Prostate Biopsy using Micro-Ultrasound and Fusion Biopsy of the Prostate - True Precision?

L. Wiemer¹, S. Hofbauer¹, R. Heckmann¹, B. Kittner¹, M. Reimann¹, K. Kornienko¹, T. Schломм¹, H. Cash¹

¹Charité, Urologie, Berlin, Berlin, Deutschland

BACKGROUND:
The PRECISION study was able to show that sole targeted fusion biopsy is superior to systematic biopsy. However, the combination of an MRI / US fusion biopsy with a systematic biopsy results in a maximized detection rate of significant carcinomas. The use of a micro-ultrasound system with improved resolution allows the evaluation of additional tumor-related foci, offering the option of further optimizing fusion biopsy.

METHODS:
- 178 consecutive men presenting for prostate biopsy between February and December 2018
- Biopsy using ExactVu™ 29 MHz Micro-ultrasound system (Figure 1)
  - Micro-ultrasound targets
  - 10-core systematic samples
  - MRI targets (sampled separately)
- Analysis for added value of each biopsy strategy.

RESULTS:
- Prostate cancer found in 126/178 (71%) patients
  - 88/178 (49%) GG > 1
  - 42/178 (24%) GG > 3
- Of the 159 cases with MRI results:
  - MRI targets upgraded the Grade Group in 34 cases (21%)
    including 11 cases not found with micro-ultrasound (7%)
  - Micro-ultrasound targets upgraded the Grade Group in 46 cases (29%)
    including 26 not found on MRI (16%)
- Only in 5 cases (3%), systematic biopsy alone revealed evidence of significant prostate cancer

CONCLUSIONS:
- Micro-ultrasound leads to an improvement in diagnostic accuracy as a supplement to an MR fusion biopsy
- Future studies will examine whether an entirely targeted approach MRI+Micro-US is feasible and effective.

REFERENCES

Table 1: Demographics

| Age (years) | 70 [64-74] |
| PSA (ng/mL) | 7.8 [5.7-11.9] |
| Volume (cc) | 35.5 [27-50] |
| pre-biopsy mpMRI | 159 (89%) |

| Max PI-RADS | “normal” / 1 | 3 |
|            | 2 | 4 |
|            | 3 | 15 |
|            | 4 | 74 |
|            | 5 | 63 |

Figure 1: Patient-level biopsy results
Prostate cancer was detected in 71% of patients, with 49% of patients harbouring significant (GG > 1) disease.

Figure 3: Case of a 64-y.o. man on Active Surveillance for GG 1 cancer presenting for follow-up biopsy with PSA 11.4 ng/mL. Pre-biopsy MRI showed a PI-RADS 4 lesion in the Right Transition Zone. This lesion was clearly visible on micro-ultrasound (A, blue arrows). Also visible on micro-ultrasound was an ipsilateral extension of the lesion into the Right Base and Mid Peripheral Zone (B, red arrows). Both areas revealed GG 3 on biopsy, all other systematic samples were benign.

Figure 5: Patient-level diagnosis based on various biopsy strategies