Treatment patterns in patients diagnosed with advanced prostate cancer in California, 2010-2018

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Background

- Androgen deprivation therapy (ADT), i.e., hormonal therapy, has been the standard of care for men diagnosed with metastatic prostate cancer (mPC) since 1940.[1]
- More recently, novel hormonal therapies and a combination therapy with ADT and a chemotherapy (e.g., docetaxel) with survival benefits have been available as well.[1,2]
- A couple of studies using real-world data have reported underutilization of the novel treatments. But no population-based studies have examined treatment patterns in recent years to examine the potential impact of change in treatment landscape.[3,4]
- Thus, we used data from a population-based registry to examine treatment utilization patterns in mPC.

Purpose

- To assess initial treatment patterns among men diagnosed with mPC.

Methods

- We used California Cancer Registry (CCR) data to identify men of ages ≥20 year, who were diagnosed with stage IV prostate cancer (site code: C619) between 2010–2018.
- We further restricted our sample to only first primary cases with microscopic confirmation and those with Gleason score ≥6.
- Treatment patterns were examined by assessing receipt of ADT and chemotherapy for initial cancer treatment.
- Frequency/proportion of patients who received ADT and/or chemotherapy were calculated by sociodemographic, comorbidity, and tumor characteristics.
- We, then, fitted a multinomial logistic regression model to examine whether receipt of ADT only and chemotherapy with or without ADT varied by sociodemographic and tumor characteristics after adjusting for covariates.

Results

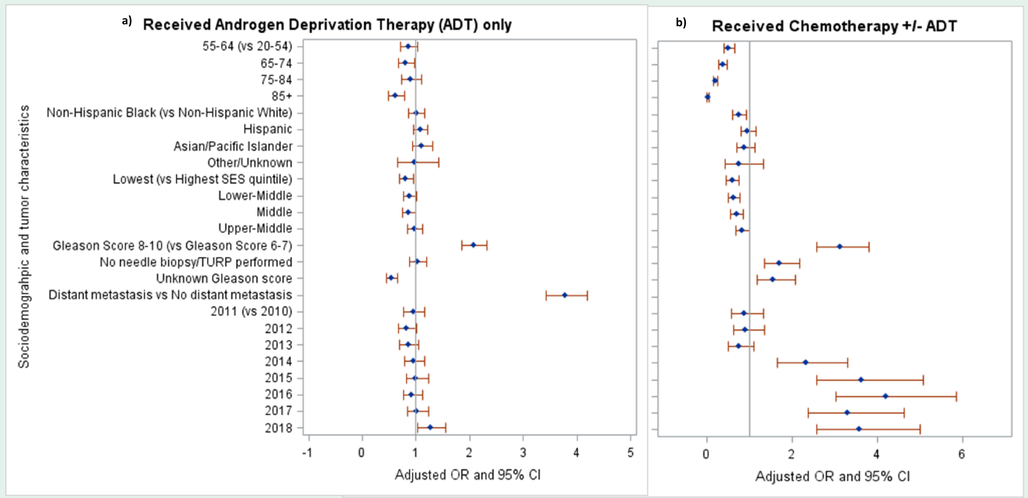
- Of the 14,205 eligible men identified, most were ≥65 years old (64.2%) and non-Hispanic white (NHW, 58%), had Gleason score >7 (59%), and distant metastasis (68%, Table 1).
- In terms of treatments, the majority (n=9214, 64.9%) received ADT alone as initial cancer treatment, 1580 (11.1%) received both ADT and chemotherapy, 219 (1.5%) received only chemotherapy, 2942 (20.7%) received neither treatment (Table 1), and 250 (1.8%) had unknown treatment status (data not shown in Table 1).
- Our findings from regression model showed that patients of ages 65-74 and 85+ had significantly lower odds of receiving ADT (OR[95%CI]: 0.81[0.67, 0.98] and 0.62[0.49, 0.79] respectively) compared to 20-54 age group. On the other hand, all patients older than 54 were significantly less likely to receive chemotherapy +/- ADT (OR range: 0.04 in 85+ age group to 0.52 in 55-64 age group, p <0.0001 for all) compared to 20-54 age group (Figure 1).

Table 1. Type of initial treatment received by baseline sociodemographic and tumor characteristics.

Characteristics	Total n (col %)*	Treatment Type, n (Row %)			
		Neither	Hormone Therapy (ADT)	ADT + Chemotherapy	Chemotherapy
Overall sample	14205 (100%)	2942 (20.71%)	9214 (64.86%)	1580 (11.12%)	219 (1.54%)
Age					
20-54	1068 (7.5%)	202 (18.91%)	615 (57.58%)	212 (19.85%)	22 (2.06%)
55-64	4019 (28.3%)	858 (21.35%)	2466 (61.36%)	551 (13.71%)	65 (1.62%)
65-74	4972 (35.0%)	1060 (21.32%)	3156 (63.48%)	566 (11.38%)	97 (1.95%)
75-84	2996 (21.1%)	540 (18.02%)	2164 (72.23%)	228 (7.61%)	27 (0.9%)
85+	1150 (8.1%)	282 (24.52%)	813 (70.7%)	23 (2%)	8 (0.7%)
Race/Ethnicity					
Non-Hispanic White	8283 (58.31%)	1721 (20.78%)	5334 (64.4%)	955 (11.53%)	124 (1.5%)
Non-Hispanic Black	1595 (11.23%)	348 (21.82%)	1047 (65.64%)	160 (10.03%)	20 (1.25%)
Hispanic	2888 (20.33%)	608 (21.05%)	1857 (64.3%)	307 (10.63%)	59 (2.04%)
Asian/Pacific Islander	1248 (8.79%)	223 (17.87%)	854 (68.43%)	135 (10.82%)	15 (1.2%)
Other/Unknown	191 (1.34%)	42 (21.99%)	122 (63.87%)	23 (12.04%)	1 (0.52%)
Neighborhood SES					
Lowest	2243 (15.79%)	500 (22.29%)	1431 (63.8%)	225 (10.03%)	46 (2.05%)
Lower-Middle	2597 (18.28%)	560 (21.56%)	1688 (65%)	262 (10.09%)	41 (1.58%)
Middle	3047 (21.45%)	657 (21.56%)	1963 (64.42%)	336 (11.03%)	37 (1.21%)
Upper-Middle	3131 (22.04%)	617 (19.71%)	2057 (65.7%)	368 (11.75%)	41 (1.31%)
Highest	2834 (19.95%)	542 (19.12%)	1839 (64.89%)	352 (12.42%)	49 (1.73%)
Clinical Gleason Score					
Gleason Score 6-7	2681 (18.87%)	887 (33.08%)	1551 (57.85%)	163 (6.08%)	19 (0.71%)
Gleason Score 8-10	8380 (58.99%)	1312 (15.66%)	5822 (69.47%)	1031 (12.3%)	90 (1.07%)
No needle biopsy/TURP performed	2256 (15.88%)	452 (20.04%)	1413 (62.63%)	301 (13.34%)	48 (2.13%)
Unknown	888 (6.25%)	291 (32.77%)	428 (48.2%)	85 (9.57%)	62 (6.98%)
Presence of any distant metastasis at diagnosis					
No distant metastasis	9671 (68.08%)	1600 (35.49%)	2610 (57.9%)	160 (3.55%)	37 (0.82%)
Distant metastasis	26 (0.18%)	1336 (13.81%)	6588 (68.12%)	1418 (14.66%)	180 (1.86%)
Unknown	4508 (31.74%)	6 (23.08%)	16 (61.54%)	2 (7.69%)	2 (7.69%)
Year of Diagnosis					
2010	1149 (8.09%)	260 (22.63%)	803 (69.89%)	59 (5.13%)	12 (1.04%)
2011	1176 (8.28%)	281 (23.89%)	814 (69.22%)	53 (4.51%)	14 (1.19%)
2012	1311 (9.23%)	320 (24.41%)	884 (67.43%)	56 (4.27%)	28 (2.14%)
2013	1385 (9.75%)	333 (24.04%)	952 (68.74%)	58 (4.19%)	15 (1.08%)
2014	1509 (10.62%)	313 (20.74%)	956 (63.35%)	168 (11.13%)	29 (1.92%)
2015	1677 (11.81%)	332 (19.8%)	1023 (61%)	262 (15.62%)	29 (1.73%)
2016	1865 (13.13%)	370 (19.84%)	1081 (57.96%)	345 (18.5%)	36 (1.93%)
2017	2006 (14.12%)	385 (19.19%)	1271 (63.36%)	285 (14.21%)	30 (1.5%)
2018	2127 (14.97%)	348 (16.36%)	1430 (67.23%)	294 (13.82%)	26 (1.22%)

*The total n and % do not add up to 100% due to exclusion of those with missing/unknown status.

Figure 1. Forest plots of adjusted odds ratios (ORSs) and 95% confidence intervals for receipt of a) ADT only and b) Chemotherapy with or without ADT.



*The model was adjusted for following variables in addition to the ones listed above: Insurance type at diagnosis, baseline Charlson comorbidity score, and type of reporting facility (NCI, NCCN, CoC).

Results (contd.)

- Those residing in lower-to-middle SES neighborhoods had approximately 12% to 19% lower odds of receiving ADT. Although only findings for Lowest and Lower-to-middle SES groups were statistically significant (p-values: 0.009 and 0.03 respectively). While middle-to-lowest SES neighborhoods all had significantly lower odds of receiving chemotherapy +/- ADT (OR range: 0.60 - 0.70, p < 0.001) (Figure 1a and b).
- There was no difference in the receipt of ADT only by race/ethnicity, however, NHB men were significantly less likely to receive a chemotherapy +/- ADT compared to their NHW counterparts (0.76[0.61, 0.94]).
- Lastly, patients with Gleason score >7 and those with distant metastasis were significantly more likely to receive both ADT only and chemotherapy +/- ADT as initial cancer treatment.

Limitations

- Registry data do not include molecule level treatment information. Thus, we were unable to assess the use of novel ADTs and specific chemotherapies used.
- We were also unable to examine treatment received beyond the first course of treatment due to lack of data.

Conclusions

- Although ADT is the standard of care for mPC, about one-fifth of the patients still do not receive it.
- Use of combination therapy has increased since 2014. However, only a small portion of patients receive this treatment currently.
- There is some evidence of disparity in treatment utilization by age, neighborhood SES, and in NHB men for newly approved combination therapy.
- Further study is needed to confirm these disparities and to better understand reasons for existing treatment utilization.

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