Introduction & Objectives

Currently, no technology is available that reliably detects cancerous regions in the prostate for guiding biopsies, which contributes to false-negative diagnoses and unnecessary biopsies. Previous studies by our group demonstrated that quantitative ultrasound-based algorithms have a strong potential for detecting cancerous prostate tissue in conventional 6-9-MHz TRUS systems. Micro-ultrasound is a novel modality operating at far higher frequencies (29 MHz) that enables ultra fine resolution of the prostate. We performed a preliminary study to investigate potential of acquiring our quantitative-ultrasound-based (QUS) approaches in the ultrasound micro-scanner for identifying cancerous regions in the prostate.

![Midline Sagittal View of the Prostate](Image)

Data Collection

RF data from 67 patients (532 biopsy cores) were acquired using a 29 MHz, transrectal, micro-ultrasound system and transducer (ExactVu™ micro-ultrasound, Exact Imaging, Markham, Canada) as part of a multi-site clinical trial. 75 of these biopsy samples had pathology determined Gleason Sums (GS) of 7 and above (positive class), and 457 had benign biopsy results (negative class). Directly before each biopsy, a frame of RF data was acquired allowing imaging data to be directly compared to the pathology sample.

![Example micro-ultrasound image and ExactVu™ 29 MHz Micro-Ultrasound system.](Image)

Conclusions

- Our results showing an AUC value of 0.74 are very encouraging for developing a prostate-cancer risk-assessing tool leveraging these novel high resolution micro-ultrasound images.
- The proposed QUS procedure can be performed automatically, eliminating the need for intensive training and mitigating inter-reader variability.
- An automated system, when used with the micro-ultrasound system like this, could help clinicians better target suspicious regions for biopsy and reduce the false negative rate of the prostate biopsy procedure.
- Currently, we are testing approaches involving additional micro-scanner for identifying cancerous regions in the prostate.

References

2. Multi-Center Trial of High-resolution Transrectal Ultrasound Versus Standard Low-resolution Transrectal Ultrasound for the Identification of Clinically Significant Prostate Cancer, clinicaltrials.gov ID NCT0209625