

Initial Outcomes of Patients Undergoing Proton Re-irradiation After Definitive Prostate Radiotherapy

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Abstract

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Abstract

Objectives: Patients presenting with local failure after definitive radiation therapy for prostate cancer have historically been treated with hormonal/systemic therapy. Local options, such as salvage prostatectomy, have been associated with higher morbidity, whereas HIFU and cryotherapy have limited data in the recurrent setting to date. Salvage reirradiation using proton therapy is an intriguing treatment option in these patients, but outcomes in this setting are unknown. Our aim is to report on the feasibility, toxicity and initial outcomes of patients undergoing proton reirradiation for locally recurrent prostate cancer.

Methods: Patients with locally recurrent prostate cancer after definitive radiation therapy who underwent treatment at the New York Proton Center (NYPC) were included in this study. Patients had rectal spacer (SpaceOAR®, Barrigel® or Bioprotect®) and gold fiducials placement prior to simulation. MRI of the pelvis/prostate and PSMA-PET acquired in treatment position was co-registered for treatment planning. Patients were treated to a total dose of 30-36.5 GyRBE (median 35 GyRBE) over 5 treatments delivered every other day using an SBRT technique with proton pencil-beam scanning. Dose constraints used for planning are summarized in Table 1.

Results: 10 consecutive prostate cancer patients treated with proton reirradiation were identified. The median (IQR) age at initial diagnosis was 60 years (54-67). Initial radiation treatment consisted of SBRT for 3 patients, IMRT for 5 patients, and brachy-monotherapy for 2 patients (1-125 with 145Gy). Median time to reirradiation was 8.3 years (6.3-14.7) after the initial course.

Eight out of 10 patients had biopsy proven recurrence, of which, 4 had worsening Gleason score, as compared to their initial diagnosis. Three patients had synchronous evidence of nodal recurrence, which were also treated with SBRT. Three patients had concurrent ADT during salvage RT. Median PSA nadir after initial treatment was 0.9ng/ml (Range: 0.4-1.30). Median PSA prior to proton re-irradiation was 5.4 (Range: 4.6-7.9). Median baseline AUA score was 14 (Range: 10-21) and SHIM score was 5 (Range: 1-12). Median PET SUV of recurrent prostatic lesions was 7.5 (4.8-10.3). Median follow-up was 12.6 months (Range: 2.1-14.1). No patient had any significant morbidity from rectal spacer and fiducials placement. No patients had any acute or late GU or GI toxicities greater than grade 2 (CTCAE v5.0).

All six patients who have a post-treatment PSA available show a decrease in the levels (from a median of 6.25 to median 0.81 (Range: 0.2-1.4)).

Conclusion(s): Reirradiation using proton therapy appears to be safe in patients recurring locally after definitive radiation therapy. Long-term data on disease control and toxicity are needed.