MP03-16

UTILITY OF MULTI-PARAMETRIC MRI/ULTRASOUND FUSION: COGNITIVE NOT INFERIOR TO TARGETED SOFTWARE-BASED PROSTATE BIOPSIES

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INTRODUCTION AND OBJECTIVES: Prostate cancer (PCa) remains the only solid organ tumor that is diagnosed by a non-targeted sampling method. Recently, multi-parametric MRI (MP-MRI) in conjunction with an MRI- ultrasound (US) fusion guided biopsy (bx) has demonstrated improved PCa detection. Unfortunately, this technology has been limited to tertiary care centers. Therefore, we sought to compare cognitive versus targeted software to assess the ability of cognitive registration to disseminate more readily into the community.

METHODS: Consecutive patients underwent an MRI-US fusion prostate bx for elevated PSA, abnormal DRE, active surveillance or prior negative bx with a persistently elevated PSA. All subjects underwent pre-bx MP-MRI and lesions visible on MRI were graded using the PI-RADS version 2 classification system. The UroNav bx tracking system was used to fuse the stored MR images with real-time US generating a 3D model, which was then used to sequentially perform cognitive, targeted, and standard 12 core systematic biopsies in an office setting under local anesthesia. Descriptive statistics included patient characteristics and univariate analysis was done using logistic regression analysis to detect the associations between presence of cancer, clinically significant cancer, demographic variables, and bx method. Signed rank test was used for paired comparisons amongst bx method.

RESULTS: 44 patients (median age 66 yrs, median PSA 6.4) underwent an MRI-US fusion bx between July 2014 and October 2015 with an overall CDR of 59%. Cognitive CDR was 40.9% with 25% being clinical significant disease. The targeted CDR was 27.3% with 22.7% being clinically significant disease. Overall, the cognitive approach had a sensitivity of 69.2% (95% CI: 50%, 88%) whereas the targeted approach had sensitivity of 46.2% (95% CI: 26%, 67%). Furthermore, the targeted approach missed 8 cancers when compared to the cognitive approach, whereas, the cognitive approach missed 2 cancer when compared to the targeted approach. The difference in sensitivity is most pronounced when comparing standard and targeted methods ($p=0.02$) and approaches significance when comparing cognitive and targeted methods ($p=0.11$).

CONCLUSIONS: MRI-US fusion targeted software when compared to the cognitive platform, was not found to have higher cancer detection rate nor sensitivity. We believe this highlights the importance of the MRI itself, rather than the platform used.

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MP03-17

MRI-BASED NOMOGRAM TO PREDICT THE PROBABILITY OF PROSTATE CANCER DIAGNOSIS WITH MRI-US FUSION BIOPSY

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INTRODUCTION AND 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, internally validate and calibrate a nomogram to predict the probability of detecting a prostate cancer.

METHODS: Prospectively collected data from 3 tertiary referral center series of 475 consecutive patients who underwent MRI-US fusion biopsy using the Koelis system were used to build the nomogram. 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 plot were performed.

RESULTS: Mean age was 66.3 yrs ($\pm$7.98) and mean PSA levels were 9.8 ng/mL($\pm$7.98). The overall PCa detection rate was 57.4%.Age, PSA serum levels, PIRADS score at MRI report, number of targeted and number of systematic cores taken were included in the model (Figure 1). Predictive accuracy was 0.82. On internal validation the CI was 0.81 and predicted probability was well calibrated (Figure 2).Limitations include the lack of external validation and the absence of patients with races different by Caucasian in the development cohort.

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 counselling purposes.

Figure 1

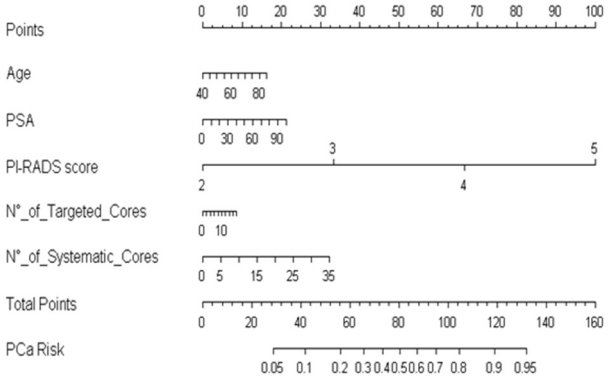
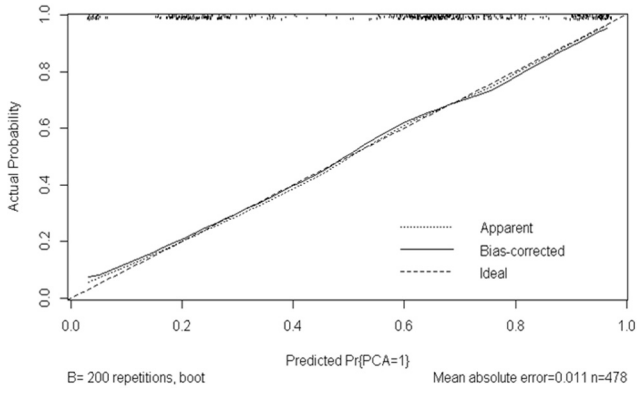


Figure 2



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