EE462

Treatment Patterns and Healthcare Resource Utilization Among Patients With Localized Prostate Cancer Treated With External Beam Radiation Therapy

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Key Takeaways

Overall, high-risk localized prostate cancer patients incurred significantly higher all-cause and prostate cancer-related costs than low/intermediate-risk patients, with outpatient costs accounting for most of the difference

There remains an unmet need for better disease management to reduce the economic burden among high-risk patients with localized prostate cancer who are treated with external beam radiation therapy

Conclusion

Although patients with high-risk and low/intermediate-risk localized prostate cancer had similar baseline costs following external beam radiation therapy, high-risk patients incurred higher costs, overall and prior to progression. This suggests an unmet need for effective treatment options across this patient population

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Disclosures
G. Brown is an employee of New Jersey Urology and has received consulting fees from Johnson & Johnson. C. Patel and S. Burbage are employees and stockholders of Johnson & Johnson. C. Rossi, F. Kinkead, F. Lee, Y. Wang, and D. Pilon are employees of Analysis Group, Inc., a consulting company that has provided paid consulting services to Johnson & Johnson. B. Lowentritt is an employee of Chesapeake Urology and has received consulting fees from Johnson & Johnson.

Background

- External beam radiation therapy (EBRT), a common type of cancer treatment that uses radiation to damage cancer cells, has long been used to treat localized prostate cancer (LPC)[1]
- Although prognosis for patients after undergoing EBRT is favorable, patients with high-risk (HR) features (eg, T4 staging, Gleason score ≥8, and prostate-specific antigen [PSA] level ≥20 ng/mL) face a higher likelihood of disease recurrence and poorer prognosis compared with those who have low/intermediate-risk (L/IR) disease[2]
- Despite these differences in prognosis, there is limited evidence on the economic burden of HR LPC patients treated with EBRT in the United States (US)
- Assessing and understanding healthcare costs, overall and stratified by risk cohort, can help inform treatment decision-making

Objectives

- To compare all-cause and prostate cancer (PC)-related healthcare costs for patients with LPC who undergo EBRT, stratified by HR and L/IR disease

Methods

Data sources

- Clinical data from Precision Point Specialty (PPS) Analytics, collected as part of routine clinical care from community-based urology practices in the US, linked with closed claims data from the Komodo Research Dataset (KRD+) was used (study period: January 1, 2016–August 31, 2024)
- Data were de-identified and Health Insurance Portability and Accountability Act (HIPAA) compliant

Study design

- A retrospective, longitudinal cohort analysis utilizing score-weighted cohorts of patients with LPC who underwent EBRT was conducted
- Patients who underwent EBRT were categorized into mutually exclusive cohorts (ie, HR or L/IR) based on NCCN® guidelines, considering pre-index tumor staging, Gleason score, and PSA level
- The index date was defined as the date of the first claim for an EBRT procedure
- The baseline period was defined as the 12-month period prior to the index date
- The observation period was defined as the time from the index date until the earliest of the end of continuous closed claim insurance eligibility or August 31, 2024 (ie, end of data availability)
- The overall LPC follow-up period was defined as the portion of the observation period that occurred prior to evidence of either metastasis, castration resistance or biochemical recurrence (BCR)

Study outcomes

- All-cause and PC-related healthcare costs were compared between HR and L/IR patients with LPC who underwent EBRT during the observation period
- All-cause and PC-related healthcare costs during the LPC period were described among HR and L/IR patients

Statistical analysis

- Inverse probability of treatment weighting (IPTW) was used to balance on potentially confounding baseline variables between the HR and L/IR patient cohorts[3]
- Baseline characteristics in the weighted cohorts were considered well-balanced if individual baseline characteristics had a standardized difference of <10%[4]
- Healthcare costs (2024 US dollars) were compared between weighted cohorts using mean cost differences, evaluated based on weighted ordinary least squares regressions
- Costs were reported as imputed allowed amounts, measured per-patient-per-year (PPPY)

Patient selection criteria

Figure 1: Patient flowchart

Procedure for EBRT or RP on or after July 1, 2016 *(first record defined as the index date)*
N=138,945
↓
No evidence of metastasis prior to or on the index date
N=122,035 (87.8%)
↓
No diagnosis of a non-prostate cancer prior to or on the index date
N=89,811 (73.6%)
↓
No use of other localized therapy for LPC prior[a] to the index date
N=87,064 (96.9%)
↓
No use of ARPIs, or the use of advanced PC-related therapy[b] prior to or on the index date
N=86,589 (99.5%)
↓
≥12 months of continuous closed claims insurance enrollment prior to and including the index date
N=15,346 (17.7%)
↓
No evidence of castration resistance on or prior to the index date
N=15,318 (99.8%)
↓
≥18 years of age on the index date
N=15,318 (100.0%)
↓
Patients treated with EBRT
N=6,193 (40.4%)
↓

Using 180 days prior to the index date to assess risk stratification[c]

HR patients	L/IR patients
N=980 (15.8%)	N=1,862 (30.1%)

ARPI, androgen receptor pathway inhibitor; EBRT, external beam radiation therapy; HR, high-risk; L/IR, low/intermediate-risk; LPC, localized prostate cancer; PARP, poly-ADP ribose polymerase; PC, prostate cancer; RP, radical prostatectomy.
[a]Other therapies for LPC included cryotherapy, interstitial prostate brachytherapy, and high-intensity focused ultrasound.
[b]Advanced PC-related therapies included ARPIs, chemotherapy, immunotherapy, estrogens, radiopharmaceuticals, and PARP inhibitors.
[c]Patients with insufficient information to classify in either the HR or L/IR cohort were excluded from the study.

Results

Baseline characteristics

- Overall, 980 patients with HR LPC and 1,862 patients with L/IR LPC who underwent EBRT were included in this study (**Figure 1**)
- Baseline patient characteristics were generally well-balanced between the weighted cohorts, with standardized differences <10% (**Table 1**)
- Mean (median) all-cause baseline healthcare costs were $14,557 ($11,416) PPPY for HR patients and $13,017 ($10,030) PPPY for L/IR patients

Table 1: Baseline characteristics

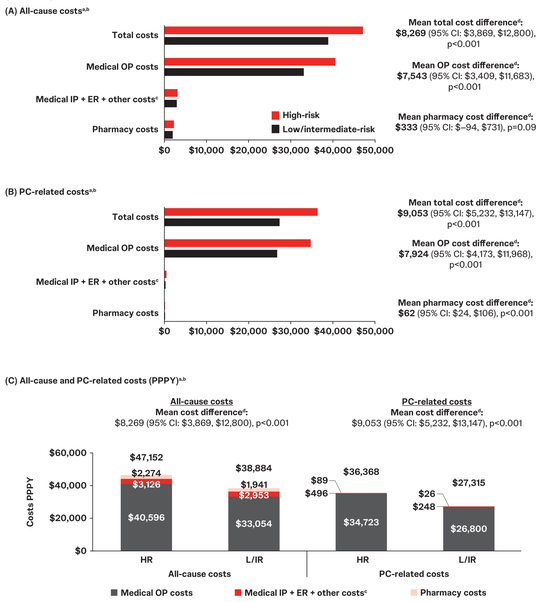
	Weighted population[a,b]		
	HR LPC N=980	L/IR LPC N=1,862	Standardized difference (%)
Age, years, mean ± SD [median]	68.9 ± 8.0 [69.0]	68.6 ± 7.6 [69.0]	5.0
Race/ethnicity, n (%)			
White	442 (45.1)	852 (45.8)	1.3
Black or African American	188 (19.2)	339 (18.2)	2.5
Asian or Pacific Islander	14 (1.4)	25 (1.4)	0.5
Hispanic or Latino	9 (1.0)	19 (1.0)	0.6
Unknown	326 (33.3)	626 (33.6)	0.7
Geographic region, n (%)			
South	466 (47.6)	880 (47.2)	0.7
Midwest	240 (24.5)	464 (24.9)	0.9
Northeast	194 (19.8)	367 (19.7)	0.3
West	79 (8.1)	150 (8.1)	0.0
Unknown	0 (0.0)	1 (0.0)	3.1
Payer type, n (%)			
Medicare	605 (61.8)	1,126 (60.5)	2.7
Commercial	299 (30.5)	595 (31.9)	3.2
Medicaid	39 (4.0)	75 (4.0)	0.2
Unknown	37 (3.8)	66 (3.6)	1.1
Year of EBRT initiation (index year), n (%)			
2017	97 (9.9)	184 (9.9)	0.2
2018	145 (14.8)	285 (15.3)	1.3
2019	148 (15.1)	273 (14.6)	1.2
2020	140 (14.3)	257 (13.8)	1.5
2021	164 (16.7)	312 (16.7)	0.0
2022	174 (17.8)	326 (17.5)	0.8
2023	109 (11.1)	224 (12.1)	3.1
2024	2 (0.2)	2 (0.1)	2.6
Time between PC diagnosis and index date, months, mean ± SD [median]	11.5 ± 21.4 [3.9]	12.6 ± 24.4 [3.6]	4.6
Use of first-generation ARPI, n (%)	109 (11.1)	172 (9.2)	6.3
Use of bone antiresorptive therapy, n (%)	23 (2.4)	36 (1.9)	3.0
Quan-Charlson Comorbidity Index, mean ± SD [median]	3.6 ± 1.9 [3.0]	3.5 ± 1.9 [3.0]	2.4

ARPI, androgen receptor pathway inhibitor; EBRT, external beam radiation therapy; HR, high-risk; L/IR, low/intermediate-risk; LPC, localized prostate cancer; PC, prostate cancer; SD, standard deviation.
[a]The propensity score was obtained from a logistic regression model where index treatment was the dependent variable and with the following baseline characteristics as independent variables: age, race/ethnicity, geographic region, payer type, year of index date, time between PC diagnosis and index date, prior use of first-generation ARPI, prior use of bone antiresorptive therapy, and baseline Quan-Charlson Comorbidity Index.
[b]Of note, the number of patients reported in this weighted population represents the sum of weights for the corresponding non-weighted patients, rounded to the nearest integer. The proportions displayed were calculated before the rounding and may be slightly different than if they were calculated based on rounded numbers.

Healthcare costs

- The mean (median) observation period duration was 31.8 (28.1) months for HR patients and 32.7 (27.2) months for L/IR patients
- Mean [median] all-cause total medical and pharmacy costs during the observation period were significantly higher among HR patients ($47,152 [$29,517] PPPY) compared to L/IR patients ($38,884 [$24,317] PPPY), with a mean cost difference of $8,269 PPPY (95% confidence interval [CI]: $3,869, $12,800; p<0.001)
- Difference in outpatient costs between HR and L/IR cohorts ($7,543 PPPY; 95% CI: $3,409, $11,638, p<0.001) accounted for 91% of the observed difference in total medical and pharmacy costs in the HR cohort (**Figure 2A; Figure 2C**)
- Similar trends were observed for PC-related costs (**Figure 2B; Figure 2C**)

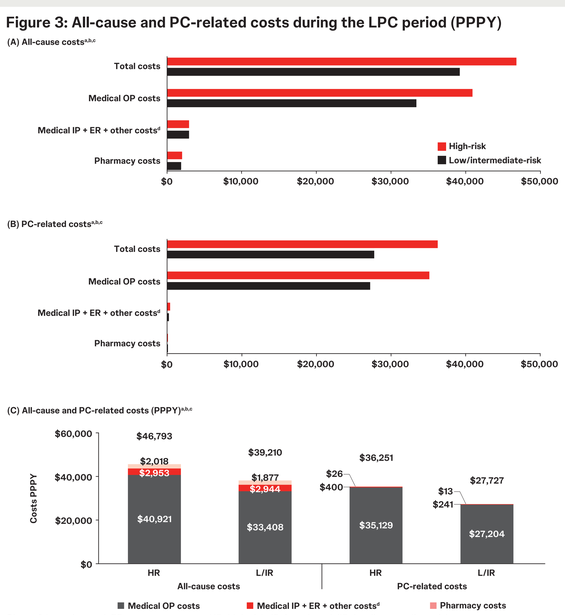
Figure 2: All-cause and PC-related costs during the observation period (PPPY)



CI, confidence interval; ER, emergency room; HR, high-risk; IP, inpatient; L/IR, low/intermediate-risk; OP, outpatient; PC, prostate cancer; PPPY, per-patient-per-year; US, United States.
[a]Costs were inflated to 2024 US dollars.
[b]All costs were truncated at the 99th percentile to account for the influence of outliers. As a result, the sum of the individual mean cost differences may not align exactly with the total cost difference.
[c]IP, ER, and the costs of other services were reported together. No formal comparison was conducted for the IP + ER + other costs between the HR and L/IR cohorts. Other services included medical claims for dental/vision care and durable medical equipment.
[d]95% CIs and p-values for mean cost differences were estimated using non-parametric bootstrapping procedures with 500 replications.

- During the LPC period, mean (median) all-cause total medical and pharmacy costs were $46,793 ($29,504) PPPY for HR patients vs $39,210 ($29,810) PPPY for L/IR patients (**Figure 3A; Figure 3C**)
- Similarly, mean (median) PC-related total medical and pharmacy costs were $36,251 ($19,301) PPPY for HR patients vs $27,727 ($14,661) PPPY for L/IR patients (**Figure 3B; Figure 3C**)

Figure 3: All-cause and PC-related costs during the LPC period (PPPY)



CI, confidence interval; ER, emergency room; HR, high-risk; IP, inpatient; L/IR, low/intermediate-risk; LPC, localized prostate cancer; OP, outpatient; PC, prostate cancer; PPPY, per-patient-per-year; US, United States.
[a]Costs were inflated to 2024 US dollars.
[b]All costs were truncated at the 99th percentile to account for the influence of outliers. As a result, the sum of the individual mean cost differences may not align exactly with the total cost difference.
[c]IP, ER, and the costs of other services were reported together. No formal comparison was conducted for the IP + ER + other costs between the HR and L/IR cohorts. Other services included medical claims for dental/vision care and durable medical equipment.
[d]95% CIs and p-values for mean cost differences were estimated using non-parametric bootstrapping procedures with 500 replications.

Limitations

- This observational study relied on administrative claims and clinical data, which may contain coding inaccuracies or omissions. Additionally, while the linkages between the PPS and KRD+ data sources are comprehensive, any mis-linkages may lead to misclassification and potential information bias
- Although we attempted to account for all observable confounding covariates in our balancing with IPTW, it is possible that some relevant confounders were not measured or were unavailable in the data

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Prostate Cancer

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