INTRODUCTION

Reducing unnecessary prostate biopsy procedures is an important clinical goal to minimize patient stress, minimize risk of infection and overtreatment, and reduce overall healthcare cost. Prostate imaging with mpMRI shows considerable utility in patient risk stratification however indeterminate or equivocal results pose a diagnostic challenge. Alternately, micro-ultrasound operates at high frequencies (29 MHz) and provides real-time, office-based imaging with high resolution (down to 70 microns) and may help guide evidence-based decision-making for indeterminate results.

OBJECTIVE

This study seeks to identify the potential of micro-ultrasound as an additional tool for risk stratification with patients who have equivocal mpMRI results.

METHODS:

- Retrospective analysis was performed on 83 patients, each with MRI findings of maximum PI-RADS 3 (equivocal), across 7 international urological sites
- PRI-MUS™ (prostate risk identification using micro-ultrasound) protocol was used to identify suspicious regions, locate targets (PRI-MUS ≥ 3) and biopsies were performed using the ExactVu™ micro-ultrasound system (ExactVu™, Exact Imaging).
- Overall maximum PRI-MUS score for each subject was used to determine whether the case was non-suspicious (PRI-MUS 1 or 2), equivocal (PRI-MUS 3), or suspicious (PRI-MUS 4 or 5)
- Overall Gleason sum was used as a reference; however there was no standard biopsy procedure due to varying number of systematic and targeted samples

RESULTS:

- 83 subjects were included, each with 1 biopsy
- Overall detection rate was 55% (46/83) with 23% (19/83) csPCa (GG≥1)
  - Non-suspicious micro-ultrasound imaging reduced the risk of finding csPCa by more than half to 10% (1/10)
  - Equivocal micro-ultrasound imaging provided little additional information with detection rate 17% (3/18)
  - Suspicious micro-ultrasound imaging resulted in 17% increase in detection rate to 27% (15/55) over mpMRI

CONCLUSIONS:

- Micro-ultrasound imaging along with the PRI-MUS protocol appear to provide additional information in equivocal mpMRI cases
- Synergies between micro-ultrasound imaging and existing clinical risk indicators such as PSA or family history may help advise patients on the necessity of a biopsy

REFERENCES


Figure 1: Study procedure using micro-ultrasound PRI-MUS score to indicate suspicion levels on equivocal mpMRI subjects

Figure 2: Comparative MRI and micro-ultrasound images of index lesion (Reproduced from Chai and Van der Kwast, Urol Case Reports 2018).

Figure 3: Parasagittal micro-ultrasound image of a PI-RADS 3 lesion in the right base medial aspect of the prostate.

Figure 4: Detection rate on micro-ultrasound identified non-suspicious, equivocal, and suspicious cases for indeterminate mpMRI subjects

Micro-Ultrasound Identified Cases

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<tr>
<th></th>
<th>csPCa</th>
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<tbody>
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