

**2020 Genitourinary Cancers Symposium (February 13-15, 2020)****Radiotherapy (RT) guided by ultra-small superparamagnetic iron oxide (USPIO)-contrast MRI staging for patients with advanced or recurrent prostate cancer.**

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**Background:** Aggressive treatment of oligometastatic PC may prolong survival in selected patients. USPIO-contrast MRI is potentially more sensitive in detecting early lymph node (LN) metastases than PET.

**Methods:** This retrospective study explores the safety and utility of USPIO-guided RT in 69 patients with advanced/recurrent PC treated at 2 US institutions. All USPIO-MRIs were completed at RadboudUMC and interpreted by expert radiologists. Age, Stage, Gleason score, PSA, prior therapy, duration of androgen-deprivation (ADT), cause of death, details of RT, and adverse events (AEs) were collected by chart review. Biochemical recurrence (BCR) was defined as PSA Nadir plus 2.0 (RT) or PSA > 0.2 (radical prostatectomy, RP). Patients received external beam radiation (RT) to involved nodal basins (+/- prostate/prostate bed) with either a simultaneous integrated or sequential boost to USPIO(+) nodes. All patients received  $\geq 6$  months of ADT. Overall (OS) and BCR free-survival (BCRFS) were calculated using Cox-PH models in *R*.

**Results:** Between 2007-18, 69 patients with de novo or recurrent PC were found to have USPIO(+) LNs and received USPIO-guided RT; median age was 62. The majority of patients presented after BCR following RP (N = 28), definitive RT (N = 27) or RP and post-op RT (N = 6). Prior to USPIO-MRI, 20/69 patients had cN1 disease based on abdominal-pelvic CT/MRI, Bone Scan, Prostascint-scan, and F18 Choline, Axumin or PSMA PET/CT. The mean(median)USPIO(+) LNs was 5.2(3) Range = [1-32]. Patients had (+)pelvic (95%), para-aortic (43%), and/or peri-rectal LNs (19%). At median follow up of 29.5(44.6) Range = [5-127]

months, OS was 58/69 (84%) and 11/11 patients died of PC. At last follow up, 40 patients remained BCR-free (BCRFS not reached). The median time to BCR (N = 29) was 25.9 months after USPIO-guided RT. For patients with follow-up imaging, recurrences were predominantly out-of-field (outside of elective LN fields or in osseous sites). No patients experienced > CTCAE grade 2 AEs.

**Conclusions:** In this cohort of 69 patients with predominantly recurrent PC, USPIO-directed RT was well-tolerated, feasible and resulted in encouraging biochemical control rates.