Healthcare Resource Utilization in Treatment of Patients with Localized/Locally Advanced Prostate Cancer in a Portuguese Comprehensive Cancer Center

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BACKGROUND AND OBJECTIVES

BACKGROUND

- In the European Union, **prostate cancer** is ranked first among the most frequently diagnosed cancer in men[1] and more common over 65 years[2]. **Medical costs** for prostate cancer make it one of the most costly cancers[3].
- Despite the high prevalence of **localized/locally advanced prostate cancer** (LPC/LAPC) and its economic burden, evidence regarding the health care resource utilization (HCRU) to manage these conditions and medical expenditure is lacking in Portugal.
- **PEarlC Study** (Prostate Early Cancer Study) was a real-world retrospective study in a cohort of patients with early stage prostate cancer followed at Instituto Português de Oncologia (IPO) do Porto in Portugal. Data collected included patients' characteristics, treatment patterns, treatment response and healthcare resource utilization (HCRU).

OBJECTIVES

- To characterize **HCRU** in the treatment of LPC/LAPC in a Portuguese Comprehensive Cancer Center (PCCC), overall and by subgroup (LPC non-high risk, LPC high-risk, and LAPC).
- To perform an exploratory post hoc analysis to estimate LPC/LAPC **annual prostate cancer cost per patient** and the **annual total expenditure** with patients that are diagnosed and treated exclusively at IPO and have no multiple primary tumors.

METHODS

DATA COLLECTION

- PEarlC study was a retrospective observational cohort analysis conducted using a PCCC database which included patients with LPC/LAPC **diagnosed** between Jan2015-Dec2017 and **followed-up** until Dec2020.
- Patients classified as LPC/LAPC according to European Association of Urology Guidelines and considered eligible if on stage I-III at diagnosis and followed in Outpatient Service of Urology, Medical Oncology or Radiation Oncology.
- Patient-level data collected from medical/administrative records; HCRU included prostate cancer-related outpatient and emergency room (ER) visits, hospitalizations, radiotherapy and outpatient complementary diagnostic and therapeutic procedures (CDTs).

METHODOLOGICAL APPROACH

- Patients' characteristics and HCRU were summarized using descriptive statistics. HCRU was annualized and described as mean/patient/year (excluding chemotherapy).
- HCR costs were estimated for 2022 (€) based on unitary costs (**Table 1**) from official Portuguese sources [4-5]; annualized costs (no discount) related only with prostate cancer were estimated based on aggregated statistical tables of HCRU and expressed as mean cost per patient per year.

Table 1. Unitary costs

Healthcare resource	Unitary cost	Source/Comment
Hospitalization	€ 1,599.88	Weighted mean 30% radical prostatectomy (DRG 484), 35% brachytherapy (DRG 500), 30% other (DRG 484/500), severity 1 and 2
Outpatient visits – specialist	€ 34.10 first visit € 31 follow-up visit	Art. 15 [5]
Unplanned urgent visits – specialist	€ 31	Art. 15 [5]
Outpatient visits – other	€ 16	Art. 15 [5]
Clinical laboratory analysis	€ 1.20	Code 21620 [4], minimum price within routine analyses
PSA	€ 14.70	Code 21262 and 21261(total and free) [4]
Bone scintigraphy	€ 90	Code 58150 [4]
CT-scan	€ 61.59	Code 16080 [4], minimum price
PET-CT	€ 1,032.80	Code 58527 [4]
MRI	€ 127.90	Code 18080 [4], minimum price
Radiotherapy, session	€ 250.92	Code 45198, complex radiotherapy

Abbreviations: DRG – Diagnosed Related Groups

RESULTS AND DISCUSSION

- 790 out of 2194 patients were considered eligible (85.7% LPC/14.3% LAPC) (**Figure 1**). The median **follow-up** was 46.7 months and identical between subgroups; 94.8% were alive at the end of the follow-up.
- Approximately one-third (36%) of LPC patients were **high-risk**. No statistical differences were found between groups concerning age and ECOG at diagnosis (**Table 2**).

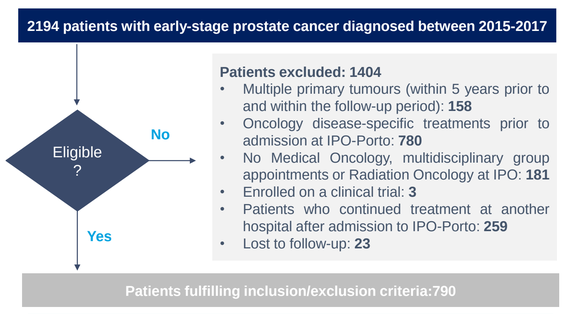

Figure 1. Included/excluded patients

- 85.4% were treated with **curative intention** with radiation (external beam radiation therapy or brachytherapy) or radical prostatectomy (**Figure 2**); 81 patients did not receive any treatment until the end of the follow-up period; description of first treatment is available in **Table 3**.

Table 2. Demographic and clinical characteristics

Characteristics	LPC non-high risk (n=433)	LPC high-risk (n=244)	LAPC (n=113)	Overall (n=790)
Follow-up (months), median/mean	47.3/47.1	47.2/47.2	45.2/46.4	46.7/47.0
Age at diagnosis* (years), median (range)	66.0 (44.0-83.0)	71.0 (46.0-89.0)	70.0 (42.0-85.0)	68.0 (42.0-89.0)
Age <60 years at diagnosis, %	20.1%	9.4%	4.4%	14.6%
Stage at diagnosis, %				
I	28.9%	2.5%	0%	16.6%
II	47.8%	86.5%	0%	52.9%
III	22.9%	10.7%	100%	30.1%
Unknown	0.5%	0.4%	0%	0.4%
ECOG at diagnosis*, %				
0-1	96.8%	94.3%	97.3%	96.1%
2-3	0.7%	1.6%	1.8%	1.1%
Unknown	2.5%	4.1%	0.9%	2.8%

*Differences between groups non-significant (two-sided non-parametric statistical tests with a significance level of 0.05)

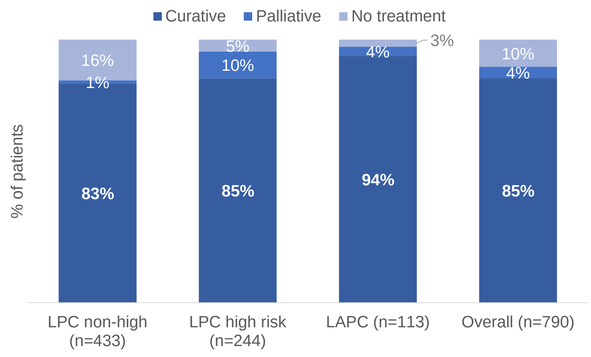

Figure 2. Treatment intent (n=790)

Table 3. First treatment (n=709)

First treatment	LPC non-high risk (n=366)	LPC high-risk (n=233)	LAPC (n=110)	Overall (n=709)
ADT	1.4%	10.7%	3.6%	4.8%
Brachytherapy	31.1%	6.9%	0.9%	18.5%
Radical prostatectomy	38.8%	16.3%	4.5%	26.1%
Radiotherapy	16.1%	15.5%	1.8%	13.7%
Radiotherapy + HT	12.6%	50.6%	89.1%	37.0%

Abbreviations: ADT - Androgen deprivation therapy; HT - Hormone-therapy

- Annual HCRU is described in **Figure 3**.
- **Hospitalization** occurred in 27% of LAPC versus 58% of LPC but mean number of hospitalizations was higher in the former; non-high risk LPC showed higher hospitalization rate than high-risk LPC (69% vs 38%).
- Average **length of stay** was comparable between cohorts: 4.37, 3.56 and 4.39 days, respectively.
- High-risk LPC showed higher **outpatient HRU** compared to non-high risk: average outpatient and ER visits/patient increased by 12% and 47%, average number of CDTs/patient increased by 40%.

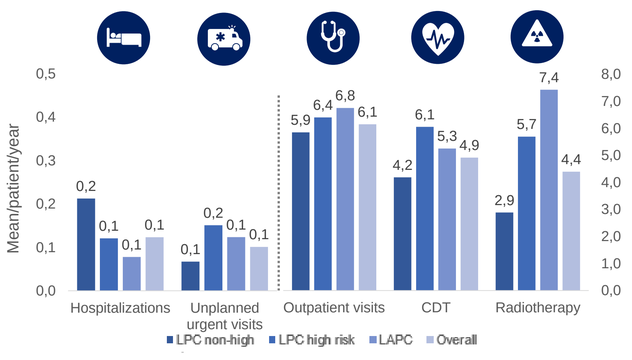

Figure 3. Annual HCRU average per patient

- Estimated mean cost/patient/year varied between €1,320 in LPC non-high risk and €2,278 in LAPC patients (**Figure 4**).
- We estimated a **total annual expenditure** of about €1.3 million per year for treating and managing these LPC/LAPC diagnosed and treated exclusively at IPO Porto (**Figure 5**); 80% of the total expenditure is concerned with the management of **LPC patients**.
- **Radiotherapy** represents 67% of the overall expenditure.
- 79% of the total expenditure is related with the **first treatment.**

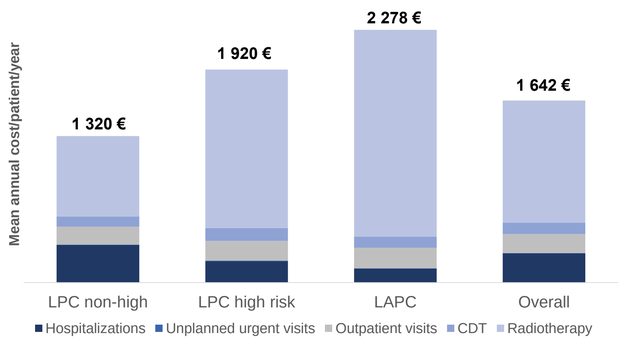

Figure 4. Estimated annual mean cost/patient

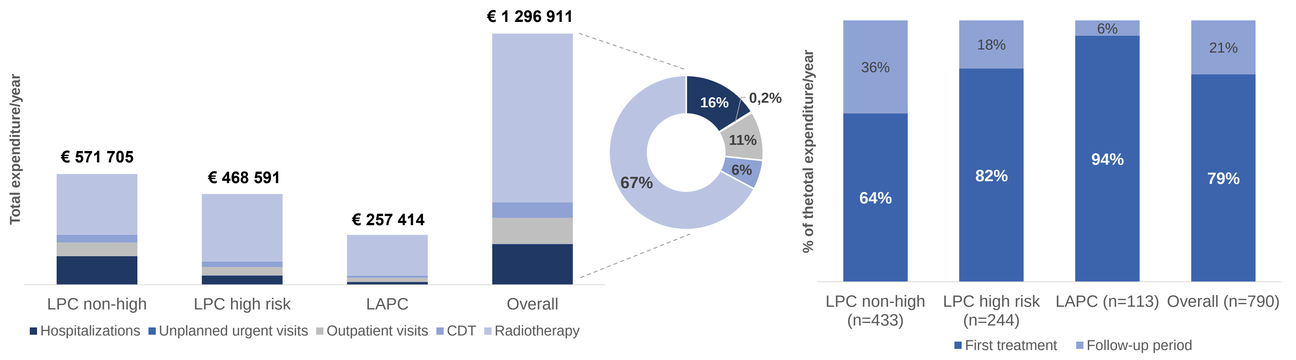

Figure 5. Total annual estimated expenditure on localized/locally advanced prostate cancer

CONCLUSION

- The treatment of early prostate cancer requires **significant healthcare resources**, particularly in the first treatment.
- **Mean cost/patient** increases with disease severity: hospitalization cost decreases but radiotherapy cost increases. The annual cost of treating a LPAC patient is 1.7 times higher than LPC non-high risk. Spending in all subgroups was driven by **radiotherapy cost**.
- Costs are likely **underestimated** since we used 'prices' commonly used in hospital financing instead of using real 'costs' taken from hospital analytical accountability (not previewed by protocol).
- **Annual expenditure estimates** reflect only LPC/LAPC patients that are diagnosed and treated exclusively for this condition at IPO Porto (do not include expenses related with 1.404 excluded patients).
- We followed a **conservative approach** in costing HCRU; hormone-therapy was not costed due to expected low impact in this population.
- Given the high prevalence of these conditions and costs, the treatment of LPC/LAPC is likely to result in a **high budget impact** for hospitals.

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