PCA3 Gene In Prostate Cancer Diagnosis: Improving Biopsy Efficiency And Predicting Tumor Grade And Extension

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BACKGROUND

PCA3 gene (Figure 1) is a molecular biomarker recently incorporated to clinical practice with specificity close to 80% for prostate cancer (PC) diagnosis. It is currently used as a new diagnostic tool in the clinical management of patients with elevated PSA. PCA3 study in urine collected after prostatic massage significantly reduces the number of prostate biopsies and increases diagnostic yield. Recently it has also granted predictive value of tumor grade and stage.

The aim of this study was to analyze the relationship between urine PCA3 score (s-PCA3) with Gleason grade and tumor volume in a series of 131 biopsies performed in patients with elevated PSA and positive s-PCA3.

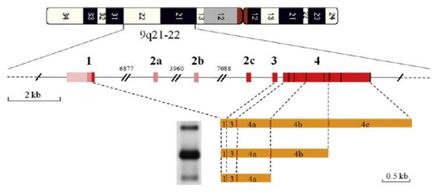


Figure. 1. PCA3 gene structure (from Day JR et al. Cancer Letters 2011).

DESIGN

750 urine samples collected after prostatic massage, corresponding to 658 patients with elevated PSA, were included. s-PCA3 (ARNmPCA3/ARNmPSAx1000) was determined using Progensa PCA3 Assay kit ™. Biopsies were performed in patients with positive s-PCA3 (≥35). Histopathological and immunohistological studies (AMACR, p63 and 34βE12) were conducted by two pathologists independently, on serial sections of paraffin embedded tissues (Figure 2). The average number of studied cylinders was 13 per patient, Gleason scores and percentage of affected cylinders were recorded.

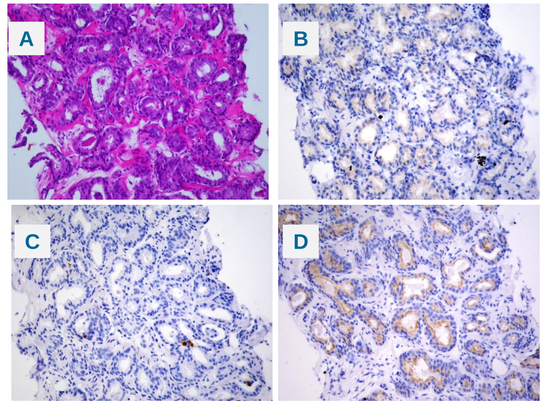
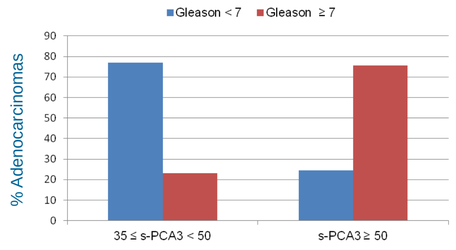
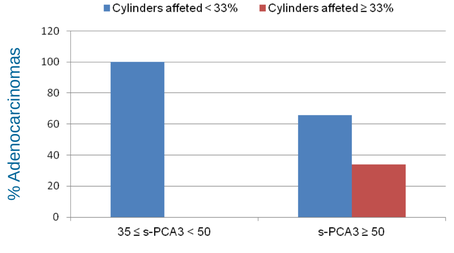


Figure. 2. (A) H&E section of a Prostate Adenocarcinoma. It shows negative IHC staining for p63 (B) and 34βE12 (C); and positive staining for AMACR (D). (x200)



Fisher: p=0.002

Figure. 3. Gleason score vs s-PCA3 (n = 58).



Fisher: p=0.023

Figure. 4. Percentage of affected cylinders vs s-PCA3 (n = 53).

RESULTS

s-PCA3 was positive in 43,3% of studied samples. In this group 131 biopsies were performed, incidence of PC or atypical small acinar proliferation was 52,7%, reaching to 67,6% in s-PCA3≥100. There was a statistically significant relationship between s-PCA3 and tumor grade (p =,002) (Figure 3). In cases where positive s-PCA3 was lower than 50, only 23% were high grade (Gleason ≥ 7), whereas with s-PCA3 higher than 50, high grade incidence rose to 75,6%. There was a statistically significant relationship between s-PCA3 and the percentage of affected cylinders (p =,023) (Figure 4). None of the PC with positive s-PCA3 lower than 50 had more than 33% of the cylinders affected. Both relationships were confirmed by applying the log-linear model that included the three variables (Figure 5).

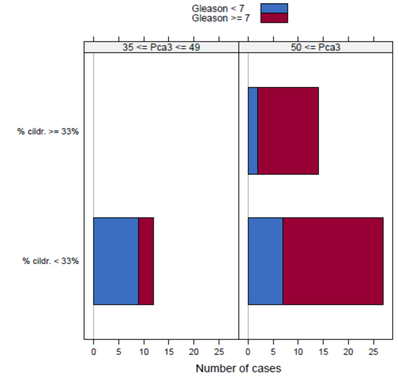


Figure. 5. Log-linear model including s-PCA3, Gleason and affected cylindres(%).

CONCLUSIONS

•Including s-PCA3 studies to PC screening allows a significant reduction in the number of biopsies performed (55,1%) and an increase of positive biopsies (52,7%).

•s-PCA3 is also an indicator of tumor aggressiveness and provides essential information when making treatment decisions (grade and tumor volume).

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