Improving the Prediction of Pathologic Outcomes in Patients Undergoing Radical Prostatectomy: The Value of Prostate Cancer Antigen 3 (PCA3), Prostate Health Index (Phi) and Sarcosine

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**Abstract**

**Background/Aim:** Several efforts have been made to find biomarkers that could help clinicians to preoperatively determine prostate cancer (PCa) pathological characteristics and choose the best therapeutic approach, avoiding over-treatment. On this effort, prostate cancer antigen 3 (PCA3), prostate health index (phi) and sarcosine have been presented as promising tools. We evaluated the ability of these biomarkers to predict the pathologic PCa characteristics within a prospectively collected contemporary cohort of patients who underwent radical prostatectomy (RP) for clinically localized PCa at a single high-volume institution.

**Materials and Methods:** The prognostic performance of PCA3, phi and sarcosine were evaluated in 78 patients undergoing RP for biopsy-proven PCa. Receiver operating characteristic (ROC) curve analyses tested the accuracy (area under the curve (AUC)) in predicting PCa pathological characteristics. Decision curve analyses (DCA) were used to assess the clinical benefit of the three biomarkers.
Results: We found that:

PCA3, phi and sarcosine levels were significantly higher in patients with tumor volume (TV) ≥0.5 ml, pathologic Gleason sum (GS) ≥7 and pT3 disease (all p-values ≤0.01).

ROC curve analysis showed that:

PHI is an accurate predictor of high-stage (AUC 0.85 [0.77-0.93]), high-grade (AUC 0.83 [0.73-0.93]) and high-volume disease (AUC 0.94 [0.88-0.99]).

Sarcosine showed a comparable AUC (0.85 [0.76-0.94]) only for T3 stage prediction.

PCA3 score showed lower AUCs, ranging from 0.74 (for GS) to 0.86 (for TV).

Conclusion: PCA3, phi and sarcosine are predictors of PCa characteristics at final pathology. Successful clinical translation of these findings would reduce the frequency of surveillance biopsies and may enhance acceptance of active surveillance (AS).