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Introduction & Objectives: Prostate-specific membrane antigen (PSMA) positron-emission tomography (PET) allows detection of small and/or atypically localized metastatic prostate cancer (PCa) lesions. In a subset of patients with recurrent oligometastatic PCa salvage surgery with PSMA-targeted radioguidance (PSMA-RGS) may be of value. We aimed to evaluate the oncological outcomes of salvage PSMA-RGS for oligo-recurrent PCa and determine predictive preoperative factors of improved outcomes.

Materials & Methods: In this cohort study within two tertiary care centers, patients with biochemical recurrence (BCR) after radical prostatectomy (RP) and imaging with PSMA PET receiving salvage PSMA-RGS between 2014 and 2020 were analyzed. Kaplan-Meier and multivariable Cox regression models adjusted for various parameters were used to test for BCR-free survival (BFS) and therapy-free survival (TFS) differences. Postoperative complications were classified according to Clavien-Dindo.

Results: Overall, 364 patients were assessed. At PSMA-RGS, median (IQR) age and preoperative PSA was 67 (61-71) years and 1.0 (0.5-1.9) ng/ml. Metastatic soft-tissue lesions were removed in 356 (94.4%) patients. Within three months from surgery, 25 (6.6%) patients suffered from Clavien-Dindo complications grade III-IV. During follow-up, 235 patients experienced BCR and 129 patients received further therapy. Median follow-up for patients who did not experience BCR and who did not receive further therapy was 11.1 months and 10.5 months, respectively. Median (IQR) BFS and TFS was 7.8 (5.4-10.9) and 34.9 (24.7-43.5) months. At two years of follow-up, BFS rate was 31.9% and TFS rate was 56.6%. In multivariable analyses, higher preoperative PSA (HR: 1.06), higher number of PSMA-avid lesions on preoperative imaging (HR: 1.2) and multiple (pelvic plus retroperitoneal) localizations (HR: 1.7), as well as retroperitoneal localization (HR: 2.0) of lesions in PSMA PET imaging were independent predictors of BCR after PSMA-RGS. Limitations are the retrospective design and lack of a control group.

Conclusions: As salvage surgery in oligo-recurrent PCa currently constitutes an experimental treatment approach careful patient selection is mandatory based on life expectancy, low PSA values and low number of PSMA PET avid lesions located in the pelvis. Further studies are needed to confirm our findings and define the oncological value of salvage surgical procedures in oligo-recurrent PCa.