

PUBLISHED ABSTRACT

Imaging is Not Indicated in Staging of Asymptomatic Patients with Early Breast Cancer – Are We Following Current Recommendations?

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Background

Estimated healthcare costs in the US for diagnosis and treatment of breast cancer are expected to reach \$20.5 billion per year by 2020. In 2012, ASCO released the Choosing Wisely Initiative which recommended against the use of routine staging imaging in patients with newly diagnosed early stage breast cancer. We examined physicians' adherence rate and factors associated with non-adherence to current guidelines in patients with early stage breast cancer treated within the Mount Sinai Health System.

Methods

We identified all women with stage I-II breast cancer diagnosed between January 1, 2014 and December 31, 2015 from the Cancer Registry of the Mount Sinai Health System. Patients with history of prior malignancy or symptom-triggered imaging were excluded. Demographic, clinical and treatment related factors were collected. Medical records were reviewed to identify patients who had routine staging scans. Data of initial and follow-up imaging over 1-year period were collected. Odds ratios (ORs) and 95% confidence intervals (CIs) were estimated from logistic regression models.

Results

Among 917 breast cancer patients, the median age at diagnosis was 59 years (range 26–98) (**Table 1**). One hundred seventy-one patients (18.6%) had routine staging imaging with a mean number of initial scans of 1.48. Eighty-two patients (48%) had at least 1 subsequent scan in the 1-year follow up (range 1-4 scans/year). PET/CT was the most frequent modality (49%), followed by CT scan (33%). The medical oncologist was the ordering provider in 50.3% of the cases and surgical oncologist in 43.2%. Routine staging scans identified no cases of metastatic disease. False-positive findings were identified in 49.7% and incidental findings in 9.3% of cases (**Table 2**). Total cost of imaging in this group was \$3,990 per patient. Age < 50 years old (OR 1.57, CI 1.03–2.39, p 0.037), tumor size > 2cm (OR 3.47, CI 2.34–5.17, p < 0.0001), positive lymph nodes (OR 4.04, CI 2.64–6.18, p < 0.0001), and triple negative disease (OR 2.99, CI 1.76–5.05, p < 0.0001) were associated with presence of routine staging scans on univariate and multivariate analysis (**Table 3**).

Conclusions

Our study highlights the prevalence of unnecessary staging scans in up to 18.6% of patients with stage I-II breast cancer. Routine imaging resulted in increased radiation exposure, multiple subsequent imaging, and increased economic burden with a cost of \$3,990 per patient, particularly for those of young age, T2 tumors, positive lymph nodes, and triple negative disease. Further educational efforts are needed to avoid unnecessary scans in patients with early stage breast cancer and improve high-value practices among medical and surgical oncologists.

Table 1: Patient Characteristics.

		N (%)
Age at diagnosis		59 (range 26–98)
	< 50 y/o	236 (25.7)
	50–70 y/o	507 (55.3)
	> 70 y/o	174 (19.0)
Race	White	527 (57.5)
	Black	233 (25.4)
	Asian	89 (9.7)
AJCC stage (7th edition)	1A	575 (62.7)
	1B	30 (3.3)
	2A	208 (22.7)
	2B	103 (11.2)
Type of breast cancer	ER/PR positive	737 (80.4)
	HER2 positive	106 (11.6)
	Triple negative	99 (10.8)
Treatment	Mastectomy	366 (40.0)
	Lumpectomy	542 (59.1)
	Axillary node dissection	108 (11.8)
	Sentinel lymph node	742 (80.9)
	Neoadjuvant chemotherapy	90 (9.8)
	Adjuvant chemotherapy	241 (26.3)
	Hormonal therapy	651 (71.0)
	Radiation	536 (58.5)

Table 2: Routine staging scans & follow-up imaging.

		N (%)
Underwent staging imaging		171 (18.6)
Mean number of staging scans		1.48(1–5)
Type of imaging	CT-scan	74
	PET/CT-scan	95
	MRI	7
	Other	26
Ordering provider	Medical Oncologist	86 (50.3)
	Surgical Oncologist	74 (43.2)
Imaging findings	False-positives	85 (49.7)
	Incidental	16(9.3)
Follow-up imaging	Patients with follow up imaging	82 (48; 1–4)
	1 follow up scan	47 (27.5)
	>=2 follow up scans	35 (20.5)
	Recommended, but not performed	50 (29.0)

Table 3: Factors associated with staging imaging scans on univariate & multivariate analysis.

	OR	95% Confidence Interval	p-value
Age < 50	1.57	1.03–2.39	0.037
T2 tumor	3.47	2.34–5.17	<0.0001
Triple negative disease	2.99	1.76–5.05	<0.0001
Positive lymph nodes	4.04	2.64–6.18	<0.0001

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