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European Urology

Volume 62, Issue 5, November 2012, Pages 902-909

Prostate Cancer

Three-Tesla Magnetic Resonanceâ€“Guided Prostate Biopsy in Men With Increased Prostate-Specific Antigen and Repeated, Negative, Random, Systematic, Transrectal Ultrasound Biopsies: Detection of Clinically Significant Prostate Cancers

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<https://doi.org/10.1016/j.eururo.2012.01.047>

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Abstract

Background

Patients with elevated prostate-specific antigen (PSA) and one or more previous negative transrectal ultrasound (TRUS) biopsy sessions are subject to diagnostic uncertainty due to TRUS-biopsy undersampling. Magnetic resonance (MR)â€“guided biopsy (MRGB) has shown high prostate cancer (PCa)â€“detection rates in studies with limited patient numbers.

Objective

Determine the detection rate of (clinically significant) PCa for MRGB of cancer-suspicious regions (CSRs) on 3-T multiparametric MR imaging (MP-MRI) in patients with elevated PSA and one or more negative TRUS-biopsy sessions.

Design, setting, and participants

Of 844 patients who underwent 3-T MP-MRI in our referral centre between March 2008 and February 2011, 438 consecutive patients with a PSA >4.0 ng/ml and one negative TRUS-biopsy session or more were included. MRGB was performed in 265 patients. Exclusion criteria were existent PCa, endorectal coil use, and MP-MRI for indications other than cancer detection.

Intervention

Patients underwent MRGB of MP-MRI CSRs.

Measurements

(Clinically significant) MRGB cancer-detection rates were determined. Clinically significant cancer was defined by accepted (i.a. Epstein and d'Amico) criteria based on PSA, Gleason score, stage, and tumour volume. Follow-up PSA and histopathology were collected. Sensitivity analysis was performed for patients with MP-MRI CSRs without MRGB.

Results and limitations

In a total of 117 patients, cancer was detected with MRGB ($n = 108$) or after negative MRGB ($n = 9$). PCa was detected in 108 of 438 patients (25%) and in 41% (108 of 265) of MRGB patients. The majority of detected cancers (87%) were clinically significant. Clinically significant cancers were detected in seven of nine (78%) negative MRGB patients in whom PCa was detected during follow-up. Sensitivity analysis resulted in increased cancer detection (47%–56%). Complications occurred in 0.2% of patients (5 of 265).

Conclusions

In patients with elevated PSA and one or more negative TRUS-biopsy sessions, MRGB of MP-MRI CSRs had a PCa-detection rate of 41%. The majority of detected cancers were clinically significant (87%).



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Keywords

Magnetic resonance imaging; Prostate biopsy; Prostate cancer

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