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Brief Communication

Comparative Survival of Asian and White Metastatic Castration-Resistant Prostate Cancer Men Treated With Docetaxel

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Abstract

There are few data regarding disparities in overall survival (OS) between Asian and white men with metastatic castration-resistant prostate cancer (mCRPC). We compared OS of Asian and white mCRPC men treated in phase III clinical trials with docetaxel and prednisone (DP) or a DP-containing regimen. Individual participant data from 8820 men with mCRPC randomly assigned on nine phase III trials to receive DP or a DP-containing regimen were combined. Men enrolled in these trials had a diagnosis of prostate adenocarcinoma. The median overall survival was 18.8 months (95% confidence interval [CI] = 17.4 to 22.1 months) and 21.2 months (95% CI = 20.8 to 21.7 months) for Asian and white men, respectively. The pooled hazard ratio for death for Asian men compared with white men, adjusted for baseline prognostic factors, was 0.95 (95% CI = 0.84 to 1.09), indicating that Asian men were not at increased risk of death. This large analysis showed that Asian men did not have shorter OS duration than white men treated with docetaxel.

In the United States, the age-adjusted incidence and mortality rates for prostate cancer are much lower for Asian American men compared with white men (1). Individuals of Asian descent are estimated to constitute around 7% of the US population. There are few data regarding disparities in overall outcomes between Asian and white men with metastatic castration-resistant prostate cancer (mCRPC). Moreover, the relative efficacy of docetaxel in Asian men with mCRPC compared with white men is largely unknown because of the small number of Asian men enrolled on the pivotal studies that led to the approval of docetaxel for this indication (2,3). To address these limited data, we performed a pooled analysis of multiple phase III trials in men with mCRPC treated with docetaxel, with the goal of comparing overall survival (OS) in Asian vs white men.

We included 8820 men who participated in phase III trials of docetaxel and prednisone (DP) vs DP plus an experimental agent (2–11). Men enrolled in these trials between 1990 and 2014 had a diagnosis of prostate adenocarcinoma, developed progressive metastatic disease during androgen deprivation therapy, and, when relevant, progressed despite antiandrogen withdrawal (2–11).

Data on 7952 white and Asian men from nine phase III trials were pooled, regardless of treatment arm, because these trials comparing DP with DP plus an experimental agent had failed to

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Table 1. Baseline characteristics of 7952 Asian and white men with mCRPC*

Baseline characteristic	Asian (n = 424)	White (n = 7528)	Total (n = 7952)
Median age (25th, 75th percentile), y	69.0 (62.0, 73.0)	69.0 (63.0, 74.0)	69.0 (63.0, 74.0)
Performance status, %	95.2	94.5	94.5
0	50.4	44.6	44.9
1	44.8	49.9	49.6
Median PSA (25th, 75th percentile), ng/ml	60.1 (19.1, 170.0)	84.9 (30.5, 246.6)	83.5 (29.8, 243.0)
Median alkaline phosphatase (25th, 75th percentile), U/L	150.0 (91.5, 343.5)	138.0 (85.0, 284.0)	138.0 (86.0, 288.0)
Median hemoglobin (25th, 75th percentile), g/dL	12.2 (11.0, 13.4)	13.0 (11.8, 14.2)	13.0 (11.8, 14.1)
Median testosterone (25th, 75th percentile), ng/dL	15.0 (7.3, 25.0)	18.0 (10.0, 26.0)	18.0 (10.0, 26.0)
Site of metastases, %			
LN only	4.5	6.7	6.6
Bone only	46.5	42.4	42.7
Bone + LN	27.4	29.7	29.5
Lung	5.0	9.0	8.8
Liver	12.5	8.4	8.6
Other visceral	3.8	2.8	2.8
Randomized to docetaxel and prednisone arm (%)	56.6	51.7	51.7
Median follow-up time (range)	28.1 (0.0–63.8)	30.8 (0.0–94.2)	30.7 (0.0–94.2)

*LN = Lymph Nodes; mCRPC = metastatic castration-resistant prostate cancer; PSA = prostate-specific antigen.

show statistically significant differences in OS between their arms (2–11). The main objective of this analysis was to estimate the adjusted pooled hazard ratio (HR) for death. Two-stage fixed effect approach was used in analyzing the data (12,13). In the first stage, hazard ratios from each of the trials were estimated. In the second stage, estimates from individual trials were combined to obtain an overall estimate of the HR along with the variance. We computed weighted average coefficients, 95% confidence intervals (CI) for the coefficients, and Cochran Q's and I^2 statistics for testing heterogeneity across the trials (12,13). Within each trial, we employed the proportional hazards model (this assumption was not verified) to adjust for age, ECOG performance status, prostate-specific antigen, alkaline phosphatase, hemoglobin, and sites of metastases.

The median age at diagnosis and the proportion of patients with performance status of 0–1 were similar in Asian and white men (Table 1). Baseline laboratory parameters predictive of OS were slightly less favorable in Asian compared with white men (median hemoglobin of 12.2 g/dL vs 13.0 g/dL; median alkaline phosphatase of 150 U/L vs 138 U/L). Proportionally, more Asian men had the liver as a site of metastases than white patients (12.5% vs 8.4%). However, prostate-specific antigen levels were slightly lower in Asian men: 60.1 ng/mL vs 84.9 ng/mL. The median follow-up time was 30.7 months (95% CI = 30.2 to 31.2 months) among surviving patients, with a total of 4969 deaths observed (event rates of 62.7% in Asian and 62.5% in white men).

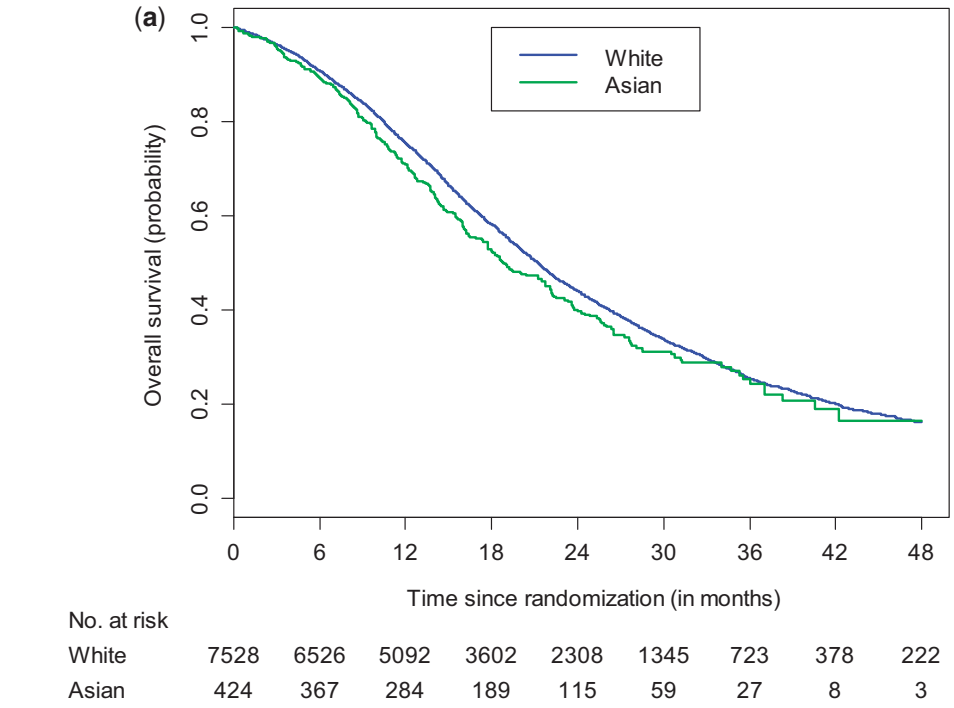
The median OS were 18.8 months (95% CI = 17.4 to 22.1 months) and 21.2 months (95% CI=20.8 to 21.7 months) for Asian and white men, respectively (Figure 1A). However, when adjusting for important prognostic factors, the pooled hazard ratio for death in Asian men was 0.95 (95% CI = 0.84 to 1.09; Figure 1B) vs white men, demonstrating that Asian men had no statistically significant differences in their risk of death.

Focusing on men who participated in the "National Cancer Institute" National Clinical Trials Network (NCI NCTN) trials is critical because these studies enrolled patients in the United States, and complete information on race and ethnicity was collected. When the three NCI NCTN trials were considered separately, the median OS was shorter in Asian men (15.8 months, 95% CI = 11.4 to 27.6 months) than white men (20.0 months, 95% CI = 19.2 to 20.9 months). In the 2022 white and 28 Asian men who were enrolled in the NCI NCTN trials, the pooled multivariable hazard ratio for death for Asian vs white men was 1.24(0.81- 1.89) (See new supplementary Figure 1A, available online). This difference might reflect true differences in outcomes for the NCI NCTN Asian men, or simply the very small number of Asian men accrued to the NCI NCTN trials. Thus, caution should be exerted in interpreting the pooled hazard ratio from the NCI NCTN trials.

In 4108 patients treated with DP alone, the median OS were 18.4 months (95% CI = 15.9 to 22.2 months) and 20.8 months (95% CI = 20.1 to 21.5 months) in Asian and white patients, respectively. In multivariable analysis, the pooled hazard ratio for death was 1.04 (95% CI = 0.86 to 1.24) (Supplementary Figure 1B, available online). Several authors indicated that Asian men have less tolerance for docetaxel, and thus their dose is often lower than the standard dose of 75 mg/m^2 (14–19). In this analysis, we had no access to dosing information or limited information about toxicity and are unable to confirm that docetaxel is poorly tolerated in the Asian population.

The main limitation of this analysis is that the patient population was highly selected. Also, this study does not account for heterogeneity among the population of Asian men with prostate cancer, and race was not further categorized in these clinical trials. It is possible that Asian men born or living in the United States might have different characteristics and outcomes to Asian men living in Asia.

A striking difference in terms of accrual patterns between industry and the NCI NCTN trials was observed in these trials. Whereas the industry trials, which were mostly conducted outside the United States, were successful in enrolling a higher proportion of Asian patients with mCRPC (6%), the US-based NCTN trials lagged behind and only enrolled 1% (28 patients) (Supplementary Figure 2, available online). The proportion of Asian patients enrolled on the US-based NCTN trials is much lower than the estimated US Asian population of about 6% and much lower than the 3.4% of Asian patients who are diagnosed with prostate cancer. This observation has been confirmed in other analyses (20–23). Barriers to participation of underrepresented populations in cancer trials include clinical, structural, and attitudinal (physicians and patients) factors and vary by demographic and socioeconomic



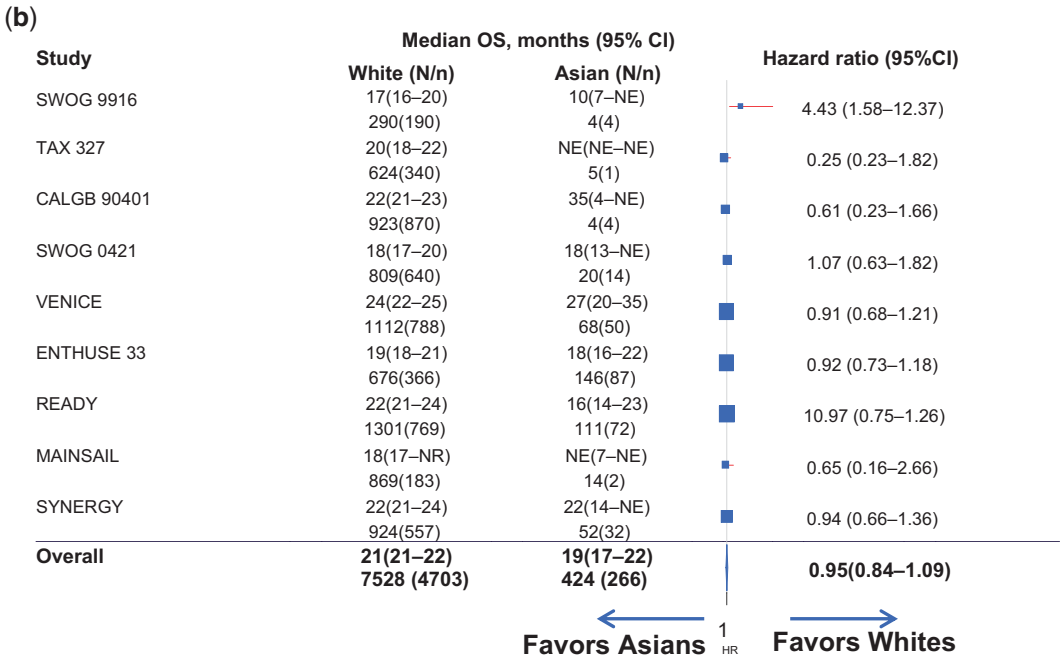


Figure 1. (**A**) Kaplan—Meier overall survival (OS) curves by white and Asian patients. (**B**) Forest plot with hazard ratios (HR) for OS comparing Asian men with white men (reference group = white men; Q=11.721, df=8, P=0.164; I^2= 0.317). CI = confidence interval; N = number of patients; n = number of deaths; NE = not estimated.

factors (24–26). Specific reasons for lack of participation of Asian patients in clinical trials are largely unknown because this population is understudied. Efforts to increase participation of Asian patients with mCRPC in prostate cancer trials are urgently needed.

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Notes

Conflicts of Interest: SH reports other from Bayer, Eisai and Ferring; outside the submitted work; DPP Consultant fees: Ada Cap (Advanced Accelerator Applications), Amgen, Astellas,

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