

Diagnosis of anterior prostate cancer using MRI/TRUS real time soft image fusion

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Background: Anterior prostate cancers (APC) are rarely palpable and difficult to sample when using traditional transrectal ultrasound (TRUS) biopsies. Accurate targeted biopsies can be performed when using magnetic resonance imaging (MRI) and 3D TRUS real time soft image fusion.

The aim of the study was to evaluate the accuracy of MRI/TRUS guided biopsies in the detection of APC.

Materials and Methods: Between 2010 and 2012, 358 patients with elevated prostate specific antigen (PSA) underwent MRI/TRUS guided biopsies. 90/358 (25%) pts with MRI suspicious anterior cancer were included in the study. Biopsy patients groups were: initial biopsy 5 pts, 1st-10th re- biopsy 63 pts (mean previous negative biopsy procedures 2,6), re-biopsy due to active surveillance 19 pts, and PSA recurrence after radiotherapy 3 pts.

Mean age, PSA and prostate volume were 65 years, 17.0 ng/ml and 42 ml.

MRI: 1.5T Avanto (Siemens, Erlangen) and body array coil. Sequences: ax3D T2w, and DWI b2000 and b50/1000 were used for apparent diffusion coefficient (ADC).

Ultrasound: 3D Accuvix V10 (Medison®, Korea), navigation system: Urostation (Koelis®, Grenoble, France).

Minimum one biopsy was obtained from each MRI target using 18G Tru Core ®II (Angiothech, USA). One sample T- test was used for statistics.

Results: 74/90 (82%) pts had positive targeted biopsies with Gleason score 6 (n=25), 7 (n=34), 8 (n=14) and 9 (n=1), and mean tumour volume 3.2 ml (95% CI 1.6-4.8).

ADC values for positive targeted biopsies were $78 \times 10^{-5} \text{ mm}^2/\text{s}$ (95% CI 74-82) and for negative targeted biopsies $97 \times 10^{-5} \text{ mm}^2/\text{s}$ (95% CI 90-104), $p < 0.001$.

The mean number of positive targeted biopsies pr. patient was 2.7, and the mean length of cancer pr. biopsy was 5.5 mm.

Conclusion: MRI/TRUS real time fusion biopsy technique is accurate in diagnosing anterior prostate cancer.