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Original article

Survival outcomes of radiotherapy with or without androgen-deprivation therapy for patients with intermediate-risk prostate cancer using the National Cancer Data Base

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Abstract

Purpose: Presently no reported prospective, randomized trials have clearly defined the role of androgen-deprivation therapy (ADT) for patients with intermediate-risk prostate cancer in the setting of radiation therapy (RT) dose escalation. This study's objective was to evaluate the survival benefit of adding ADT to high-dose RT for patients with intermediate-risk prostate cancer using the National Cancer Data Base.

Materials and methods: The National Cancer Data Base was queried for patients with intermediate-risk prostate cancer treated from 2004 to 2006, with available data for Gleason Score, prostate-specific antigen, TNM staging, and receipt of radiation and ADT. Start of RT was within 1 to 180 days of ADT; radiation included external beam alone ($\geq$70 Gy) or external beam RT plus brachytherapy boost. Overall survival was evaluated using multivariate (MVA) Cox regression and propensity score-matched (PSM) analyses.

Results: A total of 14,126 patients were included of which 7,568 (53.6%) received no ADT and 6,558 (46.4%) received ADT. Median follow-up was 85.8 months (6.0–119.9 mo). Median RT dose was 75.6 Gy in 42 fractions. Under MVA, the addition of ADT for patients with intermediate-risk prostate cancer had no overall survival benefit compared with RT alone (hazard ratio [HR] = 0.97, P = 0.316). PSM also confirmed no survival benefit with the addition of ADT for the entire intermediate-risk cohort (HR = 0.98, P = 0.560). On subset analysis, those with 3 intermediate-risk factors had a survival benefit with the addition of ADT on both MVA (HR = 0.69, P = 0.037) and PSM (HR = 0.61, P = 0.026). Limitations include retrospective design and incomplete data on the type of ADT and duration.

Conclusions: With the exception of men who present with all 3 intermediate-risk factors, a significant association with decreased all-cause mortality risk and ADT was not observed for patients with intermediate-risk prostate cancer.

Keywords: Androgen-deprivation therapy; Hormones; Intermediate-risk; NCDB; Prostate cancer; Radiation therapy

1. Introduction

Multiple prospective randomized trials combining androgen-deprivation therapy (ADT) and conventional doses of external beam radiotherapy (EBRT) ($\leq$70 Gy) for patients with intermediate- and high-risk prostate cancer have demonstrated improvement in biochemical, disease-free, and overall survival (OS) [1–4]. Patients with intermediate-risk prostate cancer (clinical stage T2b or T2c, Gleason score (GS) = 7, or prostate-specific antigen (PSA) of 10–20 ng/ml, and without high-risk features (clinical stage T3a or higher, GS = 8–10, or PSA > 20 ng/ml), however, represent a heterogeneous group, and subsets of patients with intermediate-risk prostate cancer might not derive net benefit from the addition of ADT to radiation therapy (RT). Several randomized trials performed in the conventional dose era demonstrated a survival advantage with the addition of ADT to RT for patients with intermediate-risk prostate cancer [4–6]. However, 3 randomized trials have shown a progression-free survival advantage for dose-escalated RT relative to conventional

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Table 1
Patient and treatment characteristics

Characteristic	All patients		No ADT		ADT		*P*
	No.	%	No.	%	No.	%	
Age, y							<0.001
40–55	694	4.9	436	5.8	258	3.9	
56–70	6,466	45.8	3,692	48.8	2,774	42.3	
>70	6,966	49.3	3,440	45.5	3,526	53.8	
Race							0.458
White	11,512	81.5	6,173	81.6	5,339	81.4	
African-American	2,053	14.5	1,079	14.3	974	14.9	
Other	398	2.8	225	3.0	173	2.6	
Unknown	163	1.2	91	1.2	72	1.1	
Insurance status							<0.001
Not insured	159	1.1	100	1.3	59	0.9	
Private insurance/managed care	4,177	29.6	2,430	32.1	1,747	26.6	
Medicaid	251	1.8	133	1.8	118	1.8	
Medicare	9,096	64.4	4,669	61.7	4,427	67.5	
Other Government	214	1.5	114	1.5	100	1.5	
Unknown	229	1.6	122	1.6	107	1.6	
Charlson-Deyo comorbidity score							0.043
0	12,755	90.3	6,875	90.8	5,880	89.7	
1	1,150	8.1	587	7.8	563	8.6	
≥2	221	1.6	106	1.4	115	1.8	
Residence							<0.001
Metropolitan	11,390	80.6	6,208	82.0	5182	79.0	
Urban	1,985	14.1	982	13.0	1,003	15.3	
Rural	273	1.9	122	1.6	151	2.3	
Unknown	478	3.4	256	3.4	222	3.4	
Year of diagnosis							0.003
2004	4,473	31.7	2,309	30.5	2,164	33.0	
2005	4,548	32.2	2,447	32.3	2,101	32.0	
2006	5,105	36.1	2,812	37.2	2,293	35.0	
Tumor stage							<0.001
1 NOS	49	0.3	33	0.4	16	0.2	
1a	18	0.1	8	0.1	10	0.2	
1b	13	0.1	8	0.1	5	0.1	
1c	8,356	59.2	4,642	61.3	3,714	56.6	
2a	2,046	14.5	1,038	13.7	1,008	15.4	
2b	1,419	10	721	9.5	698	10.6	
2c	2,225	15.8	1,118	14.8	1,107	16.9	
Prostate-specific antigen (PSA)							<0.001
<10	9,666	68.4	5,367	70.9	4,299	65.6	
10–20	4,460	31.6	2,201	29.1	2,259	34.4	
Gleason score (GS)							<0.001
3 + 3	3,217	22.8	2,052	27.1	1,165	17.8	
3 + 4	7,323	51.8	3,936	52	3,387	51.6	
4 + 3	3,586	25.4	1,580	20.9	2,006	30.6	
Number of intermediate-risk factors							<0.001
1	9,816	69.5	5,760	76.1	4,056	61.8	
2	3,733	32.1	1,628	21.5	2,105	32.1	
3	577	4.1	180	2.4	397	6.1	
Radiation treatment site							<0.001
Prostate alone	8,426	59.6	4,617	61.0	3,809	58.1	
Prostate and pelvis	5,700	40.4	2,951	39.0	2,749	41.9	
Radiation treatment							<0.001
70.0–72.0 Gy	1,691	12.0	855	11.3	836	12.7	
72.1–77.9 Gy	7,136	50.5	3,553	46.9	3,583	54.6	
≥78 Gy	2,131	15.1	1,444	19.1	687	10.5	