

Does Use of Neoadjuvant Chemotherapy Affect the Decision to Pursue Fertility Preservation Options in Young Women with Breast Cancer?

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Background

- ASCO guidelines recommend early referral to reproductive endocrinology and infertility (REI) specialists
- Women are increasingly delaying pregnancy, making it more likely that a breast cancer diagnosis may occur prior to completion of childbearing
- Current practice patterns indicate increased rates of NAC utilization
- The impact of NAC on decision making regarding fertility preservation options is unknown
- In 2009, Memorial Sloan Kettering Cancer Center established the Cancer and Fertility Program led by fertility nurse specialists (FNS) who provide education and counseling regarding fertility concerns, and facilitate referrals to reproductive endocrinology and infertility (REI) specialists

Study Objectives

- To elucidate clinicopathologic features that are associated with pursuing REI referral
- To determine whether NAC impacts the decision to pursue an REI referral

Methods

- Premenopausal women with unilateral stage 0-III breast cancer who were counseled by an FNS were identified from a prospectively maintained database
- Clinicopathologic and treatment factors as well as decision whether to pursue REI referral were recorded
- Between-group comparisons were made with the Wilcoxon rank-sum test for continuous variables and Chi-square or Fisher's exact tests for categorical variables

Results

Table 1. Clinicopathologic features of study population and factors associated with REI referral

Factors	Total (n = 334)	Declined REI Referral (n = 97)	Accepted REI Referral (n = 237)	p value
Median Age, years (IQR)	35 (32-39)	36 (32.0-39.9)	35 (31.0-39.0)	0.4
Single	198 (59.3%)	57 (58.8%)	141 (59.5%)	> 0.9
Race				0.3
White	210 (62.8%)	55 (56.7%)	155 (65.4%)	
Black	49 (14.7%)	17 (17.5%)	22 (9.3%)	
Asian	39 (11.7%)	14 (14.4%)	35 (14.8%)	
Other	6 (1.8%)	2 (2.1%)	4 (1.7%)	
Unknown	30 (9.0%)	9 (9.3%)	21 (8.9%)	
Insurance Type				> 0.9
Private	296 (88.6%)	86 (88.6%)	210 (88.6%)	
Government	31 (9.3%)	9 (9.3%)	22 (9.3%)	
Uninsured	7 (2.1%)	2 (2.1%)	5 (2.1%)	
Nulligravid	185 (55.4%)	45 (46.4%)	140 (59.1%)	0.3
Nulliparous	239 (71.6%)	53 (54.6%)	186 (78.5%)	< 0.0001
Referring Service				0.002
Breast Surgery	194 (58.1%)	43 (44.3%)	151 (63.7%)	
Breast Medicine	137 (41.0%)	53 (54.6%)	84 (35.4%)	
Genetics/GYN	3 (0.9%)	1 (1.0%)	2 (0.8%)	
Breast Surgery				0.2
Lumpectomy	126 (37.7%)	42 (43.3%)	84 (35.4%)	
Mastectomy	208 (62.3%)	55 (56.7%)	153 (64.6%)	
CPM	39 (11.7%)	39 (40.2%)	99 (41.8%)	0.9
Axillary Surgery				0.05
SLNB	216 (66.7%)	54 (55.7%)	162 (68.4%)	
ALND	110 (32.9%)	41 (42.3%)	69 (29.1%)	
None	8 (2.4%)	2 (2.1%)	6 (2.5%)	
Genetic Mutations				0.3
Not Tested	88 (26.3%)	24 (24.7%)	64 (27.0%)	
Negative Testing	198 (59.3%)	58 (60.0%)	140 (59.1%)	
BRCA1	25 (7.5%)	7 (7.2%)	18 (7.6%)	
BRCA3	18 (5.4%)	7 (7.2%)	11 (4.6%)	
TP53	3 (0.9%)	0	3 (1.3%)	
Unknown	2 (0.6%)	1 (1.0%)	1 (0.4%)	
Tumor Grade				0.3
I	10 (3.0%)	1 (1.0%)	3 (1.3%)	
II	121 (36.2%)	33 (34.0%)	102 (43.0%)	
III	158 (47.3%)	55 (56.7%)	122 (51.5%)	
Unknown	45 (13.5%)	8 (8.3%)	10 (4.2%)	
Receptor Profile				0.053
ER Positive	257 (76.9%)	67 (69.1%)	192 (81.0%)	
HER2	67 (20.1%)	23 (23.7%)	44 (18.6%)	0.4
Triple Negative	58 (17.4%)	21 (21.6%)	37 (15.6%)	0.4
AJCC Stage				< 0.001
0	10 (3.0%)	3 (3.1%)	7 (3.0%)	
I	121 (36.2%)	19 (19.6%)	102 (43.0%)	
II	158 (47.3%)	58 (59.8%)	100 (42.2%)	
III	45 (13.5%)	17 (17.5%)	28 (11.8%)	
Chemotherapy				0.003
Adjuvant	195 (58.4%)	44 (45.4%)	151 (63.7%)	
NAC	63 (18.9%)	38 (39.2%)	25 (10.5%)	< 0.001
Endocrine Therapy	44 (73.1%)	64 (66.0%)	180 (75.9%)	0.07

Results

Table 2. Comparison of patients who received NAC and those who received adjuvant chemotherapy

Factors	Adjuvant Chemotherapy (n = 195)	NAC (n = 63)	p value
Median Age, years (IQR)	36 (32.0-39.9)	35 (31.0-39.0)	0.4
Single	105 (53.8%)	41 (65.1%)	0.2
Race			0.11
White	130 (66.7%)	31 (49.2%)	
Black	22 (11.3%)	10 (15.9%)	
Asian	23 (11.8%)	13 (20.6%)	
Other	3 (1.5%)	2 (3.2%)	
Declined to Answer	17 (8.7%)	7 (11.1%)	
Insurance Type			> 0.9
Private	172 (88.2%)	57 (90.5%)	
Government	18 (9.2%)	5 (7.9%)	
Uninsured	5 (2.6%)	1 (1.6%)	
Nulligravid	108 (55.4%)	29 (46.0%)	0.11
Nulliparous	139 (71.3%)	38 (60.3%)	0.3
Breast Surgery			0.5
Lumpectomy	70 (35.9%)	19 (30.2%)	
Mastectomy	125 (64.1%)	44 (69.8%)	
CPM	90 (46.2%)	25 (39.7%)	0.5
Axillary Surgery			0.006
SLNB	124 (63.6%)	27 (42.9%)	
ALND	71 (36.4%)	36 (57.1%)	
Genetic Mutations			0.3
Not Tested	51 (26.2%)	16 (25.4%)	
Negative Testing	112 (57.4%)	41 (65.1%)	
BRCA1	21 (10.8%)	2 (3.2%)	
BRCA3	10 (5.1%)	3 (4.8%)	
TP53	1 (0.5%)	1 (1.6%)	
Unknown	1 (0.5%)	1 (1.6%)	
Tumor Grade			0.11
II	73 (37.4%)	16 (25.4%)	
III	116 (59.5%)	45 (71.4%)	
Unknown	6 (3.1%)	2 (3.2%)	
Receptor Profile			0.003
ER Positive	144 (73.8%)	39 (61.9%)	
HER2	39 (20.0%)	26 (41.3%)	
Triple Negative	44 (22.6%)	14 (22.2%)	
Stage			< 0.001
I	66 (33.8%)	1 (1.6%)	
II	101 (51.8%)	47 (74.6%)	
III	28 (14.4%)	15 (23.8%)	
Endocrine Therapy	147 (75.4%)	43 (68.3%)	0.3

- Women who received NAC tended to have advanced disease and were more likely to decline REI referral

Results

Table 3. Factors associated with decision regarding whether to pursue REI referral or not

Factor	Univariate Analysis		Multivariate Analysis	
	Factor	p value	Factor	p value
Nulliparity		< 0.0001		
Referring Service		0.002	Referring Service	0.04
Type of Axillary Surgery		0.05	NAC	< 0.001
AJCC Stage		< 0.001		
Adjuvant Chemotherapy		0.003		
NAC		< 0.001		

- Treatment delays were uncommon
- 4 (6.3%) of women receiving NAC started chemotherapy \geq 6 weeks of diagnosis
- 7 (3.5%) of women receiving adjuvant chemotherapy started > 12 weeks after definitive surgery

Conclusions

- Referral from Breast Surgery is associated with accepting REI referral, highlighting the important role that breast surgeons have in multidisciplinary cancer care
- Receipt of NAC is associated with declining REI consultation, revealing opportunities for improved counseling and education
- Additional study evaluating uptake of fertility preservation options and oncologic outcomes is warranted

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