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Comparison of diagnostic performance between magnetic resonance imaging guided prostate biopsy and systematic 14-core biopsy including anterior samplings

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Introduction & Objectives: Multiple studies have compared magnetic resonance imaging (MRI)-guided biopsy (MRBx) and transrectal extended biopsy in detecting significant cancer (SC). In these studies, MRBx might be overestimated because MRBx has an advantage in detecting anterior cancer compared to transrectal biopsy. The aim of our study is to directly compare MRBx and transrectal ultrasound (TRUS)-guided systematic 14-core biopsy including transperineal anterior samplings (S14Bx) in detecting SC and assessing cancer aggressiveness.

Material & Methods: Between September 2011 and October 2012, we prospectively evaluated 127 consecutive men with a PSA level between 2.5-20 ng/ml and/or digital rectal examination (DRE) for suspected clinically localized disease, no previous prostate surgery, and positive findings on prebiopsy 1.5T multiparametric MRI. Multiparametric MRI included T2-weighted, diffusion-weighted and/or dynamic contrast-enhanced imaging. All men underwent MRBx and S14Bx concurrently. During the biopsy, MRI results were displayed so that the suspected lesion on MRI was visually matched with the corresponding location on TRUS. Four-core samplings for one suspected lesion on MRI were performed. The S14Bx we performed were a transperineal 14-core biopsy (including 6 anterior samplings) or a combined 14-core biopsy of transperineal 8-core and transrectal 6-core biopsies (including 4 anterior samplings).Pathological specimens were evaluated according to the 2005 modified Gleason grading system. We defined indolent cancer (IC) as PSA < 10 ng/ml, DRE-based clinical stage T1a-T2a, biopsy Gleason score (GS) ≤ 3+4, and maximum cancer length (MCL) < 5 mm. Cancer other than IC was defined as SC. Detection capability of SC and ability to identify the highest GS and MCL as indicators of cancer aggressiveness were compared between MRBx and S14Bx.

Results: Median age and PSA were 67 years and 8.1 ng/ml, respectively. Number of suspected lesions on MRI was one/two/three in 112/13/2 cases, respectively. Biopsy results in combination of MRBx and S14Bx were no cancer/IC/SC in 35/13/79 cases, respectively. MRBx/S14Bx detected 4/12 IC and 71/74 SC, respectively. MRBx had equivalent ability to S14Bx in detecting SC ($p = 0.70$), while MRBx detected significantly fewer IC compared to S14Bx ($p = 0.03$). In 67 SC that both MRBx and S14Bx detected, MRBx/S14Bx identified the highest GS in 51/46 cases and MCL in 45/42 cases, respectively. There were no significant difference between MRBx and S14Bx in identifying the highest GS ($p = 0.33$) and MCL ($p = 0.58$).

Conclusions: MRI-guided biopsy with 4 cores for one suspected lesion has equivalent ability to detect significant cancer and assess cancer aggressiveness compared to a systematic 14-core biopsy including anterior samplings.