Prostate Cancer Risk Profiles of Asian-American Men: Disentangling the Effects of Immigration Status and Race/Ethnicity

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Abbreviations and Acronyms

FB = foreign born
GS = Gleason score
NH = nonHispanic
PCa = prostate cancer
PSA = prostate specific antigen
SES = socioeconomic status
USB = United States born

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Purpose: Asian-American men with prostate cancer have been reported to present with higher grade and later stage disease than white American men. However, Asian-American men comprise a heterogeneous population with distinct health outcomes. We compared prostate cancer risk profiles among the diverse racial and ethnic groups in California.

Materials and Methods: We used data from the California Cancer Registry on 90,845 nonHispanic white, nonHispanic black and Asian-American men diagnosed with prostate cancer between 2004 and 2010. Patients were categorized into low, intermediate and high risk groups based on clinical stage, Gleason score and prostate specific antigen at diagnosis. Using polytomous logistic regression we estimated adjusted ORs for the association of race/ethnicity and nativity with risk group.

Results: In addition to the nonHispanic black population, 6 Asian-American groups (United States born Chinese, foreign born Chinese, United States born Japanese, foreign born Japanese, foreign born Filipino and foreign born Vietnamese) were more likely to have an unfavorable risk profile compared to nonHispanic white men. The OR for high vs intermediate risk disease ranged from 1.23 (95% CI 1.02–1.49) for United States born Japanese men to 1.45 (95% CI 1.31–1.60) for foreign born Filipino men. These associations appeared to be driven by higher grade and prostate specific antigen rather than by advanced clinical stage at diagnosis.

Conclusions: In this large, ethnically diverse, population based cohort Asian-American men were more likely to have an unfavorable risk profile at diagnosis. This association varied by racial/ethnic group and nativity, and was not attributable to later stage at diagnosis. This suggests that Asian men may have biological differences that predispose to more severe disease.

Key Words: prostate, prostatic neoplasms, Asian Americans, epidemiology, SEER program

In men with PCa it is clinically important to distinguish between low risk disease, in which treatment related morbidity could be minimized by active surveillance, and high risk disease, for which more aggressive treatment may be indicated. Risk stratification tools based on prognostic factors such as GS, serum PSA and stage are widely used to categorize men into pretreatment risk groups that predict disease progression.[1,2]

PCa clinical characteristics vary by race/ethnicity[3–6] and birthplace.[7,8]

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Studies suggest that Asian-American men have proportionally more advanced stage[9–11] and high grade[9,10,12–14] disease than white men, which could have significant implications for treatment and prognosis in this population. However, in previous studies Asian subpopulations were not disaggregated by ethnicity and birthplace, or they were based on data collected before the widespread adoption of PSA screening or data on select clinical populations.

Using a pretreatment risk stratification approach we compared clinical risk profiles among Asian-American populations defined by ethnicity and birthplace to those of NH white and NH black men in a large, population based cohort.

PATIENTS AND METHODS

The CCR (California Cancer Registry) comprises 4 registries from the NCI (National Cancer Institute) SEER (Surveillance, Epidemiology and End Results) program. We used tumor and demographic data collected through the CCR on men diagnosed with adenocarcinoma of the prostate during 2004 to 2010. These years were selected because GS and PSA information was unavailable before 2004. We limited our study to men with first primary tumors that were not diagnosed only by death certificate or autopsy. We further restricted analysis to NH white and NH black men, and members of the 6 largest Asian racial/ethnic groups in California, including Chinese, Japanese, Filipino, Korean, Vietnamese and South Asian, resulting in a total of 102,824 men.

Using a previously described, validated algorithm based on age at Social Security number issue[15] we imputed nativity for the 38% of Asian-American men whose place of birth was unknown in the registry data. We excluded from study 13 USB Korean, 19 USB Vietnamese and 61 USB South Asian men due to small numbers that limited meaningful analysis. We further excluded 23 men with clinical stage T0, 2,510 with unknown stage, 2,806 with unknown GS and 6,547 with unknown PSA. The final cohort consisted of 90,845 men.

Participants were geocoded to their census block group of residence at diagnosis. Using a previously described composite measure of neighborhood SES based on block group at diagnosis[16] we assigned men to a SES quintile based on the statewide distribution. Using a modification of the original D'Amico risk groups[17] we then categorized the men into 3 clinical risk groups. The 19,648 men with the highest pretreatment PSA of greater than 20 ng/ml, GS 8 or greater, or stage cT3 or higher were classified with high risk disease. The 26,918 men with stage cT1-cT2a, PSA 10 ng/ml or less and GS 6 or less were classified with low risk disease. The remaining 44,279 men were considered to have intermediate risk disease.

Statistical Analysis

Distribution differences in disease and sociodemographic characteristics among the groups were compared using the chi-square test. Medians were compared using the Kruskal-Wallis test. Each racial/ethnic group was compared to NH white men and p values were adjusted for multiple comparisons using the stepdown Bonferroni method,[18] as implemented in the SAS® MULTTEST procedure.

Because high and low risk disease carry well-defined but distinctly different treatment recommendations, we used polytomous logistic regression to estimate adjusted ORs and 95% CIs for the association of race/ethnicity with these risk categories compared to intermediate risk. To further analyze the nature of this relationship we deconstructed the overall risk category and modeled the association of race/ethnicity with each component prognostic factor using polytomous logistic regression. Each factor was categorized into high, intermediate and low risk categories using the same cutoffs used to define overall risk groups.

Statistical analysis was done with SAS 9.3. This study was approved by the Cancer Prevention Institute of California institutional review board.

RESULTS

Supplementary table 1 (http://jurology.com/) lists the sociodemographic and clinical characteristics of the cohort. Median age at diagnosis was greater in FB Chinese, FB Japanese, FB Filipino, FB Korean, FB Vietnamese and USB Japanese men, and younger in USB Filipino and NH black men compared to NH white men. Most of the Asian groups (FB Chinese, USB Japanese, FB Japanese, FB Filipino, FB Korean and FB Vietnamese) had a higher proportion of men with high GS. All groups except the USB Chinese and USB Filipino groups had a lower proportion of men with low PSA than NH white men. The proportion of patients diagnosed with high risk disease was higher among FB Chinese, USB and FB Japanese, FB Filipino, FB Vietnamese and NH black men than NH white men. Interestingly, several groups (NH black, USB Chinese and FB Chinese men) presented with favorable clinical stage distribution relative to NH white men.

The odds of presenting with an adverse risk profile compared unfavorably to NH white men for most racial/ethnic groups after adjusting for age, SES, marital status and year of diagnosis (see table). Effect sizes in the Asian groups were similar to those in NH black men. However, the pattern of prognostic factors conferring this increased risk differed among the groups (supplementary table 2, http://jurology.com/).

USB Chinese men were more likely than NH white men to be diagnosed with high vs intermediate risk disease (OR 1.34, 95% CI 1.05–1.71). This resulted from higher odds of high vs intermediate GS (OR 1.58, 95% CI 1.19–2.11) and lower odds of low vs intermediate PSA category (OR 0.76, 95% CI 0.58–0.98) compared to NH white men. FB Chinese