Previous Cryotherapy and Older Age Predict for Faster Biochemical Response After Definitive SBRT for Prostate Cancer

Seth R. Blacksburg, M.D., M.B.A., Aaron E. Katz, M.D., Christopher Mendez, B.A., Awais Mirza, RTT, Matthew R. Witten, Ph.D., Jonathan A. Haas, M.D.
NYU-Winthrop Hospital, Mineola, NY

Purpose:
• Stereotactic Body Radiation Therapy (SBRT) remains an emerging treatment option for men with prostate adenocarcinoma with low or intermediate risk disease.
• Despite a growing volume of investigation, there is a paucity of data that characterizes predictors of post-treatment PSA kinetics in the initial six-month window.
• Cryosurgery is an evolving minimally invasive therapy for the treatment of focal prostate cancer.
• The effect of previous cryosurgery on PSA kinetics following salvage SBRT has not been previously explored.
• This study reports the effect of age and previous cryosurgery on initial PSA kinetics for patients that have undergone definitive SBRT for low or intermediate risk prostate cancer.

Materials/Methods:
• Between April 11, 2006 and August 22, 2016, 954 consecutive patients with low or intermediate prostate cancer were treated with definitive SBRT without the use of Androgen Deprivation Therapy.
  • The median pre-treatment PSA was 5.7ng/ml (0.35-19.62ng/ml).
  • Gleason scores were 6 (3+3) in 49.6%, 7 (3+4) in 33.4%, and Gleason 7 (4+3) in 17.0%.
  • Based on NCCN risk categories, 45.6% had low risk disease and 54.4% had intermediate risk disease.
  • The median prescription dose was 3500cGy (3500-3625) delivered in 5 fractions.
  • The median age was 67 years (41-88) and the mean CTV was 83.7cc’s (16.8-242.8).
  • 8 patients previously treated with cryosurgery were subsequently treated with salvage SBRT.

Results:
• At 6 months follow-up, the mean decline in pre-treatment PSA was 59.9%.
• There was no statistical difference in pre-treatment PSA values between the previously cryoablated cohort and the pre-treatment naïve patient group.
• Patients who had previously received cryosurgery had a higher mean PSA decline (79.0% vs. 59.8%, p=.04).
• They were also more likely to experience a PSA decline >75% of their pre-treatment value.
  • Patients with Gleason 7 disease had a higher likelihood of this treatment response (34.9% vs. 27.4%, p=.013), with no difference seen between 7 (3+4) and 7 (4+3) histology.
  • This finding was also seen in patients with intermediate vs. low risk disease (35.2% vs. 26.3%, p=.003).
• Older patients experienced a steeper decline in PSA at 6 months, with 42.7% having a decrease >75% of pre-treatment PSA compared to 24.8% in younger patients (p<.0001). Table1

CTV size did not predict for post-treatment PSA kinetics.
• On multivariate analysis, age >70 (OR 2.18, CI 1.64-2.91, p<.0001) and previous cryosurgery (OR 5.85, CI 1.13-30.3, p=.035) predicted for a pre-SBRT PSA decline of >75% at 6 months' time. Table2

Conclusions:
• This represents the largest series evaluating the magnitude of early PSA decline after SBRT as a function of age and previous cryotherapy.
• Proposed mechanisms for post-cryotherapy biochemical kinetics include immune-mediated activity and altered ratio of tumor to normal prostatic tissue.
• We have outlined a matched pairs analysis to analyze tumor-directed antibody levels and immune populations to prospectively investigate these findings.