Prostate CyberKnife Stereotactic Body Radiotherapy: Report on the Early Experience at a Community-based CyberKnife Center

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OBJECTIVE

To review PSA responses and prostate toxicity using CyberKnife Stereotactic Body Radiotherapy (SBRT) during the first 2 years of experience at Reno CyberKnife.

METHODS

A retrospective review and analysis of the first 70 patients treated during the first year at Reno CyberKnife (10/24/08-6/28/2011) was performed. Seventeen patients were excluded from analysis because of the use of androgen deprivation or previous therapy (cryotherapy or conventional external beam radiotherapy). Fifty-three patients treated with the CyberKnife robotic radiosurgical system were available for this analysis, of which 46 had toxicity data. For every patient, 4 gold fiducials were inserted transperineally for fiducial tracking, and MRI and CT were use fused for treatment planning. Most patients received a total dose of 36.25 Gy in 5 fractions within a 7 day period. Two patients with high risk disease were treated with 3 fractions of 7Gy in combination with conventionally fractionated pelvic radiotherapy, 45Gy in 25 treatments over 5 weeks. The dose was prescribed to cover at least 95% of the Planning Target Volume (PTV) which was defined as the Clinical Target Volume (CTV) plus 5mm in all directions except posteriorly, where the margin was 3mm. The CTV was defined as the prostate +/– the seminal vesicles, depending on risk characteristics. Median number of beams used and isodose line prescribed are 140 beams and 83%, respectively. In most cases, treatment was started on a Wednesday or Thursday, and completed the following Tuesday or Wednesday, providing an inherent weekend break during the course of therapy. Posttreatment PSA's were monitored every 3 months in the first year, followed by every 6months starting in the second year. Toxicity was assessed according to the Common Terminology Criteria for Adverse Events (CTCAE), version 3, at each follow-up visit.

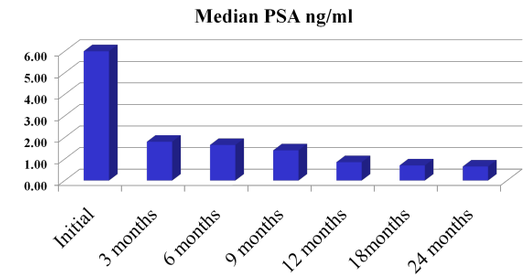
TREATMENT PLAN

Multiplan screen shot (mri) here

RESULTS: PATIENT CHARACTERISTICS

Median Follow Up	12 months (range: 1-30)	
Age, median	67 (range: 48-76)	
PSA, median	6.00 ng/ml (range: 1.5-115.0)	
Gleason Sum		
	3+3=6	25
	3+4=7	11
	4+3=7	11
	4+4=8	5
	4+5=9	1
Clinical Stage		
	T1b	1
	T1c	38
	T2a	12
	T2b	1
	T3a	1
NCCN Risk Group		
	Low	23
	Interm.	23
	High	7

RESULTS: PSA TREND



Three patients (5.7%) failed biochemically at 12, 18, and 24 months.

RESULTS: TOXICITY

CTCAE v.3 Toxicity Grading System N(%)

Site	1	2	3	4	5
GI	7(15.2)	1(2.1)	0(0)	0(0)	0(0)
GU	15(32.6)	4(8.7)	3(6.5)*	0(0)	0(0)

*Three patients experienced urinary obstruction requiring catheterization at 9 months; 2 temporary, 1 underwent TURP and had significant healing difficulties, improved with hyperbaric oxygen therapy, subsequently relapsed requiring suprapubic catheterization.

CONCLUSIONS

CyberKnife SBRT for localized prostate cancer shows promising early PSA responses and is well tolerated by the majority of patients, although we note 3 incidents of grade 3 urinary toxicity at 9 months.