Transperineal MRI-US Fusion to aid conformal focal Ablation for intermediate risk anterior focal tumors

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Introduction: Targeted prostate cancer diagnostic biopsies utilizing MRI have increased the rate of prostate cancer detection in the transitional and anterior zone. Focal ablation in the anterior or transitional zone is complicated and often requires a transperineal approach. We aim to evaluate the feasibility and initial results of focal ablation using a transperineal MRI-US fusion system.

Methods: A pilot-study of 20 consecutive men diagnosed with intermediate risk anterior (n=13) or transitional (n=7) prostate cancer. A MRI-US fusion system (Navigo, UC Care or Biojet, DK technologies) was used to transfer data on the location of the tumor and to direct treatment. Patients were treated by a focal therapy: 12 by Nanoknife and 8 by Cryoablation, both guided by a MRI-US fusion system. The following outcomes were measured; feasibility of focal treatment, ablative precision (using 2-week post treatment MRI), amount of fibbers and short term functional & oncological outcomes.

Results: All treatments were completed successfully with no intra or postoperative complications. All MRI images were fused successfully to the real time us and allowed focal treatment localization. We used 4-8 needles for Nanoknife and 2-4 for cryoablation. Treatment time was reduced from a mean time of 180 min to 100 min. Post-treatment MRI demonstrated that focal ablation was achieved with precision. PSA decreased by a median of 80% after 3 months for both procedures. Both IPSS and IIEF returned to baseline after 3 months. As these are early results post-treatment biopsies were performed on only two subjects, both revealing fibrotic tissue only in the ablative area.

Conclusions: MRI-US Fusion registration is feasible, efficient and can locate lesions during focal treatment and thus reduce the damage of the healthy surrounding tissue. The short-term ablative and functional results are promising. A further biopsy confirmation is still needed in order assess the oncological outcomes in the long term.