Acute Toxicity Following PSMA-Directed Focal Salvage Robotic SBRT for Local Recurrences Following Prior Robotic Prostate SBRT

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Introduction

The management of focal recurrences following prostate stereotactic body radiation therapy (SBRT) is an area of active clinical investigation. Focal recurrences commonly occur at the site of the dominant intraprostatic lesion (DIL). Prostate-specific membrane antigen (PSMA) PET scans with their increased sensitivity and specificity may allow for focal targeting of clinically meaningful disease. In this elderly patient population, focal SBRT may allow effective salvage treatment with fewer high-grade toxicities than whole gland SBRT. This study reports on the short-term toxicity and safety of focal salvage SBRT with PSMA targeting for locally recurrent prostate cancer after SBRT.

Methods

(1) This study included patients with a rising PSA and solitary focal PSMA prostate uptake after undergoing prior robotic prostatic SBRT alone (35-36.25 Gy in 5 fractions) or robotic prostatic SBRT (19.5 Gy in 3 fractions) with supplemental pelvic IMRT (45 Gy in 25 fractions).

(2) Patients were treated at Georgetown University Hospital from February 2022 to April 2023 with focal robotic SBRT to the PSMA-positive prostate (34 Gy in 5 fractions prescribed to the 83-86% isodose line over 1-2 weeks utilizing the CyberKnife Radiosurgical System), with or without adjuvant androgen deprivation therapy (ADT).

(3) Prostate biopsy was not performed, and rectal spacers were not used. Acute urinary and gastrointestinal toxicities (≤3 months) were documented and scored using the Radiation Therapy Oncology Group (RTOG) criteria. Data was prospectively entered into an institutional database and retrospectively analyzed.

Table 1 – Patient and tumor characteristics

Characteristics	Total (*N* = 17)
Race, *n* (%)	
Black	4 (24)
White	12 (71)
Asian	1 (6)
Age at salvage SBRT (years), *n* (%)	
<60	0
60-69	1 (6)
70-80	11 (65)
>80	5 (29)
PSA before salvage SBRT (ng/ml), *n* (%)	
≤10	13 (76)
>10 and ≤20	2 (12)
>20	2 (12)
Initial NCCN risk category, *n* (%)	
Low	0
Intermediate	10 (59)
High	7 (41)
Prostate volume (cc), [range]	35 [13-57]

SBRT = stereotactic body radiation therapy; NCCN = National Comprehensive Cancer Network

Table 2 – Salvage treatment characteristics

Characteristics	Total (*N* = 17)
Prostate radiotherapy, *n* (%) [a]	17 (100)
Pelvic radiotherapy, *n* (%) [b]	2 (12)
Androgen deprivation therapy, *n* (%)	
Yes	14 (82)
No	3 (18)
Prophylactic α_{1a} antagonist, *n* (%)	
Yes	10 (59)
No	7 (41)

[a] Prostate dose of 34 Gy in 5 fractions
[b] Pelvic lymph node dose of 30 or 35 Gy in 5 fractions

Results

17 patients at a median age of 76 years (range, 61-90 years) received focal salvage SBRT. Two patients (12%) received additional SBRT to PSMA-positive pelvic lymph nodes (30-35 Gy in 5 fractions). 14 patients (82%) received adjuvant ADT (13 Relugolix, 1 Lupron). 10 patients (59%) utilized alpha antagonists prior to focal SBRT. The mean interval between the initial course of SBRT and salvage treatment was 6.8 years with a median pre-salvage PSA of 3.71 ng/ml (range, 1.4-24.7 ng/ml). The median PSA at 3 months after focal re-irradiation was 0.152 ng/ml (range, 0.006-2.97 ng/ml). One patient experienced an acute grade 2 GU toxicity (spontaneous incontinence requiring use of pads) for an incidence of 7.7%. No acute grade ≥3 GU adverse events were observed. No acute grade ≥2 GI adverse events were reported. The most common grade 1 GU side effects included frequency, urgency, leakage, and dribbling.

Table 3 – Acute GI and GI toxicity

	Grade 0	Grade 1	Grade 2	Grade ≥3
Gastrointestinal (*N* = 13)	12 (92%)	1 (8%)	0	0
Genitourinary (*N* = 13)	6 (46%)	6 (46%)	1 (8%)	0

All data are given as *n* (%). Missing data for *n* = 4

Conclusions

Re-irradiation for locally recurrent prostate cancer with PSMA-guided focal robotic SBRT was well-tolerated with a low incidence of short-term GU and GI toxicities. Early PSA responses were favorable. Long-term follow-up will be required to determine the efficacy and safety of this minimally invasive management approach.

References

1. Pasquier D, Lacornerie T, Supiot S, et al. The safety and efficacy of salvage stereotactic radiation therapy in patients with intraprostatic tumor recurrence after previous external radiation therapy: Phase 1 results from the GETUG-AFU 31 study. *European urology oncology*. 2023;6(4):399-405.