Predictors of Nodal Response after Neoadjuvant Therapy in Invasive Lobular Carcinoma of the Breast

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BACKGROUND

- Neoadjuvant therapy in breast cancer can down-stage involved axillary lymph nodes and reduce the extent of axillary surgery required.

- Accurately determining nodal response after therapy can impact surgical management.

- This is particularly important for patients with invasive lobular carcinoma (ILC), which grows in a diffuse pattern due to the lack of adhesion protein E-cadherin and has an unpredictable pattern of nodal spread.

- We evaluated the accuracy of breast magnetic resonance imaging (MRI) in detecting axillary lymph node involvement after neoadjuvant therapy (NAT) in a cohort of patients with ILC.

METHODS

- We performed a retrospective analysis of patients with ILC treated at UCSF from 2006-2020.

- Inclusion criteria: stage 1-3 ILC, received either neoadjuvant chemotherapy or endocrine therapy, and had a breast MRI after NAT.

- Clinical node status was positive if pre-NAT fine needle aspiration (FNA) showed lymph node involvement and negative if pre-NAT FNA was negative or no FNA was performed.

- Two fellowship-trained breast radiologists reviewed breast MRI's and assigned BIRADS features to axillary nodes (cortical thickness, rounded morphology, loss of fatty hilum, asymmetry). Lymph nodes with at least one abnormal BIRADS feature were considered abnormal.

- Final node status was determined by surgical pathology via sentinel lymph node biopsy or axillary dissection after NAT.

RESULTS

- Of 79 patients analyzed, 46 received neoadjuvant chemotherapy and 33 neoadjuvant endocrine therapy.

- Receiving neoadjuvant chemotherapy was associated with hormone receptor negative disease (p=0.022), stage II disease (p=0.001), and clinical node positivity (p<0.001).

RESULTS (CONTINUED)

- 27 (90%) out of 30 clinically node positive patients had positive nodes at surgery, and 17 (35%) out of 49 clinically node negative patients had positive nodes at surgery

- Accuracy of breast MRI for predicting nodal positivity was 54.2% and 45.5% in clinically node negative and positive patients, respectively, who received neoadjuvant chemotherapy (Table 2A). The accuracy of MRI in clinically node negative patients who received neoadjuvant endocrine therapy was 60.0% (Table 2B).

Variable	Overall (n=79)	Chemotherapy (n=46)	Endocrine Therapy (N=33)	P-Value
Age at Diagnosis (Years, SD)	56.5 (9.7)	54.1 (8.3)	59.9 (10.5)	0.159
Histological Subtype (N=75)				0.022
ER+/PR+/HER2-	39 (52.0)	21 (46.7)	18 (60.0)	
ER+/PR-/HER2-	24 (32.0)	12 (26.7)	12 (40.0)	
Triple Negative	1 (1.3)	1 (2.2)	0 (0.0)	
Her2+	11 (14.7)	11 (24.4)	0 (0.0)	
ILC Grade				0.140
1	23 (29.1)	11 (23.9)	12 (36.4)	
2	52 (65.8)	31 (67.4)	21 (63.6)	
3	4 (5.1)	4 (8.7)	0 (0.0)	
ILC Stage				0.001
1	33 (41.8)	13 (28.3)	20 (60.6)	
2	31 (39.2)	26 (56.5)	5 (15.2)	
3	15 (19.0)	7 (15.2)	8 (24.2)	
Lymphovascular Invasion	7 (8.9)	5 (10.9)	2 (6.1)	0.458
Radiation (N=77)	52 (67.5)	32 (69.6)	20 (64.5)	0.643
Treatment Type (N=77)				0.070
Lumpectomy without Radiation	7 (9.1)	3 (6.5)	4 (12.9)	
Lumpectomy with Radiation	25 (32.5)	11 (23.9)	14 (45.2)	
Mastectomy	18 (23.4)	11 (23.9)	7 (22.6)	
Mastectomy with Radiation	27 (35.1)	21 (45.7)	6 (19.4)	
Clinical Node Status				< 0.001
Positive	30 (38.0)	22 (47.8)	8 (24.2)	
Negative	49 (62.0)	24 (52.2)	25 (75.8)	
Pathologically Node Positive at Surgery	44 (55.7)	29 (63.0)	15 (45.5)	0.067
1-3 Positive Nodes	25 (31.7)	20 (43.5)	5 (15.2)	
4-9 Positive Nodes	11 (13.9)	5 (10.9)	6 (18.2)	
10 or more Positive Nodes	8 (10.1)	4 (8.7)	4 (12.1)	

Table 1: Patient demographics in the overall cohort and divided by type of NAT

	Clinically Node Negative (n=24)	Clinically Node Positive (n=22)
Sensitivity	20.0%	47.4%
Specificity	78.6%	33.3%
Negative Predictive Value	57.9%	9.1%
Positive Predictive Value	40.0%	81.2%
Accuracy	54.2%	45.5%

Table 2A: Performance of breast MRI for predicting pathologic nodal status in neoadjuvant chemotherapy cohort, stratified by clinical nodal status

	Clinically Node Negative (n=25)	Clinically Node Positive (n=8)
Sensitivity	42.9%	87.5%
Specificity	66.7%	N/A*
Negative Predictive Value	75.0%	0.0%
Positive Predictive Value	33.3%	100.0%
Accuracy	60.0%	N/A*

Table 2B: Performance of breast MRI for predicting pathologic nodal status in neoadjuvant endocrine therapy cohort, stratified by clinical nodal status
*There were no clinically node positive patients who received endocrine therapy who were pathologically node negative; as such, specificity and accuracy cannot be calculated

CONCLUSIONS

- In our cohort of ILC patients treated with neoadjuvant therapy, the overall treatment response rate was low, and the rate of undetected disease was high.

- Accuracy of breast MRI for predicting nodal positivity is overall low. Negative predictive value was best in the clinically node negative cohort receiving neoadjuvant endocrine therapy.

- Further studies are needed to assess other imaging modalities to evaluate nodal disease following NAT in patients with ILC.