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Delayed Breast Reconstruction evaluation Following Mastectomy Utilisting transverse Rectus Abdominis Myocutaneous Flap Versus Latissimus Dorsi Flap Reconstruction

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Abstract

Abstract

Background: During the last century, breast reconstruction after mastectomy has become an important part of comprehensive treatment for patients who have breast cancer, **Aim:** comparison patients after delayed breast reconstruction Following Mastectomy Utilisting transverse Rectus Abdominis Myocutaneous Flap Versus Latissimus Dorsi Flap Reconstruction due to breast cancer. **Methods:** This study include 22 patients with surgical history of modified radical mastectomy and operated for delayed breast reconstruction with pedicled TRAM flap and pedicled LD flap . comparative study between to type of flap in many items such as operative time (in minutes), length of hospital stay (in days), post operative complications and hospital readmission, patient satisfaction. **Results:** latissimus dorsi flap however its limitation of patient selection is low than pedicled tram in hostipal stay and flap necrosis without major doner site complication of abdominal bluging and with low incidence of systemic complication of DVT and pulmonary embolism. **Conclusion:** TRAM procedure is good for patient adequate lower abdominal wall tissue who desire abdominoplastic result beside breast reconstruction.

Key words: Breast Reconstruction; transverse Rectus Abdominis Myocutaneous Flap; Latissimus Dorsi Flap Reconstruction

1. Introduction

The major advances in breast oncology in recent decades have provided a better understanding of the pathophysiology of breast cancer. This has enabled early detection of this disease, with a consequential increase in the number of cases treated as well as development of more conservative surgeries that enable immediate breast reconstruction using various techniques.[1]**.**

Breast reconstruction following mastectomy has become an integral part of the management algorithm for women diagnosed with breast cancer. Breast reconstruction can improve a woman's sense of identity and self-esteem .[2]

Women undergoing mastectomy are at risk of experiencing a variety of negative emotions that include feelings of mutilation, altered body image, dim nished self-worth, loss of femininity, decrease in sexual attractiveness and function, anxiety, depression, hopelessness, guilt, sham e, fear of recurrence, and abandonment.[3]

Although the decision of whether or not to pursue breast reconstruction is personal, it is prudent for healthcare providers to explain that breast reconstruction has been shown to have a signicantly positive impact on patients' quality of life and psychosocial well-being following mastectomy.[2]

Many techniques for autologous breast reconstruction have evolved since the latissimus dorsi flap and the transverse rectus abdominis myocutaneous (TRAM) flap were introduced in the 1970s and 1982, respectively. The use of microvascular techniques and perforator flaps soon evolved to minimize donor site morbidities. The method of choice shouldbe safe, reliable, and should result in little or no donor-site morbidity.[4]

In autologous breast reconstruction, the abundant adipose tissue present in the lower abdomen of most women is often used and has become the most popular donor tissue for breast reconstruction. [5]

2. Patients and methods

2.1. Patients:

This study include 22 patients with surgical history of modified radical mastectomy and operated for delayed breast reconstruction with pedicled TRAM flap and pedicled LD flap operated in period between march 2019 to September 2019 at Nasser Institute and ahmed maher teaching hospital , with a minimum postoperative follow- Up period of 4 months. All patients included in the study had fullfil their treatment of radiotherapy and chemotherapy and target therapy before reconstruction. All patient were admitted in the morning on day of surgery .they were all counseled and fully informed in the out patient clinic and

before the operation about the nature of the procedure and complication .

- **Group 1:** Included 12 patients will have delayed breast reconstruction with with pedicle TRAM flap
- **Group 2:** Included 10 patients delayed breast reconstruction with with pedicle LD flap

I-Inclusion criteria: adult patients aged 18 years or over undergoing post-mastectomy breast reconstruction after complete all adjuvant chemotherapy and radiation .

II-Exclusion criteria: Patient of physical or radiological sign of local recurrence or systemic metastase, Any medical condition associated with predicted survival of less than three years in the judgment of a Clinic physician (e.g., class IV congestive heart failure, obstructive lung disease requiring long-term ventilation or supplemental oxygen in the past, severe chronic liver disease with jaundice or ascites, kidney failure requiring dialysis, sickle cell anemia), Physiologically old, Cardiorespiratory disorders, Vasospastic disorders, Autoimmune disorders, Significant thrombophilia,Inadequate recipient vessels and Morbidly obese (BMI > 45).

2.2. Methods:

All patients included in the study have been subjected to the followings:

Full history , Physical examination, breast examination , Clinical photographs and are taken preoperatively and postoperatively for documentation, Investigations :CBC, liver function tests, fasting blood sugar.

Imaging techniques have revolutionized the preoperative mapping of vascular pedicle of TRAM and LD flap

a) Color Doppler imaging of the donor area can identify and locate the dominant perforators. It is very sensitive and it provides information about the caliber and blood flow of the main vessels and perforators. Vessel damage caused by atherosclerosis, previous surgery or blood vessel disorders and congenital abnormalities or anatomical variants can be diagnosed. However, this method also has some significant drawbacks. It is a long test, possibly lasting up to an hour, and this can be uncomfortable for patients as they have to remain in the same position during the procedure. In addition it is technician-dependent and the radiologist who performs the technique must have a sound knowledge of perforator surgery.

b) The MDCT and, more recently, the MRI. Both of them have shown they are highly reliable methods for the preoperative study. By providing anatomical images, they inform us about the number of perforators, their location, their intramuscular course and their distribution inside the subcutaneous tissue. They have 100% sensitivity and specificity at the time of locating the dominant perforator, and they are also technically reproducible.

A complete preoperative informed consent: was taken from every case detailed information about the patient's medical history, the state of local tissues, the condition of the breast, the possible donor sites, and the patient's wishes and possibility of adjustment of the opposite breast volume.

This study include 22 patients with surgical history of modified radical mastectomy and operated for delayed breast reconstruction with pedicled TRAM flap and pedicled LD flap . comparative study between to type of flap in many items such as operative time (in minutes), length of hospital stay (in days), post operative complications and hospital readmission, patient satisfaction.

3. Results

comparative study between to type of flap in many items such as operative time (in minutes), length of hospital stay (in days), post operative complications and hospital readmission, patient satisfaction.

Preoperative data : tables 1-4

Operative data: tables 5-7

Post-operative data : tables 8-10

Patient satisfaction wasn't statistically different between groups, p=0.670

3.1.Preoperative data

Table (1) : characteristics of cases

		TRAM No. = 12	LD No. = 10	Test value	P-value	Sig.
Age	**Mean±SD**	32.92 ± 4.40	34.50 ± 7.25	-0.632	0.535	NS
	Range	25 – 40	28 – 49			
Marital Status	**Single**	4 (33.3%)	3 (30.0%)	0.028	0.867	NS
	Married	8 (66.7%)	7 (70.0%)			
Working	**No**	7 (58.3%)	6 (60.0%)	0.006	0.937	NS
	Yes	5 (41.7%)	4 (40.0%)			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test; •: Independent t-test

Table (2): Height and weight and BMI

		TRAM No. = 12	LD No. = 10	Test value	P-value	Sig
Hight of the pt in cm	**Mean±SD**	168.67 ± 6.58	164.20 ± 5.05	1.755	0.094	NS
	Range	157 – 177	155 – 170			
Weight at time of Abdominoplasty in kg	**Mean±SD**	79.17 ± 7.85	75.00 ± 6.34	1.350	0.192	NS
	Range	63 – 90	65 – 88			
BMI of pt	**Mean±SD**	27.57 ± 2.06	27.80 ± 2.80	-0.225	0.824	NS
	Range	24 – 30	22.7 – 30.8			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test; •: Independent t-test

Table (3): Oncotherapy History

Oncotherapy HISTORY	TRAM		LD		Test value	P-value	Sig.
	No.	%	No.	%			
Adjuvant radiotherpy	12	100.0%	10	100.0%	NA	NA	NA
Adjuvant chemotherapy	9	75.0%	9	90.0%	0.825	0.364	NS
Hormonal Therapy	11	91.7%	8	80.0%	0.630	0.427	NS

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test

Table (4): Surgical History

SURGICAL HISTORY	TRAM		LD		Test value	P-value	Sig.
	No.	%	No.	%			
Lateral thoracotomy	1	8.3%	0	0.0%	0.873	0.350	NS
Mid line incision	2	16.7%	2	20.0%	0.041	0.840	NS
Subcostal incision	2	16.7%	2	20.0%	0.041	0.840	NS
Grid iron incision	4	33.3%	2	20.0%	0.489	0.484	NS

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test

3.2. Operative procedure

Table (5): operative time

		TRAM No. = 12	LD No. = 10	Test value	P-value	Sig.
OP time in minutes	**Mean±SD**	156.25 ± 14.00	123.30 ± 15.13	5.300	0.000	HS
	Range	140 – 180	100 – 150			
Bleeding amount in cc	**Mean±SD**	241.67 ± 70.17	135.00 ± 41.16	4.229•	0.000	HS
	Range	150 – 400	100 – 200			
Peritoneal perforation	**No**	12 (100.0%)	10 (100.0%)	NA	NA	NA
Bowel injury	**No**	12 (100.0%)	10 (100.0%)	NA	NA	NA
Solid organ injury	**No**	12 (100.0%)	10 (100.0%)	NA	NA	NA

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test; •: Independent t-test

Table (6): Vascular pedicle length in cm

Vascular pedicle length in cm	TRAM No. = 12	LD No. = 10	Test value•	P-value	Sig.
Mean±SD	12.42 ± 1.93	8.95 ± 1.32	4.811	0.000	HS
Range	9 – 15	7.5 – 11			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

•: Independent t-test

Table (7): symmetry achievement

symmetry achievement		TRAM No. = 12	LD No. = 10	Test value	P-value	Sig.
Contra lateral Mastopexy	**Mean±SD**	42.17 ± 3.04	35.00 ± 2.71	5.781	0.000	HS
	Range	37 – 47	30 – 38			
Contra lateral breast reduction	**Mean±SD**	12.58 ± 1.98	8.95 ± 1.32	4.956	0.000	HS
	Range	9 – 15	7.5 – 11			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

•: Independent t-test

3.3. Postoperative results

Table (8): Postoperative during hospital stay

Analgesia post operative		TRAM No. = 12	LD No. = 10	Test value	P-value	Sig.
NSAID	**No**	0 (0.0%)	0 (0.0%)	NA	NA	NA
	Yes	12 (100.0%)	10 (100.0%)			
Opioids	**No**	0 (0.0%)	5 (50.0%)	7.765	0.005	HS
	Yes	12 (100.0%)	5 (50.0%)			
1st Day Drains in cc		246.67 ± 59.29	145.00 ± 63.29	3.885•	0.001	HS
		150 – 350	100 – 300			
Post-Operative Hospital stay in days	**Median (IQR)**	1.00 (1 - 2)	1.00 (1 - 1)	-1.657	0.098	NS
	Range	1 – 12	1 – 1			
Blood transfusion	**No**	10 (83.3%)	10 (100.0%)	1.833	0.176	NS
	Yes	2 (16.7%)	0 (0.0%)			
Drain Time in days	**Mean±SD**	11.50 ± 1.83	7.70 ± 1.64	5.078	0.000	HS
	Range	10 – 15	6 – 10			

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test; •: Independent t-test; ‡: Mann Whitney test

Table (9): Drain Time in days

		TRAM No. = 12	LD No. = 10	Test value	P-value	Sig.
Drain Time in days	**Mean±SD**	11.50 ± 1.83	7.70 ± 1.64	5.078	0.000	HS
	Range	10 – 15	6 – 10			

Table (10): postoperative complications

Complications	TRAM		LD		Test value	P-value	Sig.
	No.	%	No.	%			
Donor site complications							
Hematoma	3	25.0%	0	0.0%	2.895	0.089	NS
Superficial Infection	4	33.3%	0	0.0%	4.074	0.044	S
Deep Infection	1	8.3%	0	0.0%	0.873	0.350	NS
Seroma	7	58.3%	2	20.0%	3.316	0.069	NS
Wound dehiscence	2	16.7%	0	0.0%	1.833	0.176	NS
Necrosis	0	0.0%	0	0.0%	NA	NA	NA
Abdominal bulge	4	33.3%	0	0.0%	4.074	0.044	S
Abdominal hernia	2	16.7%	0	0.0%	1.833	0.176	NS
Flap complications	0	0.0%	0	0.0%	NA	NA	NA
Flap complications							
Total flap loss	0	0.0%	0	0.0%	NA	NA	NA
Partial flap loss	2	16.7%	0	0.0%	1.833	0.176	NS
Hematoma/seroma of the breast	0	0.0%	0	0.0%	NA	NA	NA
Breast Wound dehiscence	2	16.7%	0	0.0%	1.833	0.176	NS
Systemic complications							
Chest Complication	2	16.7%	0	0.0%	1.833	0.176	NS
Thrombo-Embolism	3	25.0%	0	0.0%	2.895	0.089	NS
Hypoaesthesia	5	41.7%	2	20.0%	1.180	0.277	NS
Others							
Chronic Pain	6	50.0%	3	30.0%	0.903	0.342	NS
Keloid	5	41.7%	2	20.0%	1.180	0.277	NS
Hypertrophic scar	3	25.0%	2	20.0%	0.078	0.781	NS

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)

*:Chi-square test

4. Discussion

Breast cancer continues to impact women and their families at an alarming rate.The female breast can have a serious impact on a woman's self-esteem. Mastectomy involves emotional loss as well as physical loss. The goal of breast reconstruction, either at the time of the mastectomy or delayed, is to replace not just the breast but any self-esteem or sense of femininity the patient may feel she has lost. There are different approaches to reconstruction that vary depending on the type of mastectomy, the condition of the breast skin, and the patient's preferences [6]**.**

A guiding principle in all of reconstructive plastic surgery is to provide the breast reconstruction with natural appearance and feel, comfortable and in harmony with the contralateral breast while limiting the functional and aesthetic defect at the donor site. For any plastic surgeon the objective is to provide an aesthetically pleasing, natural breast reconstruction without significant impact on flap reliability**.**[7]

In order to accomplish the goal of reconstructive breast surgery, several factors should be considered. These include the size and shape of the opposite breast, the plans for altering the opposite breast, the nature of the mastectomy defect, the pathologic stage of the breast cancer, the likelihood of postmastectomy irradiation, the general health of the patient, the availability of donor tissue, the lifestyle of the patient, and finally the patient's goals and expectations. Once the factors are all taken into consideration, the reconstructive surgeon has a wide variety of options from which to choose, including prosthetic techniques, autologous techniques, and combined autologous tissue and implant techniques. In addition, a number of matching procedures are available for the contralateral breast to help with symmetry.[8]

Flap reliability is defined as the absence of fat necrosis, partial flap loss, or total flap loss. The introduction of the pedicled TRAM flap was a milestone in our ability to provide a natural breast reconstruction. This technique came at the expense of abdominal wall integrity and significant patient selection criteria. The free TRAM flap was introduced as a means of limiting the abdominal donor defect while providing improved vascularity within the flap, allowing for broader patient selection compared with the pedicled TRAM flap. The free TRAM flap, however, has not completely eliminated abdominal donor-site morbidity.[9]

If a TRAM flap is to be chosen, there are a number of options available. Surgeons generally choose these options based on the presence or absence of risk factors which significantly increase the risk of complications to both the TRAM flap and the donor site. These risk factors are obesity, smoking, diabetes, hypertension, collagen vascular disease, and other significant systemic illnesses (such as pulmonary, renal, or cardiac disease). In terms of circulation, the single-pedicled TRAM flap has its best application in patients who do not have any of these risk factors and who have enough tissue in the lower abdomen for reconstruction of the breast to the desired shape and size.[10]

Furthermore, the additional muscle and fascial harvest required in the bilateral pedicled TRAM technique is located in the upper abdomen where abdominal wall problems are rarely encountered.

In addition, the bilateral TRAM technique necessarily only requires a hemi-flap for fat perfusion, decreasing the requirements for perfusion of the overlying fat of the TRAM flap. Because each hemiflap is smaller than that of a unilateral technique, which may incorporate contralateral skin and fat, the tunnel through the inframammary fold does not have to be as large, which results in a crisper and more aesthetically pleasing IMF postoperatively.

Patients who have undergone radiotherapy can also benefit from the use of an LD flap in breast reconstruction. In these patients, the skin island of an LD flap can replace the constricted, irradiated skin of the breast; and the muscle of an LD flap can cover an implant, thereby decreasing the risk of capsular contracture and implant infection and The pedicled latissimus flap provides a moderately sized skin island as well as a large amount of well-vascularized muscle. It is a hardy flap that can be used despite irradiation to the axilla..[11]**.**
The latissimus dorsi is more resistant to the effects of impaired wound healing posed by smoking and diabetes. Additionally, latissimus dorsi reconstruction does not compromise the abdominal wall, which may be of issue in patients desiring future pregnancy. [12]**.**

A study by Teisch et al comparing the outcomes of breast reconstruction with the latissimus dorsi myocutaneous flap versus the pedicled TRAM flap found a greater risk for surgical site complications with the latissimus dorsi procedure, but an increased risk for pulmonary complications and a greater length of stay with the pedicled TRAM flap operation. The study involved more than 29,000 cases contained in the National (Nationwide) Inpatient Sample database. [13] **.**

Patients who had a previous abdominoplasty or TRAM flap, and it may also include women with insufficient abdominal skin or fat . Women who smoke, have diabetes, or are obese may be considered to be too high risk to undergo a TRAM flap. Some women may choose not to undergo on operation as extensive and lengthy as a TRAM flap, particularly in light of the time required for recuperation. When a TRAM flap is not available or advisable, the latissimus flap becomes an obvious option.

The latissimus flap includes a large well-vascularized flat muscle that may be better suited for dealing with poorly vascularized defects or for covering an implant. In patients with small defects, particularly laterally, the latissimus may be the best choice. Previous irradiation during breast conservative therapy Several papers have discussed the detrimental effects radiation has on tissues and breast reconstruction. Contracture, wound healing problems, implant exposure, infection, skin necrosis and pigmentary changes are all commonly associated with radiation therapy .

In our study result show that latissimus dorsi flap however its limitation of patient selection is low than pedicled tram in hostipal stay and flap necrosis without major doner site complication of

abdominal bluging and with low incidence of systemic complication of DVT and pulmonary embolism .

Conclusion

Patient selection for ideal flap is a mandatory step of reconstruction .that can affect reconstruction result and post operative complication and patient satisfaction. TRAM procedure is good for patient adequate lower abdominal wall tissue who desire abdominoplastic result beside breast reconstruction. LD flap reconstruction can still be accomplished without an implant, especially for women with a small to medium-sized breast. The latissimus dorsi is more resistant to the effects of impaired wound healing posed by smoking and diabetes. Additionally, latissimus dorsi reconstruction does not compromise the abdominal wall, which may be of issue in patients desiring future pregnancy. The outcome results of our study of The latissimus dorsi is more resistant to the effects of impaired wound healing posed by smoking and diabetes. Additionally, latissimus dorsi reconstruction does not compromise the abdominal wall, which may be of issue in patients desiring future pregnancy.

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