Five-Year Outcomes from a Prospective Trial of Image-Guided Accelerated Hypofractionated Proton Therapy for Prostate Cancer

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Purpose: To report 5-year clinical outcomes of a prospective trial of image-guided accelerated hypofractionated proton therapy for prostate cancer.

Methods and Materials: A total of 228 prostate cancer patients accrued to a prospective institutional review board-approved trial of 70 Gy (RBE) in 28 fractions for low-risk disease (122 patients) and 72.5 Gy (RBE) in 29 fractions for intermediate-risk disease (106 patients). This trial excluded patients with prostate volumes ≥ 60 cm^3, patients with International Prostate Symptom Scores (IPSS) of 15 or above, and patients taking anticoagulants or alpha blockers. Toxicities were graded prospectively according to Common Terminology Criteria for Adverse Events (CTCAE), version 3.0, and retrospectively according to CTCAE, version 4.0.

Results: The median time to follow-up for toxicity and prostate-specific antigen (PSA) levels were 4.9 years and 4.2 years, respectively. Five-year rates of biochemical and clinical freedom from disease progression were 96.3% for the entire group, 99.2% in the low-risk group, and 92.7% in the intermediate-risk group. Actuarial 5-year rates of late grade 3 radiation-related gastrointestinal and urologic toxicity per CTCAE, version 3.0 (or version 4.0), were 0.9% and 0.9%, respectively. Median IPSS for low- and intermediate-risk patients before treatment were 6 and 4, and at 4+ years after treatment they were 5.5 and 6, respectively.

Conclusions: Five-year outcomes for imaged-guided hypofractionated proton therapy included extremely high efficacy and minimal physician-assessed toxicity. Dose intensification utilizing this approach appears feasible so far, but further follow-up and a larger patient experience are necessary to confirm these favorable results.