2050: "CONTEMPORARY IMAGE-GUIDED TARGETED PROSTATE BIOPSY BETTER CHARACTERIZES CANCER VOLUME, GLEASON GRADE AND ITS 3D LOCATION COMPARED TO SYSTEMATIC BIOPSY"

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Introduction and Objectives

Contemporary trans rectal ultrasound (TRUS) prostate biopsy can be guided by high-resolution ultrasound, magnetic resonance imaging (MRI) or MR/US fusion. The aim of this study is to compare the characteristics of the biopsy-proven cancer between image-guided targeted biopsy and systematic biopsy.

Methods

Between January 2010 and September 2011, 127 consecutive patients underwent outpatient TRUS biopsy using the real-time 3D TRUS-tracking system (Urostation®, Koelis, France), which enabled US-guided and/or MR/US fusion targeted biopsies. In patients who had previous negative biopsies or who were under active surveillance, multi-parametric prostate MRI (n=48) was performed prior to TRUS biopsy. If MRI suggested a focal lesion, 3D volume data of the MRI was elastically fused with TRUS at the time of biopsy. The MRI was abnormal in 29 of the 48 patients (60%), and they subsequently underwent MRI/US fusion. Overall 1500 systematic biopsies (SB), 259 ultrasound guided targeted biopsies (US-TB) and 79 MRI fusion targeted biopsies (MR-TB), were performed. The mean number of SB, US-TB and MR-TB cores per patient was 11.9, 2.6 and 2.7 respectively.

Results

Of the 127 patients the mean age was 65.4, mean PSA was 8.8, and mean prostate volume was 50.8ml. 60 of the 127 patients had a positive biopsy (47%). The table demonstrates there is an increased likelihood of identifying *significant* cancer with the targeted biopsies when compared to the systematic biopsies. Gleason 7 or higher cancer was identified in 60% and 54% of patients with US-TB and MR-TB, compared to 40% for SB (p=0.014). Similarly for percent core involved, the targeted biopsies more commonly identified cancer in greater than 50% of the core compared to SB (p=0.026).

In all cases the spatial location of each biopsy was documented using 3D TRUS-tracking, allowing more accurate localization of the cancer within the prostate. This information is useful for any future intervention such as repeat biopsies or focal therapy.

Conclusions

Contemporary image-guided targeted prostate biopsy identifies greater core involvement and higher Gleason grade compared to systematic image-blind biopsies. Targeted biopsies using 3D mapping techniques significantly alter management decisions in patients with prostate cancer.

	SB	**US-TB**	**MR-TB**	p-value
Positive rate per core	131/1500 (8.7%)	100/259 (38.6%)	32/79 (40.5%)	0.0001
Positive rate per patient	50/126 (39.7%)	45/101 (44.6%)	13/29 (44.8%)	0.724
Gleason 6/7/8/9/10	30/10/3/6/1	18/15/3/9/0	6/4/1/2/0	
Gleason ≥7	20/50 (40%)	27/45 (60%)	7/13 (54%)	0.014
Mean % core positive (SD)	26.4% (22.5)	40.6% (28.7)	47.3% (28.6)	
>50% core involved	8/50 (16%)	16/45 (36%)	6/13 (46%)	0.026