Selecting patients for hemi HIFU using Koelis® 3D ultrasound and MRI fusion guided biopsies: A pilot study

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Introduction

In case of prostate cancer present in one lobe, hemiablation using high intensity focused ultrasound (hemi HIFU) may offer comparable cancer control, but less adverse effects, compared to radical prostatectomy and external beam radiation therapy (EBRT). However, the challenge is to document only one lobe cancer.

Using traditional transrectal ultrasound (TRUS) and extended transperineal template biopsies, neither documentation of exact tumor location or volume can be anticipated. For the same reasons MRI combined with traditional technique is of limited significance. In addition, transperineal biopsies requires general anesthesia and there is an elevated risk of insignificant foci overdetection.

Koelis® 3D guided TRUS biopsy is a new computer controlled biopsy technique that can document the exact biopsy location, and combined with MRI through a real-time fusion process, accurate targeted biopsies can be performed.

The aim of the study was to evaluate Koelis® 3D ultrasound and MRI fusion guided biopsies when selecting patients for primary hemi HIFU.

Materials and Methods

Fourteen patients (mean 67 years) with one lobe cancer were included between April and December 2010. Mean pretreatment PSA: 8.6 ng/ml. Mean prostate volume: 27ml.
Gleason score: 6(8pts), 7(6pts)
Negative lobe was defined as both negative MRI and biopsy.
MRI: 1.5T Avanto (Siemens, Erlangen) and body array coil. Sequences: ax3D T2w and DWI.
Post imaging processing program: Nordic ICE®.
Biopsies: 3D SonoaceV10 (Medison® Korea), navigation system: Koelis® Grenoble, France.
HIFU: Ablatherm®.
Linear mixed effect model for analysis of change in PSA.

Results

Mean PSA was significantly reduced from 8.6ng/ml (pretreament) to 3.5ng/ml (3 months) and 2.9ng/ml (6 months) $p<0.001$.
No significant change in PSA was found between 3 and 6 months ($p=0.677$).

Conclusion

Koelis® 3D ultrasound and MRI fusion guided biopsy technique might be a reliable method for selecting patients to hemi HIFU. Longer follow-up and further prospective studies are needed in order to validate the method and outcome.