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Nomogram with prostate-specific antigen velocity (PSAV) risk count for high grade prostate cancer

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INTRODUCTION AND OBJECTIVES: Prostate-specific antigen (PSA) screening is controversial for prostate cancer detection due to its limited specificity. Several recent studies have suggested that the PSA velocity (PSAV) risk count (number of times that PSAV exceeds 0.4 ng/ml/year in a row) improves predictive accuracy for identifying high-grade disease. Since multivariable nomograms are increasingly used in prostate cancer detection, our objective was to create a nomogram including PSAV risk count to predict high grade prostate cancer (HG PCa).

METHODS: From a prospective database of 12-core prostate biopsies, we identified 410 men with 3 PSA values separated by at least 6 months and a maximum of 24 months prior to biopsy. The PSAV risk count was calculated by counting the number of times in a row that PSAV exceeded the threshold value of 0.4 ng/mL/year. Logistic regression was then used to predict HG PCa at biopsy using traditional risk factors along with PSAV risk count.

RESULTS: Of the 410 men, 117 (28.5%) were diagnosed with prostate cancer on biopsy, of which 50 (12.2%) had HG PCa. On ROC analysis, PSAV risk count had superior discrimination for PCa compared to PSA. On multivariable analysis, age, PSA, DRE, prostate volume, and PSAV risk count were all statistically significant predictors of HG PCa. A nomogram developed from the final logistic regression model findings was well-calibrated and had an AUC of 0.774 for HG PCa. On decision-curve analysis, PSAV risk count alone and particularly as part of the multivariable nomogram resulted in a greater net benefit compared to PSA.

CONCLUSIONS: PSAV risk count outperforms total PSA for the prediction of prostate cancer on biopsy. We successfully developed a nomogram to predict HG PCa including age, PSA, DRE findings, prostate volume and PSAV risk count. Although the nomogram performed well in the internal validation, additional studies are warranted in external populations to confirm the clinical utility of this predictive tool.

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