

Prepectoral Versus Subpectoral Tissue Expander Placement on Free Flap Outcomes in Delayed-immediate Autologous Breast Reconstruction

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Introduction:

Tissue expanders (TE) are often used in the first stage of delayed-immediate breast reconstruction. TE’s are traditionally placed in the subpectoral plane, but recent data has suggested benefits to prepectoral placement. We sought to compare free flap intraoperative and postoperative microvascular complications as well as patient reported outcomes (PROMs) and aesthetic results in prepectoral versus subpectoral TE placement.

Methods:

This was a retrospective study that identified all patients who underwent total mastectomy, TE placement and subsequent free flap reconstruction between 2016-2020 at MD Anderson Cancer Center. Clinical information was extracted for data analysis. The Breast-Q questionnaire was administered to all study participants to assess their quality of life. Rasch scores were calculated for breast and chest questionnaires. An aesthetic survey was administered for aesthetic comparisons. Chi-square, Fisher’s exact tests and t-tests were used for statistical analysis. All tests were two sided. A p value of <0.05 was considered significant.

Results:

A total of 184 cases of delayed-immediate breast reconstruction were identified on 151 patients. 115 (62.5%) underwent prepectoral TE placement and 69 (37.5%) subpectoral TE. Patient characteristics were similar except for higher BMI in the subpectoral group. Patients in the subpectoral group were more likely to receive neoadjuvant chemotherapy or hormonal therapy and undergo radiotherapy prior to flap surgery. Nipple-sparing mastectomy was more commonly performed in the prepectoral group.

Table 1. Demographics

	Prepec TE	Subpec TE	p-value
Number of patients	115	69	
Age	50.7+/-9.2	49.5+/-10.5	0.337
BMI	28.7+/-5.1	30.3+/-5.2	0.038
Tobacco use	2 (1.7)	2 (2.9)	0.631
Hypertension	22 (19.1)	20 (29)	0.123
Diabetes mellitus	11 (9.6)	6 (8.7)	0.844
Coronary artery disease	2 (1.7)	1 (1.4)	>0.999
Neoadjuvant therapy			0.004
None	33 (28.7)	5 (7.2)	
Chemotherapy	26 (22.6)	19 (27.5)	
Hormonal therapy	25 (21.7)	15 (21.7)	
Both	31 (27)	30 (43.5)	
Radiation therapy			
XRT prior to TE	2 (1.7)	1 (1.4)	>0.999
XRT between TE/flap	26 (22.6)	36 (52.2)	<0.001
XRT after flap	1 (0.9)	0 (0)	>0.999
Adjuvant therapy			0.203
None	44 (38.3)	17 (24.6)	
Chemotherapy	4 (3.5)	4 (5.8)	
Hormonal therapy	64 (55.7)	47 (68.1)	
Both	3 (2.6)	1 (1.4)	

Table 2. Flap postop complications

	Prepec TE	Subpec TE	p-value
Infection			0.130
Major	2 (1.7)	0 (0)	
Minor	0 (0)	2 (2.9)	
Wound breakdown			0.500
Major	0 (0)	1 (1.4)	
Minor	4 (3.5)	2 (2.9)	
Necrosis			0.999
Major	1 (0.9)	1 (1.4)	
Minor	1 (0.9)	1 (1.4)	
Seroma			0.999
Major	2 (1.7)	1 (1.4)	
Minor	1 (0.9)	0 (0)	
Hematoma			0.632
Major	5 (4.3)	1 (1.4)	
Minor	1 (0.9)	0 (0)	
Fat necrosis			0.845
Major	2 (1.7)	2 (2.9)	
Minor	10 (8.7)	5 (7.2)	
Any flap complication	13 (11.3)	8 (11.6)	0.952
Reoperation	6 (5.2)	3 (4.3)	0.999

Table 3. Microvascular complications

	Prepec TE	Subpec TE	p-value
Number of patients	115	70	
Intraop			
Arterial thrombosis	1 (0.9)	3 (4.3)	0.153
Venous thrombosis	1 (0.9)	0 (0)	1.000
Flap take back	2 (1.7)	5 (7.1)	0.106
Postop			
Arterial thrombosis	0 (0)	0 (0)	--
Venous thrombosis	1 (0.9)	3 (4.3)	0.153
Flap loss			
Partial	1 (0.9)	2 (2.9)	0.558
Total	0 (0)	0 (0)	--
Overall complications	4 (3.5)	7 (10.1)	0.105

There were no significant differences in TE complications or postoperative flap complications between the two groups. There was a trend toward increased microvascular complications in the subpectoral group.

This trend toward increased microvascular complications was also present in the adjuvant radiation subgroup (subpec 16.2% vs prepec 3.6%, p=0.130).

Regarding PROMs, 87 of 151 (57.6%) patients completed the survey. The breast Rasch scores (prepec 73.6 vs subpec 68.9, p=0.401) were found to be equivalent as well as the chest Rasch scores (prepec 80.5 vs subpec 78.9, p=0.999). In the adjuvant radiation subgroup, there was again no difference in the breast Rasch scores (prepec 70.7 vs subpec 59.7, p=0.168) and chest Rasch scores (prepec 72.6 vs subpec 71.0, p=0.99).

The aesthetic survey showed superior results in non-radiated patients for both prepectoral and subpectoral reconstructions (p=0.000). In non-radiated patients, both groups were equivalent (p=0.212); whereas, subpectoral was slightly superior in radiated patients (p=0.034).

Conclusion:

Prepectoral breast reconstruction is gaining popularity in the United States with many surgeons favoring it over subpectoral breast reconstruction. Our data suggest that in staged breast reconstruction, prepectoral tissue expander placement prior to free flap surgery is a valid alternative to subpectoral placement with a trend toward less microvascular complications and comparable PROMs.