

Survival and Primary Causes of Death in Prostate Cancer Patients after Low Dose Brachytherapy

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Introduction

■ Prostate Cancer

- 200,000 new cases diagnosed/year in the US
- 40,000 deaths per year
- Most common malignancy affecting men
- 2nd leading cause of cancer death
- > 85% of men with Prostate Cancer will die of other causes

Permanent Interstitial Brachytherapy

- Implantation of radioactive sources under TRUS guidance
- Improved accuracy
- Decreased side-effects
 - Sexual dysfunction
 - Preserved bowel and urinary function

Purpose

- *To evaluate survival and primary causes of death in patients with prostate cancer.*

Methods

- Patients identified by Tumor Registry Board
- Excluded patients without PSA value at diagnosis, recent PSA value, treatment at other facility, or lost contact
- Retrospective analysis of medical charts

Risk Groups

- Low-risk
 - PSA \leq 10 ng/ml, Gleason score \leq 6, and clinical stage \leq T2a
- Intermediate-risk
 - one adverse factor: PSA 10.1-19.9 ng/ml, or a Gleason score of 7 or clinical stage of T2b
- High-risk
 - PSA \geq 20 ng/ml or Gleason score \geq 8 or clinical stage \geq T2c or two to three of the intermediate adverse features

Variables

- Demographic Data
 - Current cancer status
 - Current vital status
 - Cause of death
 - Androgen Deprivation Therapy
- Age at diagnosis
- Length of follow-up
- Length of survival
- Diagnosis PSA
- Gleason Score
- Most recent PSA

Cardiovascular Risk Factors

- Cigarette smoking
- Dyslipidemia
 - HDL <40 mg/dL
 - LDL >159 mg/dL
 - Triglycerides >150 mg/dL
 - Cholesterol >240 mg/dL
- Left ventricular dysfunction
- Hypertension
- Diabetes Mellitus

Results

- 218 patients included
 - 117 low-risk, 70 intermediate-risk, 31 high-risk
- 40 total deaths

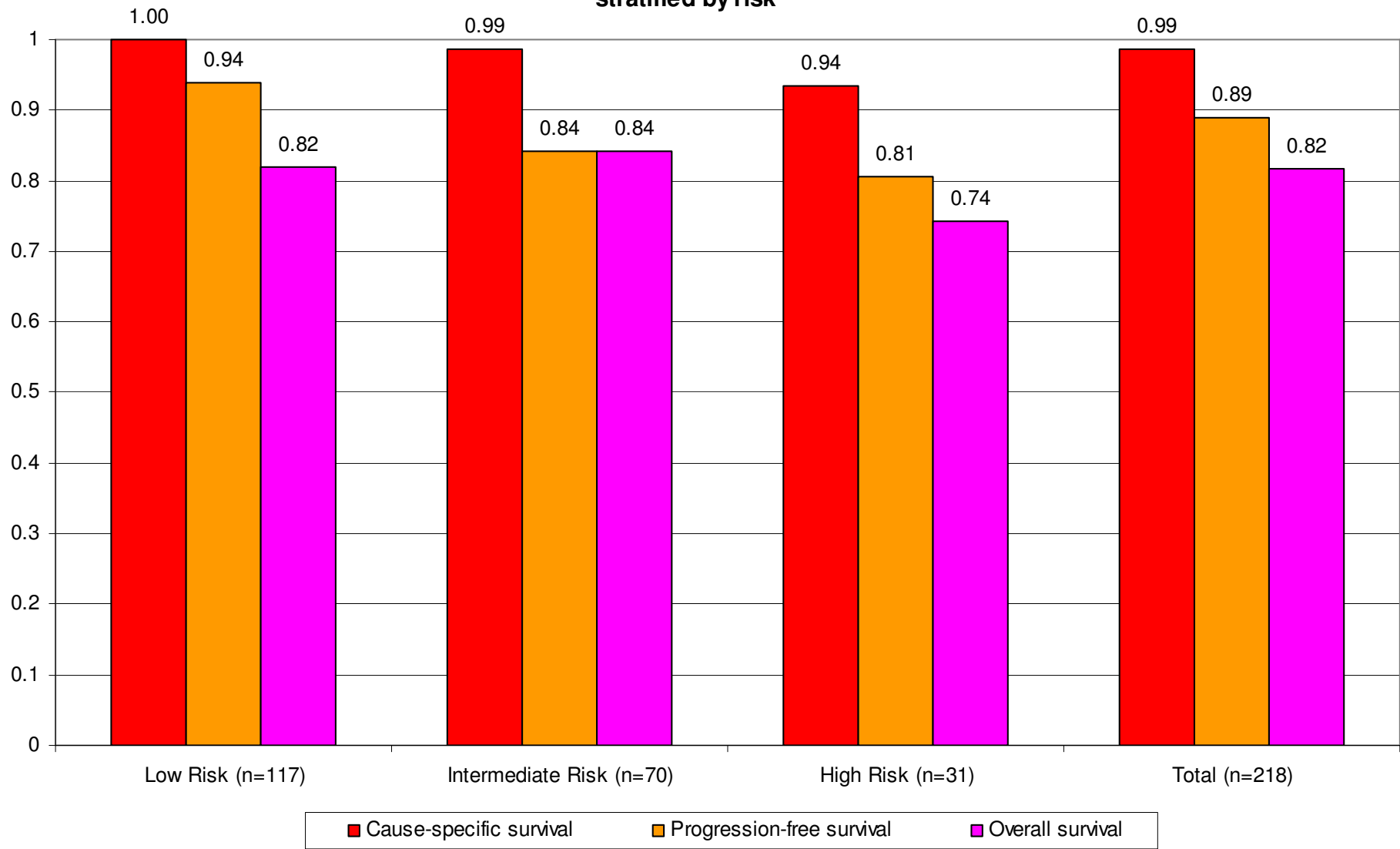
Table 1. Patient characteristics stratified by risk

	Low Risk (n=117)		Intermediate Risk (n=70)		High Risk (n=31)		P-value	Total (n=218)	
	Mean ± SD	Med	Mean ± SD	Med	Mean ± SD	Med		Mean ± SD	Med
Age at Diagnosis (yrs)	69.3 ± 6.1	71	70.5 ± 6.0	71	70.7 ± 6.8	72	0.311	70 ± 6.2	71
Follow-up (mos)	89 ± 24	92	94 ± 23	95	92 ± 27.1	101	0.519	91 ± 24	93
PSA at Diagnosis (ng/mL)	5.8 ± 1.8	5.5	9.5 ± 4.0	9.4	15.0 ± 11.6	11.2	0.000	8.2 ± 5.8	6.5
Gleason Score	5.7 ± 0.8	6	6.2 ± 1.2	6	7.1 ± 1.2	7	0.000	6.0 ± 1.1	6
Most recent PSA (ng/mL)	0.7 ± 2.5	0	3.8 ± 20.0	0.1	17.3 ± 60.0	0	0.006	4.1 ± 25.7	0
Number of CV risk Factors	2.5 ± 1.2	3	2.5 ± 1.2	3	2.4 ± 1.3	2	0.849	2.5 ± 1.2	3

Table 2. Categorical patient characteristics stratified by risk

Characteristic		Low Risk (n=117)		Intermediate Risk (n=70)		High Risk (n=31)		P-value	Total (n=218)	
		#	%	#	%	#	%		#	%
Stage	T1b-T2b	117	100.0%	70	100.0%	28	90.3%	0.000	215	98.6%
	T2c-T3a	0	0.0%	0	0.0%	3	9.7%		3	1.4%
ADT		29	24.8%	24	34.3%	16	51.6%	0.014	69	31.7%
Hypertension		96	82.1%	59	84.3%	24	77.4%	0.700	179	82.1%
Diabetes		30	25.6%	16	22.9%	10	32.3%	0.608	56	25.7%
Tobacco Use	Never	57	48.7%	31	44.3%	14	45.2%	0.935	102	46.8%
	Former	39	33.3%	23	32.9%	10	32.3%		72	33.0%
	Current	21	17.9%	16	22.9%	7	22.6%		44	20.2%
Dyslipidemia		84	71.8%	46	65.7%	18	58.1%	0.310	148	67.9%
Heart Failure		28	23.9%	14	20.0%	6	19.4%	0.762	48	22.0%

Figure 1. Cause-specific, progression-free, and overall survival in patients with prostate-cancer, stratified by risk



$p=0.033$

$p=0.475$

Table 3. Primary causes of death stratified by risk

	Low Risk (n=21)		Intermediate Risk (n=11)		High Risk (n=8)		Total (n=40)	
	#	%	#	%	#	%	#	%
Other cancer	8	38.1%	2	18.2%	2	25.0%	12	30.0%
Not prostate cancer, not otherwise specified	7	33.3%	2	18.2%	2	25.0%	11	27.5%
Cardiopulmonary	3	14.3%	4	36.4%	2	25.0%	9	22.5%
Unknown	3	14.3%	1	9.1%	0	0.0%	4	10.0%
Prostate cancer	0	0.0%	1	9.1%	2	25.0%	3	7.5%
Trauma	0	0.0%	1	9.1%	0	0.0%	1	2.5%

Results

- Decreased progression-free survival with increasing risk group
- Trend toward other cancers and cardiopulmonary disease as the predominant cause of death
- Prostate cancer was not a leading cause of death in any of the risk groups

Discussion

- Bittner et al.
 - Cardiovascular disease accounted for greater than 41% of all observed deaths
 - Death due to cardiovascular disease exceeded death due to prostate cancer even in the high risk group
- Ketchandji et al.
 - Over 200,000 participants
 - Showed similar findings with death due to cardiovascular disease and other cancer as the primary cause of death in men with primary prostate cancer

Discussion

- Differences between this study and previous studies include demographics, patient population, and clinical setting.
 - African American population
 - Community hospital vs academic center
 - Number of participants

Clinical Application

- Minimize cardiovascular risk factors
 - Encourage healthy lifestyles
 - Discourage smoking, control blood pressure, manage diabetes and dyslipidemia
- Other cancer
 - Pancreatic, bladder, renal, esophageal, lung cancer, and mantle cell lymphoma
 - The types of cancer appreciated in this study are not routinely screened
 - Associated with tobacco

Weaknesses

- Small patient population.
 - 218 patients, 40 deaths
 - Only included patients treated with interstitial permanent brachytherapy, so results cannot be generalized to all patients with prostate cancer

Conclusions

- Cardiopulmonary and other cancers more likely to cause death in patients with prostate cancer
- More research on relationship between prostate cancer and cardiopulmonary disease
 - Independent risk factor?
- Risk factor modification and mortality

Conclusions

- *It is important for physicians to be aware of these findings in order to facilitate risk factor modification in patients diagnosed with prostate cancer.*

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