy is distinguished from subtotal and transurethral resection. Endocrine therapy is coded separately as: none; hormones (estrogen or antiandrogens); endocrine surgery (mainly orchiectomy); both hormones and endocrine surgery; and codes for refusal or unknown.

The ecologic variable used for socioeconomic status was the poverty rate of census tract of residence. Socioeconomic data by census tract have been shown to provide generally valid results compared with data for individuals.[13] Although block-group data are more accurate socioeconomic status indicators for individuals,[13] Connecticut Tumor Registry and SEER data are not coded to the block-group level. Poverty rate of census tract was available for 8765 cases (88.4% of 9915), which were arranged in order of poverty rate (lowest to highest) of census tract and divided into 10 groups (deciles) of approximately equal numbers of cases. The study was limited to black and white patients.

Logistic regression was used to assess the effect of black versus white race independent of age and poverty rate in predicting stage-specific treatment. Because Medicare eligibility usually begins at age 65 years and could affect treatment choice (due to Medicare coverage for cost of hospital stays, which are usually required for surgery but not external radiotherapy), separate logistic regression analyses were done for ages <65 and ≥65 years at diagnosis of blacks and whites.

RESULTS

Among local/regional stage patients, mean age at diagnosis was 68.8 years (median: 68.5 years) for the 330 black patients and 72 years (median: 72 years) for the 6008 white patients, and radical prostatectomy declined with rising age. Radical prostatectomy was less frequent in blacks than whites diagnosed at age <65 years (50.4% of 1038 whites versus 41.6% of 89 blacks) and 65 to 74 years (23.1% of 2689 whites versus 18.9% of 164 blacks), but was infrequent at age ≥75 years (1.5% of 2281 whites versus 1.3% of 77 blacks).

In a logistic regression model for local/regional cancers including only age and race (black versus white) as predictors, both were statistically significantly associated with use of radical prostatectomy (data not shown). After inclusion of decile of poverty rate of census tract of residence, which was a significant predictor, the race variable was no longer statistically significant, although black race was still negatively associated with radical prostatectomy

Table. Logistic Regression Analysis of Treatment of Prostate Cancers Diagnosed From 1988 to 1992 in Connecticut Residents by Race and Age at Diagnosis, Within Stage at Diagnosis*

| | Age at Diagnosis† | | | | | |
| | All Ages | | <65 Years | | ≥65 Years | |
Variable	OR	P Value†	OR	P Value	OR	P Value
Local/Regional Stage: Radical Prostatectomy Versus All Other‡						
Age	0.85	<.001	0.96	.009	0.79	<.001
Poverty (decile)	0.97	.005	0.97	.197	0.97	.025
Race (black versus white)	0.75	.066	0.74	.184	0.73	.136
Distant Stage: Endocrine Surgery Versus All Other§						
Age	1.03	<.001	1.08	.037	1.01	.212
Poverty	1.02	.353	1.08	.118	1.01	.786
Race (black versus white)	1.26	.231	1.54	.323	1.19	.423

Abbreviations: OR=odds ratio.
*The reference categories were the youngest age (coded in 5-year intervals from youngest to ≥85 years), lowest decile of poverty rate (of census tract of residence), and white race.
† A P value <.05 was considered significant.
‡For all ages, n=6338; for <65 years, n=1127; and for ≥65 years, n=5211.
§For all ages, n=1278; for <65 years, n=227; and for ≥65 years, n=1051.

(odds ratio or OR=0.75) (Table). Results were similar for ages <65 and ≥65 years; the larger sample size for elderly men affected the statistical significance of predictors (Table).

Among distant-stage patients, endocrine surgery was more frequent among the 140 black patients than the 1138 white patients (47.1% versus 41.3%; P=.186). In logistic regression analyses (Table), however, only age was a significant predictor; neither race nor poverty rate were significantly associated with the use of endocrine surgery.

DISCUSSION

Study limitations include the use of an ecologic variable for socioeconomic status as a surrogate for socioeconomic status data on individuals; such analyses are subject to error due to the problem of nonhomogeneity within a stratum (ie, using a poverty rate for an entire census tract), and future studies should use census block-groups. However, in studies using individual (rather than ecologic) data on socioeconomic status indicators, missing information may preclude an adequate assessment of the effect of socioeconomic status on outcomes (stage or survival).[14] Another limitation was the small number of black patients. However, due to completeness of case ascertainment in SEER reg-

istries, these cases represent almost all black patients in Connecticut.

Use of radical prostatectomy for local/regional stage prostate cancer has increased over time in Connecticut as in other SEER areas,[2,10,11] but remains low. Declining use of radical prostatectomy with rising age, and especially low use among patients ≥75 years, is well-known.[2,12] As reported for all SEER areas combined,[2] use of radical prostatectomy for local/regional stage prostate cancer in Connecticut was lower in blacks when stratified by age at diagnosis. In a logistic regression model, black (versus white) race was still negatively associated with radical prostatectomy but the association did not reach statistical significance when age and poverty rate were included (Table). Similar analyses of radical prostatectomy are needed for other SEER regions (with larger numbers of black patients) and are relevant to race-specific risks of specific treatment complications.[15]

Although nonrandomized clinical studies suggest no difference in survival after radiotherapy versus surgery, radical prostatectomy involves operative risks and subsequent risks of impotence and urinary incontinence, while radiotherapy results in better quality-of-life scores for urinary function but somewhat worse scores for bowel function.[16] The nega-

tive association between radical prostatectomy and poverty rate of census tract of residence (Table) could reflect the cost of surgery, which requires hospitalization (while radiotherapy is given on an outpatient basis),[17] although length of hospitalization for radical prostatectomy is declining.[18]

Hormone administration (estrogen or antiandrogen) therapy and orchiectomy may result in comparable survival rates, but parenteral estrogen therapy has been recommended because of avoidance of the psychological impact of surgical castration; also, cardiovascular complications associated with oral hormone therapy are apparently avoided with parenteral therapy.[19] Initial costs are higher for orchiectomy (due to hospitalization costs), but long-term costs may be lower than estrogen therapy (which requires longer-term treatment).[19] This could help to explain the lack of association between poverty rate and endocrine surgery in this study (Table). The higher rate of bilateral orchiectomy in lower-income Medicare beneficiaries[4] may reflect the association between socioeconomic status and stage at diagnosis, which was not examined by Gornick et al.[4]

The finding that race was not significantly associated with endocrine surgery among patients with distant stage cancer (Table) suggests that the higher rates of orchiectomy in black than white Medicare patients[2] are due largely or entirely to confounding between race and stage at diagnosis rather than to differential treatment (by race) of clinically comparable patients. Explaining the later stage at diagnosis of prostate cancer and the higher incidence rates for black versus white men should be a major research priority.[3,20]

CONCLUSION

Studies of black-white differences in prostate cancer treatment should consider both stage at diagnosis and socioeconomic status in addressing the effects of cost considerations and racial discrimination (independent of patient socioeconomic status) in treatment decisions.[21] Studies are needed for other geographic areas, with larger numbers of black patients.

Literature Cited

1. Wingo PA, Bolden S, Tong T, Parker SL, Martin LM, Heath CW Jr. Cancer statistics for African Americans, 1996. *CA Cancer J Clin.* 1996;46:113-125.

2. Harlan L, Brawley O, Pommerencke F, et al. Geographic, age, and racial variation in the treatment of local/regional carcinoma of the prostate. *J Clin Oncol.* 1995;13:93-100.

3. Imperato PJ, Nenner RP, Will TO. Radical prostatectomy: lower rates among African-American men. *J Natl Med Assoc.* 1996;88:589-594.

4. Gornick ME, Eggers PW, Reilly TW, Mentech RM, Fitterman LK, Kucken LE, et al. Effects of race and income on mortality and use of services among Medicare beneficiaries. *N Engl J Med.* 1996;335:791-799.

5. Kosary CL, Ries LAG, Miller BA, Hankey BF, Harras A, Edwards BK, eds. *SEER Cancer Statistics Review, 1973-1992: Tables and Graphs.* Bethesda, Md: National Cancer Institute; 1995. NIH publication 96-2789.

6. Baquet CR, Horm JW, Gibbs T, Greenwald P. Socioeconomic factors and cancer incidence among blacks and whites. *J Natl Cancer Inst.* 1991;83:551-557.

7. Blustein J. The reliability of racial classifications in hospital discharge abstract data. *Am J Public Health.* 1994;84:1018-1021.

8. Shambaugh E. Stat bite: accuracy of SEER data. *J Natl Cancer Inst.* 1991;83:1369.

9. Zippin C, Lum D, Hankey BF. Completeness of hospital cancer case reporting from the SEER Program of the NCI. *Cancer.* 1995;76:2343-2350.

10. Polednak AP, Flannery JT. Black versus white racial differences in clinical stage at diagnosis and treatment of prostate cancer in Connecticut. *Cancer.* 1992;70:2152-2158.

11. Lu-Yao GL, Potosky AL, Albertsen PC, Wasson JH, Barry MJ, Wennberg JE. Follow-up prostate cancer treatments after radical prostatectomy: a population-based study. *J Natl Cancer Inst.* 1996;88:166-173.

12. Shambaugh EM, Ries LAG, Young JJL, Kruse MA. *SEER Extent of Disease 1988 Codes and Coding Instructions.* Rockville, Md: National Cancer Institute; 1988.

13. Krieger N. Overcoming the absence of socioeconomic data in medical records; validation and application of a census-based methodology. *Am J Public Health.* 1992;92:703-710.

14. Mayberry RM, Coates RJ, Hill HA, Click LA, Chen VW, Austin DF, et al. Determinants of black/white differences in colon cancer survival. *J Natl Cancer Inst.* 1995;87:1686-1693.

15. Bennett CL, Greenfield S, Aronow H, Ganz P, Vogelzang NJ, Elashoff RM. Patterns of care related to age of men with prostate cancer. *Cancer.* 1991;67:2633-2641.

16. Litwin MS, Hays RD, Fink A, Ganz PA, Leake B, Leach GE, et al. Quality-of-life outcomes in men treated for localized prostate cancer. *JAMA.* 1995;273:129-135.

17. Parker RG. Varying charges for comparably effective cancer treatments. *Am J Clin Oncol.* 1992;15:281-287.

18. Palmer JS, Worwag EM, Conrad WG, et al. Same day surgery for radical retropubic prostatectomy: is it an attainable goal? *J Urol.* 1996;47:23-28.

19. Henriksson P, Stege R. Cost comparison of parenteral estrogen and conventional hormonal treatment in patients with prostatic cancer. *Int J Technol Assess Health Care.* 1991;7:220-225.

20. McIntosh H. Why do African-American men suffer more prostate cancer? *J Natl Cancer Inst.* 1997;89:188-189.

21. Geiger HJ. Race and health care—an American dilemma? *N Engl J Med.* 1996;335:815-816.