Hospital-level effects on cardiovascular monitoring among cancer patients treated with cardio-toxic therapies

HSD 109

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Introduction

Despite guideline recommendations, cardiac screening and surveillance rates remain suboptimal for cancer patients exposed to potentially cardiotoxic treatments (PCT). The role of hospital-level factors in explaining suboptimal screening and monitoring practice patterns patterns understudied while this information is necessary to guide the development of interventions designed to increase screening rates.

Objective

To quantify the relationship between hospital-level factors and cardiac screenings at baseline and routine cardiac monitoring visits following the initiation of PCT.

Methods

- This study used Surveillance, Epidemiology, and End Results-Medicare patient-level data linked with hospital-level data.
- We included patients aged 66+ years who received PCT, including anthracycline, anti-HER2 agents, and immune checkpoint inhibitors (ICIs), between 1/1/2014 and 12/31/2018.
- Patients without a cancer diagnosis in the prior 24 months and hospitals with fewer than two eligible patients were excluded.
- The study outcome was cardiac screening at 30 days prior to PCT and routine cardiac monitoring after PCT.
- Routine cardiac monitoring is defined as unique visits every 90 days (with a 14-day grace period before and after), during which patients undergo at least one cardiac evaluation, including echocardiograms or multigated acquisition scans
- A logistic regression model was used to estimate the adjusted odds ratios.

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Results

Table 1. Baseline characteristics

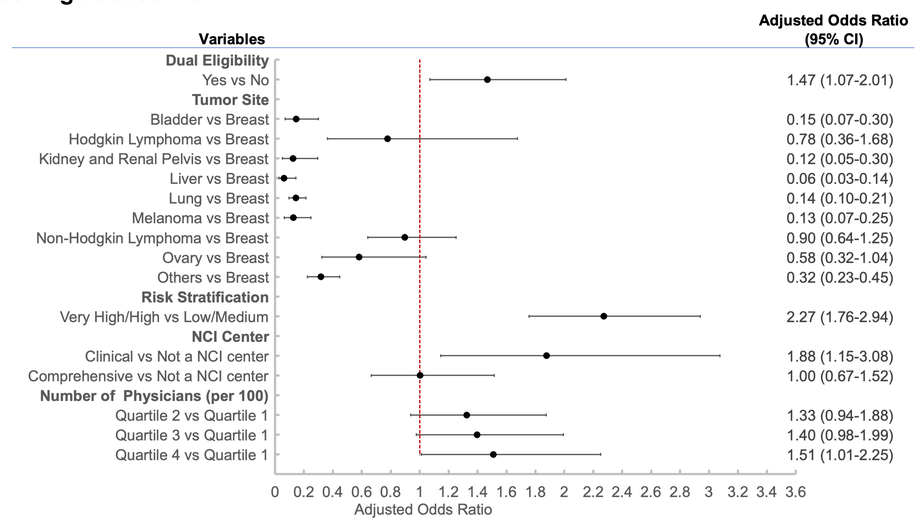
	Total (N=2,143)		No Pre-screen (N=1,349)		Had Pre-screen (N=794)		p-value
	N	%	N	%	N	%	
Age group							
66-69	572	27%	350	26%	222	28%	0.28
70-74	626	29%	389	29%	237	30%	
75-79	483	23%	309	23%	174	22%	
80-84	282	13%	175	13%	107	13%	
85+	180	8%	126	9%	54	7%	
Race							
White	1,905	89%	1,191	89%	714	90%	0.65
Black	134	6%	87	6%	47	6%	
AAPI	NR	NR	NR	NR	NR	NR	
Other/Unknown	NR	NR	NR	NR	NR	NR	
Rural	399	19%	250	19%	149	19%	0.89
History of alcohol use	121	6%	97	7%	24	3%	**<0.01**
History of smoking	1,329	62%	902	67%	427	54%	**<0.01**
Cardiomyopathy	256	12%	140	10%	116	15%	**<0.01**
Tumor site							
Bladder	67	3%	56	4%	11	1%	**<0.01**
Breast	482	22%	189	14%	293	37%	
Hodgkin Lymphoma	33	2%	13	1%	20	3%	
Kidney and Renal Pelvis	58	3%	51	4%	NR	NR	
Liver	120	6%	110	8%	NR	NR	
Lung	496	23%	429	32%	67	8%	
Melanoma	117	5%	105	8%	12	2%	
Non-Hodgkin Lymphoma	359	17%	129	10%	230	29%	
Others	336	16%	233	17%	103	13%	
Ovary	75	4%	34	3%	41	5%	
Provider Specialty							
Oncologist	734	34%	440	33%	294	37%	**<0.01**
General Practice	1,126	53%	709	53%	417	53%	
Radiologist	65	3%	59	4%	NR	NR	
Surgeon	37	2%	23	2%	NR	NR	
Ob/Gyn	44	2%	23	2%	21	27%	
Others	137	6%	95	7%	42	5%	
Cardio-toxic treatment received							
Anthracycline	944	44%	431	32%	513	65%	**<0.01**
Anti-HER2 agents	315	15%	132	10%	183	23%	
Immune checkpoint inhibitors	884	41%	786	58%	98	12%	
Risk stratification							
Very High / High	972	45%	428	32%	544	69%	**<0.01**
Low / Medium	1,171	55%	921	69%	250	31%	
Open Heart Surgery Facility Indicator	1,417	66%	925	69%	492	62%	**<0.01**
Hospital Total Beds							
Quartile 1 (<261)	542	25%	324	24%	218	27%	**0.04**
Quartile 2 (261-467)	572	27%	348	26%	224	28%	
Quartile 3 (467-656)	504	24%	323	24%	181	23%	
Quartile 4 (>656)	525	25%	354	26%	171	22%	

** HER2: human epidermal growth factor receptor 2; NR: Values are not shown to protect confidentiality of the individuals summarized in the data.*

Results (continued)

- A total of 2,143 patients was identified. The mean age was 74 years (SD=6). 89% were White, 6% were Black and 5% were Asian or Pacific Islander.
- Overall, 37% of patients received cardiac screening at baseline. Among those treated with anti-HER2 therapy, anthracyclines, and ICIs, the proportions receiving cardiac screening at baseline were 54%, 58%, and 11%, respectively.
- Less than 1% of the patients received routine cardiac monitoring within one year after initiation of PCT.
- Provider-level factors and hospital-level factors accounted for 12% and 3% of variation in cardiac screening at baseline, respectively.
- Patients received PCT in hospital with clinical NCI center designation (aOR: 1.88 [1.15-3.08]) and higher number of physicians (aOR: 1.51 [1.01-2.25]) were more likely to receive cardiac screenings at baseline. (*Figure 1*)

Figure 1. Association between patient-level and hospital-level factors and cardiac screening at baseline



** Adjusted for demographics, individual-level risk factors, and hospital characteristics.*

Conclusions

- Despite guideline recommendations, only 4 in 10 patients exposed to PCT received cardiac screening at baseline, less than 1% received routine monitoring.
- Provider-level factors accounted for more variation than hospital-level factors. Additional work is needed to determine whether their positive influence can be leveraged to improve baseline screening and routine monitoring post-initiation.
- Hospital characteristics were associated with the cardiac screenings at baseline prior to PCT. Future researches need to better understand how specific hospital-level characteristics impact cardiac care.
- Given that cancer treatment-induced cardiotoxicity can be prevented or mitigated, a combination of physician-level education and institutional-level policy changes may be needed to improve cardiac management.