Predictive Value of PIRADS v2 for Clinically Significant Prostate Cancer on Prostate Biopsy in a High-Risk Ethnic Cohort

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ABSTRACT

INTRODUCTION AND OBJECTIVES: African Americans (AA) typically harbor more aggressive prostate cancer (PCa). Prostate Imaging Reporting and Data System version 2 (PIRADS v2) for prostate multiparametric magnetic resonance imaging (mpMRI) interpretation is increasingly utilized to guide PCa screening. We assessed the predictive value of PIRADS v2 for any PCa on corresponding prostate biopsy, stratified by patient ethnicity, at our institution.

METHODS: All PIRADS v2 reports of mpMRI studies performed after 1/1/2015 for evaluation of PCa were reviewed. Patients' age, ethnicity, pre-biopsy prostate specific antigen (PSA), and prostate biopsy results were extracted. Results were analyzed based on ethnicity – AA vs non-AA. Demographics were compared by t-test, and the relationship between PIRADS lesions 3-5 and pathologic outcomes – clinically significant (CS) cancer on biopsy, defined as Gleason Score ≤ 7 – were analyzed using multivariable logistic regression.

RESULTS: We reviewed 467 prostate MRIs; 174 (37.3%) AA, 293 (62.7%) non-AA. There was no difference in age (p=0.660), pre-biopsy PSA (p=0.429), or prostate volume (p=0.129) between the two groups. 601 total PIRADS 3+ prostate lesions were analyzed on bivariate analysis: 41.2% of AAs with a PIRADS 3 lesion had CS PCa anywhere in the prostate compared to 28.5% of non-AAs (p=0.034); there was no significant difference between the groups for PIRADS 4 or 5 lesions (Table 1). 379 index lesions (31.9% PIRADS 3, 36.7% PIRADS 4, 31.4% PIRADS 5), defined as each patient's highest PIRADS lesion with the largest size, were analyzed using multivariate analysis (Tables 2 and 3). Increasing age (in increments of five years) was associated with an increased risk of having CS PCa on prostate biopsy in non-AAs (OR 1.7, p<0.001) but not in AAs (OR 1.1, p=0.567). Additionally, a PIRADS 5 lesion on MRI was associated with an increased risk of CS PCa in both non-AAs (OR 3.6, p=0.007) and AAs (OR 5.0, p=0.011).

CONCLUSIONS: Compared to non-AAs, AAs with any PIRADS 3 lesion anywhere on prostate MRI were more likely to harbor CS PCa on prostate biopsy. Older non-AAs were more likely to have CS PCa than younger non-AAs, but age was not associated with cancer risk in AAs. A PIRADS 5 lesion significantly increased the risk of CS PCa in both AAs and non-AAs.

RESULTS

Table 1: Bivariate analysis of PIRADS score and prostate biopsy pathology of all lesions by ethnicity

	non-AA	AA	p-value
PIRADS 3 (n=248)	n=151	n=97	
GS ≥ 6	79 (52.3%)	64 (66.0%)	0.034
GS ≥ 7	43 (28.5%)	40 (41.2%)	0.034
PIRADS 4 (n=209)	n=136	n=73	
GS ≥ 6	101 (74.3%)	58 (79.4%)	0.402
GS ≥ 7	67 (49.3%)	34 (46.6%)	0.711
PIRADS 5 (n=144)	n=90	n=54	
GS ≥ 6	79 (87.8%)	47 (87.0%)	0.896
GS ≥ 7	68 (75.6%)	35 (64.8%)	0.896

Table 2: Multivariate analysis of patient variables and prostate biopsy pathology of index lesions in non-AAs

Variable	Odds Ratio	95% Confidence Interval	p-value
Age (increments of 5 years)	1.7	1.4-2.2	<0.001
Prostate volume (increments of 10 cc)	0.8	0.7-0.9	<0.001
Pre-biopsy PSA	1.1	1.02 – 1.11	0.007
PIRADS			
3	0.4	0.2-0.96	0.041
4	1.2	0.5-2.6	0.708
5	3.6	1.4-9.0	0.007

Table 3: Multivariate analysis of patient variables and prostate biopsy pathology of index lesions in AAs

Variable	Odds Ratio	95% Confidence Interval	p-value
Age (increments of 5 years)	1.1	0.8-1.4	0.567
Prostate volume (increments of 10 cc)	0.7	0.6-0.8	<0.001
Pre-biopsy PSA	1.1	1.01 – 1.1	0.022
PIRADS			
3	1.2	0.4-3.6	0.714
4	2.1	0.7-5.9	0.169
5	5.0	1.4-17.5	0.011

SUMMARY

- Any PIRADS 5 lesion is associated with clinically significant prostate cancer in both AAs and non-AAs
- Any PIRADS 3 lesion in AAs may warrant more aggressive screening/counseling regarding the need for a prostate biopsy compared to non-AAs
- More aggressive screening/counseling for prostate cancer may be warranted in younger AAs compared to younger non-AAs