

Defining the target prior to prostate fusion biopsy: the effect of MRI reporting on cancer detection

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Abstract

Purpose: Definition of targets in multiparametric MRI (mpMRI) prior to MRI/TRUS fusion prostate biopsy either by urologist or radiologist, as a prose report or by illustration is crucial for accurate targeted biopsies (TB). The objective was to analyze the effect of MRI reporting on target definition and cancer detection.

Methods: 202 patients underwent MRI/TRUS fusion biopsy with Artemis™ (Eigen, USA). mpMRI results were submitted in written form to urologists, who marked the targets in the proprietary software. An expert urologist reviewed and marked mpMRI targets blinded to biopsy data. We compared number, localization and volume of targets between the observers and analyzed whether variations impaired TB results by bivariate and logistic regression models.

Results: Interobserver variability was moderate regarding number and low regarding localization of targets. Urologists overestimated target volumes significantly compared to radiologists ($p = 0.045$) and matching target volume between both observers was only 43.9%. Overall cancer detection rate was 69.8 and 52.0% by TB. A higher matching target volume was a significant predictor of cancer in TB ($p < 0.001$). Logistic regression revealed prostate volume and PI-RADS as independent predictors. Defining targets in incorrect T2w slices in the cranio-caudal axis are one presumable reason for missing cancer in TB.

Conclusions: A high concordance of the target definition between radiologist and urologist is mandatory for accurate TB. Optimized ROI definition is recommended to improve TB results, preferably as contouring in MRI sequences by the radiologist or, if not feasible, by precise MRI reports including specific localization in sequence and slice

as well as an illustration. High prostate volume and low PI-RADS score have to be considered as limiting factors for target definition.

Keywords: Biopsy; Fusion; Interobserver variability; Multiparametric MRI; Prostatic neoplasms.