Large Prostate Volumes Treated With Autonomous Continuous Image Guidance Stereotactic Body Radiation Therapy For Prostate Cancer

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BACKGROUND

Although stereotactic body radiotherapy (SBRT) using either the robotic CyberKnife System or linac-based systems has demonstrated promise for organ-confined prostate cancer, trials of linac-based SBRT have typically excluded patients with large prostate volumes (e.g., > 60 cc) while robotic SBRT trials have allowed much larger prostates. Here we present data from a retrospective study on toxicity and short-term efficacy for patients with prostates 100 cc or larger.

METHODS

Twenty-five men with organ-confined disease and prostate volumes ranging from 100 to 192.6 cc were studied.

- Low-risk: 14
- Intermediate-risk: 6
- High-risk: 5

Most received 36.25 Gy delivered in 5, 7.25-Gy fractions using the CyberKnife system; 3 received 35 Gy in 5, 7-Gy fractions.

Androgen-deprivation therapy was administered pre-treatment in 1 high-risk patient and in 1 low-risk patient for prostate downsizing.

L-glutamine (15 grams, BID) was recommended and used by all patients. Flomax was routinely recommended and dose was doubled when nocturia greater than x2 occurred. Ibuprofen was utilized for dysuria and decreased flow.

Author Disclosure Information

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RESULTS

PSA, genitourinary (GU) and gastrointestinal (GI) symptoms were assessed prior to and at the end of treatment, at 3-month intervals until 12 months, then at 6-months intervals.

Disease Control:

At a median PSA follow-up of 12 months, biochemical failure was noted in two men, both with high-risk disease at treatment; neither had confirmed local recurrence. PSA decreased with time since treatment, to a median of 1.0 ng/ml in the 10 patients tested at 2 years.

Toxicity:

GU symptoms, measured using the IPSS scaled, were highly variable at baseline. All men experienced a worsening of the IPSS score, followed by a decline to near baseline in most, but not all, men. Acute GU symptoms were more severe than noted in patients with smaller prostate volumes. At the last treatment 9/25 men reported some bowel symptoms, mostly urgency and diarrhea; one man experienced ulcerative colitis, weight loss, and diarrhea for about 2 weeks starting one week after treatment, resolved by 4 weeks.

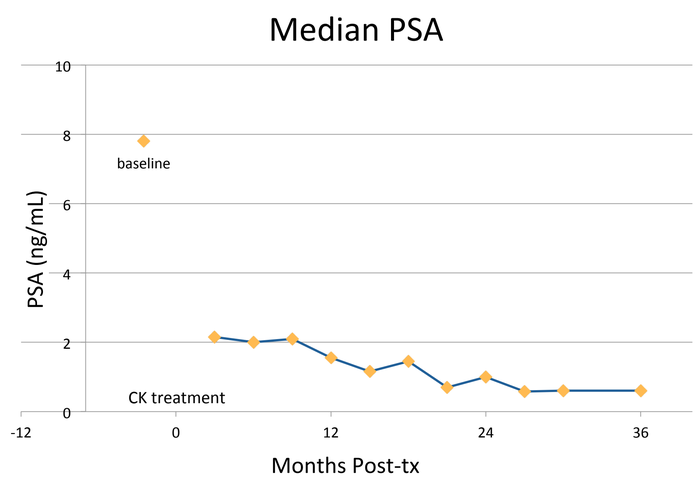

Figure 1: PSA (ng/ml) as a function of time since treatment

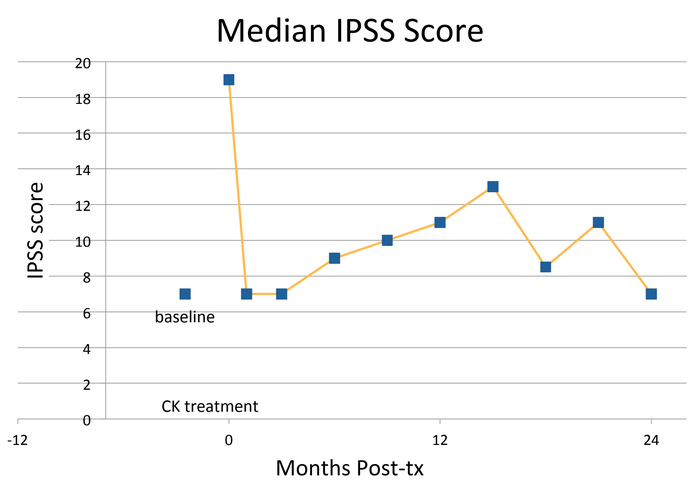

Figure 2: Median IPSS as a function of time since treatment

CONCLUSIONS

In early follow-up robotic SBRT has yielded promising disease control with tolerable GU and GI toxicity for men with prostates greater than 100 cc. Acute side effects tended to be more severe than in our patients with smaller prostates; based on this finding we recommend treating patients with low-grade, low volume disease with 35 Gy instead of 36.25. It is possible that steep dose fall-off and frequent image-guided correction of beam aim with the CyberKnife System allows high doses to be more safely delivered to men with large prostate glands.