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Introduction & Objectives: Focal therapy (FT) for localized prostate cancer (PCa) offers minimally invasive localized ablative treatment while minimizing treatment-related toxicity compared to standard radical options. Recent advances in PCa imaging with microUltrasound TRUS (mUS) and PSMA-PET offer new opportunities to detect PCa foci. We present early oncological outcomes of a PCa FT program with High-Intensity Focused Ultrasound (HIFU) using combination of multiparametric MRI, mUS and PSMA-PET/CT for PCa staging and treatment targeting

Materials & Methods: This is a preliminary analysis from an ongoing, prospective, single-center cohort study of patients treated with HIFU FT for localized PCa since February 2021. Inclusion criteria were: PSA <20ng/mL, radiological stage \leq T2bN0M0, ISUP grade 1-3, and staging with \geq 2 of the aforementioned imaging modalities. Follow up included: PSA at 3, 6 and 12 months; mUS at 3 and 12 months; PSMA-PET and MRI between 6-12 months. Post-treatment biopsies were scheduled per-protocol at 12 months or earlier if imaging suspicious. We evaluated oncological outcomes with PSA, imaging findings and biopsy results for patients completing 6 months follow up.

Results: 28 patients met criteria for analysis. Median age was 67.5 yrs(IQR 63-72), initial PSA (iPSA) was 5.8ng/mL(IQR 4.9-8.7) and prostate volume was 41mL(IQR 37-61). ISUP score was 1 in 20 (71.4%) patients and 2 in remaining 8 (28.6%). The index lesion targeted for treatment was classified PI-RADS \geq 3 in 12 (52.2%) patients with available MRI (n=23), PRI-MUS \geq 3 in 8(80%) patients imaged with mUS (n=10) and was visualized on PSMA-PET/CT in 13 (14.81%) patients with nuclear staging (n=27). Target lesion was visualized on all modalities in 4/7 (57%) patients who underwent all three imaging scans; on \geq 2 modalities in 10 (35.7%) patients and one modality only in 10 patients (35.7%). 3(10.7%) patients received strict focal ablation, with 18 (64.3%) undergoing quadrantectomy and 7(25.0%) hemiablation. Median treated volume was 9.8mL(IQR 8.2-12.1) and 22.5%(IQR 16.0-28.1%) of overall prostate volume. Median post-treatment PSA levels and reduction to %iPSA were: 3.96ng/mL(IQR 2.1-5.8) and 64.7%(IQR 37.2-80.8) at 3 months; 3.14ng/mL(IQR 1.69-5.55) and 54.7%(IQR 32.5-66.7%) at 6 months. Imaging failure-free survival was: 100% at 3-month post-op mUS (n=28), 61.1% at 6-12month post-op PSMA-PET (n=18) and 63.6% at 6-12 month post-op MRI (n=11). Disease free-survival at repeat biopsy was 81.3% (n=16), with 3 patients harbouring ISUP 1 disease. One patient underwent redo focal therapy and one underwent robotic prostatectomy.

Conclusions: Multi-modality imaging with mUS, PSMA-PET and mpMRI may be applied for pre- and post-operative examination of patient receiving PCa FT. Further comparative investigations may help in determining the most suitable imaging approach for FT follow-up.