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Abstract

Previous Cryotherapy and Older Age Predict for Faster Biochemical Response After Definitive Stereotactic Body Radiation Therapy for Prostate Cancer

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Abstract

Objectives: SBRT is a validated treatment for low or intermediate risk prostate adenocarcinoma. Despite a growing volume of investigation, there is a paucity of data that characterizes predictors of post-treatment PSA kinetics. Cryosurgery is an evolving minimally invasive therapy for the treatment of focal prostate cancer. 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 disease.

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 ADT. 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. Pearson's chi-squared test was conducted for univariate and binary logistic regression for multivariate analyses.

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). 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.

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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.