Impact of timing of real-world CT imaging on cost-effectiveness of a molecular biomarker for treatment response monitoring of immunotherapy

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Abstract #1352

INTRODUCTION

- Studies have demonstrated that dynamic molecular biomarkers for treatment response monitoring (TRM) of immune checkpoint inhibitors (ICI) can predict clinical outcomes.
- However, there is little data on when a molecular biomarker is best integrated into clinical practice based on timing of Computed Tomography (CT) imaging.
- We characterized real-world (RW) imaging-based treatment response monitoring in a cohort of advanced pan-cancer patients treated with ICI and then modeled the impact of these patterns on the clinical utility and cost-effectiveness of a molecular biomarker for TRM compared to imaging.

SUMMARY

- Utilization of imaging for treatment response monitoring varies across cancer types and therapy.
- Despite the heterogeneity in rw-imaging data, xM for TRM in conjunction with imaging **remained cost-saving compared to CT imaging alone** across all cancer subtypes.
- The **greatest cost savings and weeks of inappropriate therapy** avoided was seen in **advanced SCLC** treated with ICI-chemotherapy, where rw-imaging occurs at more frequent intervals than others.

METHODS

- We analyzed CT scan frequency in linked Tempus AI clinicogenomic and Komodo Health claims databases.
- Inclusion Criteria:
  - Diagnosed with Stage 3B, 3C or 4 cancer
  - Received first line ICI +/- chemotherapy for ≥ 60 days
  - Received ≥ 2 CT scans.
- We assume that all treatment decisions occur after CT imaging; in the intervention group, molecular non-responders switch to chemotherapy and molecular responders remain on ICI; in the control group, treatment switching decision is determined by the imaging result only.
- Median CT scan interval difference by treatment and cancer type was tested using the Kruskal-Wallis test.
- We updated a prior microsimulation model to incorporate these real-world data, calculating total treatment and molecular testing costs from Medicare's perspective.

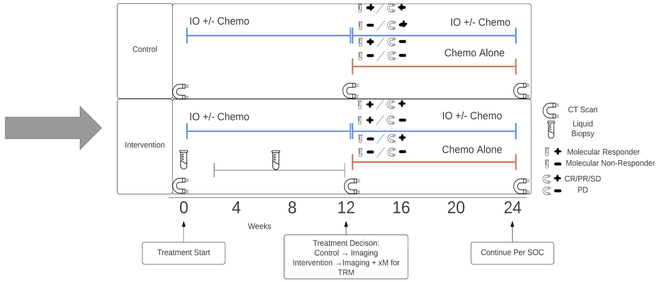

Figure 1. Our model is based on a prior publication of a microsimulation of advanced cancer patients treated with IO that compared the use of xM for TRM, as well an analysis of real world imaging and xM for TRM concordance[1]. The model was updated to incorporate rw-imaging frequency within 24 weeks of ICI therapy.

[1]Gentzler, R.D., Guittar, J., Mitra, A. et al. Dynamic Changes in Circulating Tumor Fraction as a Predictor of Real-World Clinical Outcomes in Solid Tumor Malignancy Patients Treated with Immunotherapy. Oncol Ther 12, 509–524 (2024). https://doi.org/10.1007/s40487-024-00287-2

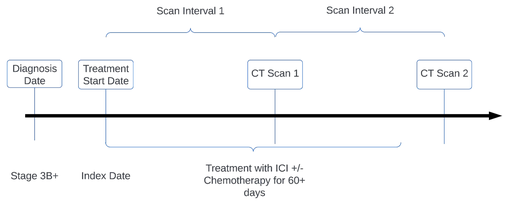

Figure 2. CT scan frequency analysis. Scan interval one was calculated as the time between an index date of first claim for ICI +/- chemotherapy that occured after stage 3B+ diagnosis and first claim for CT scan that occured greater than 7 days after treatment start. Scan interval 2 was calculated as the time between CT Scan 1 and CT Scan 2.

RESULTS

	Time from Therapy Start to First CT Scan			Time from First CT Scan to Second CT Scan		
Cancer Type	ICI-Chemo	ICI	p-value	ICI-Chemo	ICI	p-value
NSCLC	58 Days (N=1,570)	71 Days (N=1,604)	<0.001	65 Days (N=1,570)	81 Days (N=1,604)	<0.001
Breast	72 Days (N=224)	55 Days (N=50)	0.2	71 Days (N=224)	64 Days (N=50)	0.5
Colorectal	55 Days (N=79)	71 Days (N=211)	0.004	60 Days (N=79)	78 Days (N=211)	0.001
Prostate	57 Days (N=16)	59 Days (N=20)	0.7	49 Days (N=16)	65 Days (N=20)	0.8
SCLC	48 Days (N=204)	63 Days (N=28)	0.053	59 Days (N=204)	70 Days (N=28)	0.5
Melanoma	56 Days (N=39)	80 Days (N=228)	0.069	62 Days (N=39)	77 Days (N=228)	0.2
p-value*	<0.0001	0.051		0.028	0.027	

Table 1. Simulation modeling revealed that intervention patients receiving earlier scans (range: 6-11 weeks) had greater per-patient total cost savings ($4,700 to $7,100) and longer weeks of inappropriate therapy avoided (4.3-5.8) over a 24 week period compared to the control patients. *p-values for within treatment difference by cancer type.

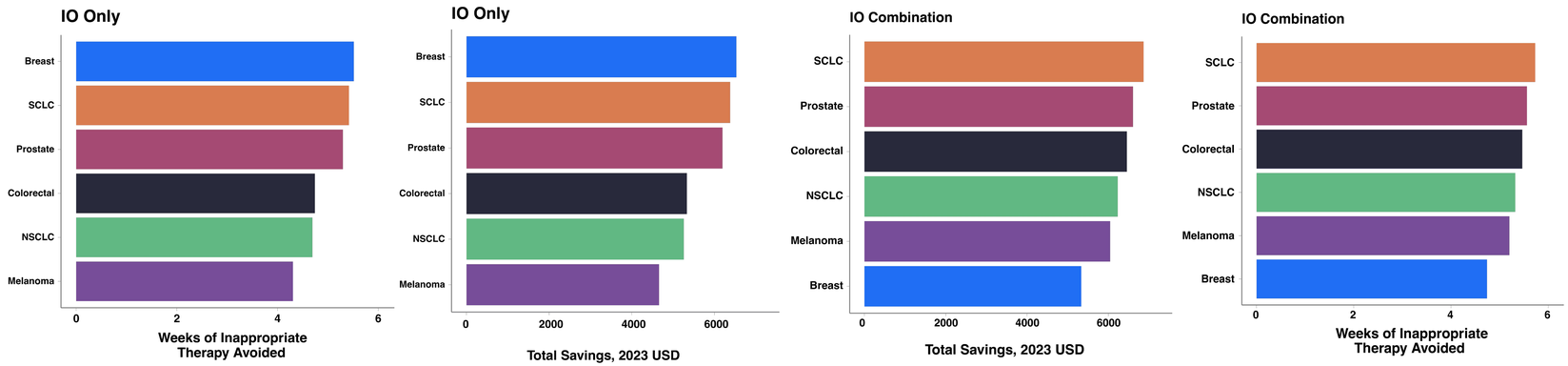

Figure 3. Simulation modeling revealed that intervention patients receiving earlier scans (range: 6-11 weeks) had greater per-patient total cost savings ($4,700 to $7,100) and longer weeks of inappropriate therapy avoided (4.3-5.8) over a 24 week period compared to the control patients.

ACKNOWLEDGMENTS

We thank Vanessa M. Nepomuceno, Ph.D. from the Tempus Science Communications team for poster development.

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