Comparison of Micro-Ultrasound and Multiparametric MRI Imaging for Prostate Cancer: Multicentre Prospective Analysis.

INTRODUCTION & OBJECTIVES:
This study aims to compare the sensitivity, specificity, NPV and PPV of mpMRI with the novel high-resolution micro-ultrasound imaging modality. This approach offers the benefits of simplicity, a single intervention for imaging and biopsy, leveraging the low cost of ultrasound. Micro-ultrasound may be used to image suspicious lesions and target biopsies in real-time with or without additional MRI-based targets.

MATERIAL & METHODS:
- 8 institutions in Europe and the USA participating, totaling 784 subjects
- All subjects received both mpMRI and ExactVu™ micro-ultrasound imaging.
- mpMRI targets sampled per site preference:
  - cognitive fusion with micro-ultrasound
  - separate software-fusion system
  - software-fusion using micro-ultrasound FusionVu™
- Micro-Ultrasound targets and systematic samples taken using the ExactVu™ micro-ultrasound system.
- Clinically significant cancer was any Gleason Sum > 6 and targeted samples were taken for PI-RADS™ > 2 or PRI-MUS™ > 2 lesions with at least 2 samples per lesion.

RESULTS:
- 40% of cases were positive for clinically significant PCAs
- mpMRI sensitivity 89% and NPV 75%
- Micro-ultrasound sensitivity 94% and NPV 83% both higher (p<0.01)
  - Micro-ultrasound less specific (19% vs 23% for mpMRI)
  - PPV 44% for both

CONCLUSIONS:
- Micro-ultrasound is an attractive option for screening and targeted biopsy. Sensitivity and NPV appear superior to MRI, but specificity is mildly reduced.
- Further larger-scale studies are required for validation of these findings.

REFERENCES:

Figure 1: Comparative MRI and Micro-ultrasound Images of index lesion. (A) Coronal 1.2 T MRI. (B) Axial 1.2 T MRI. (C) Sagittal 1.2 T MRI. (D) Parasagittal micro-ultrasound of left lateral edge of lesion. (E) Parasagittal micro-ultrasound of left medial edge of lesion. The Micro-ultrasound images show mottled tissue consistent with PRI-MUS 4, along with suspicious shadowing consistent with PRI-MUS 5. Suspicious findings in all images are marked with arrows.

Figure 2: Forest plot showing results for each institutional cohort. Most groups achieved non-inferiority independently with aggregate results showing superiority sensitivity of micro-ultrasound over MRI with sensitivity ratio of 1.06 (p=0.007).