489 Development and external validation of MRI-based nomogram to predict the probability of prostate cancer diagnosis with MRI-US fusion biopsy

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Introduction & Objectives: The wide diffusion of multiparametric magnetic resonance imaging (MRI) has dramatically modified the scenario of prostate cancer (PCa) diagnosis. The detection rate of MRI-ultrasound (US) fusion biopsy increased as well as the need for an extended prostate biopsy sampling with saturation biopsy decreased. The aim of this study was to develop, to calibrate and to externally validate a nomogram to predict the probability of detecting a clinically significant prostate cancer.

Materials & Methods: Prospectively collected data from 3 European tertiary referral center series of 478 consecutive patients who underwent MRI-US fusion biopsy using the UroStation™ (Koelis, France) were used to build the nomogram. External validation was performed in 406 patients from a US tertiary referral center. The Mann–Whitney U test and the Chi-square tests were used to evaluate differences in continuous and categorical variables, respectively. A logistic regression model is created to identify predictors of PCa diagnosis with MRI-US fusion biopsy. Predictive accuracy was quantified using the concordance index (CI). Internal validation with 200 bootstrap resampling and calibration plots were generated to explore nomogram performance.

Results: The development and validation cohorts were homogeneous for age (66.3 vs 66 yrs, p=0.57]), PSA levels (9.4 vs 8.8 ng/Ml, p=0.71] and PCa detection rates (57.4 vs 56.7%, p=0.81). Age, PSA serum levels, PIRADS score at MRI report, number of targeted and number of systematic cores taken were included in the model (Figure 1A). The nomogram showed high predictive accuracy (CI 0.82) and was well calibrated (Figure 1B). In the validation cohort the predictive accuracy was 0.77. Limitations include the need for a pre-biopsy mp-MRI and

consequent fusion biopsy to reproduce findings.

FIG 1A

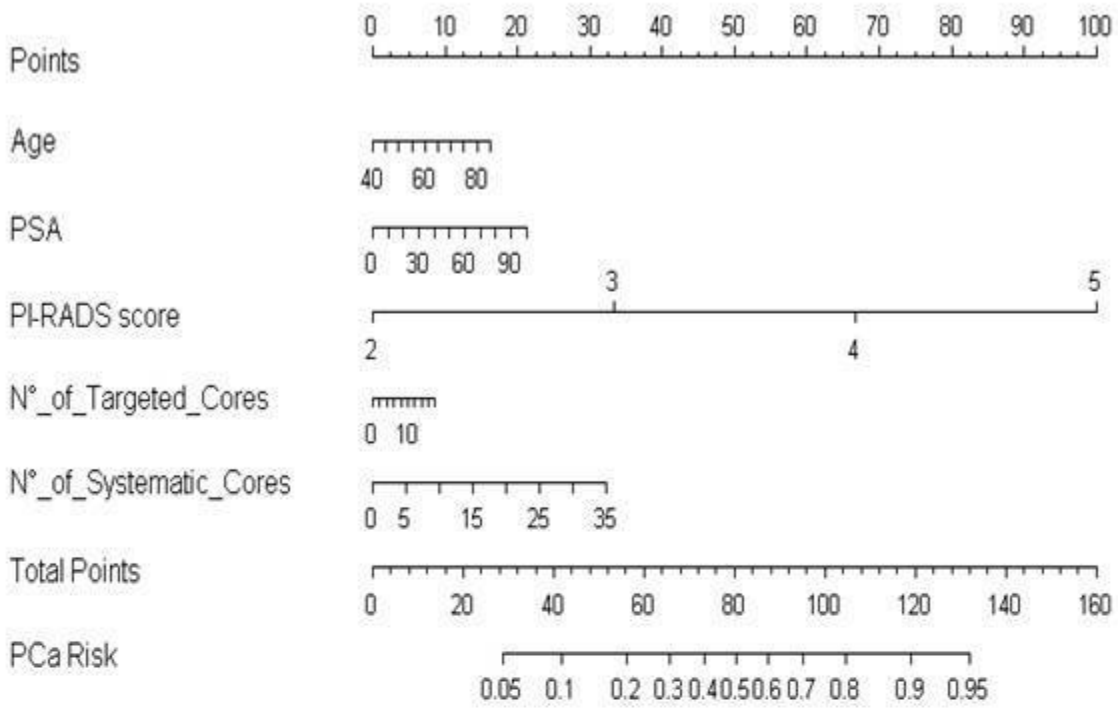
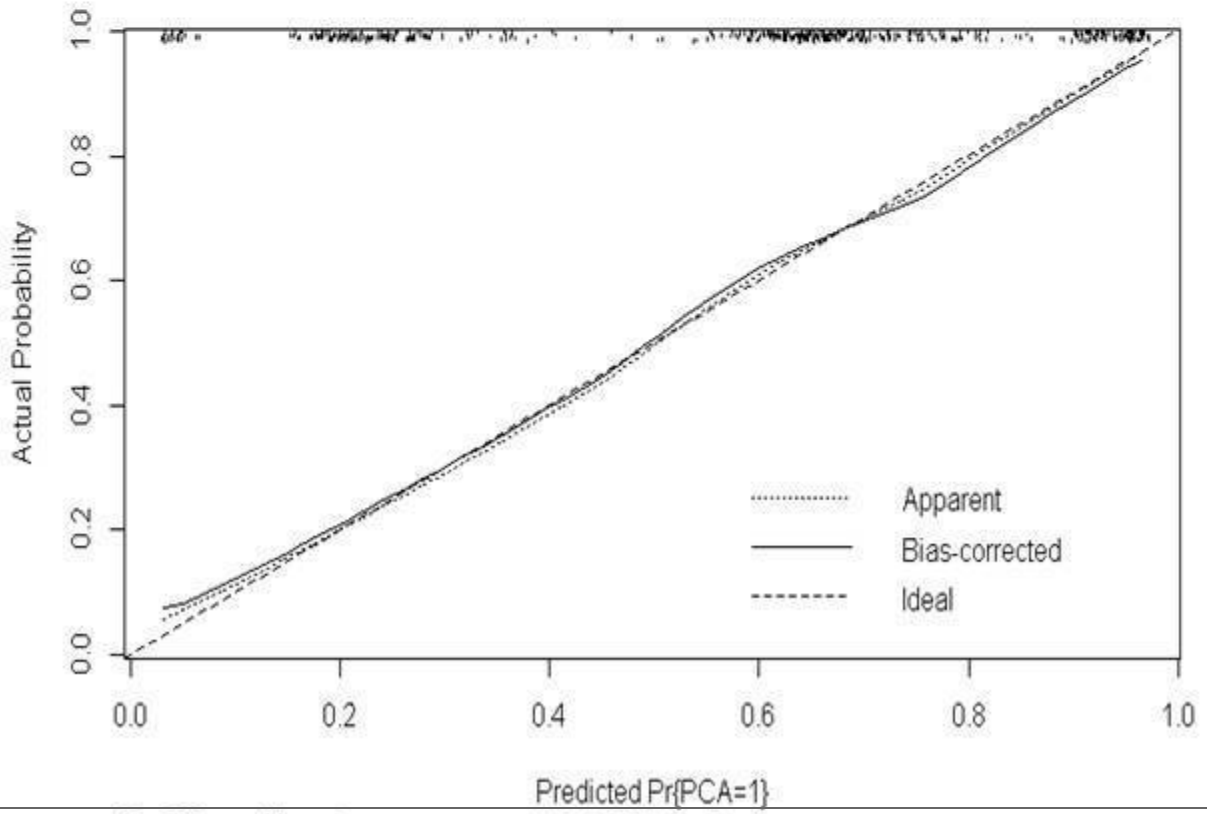

Points
0 10 20 30 40 50 60 70 80 90 100
Age
40 60 80
PSA
0 30 60 90
PI-RADS score
2 3 4 5
N°_of_Targeted_Cores
0 10
N°_of_Systematic_Cores
0 5 15 25 35
Total Points
0 20 40 60 80 100 120 140 160
PCa Risk
0.05 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.95

FIG 1B


Actual Probability
0.0 0.2 0.4 0.6 0.8 1.0
Apparent
Bias-corrected
Ideal
Predicted Pr{PCA=1}
B= 200 repetitions, boot

Conclusions: This nomogram provides a high accuracy in predicting the probability of PCa diagnosis with MRI-US fusion biopsy. This is an easy to use clinical tool that physicians may use for patients counseling purposes.