

**Targeted prostatic biopsy based on multiparametric magnetic resonance imaging to select candidates for focal therapy of prostate cancer**

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**Introduction:** Multiparametric magnetic resonance imaging (mMRI) has been reported to have considerable potential to improve the prostate cancer diagnostic pathway. The aim of this study was to demonstrate the efficacy of mMRI for targeting cancer in patients with elevated prostate-specific antigen (PSA) levels.

**Methods:** 136 consecutive men who had elevated PSA levels >4ng/ml and mMRI before biopsy were included. mMRI included T2-W turbo spin-echo sequences, diffusion-weighted imaging (DWI), and dynamic contrast-enhanced (DCE) T1-W gradient echo sequences. MRI signal criteria were a deep and homogeneous low intensity on T2-WI, focal nodular areas of abnormal high signal intensity on DWI, and/or an asymmetric, early, and intense enhancement on DCE T1-WI. MRI-targeted biopsies were performed including 1 to 3 cores from mMRI-based suspicious area as well as 8 cores from normal octant area. For patients who underwent radical prostatectomy, tracings from MRI images and histopathology maps from whole mount section were matched.

**Results:** The overall cancer-detection rate at biopsy was 56% (76/136). The overall sensitivity for predicting positive biopsies by mMRI was 87% (66/76), the specificity 58% (35/60) and the accuracy 74% (101/136). Specific mMRI-targeted biopsies and standard cores were taken, with a significant proportion (21/66, 32%) having cancer detected purely because of the MRI-targeted cores. Among 21 patients with biopsy-proven solitary lesion by mMRI, 7 patients underwent radical prostatectomy. Histopathology revealed solitary and significant focus of prostate cancer (Gleason sum greater than 6 and/or tumor volume >0.5 cc) in 5 patients who were considered to be candidates for focal therapy, multiple significant tumor in 1 patient and single insignificant tumor in 1 patient.

**Conclusions:** Targeted prostatic biopsy based on mMRI findings revealed a remarkable potential to select candidates for focal therapy of prostate cancer.