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Association of PSMA PET results at biochemical recurrence (BCR) with metastasis free survival (MFS) by conventional imaging (CI) in patients with locally advanced or high-risk localized prostate cancer initially treated with radical prostatectomy (RP): A retrospective multicenter study.

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Background: Prostate-specific membrane antigen (PSMA) positron emission tomography-computed (PET-CT) is used to stage prostate cancer (PCa) at BCR. PSMA PET-CT imaging has shown high sensitivity in detecting disease at slight prostate specific antigen (PSA) rise compared to CI. There remains an evidence gap in understanding the implications on treatment decision and clinical outcomes of PSMA-PET CT results at BCR after RP. We investigated the association of PSMA PET results with outcomes specific to MFS by CI in patients with BCR of locally advanced or high risk localized (LAHR) PCa treated with RP. **Methods:** We retrospectively screened from two academic centers patients with LAHR PCa who developed BCR after receiving RP as definitive therapy and underwent PSMA PET-CT imaging. We collected baseline characteristics including age at diagnosis, BMI, race and ethnicity, T-staging, Gleason score, and PSA. Interval treatment changes after and up to 60-days post BCR were captured. Outcomes were evaluated from 60-days post BCR. We estimated MFS by CI. A Time-to-Event (TTE) analysis was conducted between PSMA PET+ and PSMA PET- patients to estimate the effect of PSMA PET results on MFS by CI. PSMA PET+ status is defined as having evidence of a distant lesion by PSMA PET. 1:1 Propensity Score Matching (PSM) was applied to adjust for confounders using a 0.2 caliper between both groups. **Results:** We retrospectively identified a total of 333 LAHR RP patients with receipt of PSMA PET at BCR between January 2016 - January 2024. The median age at diagnosis was 63, with majority of patients being white (74.4%), while 4.1% were Black or African American and 6.2% were Hispanic or Latino. Patients had a median PSA at BCR of 1.1 ng/mL and 77.3% had a Gleason Score of 8 or higher. After adjusting for PSA at BCR and interval treatment changes, 111 PSMA PET+ and 111 PSMA PET- patients were included in the analysis. The overall median follow-up time was 47.3 (IQR: 21.2, 72.8) months. MFS was significantly higher for PSMA PET+ versus PSMA PET- patients by CI (P-value: 0.006, HR: 2.39 CI: 1.3, 4.5) which remained after PSM (P-value: 0.012, HR: 3.0 CI: 1.2, 7.5). **Conclusions:** In this retrospective, multi-institutional study we investigated the association of oncologic outcomes in a LAHR PCa population receiving RP as definitive treatment and PSMA PET-CT at time of BCR. Our results show that MFS was 3 times higher in patients with PSMA PET positive lesions at BCR. It is worth noting that a longer follow-up time may be needed to evaluate a robust association with overall survival. A plan is underway to replicate these analyses with a larger patient population at institutions in the US and Europe, aiming to confirm and extend the robustness of these estimates. Research Sponsor: Janssen.