Initial Results Comparing 29 MHz Micro-Ultrasound with Multi-Parametric MRI for Targeted Prostate Biopsy: Relative Sensitivity to Clinically Significant Prostate Cancer

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Introduction & Objectives
Prostate cancer (PCa) lacks a reliable diagnostic imaging technique as conventional ultrasound has poor sensitivity and MRI demonstrates significant inter-reader variability and may not be able to see smaller aggressive lesions.

High resolution micro-ultrasound, a novel modality with 70 micron resolution, allows visualization of the prostate in real time and can be used to perform targeted biopsies of suspicious lesions. The PRI-MUS™ (prostate risk identification using micro-ultrasound) protocol was used to assess micro-ultrasound images, while PI-RADS™ v2 was used for mpMRI.

Methods:
To compare the diagnostic accuracy of Micro-Ultrasound and mpMRI in detecting clinically significant prostate cancer:

- 35 patients presenting for prostate biopsy were imaged with mpMRI and then biopsied using micro-ultrasound (ExactVu™, Exact Imaging)
- mpMRI targets were blinded until micro-ultrasound lesions had been recorded
- Sensitivity of each modality to clinically significant cancer (G7+) was compared

Results:
Sensitivity of micro-ultrasound was significantly higher than mpMRI in both the per zone (p<0.01) (Table 2) and per patient (p<0.01) analysis (Table 3). Specificity was lower (47% micro-ultrasound vs. 91% mpMRI), though this is expected to be less of an issue as final diagnosis is determined by pathology. The high sensitivity should ensure all suspicious samples are collected at time of biopsy for proper pathological analysis.

Conclusions
- Micro-ultrasound shows promising relative sensitivity and NPV for detecting clinically significant prostate cancer when compared to mpMRI
- The small sample size and retrospective nature of this work prevents a definite conclusion from being drawn; larger studies are warranted

References