Assessment of Prostate-Specific Antigen (PSA) Kinetics in Prediction of Prostate Cancer on Prostate Biopsy

Introduction and Objective: We investigated whether prostate-specific antigen (PSA) kinetics affected the detection of prostate cancer (PC) on prostate needle biopsy.
Materials and Methods: Between January 2008 and February 2012, 107 men with at least three concurrent PSA measurements underwent extended prostate biopsy due to suspicion of PC and 55 men were performed on repeat biopsy. We measured age, PSA, PSA density (PSAD), PSA velocity (PSAV) and PSA doubling time (PSADT). We then classified total group into a PC group and non-PC group, and compared the two groups. We investigated which variables were exact to predict prostate biopsy using univariate and multivariate analyses, and assessed the diagnostic performance using the receiver operating characteristics (ROC) curve.
Results: The mean (range) patient age was 70.7 years (57-84), PSA was 9.55 ng/ml (4.00-33.3), PSAD was 0.29 (0.11-1.00) ng/ml/cc, PSAV was 1.68 (0.02-38.6) ng/ml/year and PSADT was 7.80 years (0.4-120.9). The detection rate of PC was 29.9% and 25.5% in overall and repeat biopsy patients, respectively. The PC group showed significantly higher age (74.3 vs 69.3, p=0.001), higher PSAD (0.37 vs 0.25, p=0.003, lower PSAV (1.48 vs 1.03, p=0.037) and lower PSADT (4.07 vs 9.39, p= 0.017) than the non-PC group. There was no significant difference between two groups in PSA (10.1 vs 9.34, p=0.914). Multivariate analysis showed that PSAD was the most significantly affected the detection of PC (p=0.01). On the ROC curve, the areas under the curves (AUC) of PSA, PSAD, PSAV and PSADT were 0.495, 0.574, 0.551 and 0.592. On repeat biopsy, the PC group showed significantly higher age (76.0 vs 69.2, p=0.001) and PSAD (0.48 vs 0.30, p=0.010) than the non-PC group. There was no significant difference between two groups in PSA (12.1 vs 11.1, p=0.999), PSAV (1.46 vs 1.60, p=0.643) and PSADT (5.24 vs 9.75, p=0.538).
Conclusion: We confirm that PSAD, PSAV and PSADT are valuable factors for predicting PC on prostate biopsy. PSAD is useful factor for predicting PC on repeat biopsy and preventing a substantial number of unnecessary biopsies.