Real-world Impact of Patient-reported Outcome Measurement on Overall Survival, Healthcare Resource Utilization, and Time to Next Treatment in Cancer Patients

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INTRODUCTION

Background and Objective

- Existing research on the impact of patient reported outcome (PRO) monitoring on cancer outcomes in the real-world setting is scarce.
- The purpose of this population-based, retrospective, observational cohort analysis was to assess whether routine PRO monitoring had an impact on real-world overall survival (OS), healthcare resource utilization (HCRU), and time to next treatment (TTNT) among individuals diagnosed with lung, breast, or colorectal cancer.

Methods

- Administrative databases (17 cancer centers) from Alberta, Canada were queried and individuals ≥ 18 years old diagnosed with lung, breast, or colorectal cancer 1/1/2016 – 12/31/2019 were included and followed until 12/31/2020
- Patients were eligible if they received routine PRO monitoring initiated within 120 days of diagnosis
- Eligible patients were then matched 1:1 with patients who did not initiate PRO monitoring using propensity scores based on baseline characteristics

Covariates controlled for during analysis		
Age at initial diagnosis	Sex (male/female)	Number of Charlson comorbidities within year of diagnosis
Rural/urban location	Neighborhood income	Neighborhood education level
Cancer type	Metastatic disease status	Prior systemic/radiation therapy or surgery
Number of hospitalizations	Cancer subtype	

- ITT analysis was used; patients were matched using the nearest-neighbor algorithm (MatchIt, R (4.1.3)).
- Absolute standard difference (ASD) >0.1 indicated meaningful imbalance between exposed and unexposed groups
- Cox proportional hazards estimated hazard ratio (HR) for OS and TTNT
- Linear regression estimated mean difference (MD) for HCRU events, including cancer physician visits, emergency department visits and outpatient ambulatory care encounters
- Logistic regression estimated odds ratio (OR) for hospitalization, ER visits, and treatment discontinuation
- Index date was defined at 120 days after the time of initial diagnosis and the baseline period was defined as the time from 1-year before the date of diagnosis up to the index date

RESULTS

- 19,509 individuals were initially eligible (5,950 (30%) had initiated a PRO measure within 120 days). Significant imbalances between exposed and unexposed patients existed prior to matching

Strata	ASD prior to matching
Year of diagnosis	0.72
Metastatic disease at initial diagnosis	0.22
Cancer type/subtype/sex	0.25
Systemic treatment prior to initiation of treatment	0.65
Radiation therapy prior to initiation of treatment	0.31
Surgery prior to initiation of treatment	0.20

- Following matching, 4800 patients who initiated PRO were successfully matched to 4800 patients who did not initiate PRO, with the majority (80%) having early-stage cancer (ASD all <0.1)
- Mean age of the matched cohort was 63±13 years; 24% of the cohort was male
- Breast cancer was the most common diagnosis (54%), followed by lung (24%) and colorectal (22%) cancers
- The majority of patients had initiated systemic therapy (66%) or surgery (67%) prior to index date

Outcome	Measure of Effect	Estimate (95% CI)	p-value
OS	HR	1.01 (0.93-1.09)	0.84
Time to Next Treatment (TTNT)	HR	1.03 (0.94-1.11)	0.56
Cancer physician visits	MD	-1.04 (-1.29 - -0.78)	**<0.001**
Outpatient ambulatory care encounters	MD	1.12 (0.77-1.46)	**<0.001**
Hospitalization	OR	1.12 (1.03-1.22)	**0.01**
ER visits	OR	1.10 (1.01-1.19)	**0.024**

- No differences in OS were noted when patients were stratified based on cancer diagnosis or presence of metastasis
- A sensitivity analysis utilizing a landmark time of 365 days did not meaningfully alter the findings for any of the primary analyses or subgroups with advanced-stage cancer

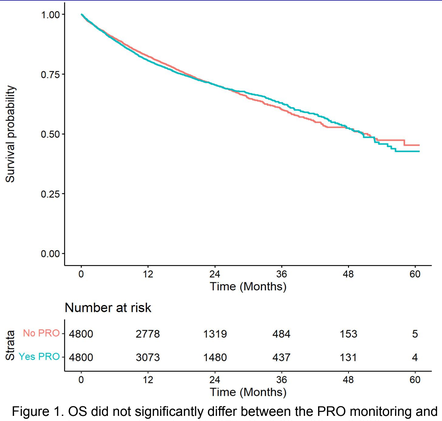

Figure 1. OS did not significantly differ between the PRO monitoring and non-monitoring cohorts (HR=1.01, 95% CI: 0.93-1.09, p=0.836). Median OS was 51.5 months for non-monitored patients (95% CI: 47.5-NA) vs 50.6 months for patients who initiated PRO monitoring arm (95% CI: 47.6-55.7).

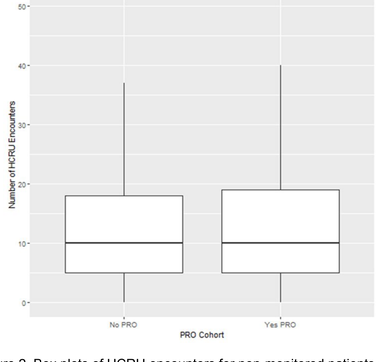

Figure 2. Box plots of HCRU encounters for non-monitored patients and patients who initiated PRO monitoring. Lower and upper box boundaries correspond to the 25th and 75th percentiles, respectively.

DISCUSSION

- We observed that capturing patient symptoms alone was not sufficient to improve OS, contrasting prior studies [1-3] that demonstrated an improvement in OS using PRO monitoring.
- The primary reason may be a lack of or delayed clinical care in response to patient reported symptoms. In prior studies, symptom monitoring triggered clinical responses to severe or worsening symptoms. This early intervention presumably helped avoid a worse disease state.
- In our study, PRO data accessibility for physicians was more limited than other studies, where data was physically available for reference during patient visits. As such, differences in implementation of PRO monitoring, with respect to the clinicians' ability to access PRO information, may have impacted the timely clinical response to identified symptoms.
- Finally, we used a 120-day landmark for PRO monitoring, while other studies were less regimented, resulting in periods ranging from 46 days [1] to 1.1 years [2], which may further explain the differences between study findings.

CONCLUSIONS

Our results suggest that capturing patient-reported symptoms alone reduced the number of physician visits but neither reduced hospitalizations nor improved OS in this real-world cancer population. To drive more meaningful clinical impact, PRO monitoring programs must be connected closely to care in response to identified symptoms. Future studies should investigate the challenges of implementing PRO programs in the real-world setting.

REFERENCES

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