Stereotactic Body Radiotherapy Offers a Safe, Noninvasive Treatment for Prostate Cancer Patients Over 70 Years Old

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Introduction

Stereotactic body radiation therapy (SBRT) offers a short 5-day, non-invasive treatment for organ-confined prostate cancer. Initial studies on low and intermediate risk patients support SBRT's potential for clinical efficacy while limiting treatment-related morbidity and maintained quality of life (1-4).

The CyberKnife (Accuray, Inc) uses computer-guided robotic technology to deliver stereotactic radiotherapy the accuracy and conformality of which are ideal for a highly hypofractionated treatment. Intrafraction tracking of fiducial seeds allows for corrections in all dimensions to achieve <1 mm accuracy. All treatments are done on an outpatient basis with no need for a urinary catheter.

In view of recent studies that suggest worse outcomes in older patients with watchful waiting, we studied a cohort of men of age 70 to determine if SBRT is an effective and safe alternative.

Methods

Treatment Details

From August 2006 through January 2009, 142 patients over 70 received CyberKnife (CK) to a dose of 35 Gy (n=31) or 36.26 Gy (n=111) in 5 fractions over 5 days.

Inverse treatment planning was done with CT and MRI fusion when feasible. Patients received 1500 mg of amifostine intrarectally 15 min prior to each fraction. Patients were treated to the 83-87% isodose line defined with 5-mm margins added to the GTV, 3-mm at the rectum. The proximal half of the seminal vesicles was included. Lymph nodes were not included. Four gold fiducial seeds were continuously tracked for the approximately 45-min duration of each fraction.

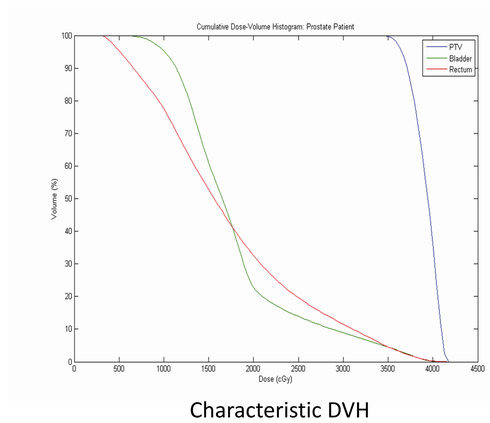
Patient Characteristics

All 142 patients were T1C or T2A, and had negative bone and CT scans. 29 of these patients received androgen deprivation therapy of up to 12 months duration.. 80 patients were low risk, 52 were intermediate and 10 were high risk.

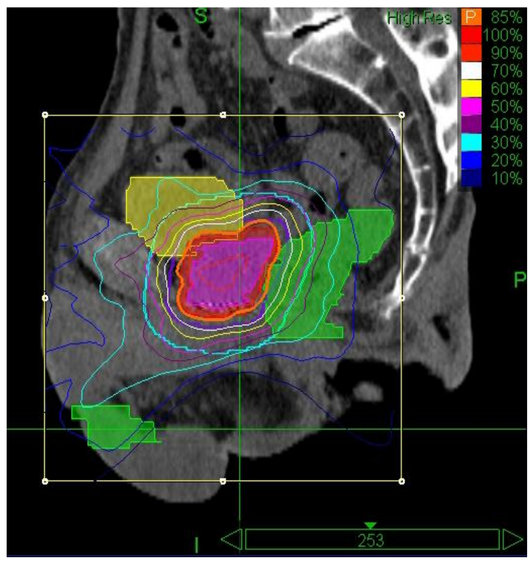
Number of patients	142
Age (years)	
mean	77
range	71-88
PSA (mean, range) ng/ml	
mean	6.9
range	1.59-22
Gleason Score	
6	85
7	49
8	8

Methods cont.

Treatment Plan



Characteristic DVH



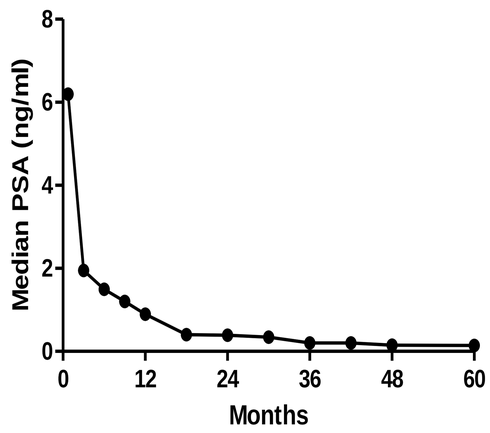
Characteristic SBRT Treatment Plan. Note the D50 to the penile bulb and testes was kept to less than 45% and 15% of DMAX, respectively.

Results

Follow-up (months)	
median	48
range	9-60
48 month PSA (ng/ml)	
median	0.10
range	0.01 – 1.2
Lost to Follow-up	4
Death from intercurrent disease	10
Death from prostate cancer	0

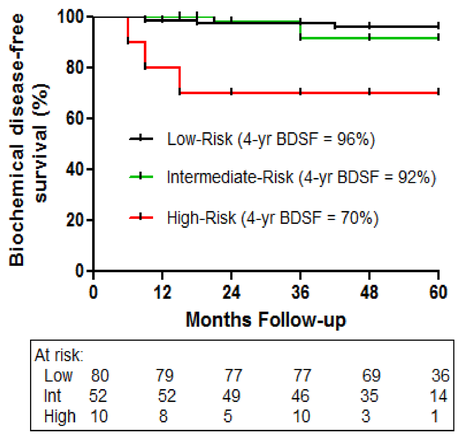
Results cont.

PSA



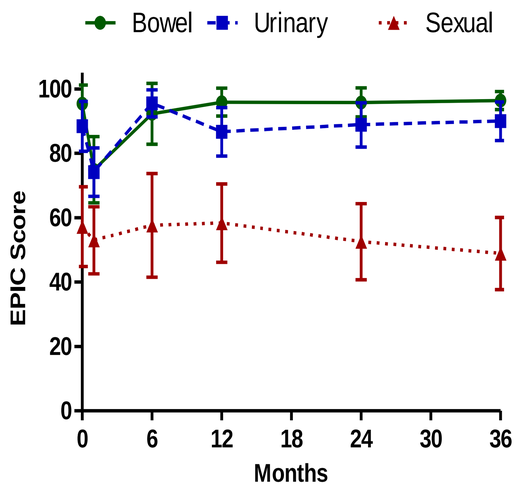
Biochemical Control

Biochemical failure occurred in 10 patients resulting in an overall 5-year actuarial freedom from biochemical rate of 92.6%.



At risk:						
Low	80	79	77	77	69	36
Int	52	52	49	46	35	14
High	10	8	5	10	3	1

Quality of Life



Mean EPIC Quality of Life for bowel, urinary and sexual domain scores.

Results cont.

Toxicity

Overall, toxicity was mild with only 3 Grade 3 toxicities and no higher grade toxicities.

	RTOG Toxicity Grade % (#) of Patients	
	II	III
Acute Urinary	1.4%	0
Acute Rectal	2.1%	0

	RTOG Toxicity Grade % (#) of Patients	
	II	III
Late Urinary	10%	2.3%
Late Rectal	3.9%	0

Conclusions

- The 92.6% biochemical control rate at 5-years is excellent without any undue toxicity
- These results are as good or better than with standard fractionation to 81GY with IMRT (5)
- The results with this cohort, in terms of control and QOL are equivalent to a larger cohort including men < 70 years old
- This suggests that 35-36.25 Gy in five fractions delivers an equivalent dose of >90 Gy, supporting the low α/β ratio for prostate cancer.
- These results also support the idea that the use of SBRT alone in older patients with organ-confined prostate cancer is an excellent option.

References

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