A multi-center comparison of a 17-gene Genomic Prostate Score (GPS) as a predictor of outcomes in African-American (AA) and Caucasian (CA) men with clinically localized prostate cancer (PCa)

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Introduction and Objectives

For clinical adoption of predictive cancer assays, it is imperative to demonstrate that they have equivalent performance in different racial groups. GPS is a tissue-based RT-PCR assay clinically validated to predict the likelihood of aggressive PCa (adverse pathology – AP, and biochemical recurrence - BCR). The assay measures the expression of 12 cancer related genes, representing 4 biologic pathways (stromal response, androgen signaling, cellular organization and proliferation), and 5 reference genes. We assessed the clinical performance of the test in different racial groups.

Methods

We compared GPS results (scale 0-100) and individual gene group scores in specimens from 138 AA and 957 CA patients in 4 independent cohorts (3 biopsy-based - CPDR, PCaP, and UCSF and one RP-based - CC) with clinically low to intermediate risk PCa. In 3 cohorts (CPDR, CC, UCSF), the association between GPS, race and outcomes were assessed using logistic regression and Cox PH models as appropriate.

Results

Although each cohort had different baseline risk distributions (as reflected by different median GPS), within each cohort median and interquartile ranges of GPS were similar between AA and CA men and were not statistically different (Table 1). Individual gene group expression patterns were similar between the two racial groups and not statistically different. In each of the 3 cohorts with AP endpoints, race was not predictive of outcome; in the CPDR study, race was not predictive of BCR. In a multivariable model with GPS, NCCN risk group and race in the CPDR and UCSF studies, only GPS was significantly ($p<0.001$) associated with clinical outcomes. In the CPDR study, GPS was strongly predictive ($p<0.05$) of clinical outcomes in both racial groups.

Conclusions

The tumor biology measured by GPS is similar between AA and CA men. AA and CA patients had comparable clinical outcomes in these cohorts. In the largest cohort (CPDR), GPS was predictive of AP and BCR in both racial groups.

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Table 1. Distribution of GPS between AA and CA men within each study

Variable	Cohort*	Race	Percentage (%)	Median	Q1	Q3	Min	Max	Wilcoxon Rank- Sum Test P-value
	CPDR	AA	21	30	23	38	12	64	0.73
	(N=387)	CA	79	30	23	40	2	87	
	CC	AA	14	28	17	40	6	70	0.90
GPS	(N=313)	CA	86	25	19	35	1	100	
	PCaP	AA	57	35	32	42	26	100	0.80
	(N=23)	CA	43	33	30	46	25	85	
	UCSF	AA	3	22	17	27	13	38	0.27
	(N=372)	CA	97	24	18	33	1	65	

*CPDR - Center for Prostate Disease Research; CC - Cleveland Clinic, PCaP - North Carolina Louisiana Prostate Cancer P

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