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Differences of histopathologic features in prostate biopsy techniques: Systematic versus cognitive versus software fusion

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Introduction & Objectives: The amount of tumor and its grading are extremely important parameters in prostate biopsy cores. They are predictors of clinically significant versus insignificant prostate cancer(PCa) and the cornerstone for planning treatment strategy.
The purpose of this work was to compare the amount and grading of tumor in prostate biopsy cores obtained from the same patient using systematic biopsy (SBx), new MRI-TRUS registration biopsy techniques - cognitive (CBx) and software-based fusion (FBx).

Materials & Methods: Study group included thirty nine consecutive men subjected to primary (25 men-64%) and repeated (14 men-36%) TRUScoreBx due to suspicion of PCa. The median age was 66 (50-78) yo. The median PSA level was 6,6 ng/ml, PSAD 0,11. All men underwent 1,5T (23 men -59%) or 3T (16 men-41%) mpMRI (T2-weighted, diffusion weighted, dynamic contrast enhanced). We defined 81 suspected lesions on MRI images - 6 lesions were scored PIRADS 5 (7,4%) ,33 lesions - PIRADS 4 (41%); 41 lesions - PIRADS 3 (51 %) 1 lesion - PIRADS 2 (1%). During the same procedure study protocol consisted of: SBx performed by the first operator blinded for mpMRI results (mean 12 cores), CBx performed by the first operator after reviewing mpMRI results (mean 2 cores) and finally FBx performed by the second operator using BioJet System biopsy platform (mean 2,2 cores).

Results: Mean length of cancer per biopsy core (median) reached: SBx - 2,1 mm (1,8), CBx - 4,4 mm (4) and FBx - 3,8 mm (3). Analogical results have been obtained in mean percentage of cancer per core (median): SBx - 20% (17,5), CBx - 38,7% (30) and FBx - 38,6% (30). Number of cores needed to be taken in order to obtain one positive core with cancer was: SBx - 11,1, CBx - 3,8 and FBx - 4,1. Upgrading of Gleason score (Gs) comparing different biopsy techniques was seen in SBx -2 men, CBx 1 -man and FBx 4 -men.

Conclusions: We found that amount of cancer counted in length and percentage per core was higher in FBx and CBx with less cores needed to be taken. The most frequent Gs upgrading was observed in FBx.