

Early Experience with CyberKnife Stereotactic Body Radiation Therapy for Prostate Cancer

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Objectives: The CyberKnife offers delivery of highly conformal radiation through hundreds of non-coplanar radiation beams that is well suited to hypofractionated stereotactic body radiation therapy (SBRT) for prostate cancer. We report on a retrospective analysis of our early results of SBRT as monotherapy for prostate cancer.

Methods: A retrospective analysis of patients treated with SBRT and who had at least 12 months follow-up was performed. All patients had pathologically confirmed adenocarcinoma of the prostate. SBRT was delivered using the CyberKnife with fiducial tracking to allow real-time motion compensation. All patients had CT following fiducial placement with MRI merged to fiducials for accurate prostate definition. The prescribed dose was 7.25 Gy in 5 fractions delivered over one to two weeks, which included rotation correction in the majority of patients. Acute and late toxicities were evaluated using NCI V3. Biochemical control was assessed using the nadir+2 (Phoenix) definition.

Results: Fifty-two patients with a median age of 67 years (range 46-88) were analyzed. Patients were primarily T1C (73%); 27 patients were low-risk, 18 were intermediate-risk and 7 were high-risk patients using the NCCN criteria. The median pre-treatment PSA was 5.7 ng/mL (range, 1.1-39.35 ng/mL). Of the 52 patients, 3 received androgen deprivation therapy (ADT) for ≤ 6 months, 4 received ADT between 6 to 23 months, and 7 patients received ADT for ≥ 24 months. At a median follow-up of 23 months (range, 13-36 months), one high-risk patient failed biochemically. Another patient has an increased PSA of 10.8; he is on antibiotics for a possible infection and continues to be observed. The median PSA for the remaining patients is 0.3 ng/mL (range, 0.1-2.9). One patient experienced acute Grade III GU toxicity which has been ameliorated to grade II; no other severe toxicities were observed. Quality of life with this subset will be described.

Conclusions: Our early results of CyberKnife radiosurgery treatment for prostate cancer show favorable biochemical response and low toxicity. While the short follow-up limits comparison with other radiation based treatments such as brachytherapy and IMRT, radiobiology calculations (alpha/beta ratios) suggest this fractionation schema should be comparable to HDR brachytherapy techniques for prostate cancer. Further follow-up of this data, and others, will help delineate the role of CyberKnife SBRT for prostate cancer.