Cureus
Part of SPRINGER NATURE

Open Access
Abstract

Cureus

Patient Outcomes following MRI-guided Stereotactic Body Radiation Therapy with Adaptive Planning and Hydrogel Spacer for Prostate Adenocarcinoma

Open Access
Abstract
Published 03/17/2025

John G. Roubil [1], Ariel Rosa [2], Suzanne Kirby [3], Elisabeth Weiss [4], Alfredo I. Urdaneta [5]

1. Radiation Oncology, Massey Comprehensive Cancer Center, VCU Health, Richmond, USA 2. Department of Radiation Oncology, VCU School of Medicine, Richmond, VA, USA 3. Radiation Oncology, VCU Health, Richmond, USA 4. Radiation Oncology, Virginia Commonwealth University, Richmond, USA 5. Department of Radiation Oncology, Massey Comprehensive Cancer Center, VCU Health, Richmond, VA, USA

Corresponding author: John G. Roubil, john.roubil@vcuhealth.org

Categories: Urology, Radiation Oncology, Oncology
Keywords: adaptive planning, hydrogel spacer, mr-guided stereotactic body radiotherapy, prostate cancer, sabr, sbrt

How to cite this abstract
Roubil J G, Rosa A, Kirby S, et al. (March 17, 2025) Patient Outcomes following MRI-guided Stereotactic Body Radiation Therapy with Adaptive Planning and Hydrogel Spacer for Prostate Adenocarcinoma. Cureus 17(3): a1537

Abstract

PURPOSE: The purpose of this study is to analyze patient toxicity and adaptive planning outcomes following stereotactic body radiation therapy (SBRT) for non-metastatic, intermediate risk, prostate adenocarcinoma treated on an MRI-linear accelerator with adaptive planning and hydrogel spacer.

METHODS: Consecutive patients with non-metastatic, intermediate risk prostate cancer (Stage 2c or less) treated to 36.25 Gy/5 fractions from 2022-2023 with hydrogel spacer were included for analysis. Change in International Prostate Symptom Score (IPSS) and PSA before and after treatment was analyzed using a 2-tailed paired T-test and 1-tailed paired T-Test, respectively. Common Terminology Criteria for Adverse Events was used to classify toxicity during treatment and at all subsequent follow-up appointments. Variations in adaptive treatment volumes and dosimetry were compared to the original treatment plans.

RESULTS: We included 8 pts with an average age of 65.86 years (54-73). 2/8 patients had short-course ADT (4 and 6 months). Average PSA at consult and at most recent follow-up was 8.68 and 1.18 (p=0.00), and there was no recurrence by Phoenix Criteria. There was no Grade ⩾2 acute toxicity. At a median follow up of 1.77 years (1.06-2.24) from end of treatment, there was only 1 instance of new Grade 2 GU toxicity due to short-term tamsulosin use, which was later discontinued. There was no acute or late GI toxicity. Average IPSS scores at consult and most recent follow-up were 5.63 and 3.5, respectively (p=0.20). 39/40 total fractions were adapted on the day of treatment. Adapted GTV and PTV varied by an average range of 8.56% and 9.24%, respectively, in comparison to the original treatment plan. Adapted urethra, rectum, and bladder hot spot varied by an average range of 0.44%, 1.65% and 3.47%, respectively in comparison to the original treatment plan.

CONCLUSIONS: While this is a small patient sample, variation in pre- and-post treatment IPSS was not statistically significant, and there were very favorable toxicity outcomes overall, with no Grade ⩾2 acute toxicity, only 1 instance of Grade 2 late toxicity due to temporary tamsulosin use, and no acute or late GI toxicity. There have been no recurrences. Adaptive planning accounted for small variations in anatomy and allowed for optimization of original treatment plans resulting in excellent clinical outcomes.