



Overuse of Pre-Operative Staging in Patients Undergoing Neoadjuvant Chemotherapy for Breast Cancer

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Introduction

- Overuse of pre-operative imaging to stage patients with breast cancer contributes to rising healthcare costs
- National and international guidelines (ASCO, NCCN, ESMO) discourage the use of staging imaging for newly diagnosed early breast cancer (Stage I-II) regardless of nodal status

Objective

- To evaluate pre-operative staging imaging rates among patients with stage I-II breast cancer undergoing neoadjuvant chemotherapy (NAC)

Methods

- 303 patients with stage I-II breast cancer who had NAC from 2008 to 2016 were identified from a prospectively maintained database
- Pre-operative staging imaging was examined
- The main outcome measure was the rate and outcomes of staging imaging performed

Results

- Mean age was 51 (range 26-87) years
- 278 pts (92.4%) had invasive ductal cancer
- 167 pts (56.0%) had estrogen receptor positive, 79 pts (26.5%) had triple negative, and 126 pts (42.3%) had HER2 positive disease [Table 1]

Results

Table 1: Demographics and Clinical Characteristics

Characteristic	Total (N = 303)
Age, (years), mean (SD)	51.0 (13.05)
Biopsy Pathology	
IDC	278 (92.4)
ILC	15 (5.0)
Mixed invasive carcinoma	7 (2.3)
Estrogen Receptor	167 (56.0)
HER2 Receptor	126 (42.3)
Triple negative breast cancer	79 (26.5)
Clinical T stage	
0	3 (1.0)
1	66 (21.8)
2	216 (71.3)
3	18 (5.9)
4	0 (0.0)
Clinical N stage	
0	149 (49.2)
1	154 (50.8)

Abbreviations: IDC, Invasive Ductal Carcinoma; ILC, Invasive Lobular Carcinoma;

- Staging PET or CT scan was completed in 258 pts (85.2%), brain imaging in 94 pts (31.0%, & bone scans in 117 pts (38.6) [Table 2]

Table 2: Pre-operative Imaging

Characteristic	Total (N = 303)	<50 Years (N = 154)	≥50 Years (N=149)	P-value
Body Imaging				0.704
None	45 (14.9)	22 (14.3)	23 (15.4)	
PET/CT	225 (74.3)	113 (73.4)	112 (75.2)	
CT Abdomen/Pelvis	33 (10.9)	19 (12.3)	14 (9.4)	
Brain Imaging				0.229
None	209 (69.0)	100 (64.9)	109 (73.2)	
MRI	84 (27.7)	47 (30.5)	37 (24.8)	
CT	10 (3.3)	7 (4.6)	3 (2.0)	
Bone Scan				0.235
No	186 (61.4)	89 (57.8)	97 (65.1)	
Yes	117 (38.6)	65 (42.2)	52 (34.9)	

Abbreviations: PET, Positive Emission Tomography; CT, Computed Tomography; MRI, Magnetic Resonance Imaging;

- 48 pts (15.8%) had all three imaging modalities completed
- Overall, 21 pts (8.1%) had a positive PET/CT scan demonstrating distant disease
- 139 pts (61.0%) had metastatic nodal disease or suspicious axillary nodal activity seen on PET/CT. Of these pts, 107 (77.0%) had cN1 disease

Results

- 15 (71.4%) of the 21 patients with a positive PET/CT scan were upstaged to stage IV breast cancer
- Overall, only 1 patient (1.1%) had a positive brain scan. 5 pts (4.3%) had a positive bone scan [Table 3]

Table 3: Results Pre-operative Imaging

Characteristic	Total (N = 303)
Number of Imaging Scans Done	
0	37 (12.2)
1	111 (36.6)
2	107 (35.3)
3	48 (15.8)
Positive PET/CT Imaging	21 (8.1)
Upstaged to Stage 4	15 (50.0)
Other incidental cancer	4 (57.1)
PET/CT Activity	
Breast activity	211 (90.9)
Lymph node activity	139 (61.0)
Positive Brain Imaging	1 (1.1)
Positive Bone Scan	5 (4.3)
Correlates to PET/CT	3 (1.2)

Abbreviations: PET, Positive Emission Tomography; CT, Computed Tomography; MRI, Magnetic Resonance Imaging; NAC, Neoadjuvant chemotherapy;

- Importantly, there was no difference in ER positive (p=0.796), HER2 positive (p=0.281), or triple negative (p=0.369) receptor profiles for pts who were upstaged to stage 4 disease.

Conclusion

- Despite guideline recommendations, there is a high rate of pre-operative staging imaging completed in patients with clinically stage I-II breast cancer who receive NAC with few positive results
- Our findings suggest that pre-NAC staging is not necessary and contributes to higher costs in the management of patients with early stage breast cancer