Section A -Research paper

MINI-LDF VERSUS PERFORATOR FLAPS IN ONCOPLASTIC BREAST SURGERY

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ABSTRACT

Breast cancer is the most prevalent form of cancer among women worldwide and in Egypt. Women who have tiny or medium-sized breasts still provide a difficulty for simple breast conserving surgery. As a result, the only viable options are implants or the Mini-LDF volume replacement procedure. However, mini-LDF still has some adverse effects, most notably recurring seroma formation and impairment of shoulder girdle movement. This study was done to assess aesthetic and functional outcome of perforator flaps in comparison to mini-LDF in partial breast reconstruction in terms of feasibility, safety and efficacy considering the aesthetic outcome and patient satisfaction. It was a non-blind non-randomized comparative study that was done at Oncology center of Mansoura university (OCMU). We included female patients with breast cancer from attendants to OCMU and had small to medium sized breasts with T1-T3, N0-N1, M0 primary breast cancer, upper or lower lateral quadrant tumors either received neo-adjuvant chemotherapy or hormonal therapies or not. The breast reconstruction was done with either mini-LDF or perforator flap. In this study, 50 patients diagnosed with breast cancer were assessed for their eligibility for oncoplastic breast surgery (OPS) and were allocated into two equal groups (25 patients in each group). As regard the objective evaluation of the aesthetic outcome among the studied groups, the breast symmetry index (BSI) was significantly higher in the mini-LDF group compared to the perforator flaps group. The breast volume symmetry, the shape of breast mound, the NAC position and symmetry showed significantly better results in the perforator flaps group compared to the mini LDF group. Overall complications were insignificantly different between the studied groups. We concluded that immediate partial breast reconstruction using perforator flaps is a reliable option since it avoids the need for prosthesis, spares the muscle, and reduces the likelihood of recurrent back seroma while offering good cosmetic results and not jeopardizing the oncologic outcomes.

Keywords: Latissimus Dorsi Flap, Breast Conservative Surgery, lateral Intercostal Artery Perforator Flap

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INTRODUCTION

When the word oncoplastic was first introduced in the early 1990s, the rationale was clear. Breast conservation rates were progressively increasing as high as 90% in some series; however, in some cases, this was at the expense of poor cosmetic outcomes. The aim was to improve long term cosmetic outcomes after breast conservation and radiotherapy, facilitating conservation surgery where more than the traditional relative volume (usually up to 20%) needed to be excised or where the location of the tumor was adverse (superior/medial/inferior) **[1]**.

There are two broad techniques in oncoplastic surgery to reconstruct the breast parenchymal defect; 1) Volume displacement: Local breast parenchyma is repositioned to fill the defect using either simple advancement or more complex pedicles. Volume replacement: Distant autologous or heterologous material such as muscle or dermofascial flaps or silicone prostheses or fat grafting may be used **[2].**

Since the 1970s, a myocutaneous Latissimus Dorsi (LD) has been the workhorse of breast reconstruction Even in the era of microsurgery and perforator flaps [3]. Rainsbury described LD mini flaps aiming to reconstruct the partial breast defects after central and upper quadrant resections. This oncoplastic approach allows extensive local excision during Breast Conservative Surgery (BCS) without cosmetic penalties in a group of patients to avoid mastectomy **[1].**

LD mini flap is an option for reconstruction of defects in lateral, central, inferior, and even medial defects. It has gained favorability as it can be harvested along with the axillary dissection at the same time from the same inferolateral incision **[4].**

Local flaps allow reconstruction with a number of; a single region operation without the need for microsurgery or a remote donor site, autologous tissue with a more predictable volume than free fat grafting, an excellent color match and good texture. Suitable tissue sources in the thoracic wall are the back (thoracodorsal artery perforator (TDAP) flap),

lateral and anterior thoracic wall (lateral and anterior intercostal artery perforator (LICAP and AICAP flaps) and lateral thoracic artery perforator (LTAP) flap) **[5, 6].**

This study was done to assess aesthetic and functional outcome of perforator flaps in comparison to mini-LDF in partial breast reconstruction in terms of feasibility, safety and efficacy considering the aesthetic outcome and patient satisfaction and also to assess operative measures and postoperative complications as operative time, bleeding, seroma, flap necrosis, oncologic outcome and adjuvant therapy.

PATIENTS AND METHODS

This was a prospective comparative study done for three years after being started in 2019. It was done on patients referred to the oncology center of Mansoura university (OCMU) with breast cancer and planned for oncoplastic breast surgery of volume replacement techniques, either mini-LDF or perforator flaps reconstruction. It included 50 patients, 25 cases for each of mini-LDF and perforator flaps groups. We included female patients with breast cancer from attendants to OCMU and had small to medium sized breasts, T1-T3, N0-N1, M0 primary breast cancer, either received neo-adjuvant chemotherapy or hormonal therapies or not and after getting the consent after description of the study to them. But we excluded patients with advanced cases with skin infiltration, with inflammatory breast cancer disease, with metastatic breast cancer, with large breast size, with previous ipsilateral lateral chest wall irradiation or incisions, with persistent infiltrated margins on frozen section study, patients preferred mastectomy, patients refused to participate, patients with pregnancy or autoimmune or connective tissue diseases and patients. The primary outcome measures are the aesthetic and functional outcome in terms of feasibility, safety and efficacy considering the patient satisfaction. The secondary outcome measures: operative measures and postoperative complications as bleeding, seroma, flap necrosis and oncologic outcome.

Methods

All patients were subjected to full medical history taking. All patients had predictable lab work testing for anesthesiology suitability, breast MRI, mammography, imaging tests for metastatic disease by CT scan, MRI and chest x-ray, and preoperative doppler marking of the perforator sites. Pathological assessment was done by core needle biopsy (CNB) to detect the tumor molecular biology (ER, PR, Her2neu and Ki67). The procedure was explained and discussed to all patients with informed written consent.

Surgical Technique

In all cases, preoperative photographs of both breasts were taken and skin marking of breast tumor site was done , (fig. 1)**.** Under general anesthesia, a lateral mammary incision was then drawn in a lazy S shape, beginning at the axilla and continuing down the lateral breast border to the inframammary fold's outer border , (fig. 2). The incision was deepened into the subcutaneous fat and then continued medially until it reached the free outer border of the pectoralis major muscle. From this same incision, we did a wide local excision of the primary tumor with specimen marking with frozen section study for confirmation of free safety margins , (fig. 3). The tumor bed was tagged with metal clips to enable radiation therapy (RT) after surgery. We Entered the axilla by elevation of the pectoralis minor muscle, then handled the axilla with either sentinel lymph node biopsy (SLNB) if indicated or with axillary lymph node dissection (ALND); level I, II lymph lymph nodes were removed while protecting the blood and nerve supply of the LD muscle. Finally, the breast reconstruction was done with either mini-LDF or perforator flap.

Figure (1): Skin marking of breast tumor site.

Figure (2): Lateral mammry incision (Hidden scar).

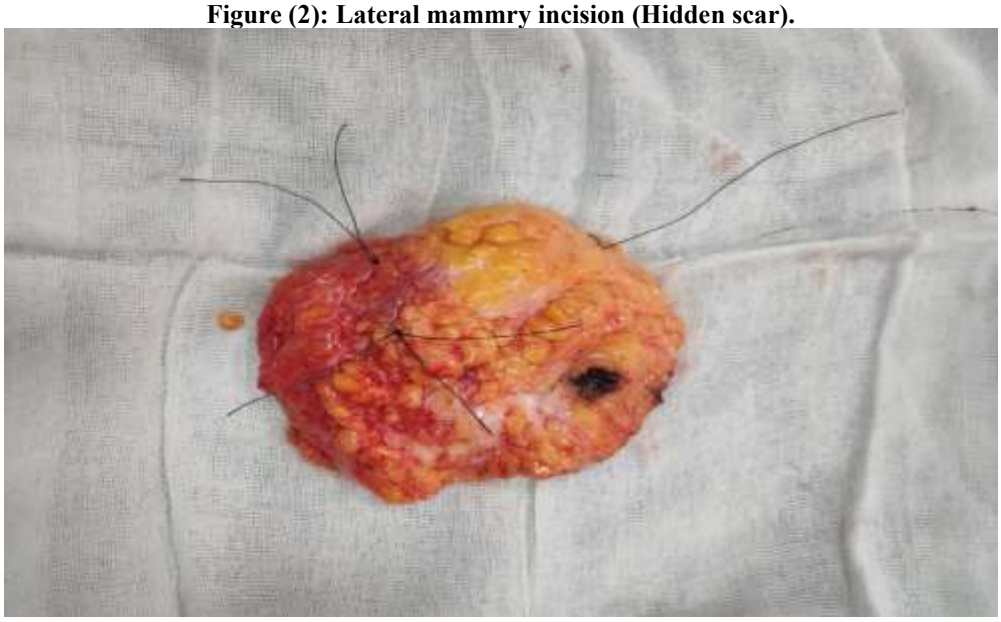

Figure (3): Tumor specimen marking.

1) The Mini-LDF reconstruction:

The patients remained in the supine posture the whole procedure time. We harvested the mini-LDF flap by dissecting in premuscular plane beginning at the anterior border of the LD muscle and extending dorsally to the lumbosacral fascia and inferiorly to the level of the costal edge. A second, deeper muscular pocket deep to the LD muscle was formed. Then, the LD muscle was split along the pockets' edges to form the LD mini-flap. The muscle was cut in half distally, then again posteriorly. Cutting the LD tendon allowed its complete mobilization and

delivery to the tumor bed , (fig. 4 & 5). The fat covering the flap and the fat covering the serratus anterior on the anterolateral chest wall, both of which connected to the lower half of the anterior border of the LD muscle, may be dissected to increase the size of the flap (Extended mini-LDF). A small number of interrupted sutures were used to fold the flap into a shape that fits over the defect's margins , (fig. 6).

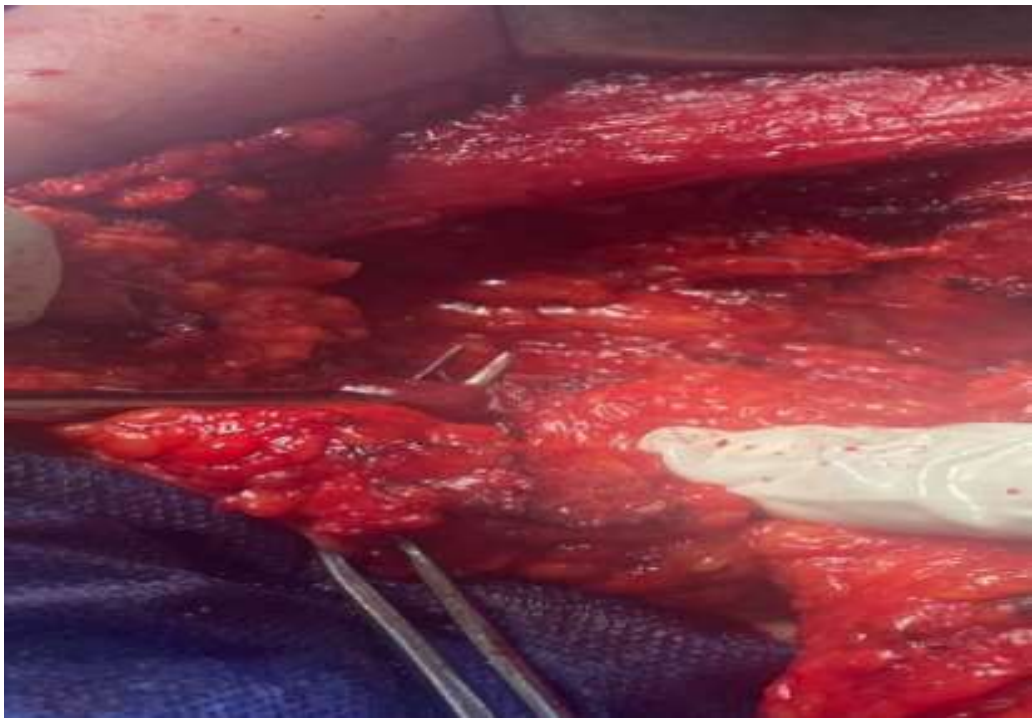

Figure (4): Latissmus dorsi tendon.

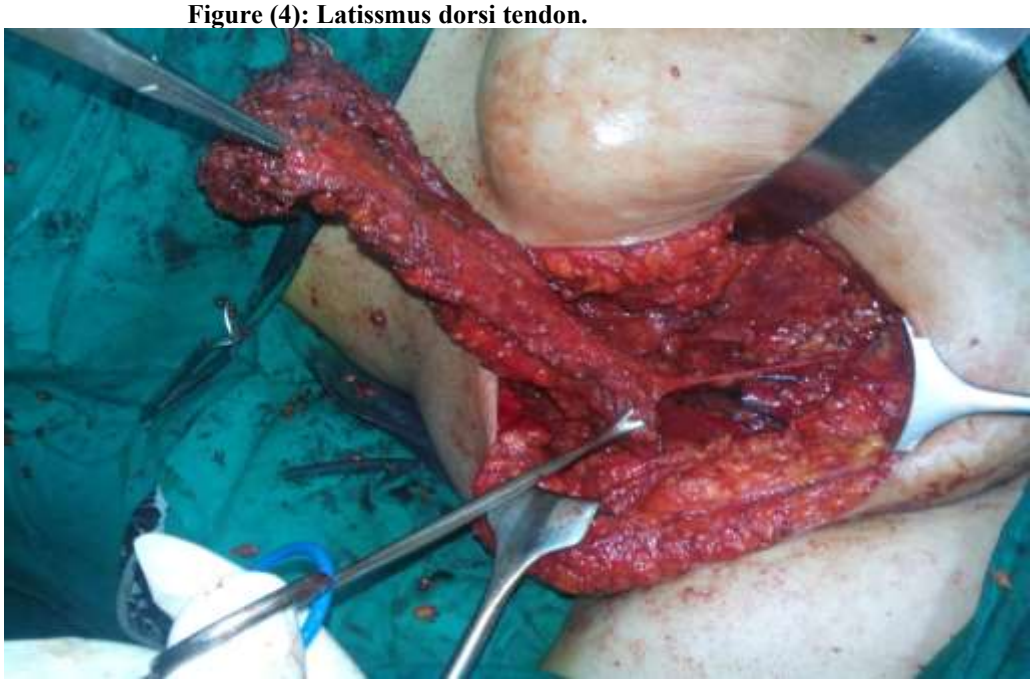

Figure (5): Cutting of the Mini-LDF tendon.

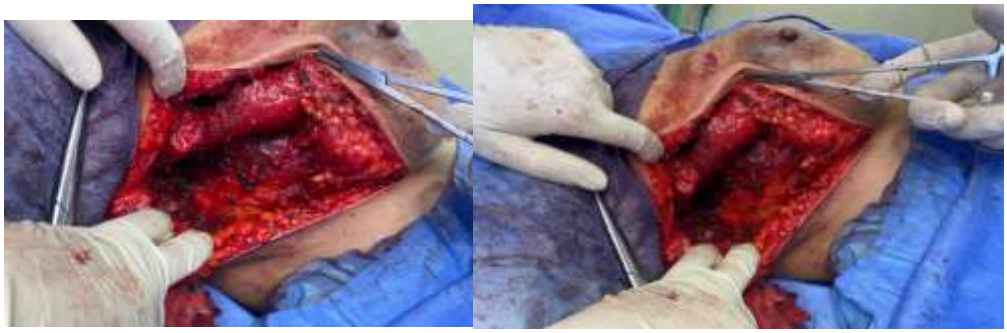

Figure (6): Placement of the mini-LDF into the breast defect.

2) The Lateral Intercostal Artery Perforator (LICAP) Flap:

Preoperative LICAP flap design was done with either a CT angiography or a unidirectional doppler ultrasonography for marking the LICAP perforators sites or when failed, the lateral cutaneous branches of the intercostal arteries were marked by recognizable anatomical landmarks. They are commonly seen in the 5th, 6th and 7th intercostal spaces 2-4 centimeters anterior to the anterior border of LD (the posterior axillary fold). Then, the site of the tumor was marked and the flap was drawn , (fig. 7). The incision was started from the back and extended downward until the LD muscle was reached. After the perforator has been located, the surrounding muscles were precisely dissected out of the way so that it emerged from the costal groove , (fig. 8). The flap was then turned and moved to the defect site where it was folded and repositioned as needed before being stitched in place using vicryl sutures. The flap's harvest location was punctured with a suction drain that leads to the axilla. Prolene 3-0 was then used to seal the wounds , (fig. 9).

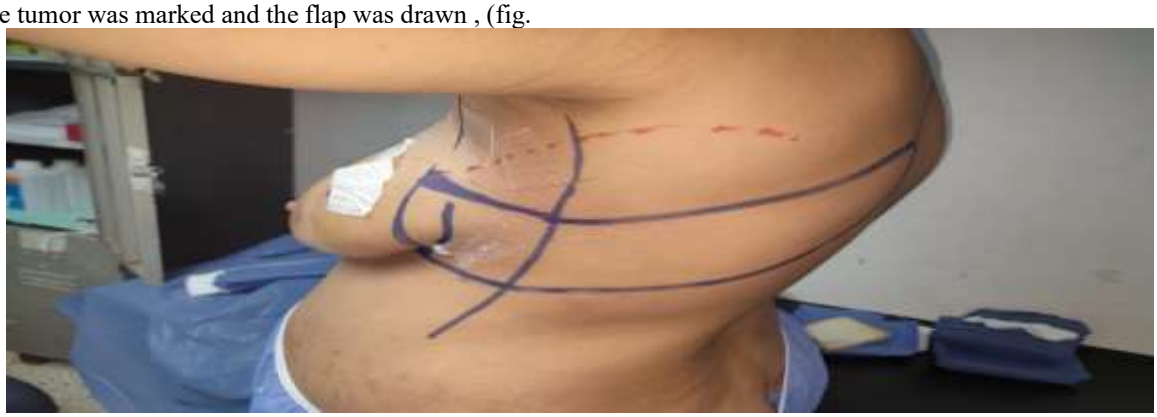

Figure (7): Preoperative skin marking for LICAP flap.

Figure (8): LICAP perforators.

Figure (9): Immediate postoperative view after LICAP flap reconstruction.

3) The Thoracodorsal Artery Perforator (TDAP) Flap:

Preoperative marking of the TDAP perforator was created in a lateral location using Doppler ultrasound or by using anatomical landmarks (6-8 cm above the upper axillary crease and 1-3 cm beyond the posterior axillary fold). Flaps were then drawn with the tumor's location, the incision's planned length and width. , (fig. 10). The flap incision was made deep enough to reach the fascia covering the underlying muscles. Dissection should begin medially and progress laterally and vertically till reaching the location of the designated perforator. , (fig. 11). After locating the perforators, dissecting between the muscle fibers till reaching the descending branch of the dorsal division of the TD artery was done, continuing dissection till reaching the major pedicle, and finally securing a sufficient pedicle length. A section of muscle enclosing the perforator may be included in the flap if the perforator was not pulsatile or had a limited diameter. After completing flap dissection, flap delivary into the breast defect was done, (fig. 12) and repositioning of breast skin over the flap , (fig. 13). After the flap was moved to the breast, a suction drain was placed at the flap harvest site and in the axilla. The back incision was then closed. The flap was then repositioned (with vicryl 2-0) to best conceal the deformity and the incision was closed using prolene 3-0 sutures.

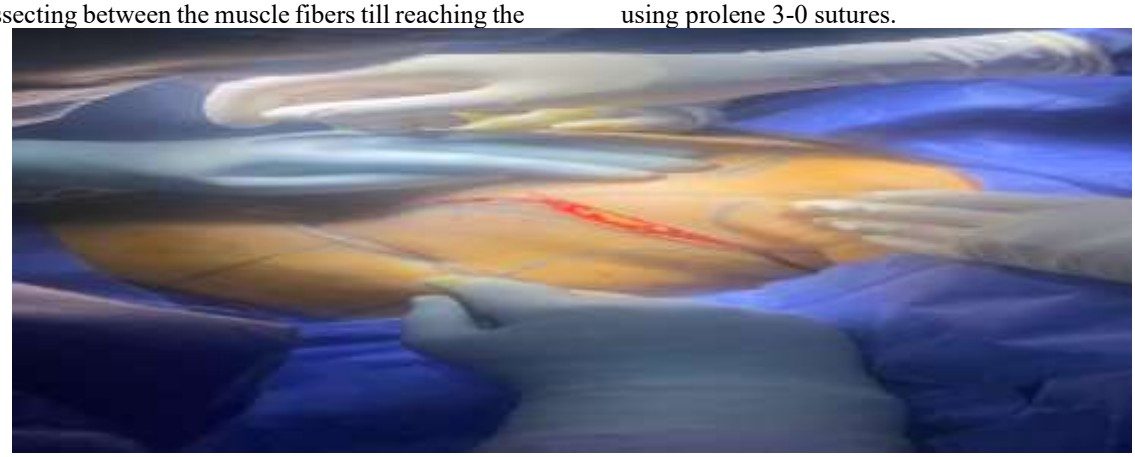

Figure (10): Incision over the skin marking for TDAP flap.

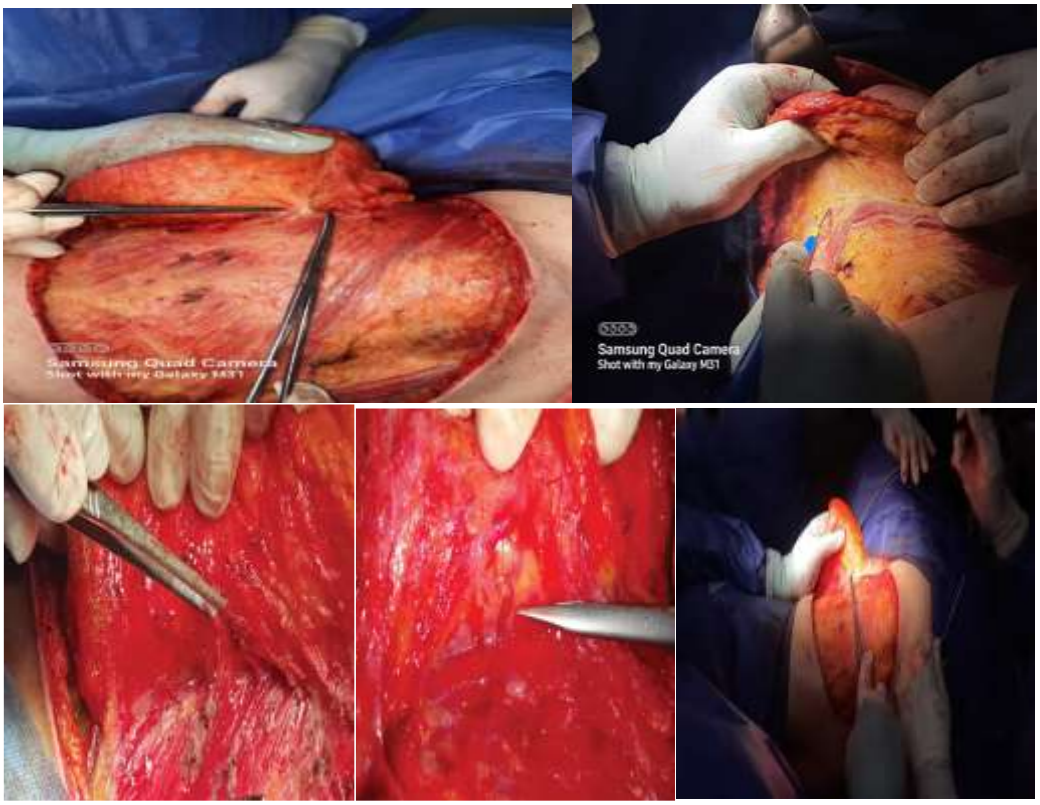

Figure (11): Identification of the TDAP Flap perforators.

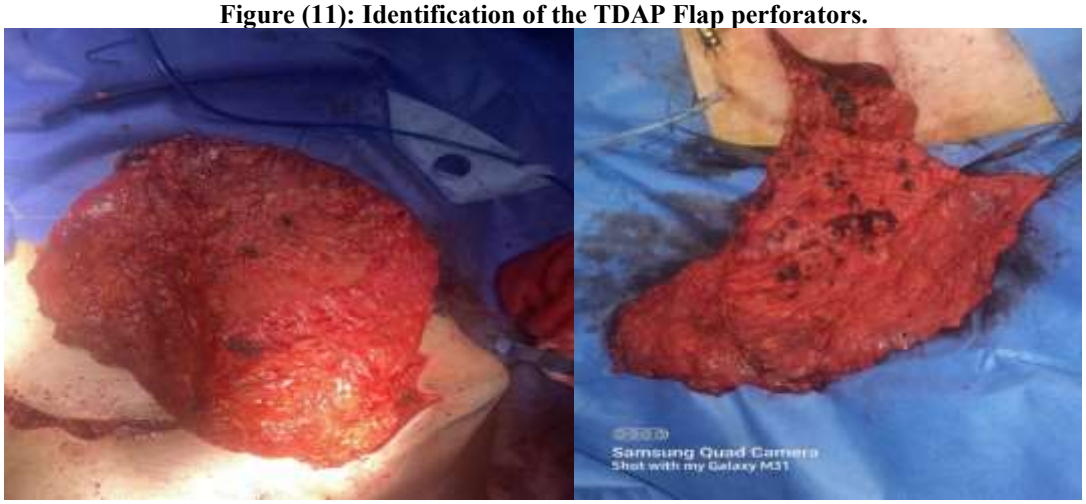

Figure (12): TDAP flap delivery.

Figure (13): Repositioning of breast skin over the TDAP flap.

Postoperative follow up: all patients were followed regularly after surgical recovery and discharge in the outpatient clinic;

1. All patients have received antibiotics, analgesics, anti-inflammatory and anti-edematous drugs in the early postoperative period.
2. Evaluation of the followings was done:

- The patient characteristics.
- The tumor characteristics.
- The operative time and hospital stay period.

3. Observation and management of surgical complications as seroma, hematoma, wound dehiscence, infection and flap necrosis.
4. Documentation of oncologic outcome including time of adjuvant therapy and local recurrence.
5. Postoperative photographs from both breasts were taken from all patients , (fig. 14 , 15).
6.

Figure (14): Postoperative photographs after mini-LDF reconstruction.

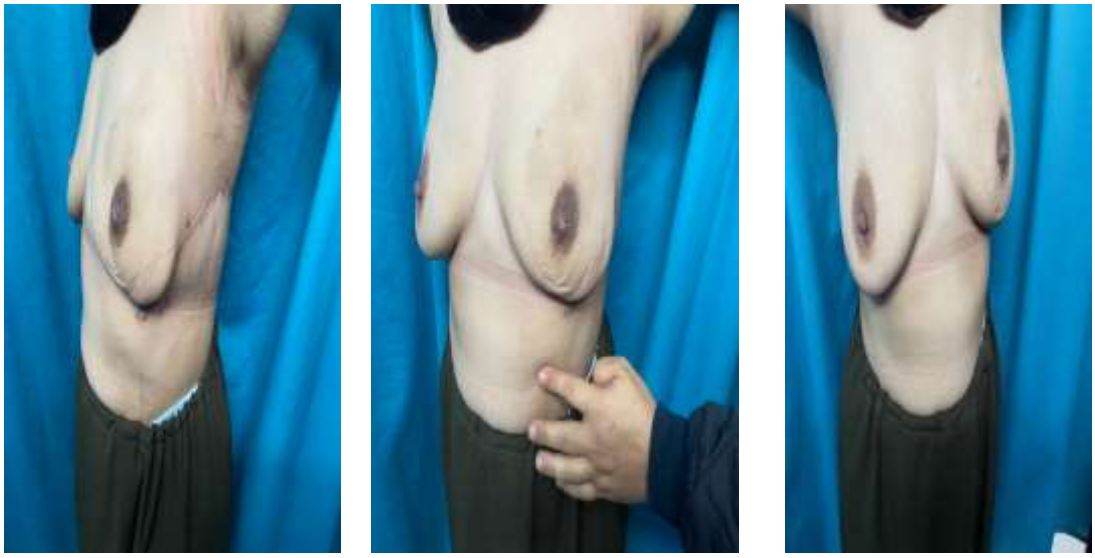

Figure (15): Postoperative photographs after TDAP flap reconstruction.

7. Assessment of aesthetic outcome and patient satisfaction:

A. Objective evaluation:

- Using the breast symmetry index (BSI) to evaluate the cosmetic outcome of breast conservation. BSI is calculated by comparing the area, the circumference and the nipple position of both breasts and subtracting the data of one breast from the contra-lateral side. BSI ranges from 1 to 10 while 1–3 is considered as excellent, 4–6 as good and 7–10 as poor breast symmetry **[27]**.
- 3 observers: the consultant surgeon (observer 1), an independent breast surgeon (observer 2) and an independent nurse (observer 3) by comparing preoperative and postoperative photographs. The most frequently tailored validated scale was used to evaluate 4 criteria with impact on overall aesthetic outcome and patient satisfaction; breast volume symmetry, shape of the breast mound, symmetry and position of both NACs, then giving the 5 points scale (5= excellent, 4= very good, 3= good, 2=fair and 1= poor). The aesthetic outcome was described as mean or median **[26].**

B. Subjective evaluation of patient satisfaction:

It was assessed through distributing questionnaires to the patients to rate their postoperative satisfaction. For each of breast volume symmetry, shape of the breast mound, symmetry and position of both NACs, a 5 point Likert scale was used for scoring. This scale ranges from 5= very satisfied, 4= satisfied, 3= neutral, 2= dissatisfied and 1= very dissatisfied. The patient satisfaction was described as mean or median **[26].**

8. **Assessment of shoulder motility:**

It was done using the Apley scratch test to evaluate the flexibility and mobility of the shoulder joint including flexion and extension and to give a good idea of the functional ROM. It is also known as shoulder flexibility test or back scratch test. The right arm is raisen straight up over the head. The right elbow is bended letting the right palm rest on the back of neck with fingers pointing down toward the feet. The palm should be facing away from the body. Without straining, the hands should be moving toward each other; the right hand is slided down the neck and the left hand up the spine. The distance between fingers of both hands is measured. If fingers are touched, zero score (0 inch) is recorded. If fingers are overlapped, negative figure as -1 inch is recorded. Test Results; Excellent if fingers overlap, Good if fingers touch, Average if fingers are less than 2 inches apart and Poor if fingers are more than 2 inches apart. Hands are then switched to perform the test on the opposite shoulder. The test was repeated every to determine the progress , (fig. 16) **[28]**.

Figure (16): Assessment of shoulder motility using the Apley scratch test.

Statistical Analysis

The statistical software SPSS was used for data entry, tabulation, and analysis (version 20). If the data was properly distributed, it was showed as mean SD; otherwise, it was showed as median IQR. When comparing three or more groups, the Chi-square test was utilized, numerical data was given as percentages and qualitative data was analyzed using the nominal unpaired test or the Mann- Whitney test. Appropriate statistical tests were used to examine statistical differences between groups. If the probability level was less than 0.05, the result was significant.

Ethical consideration

Study protocol was submitted for approval by IRB of Mansoura medical college. Informed verbal consent was obtained from each participant sharing in the study. All information provided by participants was kept strictly confidential. The information gathered was kept strictly confidential.

RESULTS

In this study, 60 patients diagnosed with breast cancer were assessed for their eligibility for OPS and 10 patients did not meet the inclusion criteria. The remaining 50 patients were randomly allocated into two equal groups (25 patients in each). All allocated patients were followed-up and analyzed statistically , (F**ig. 17).**

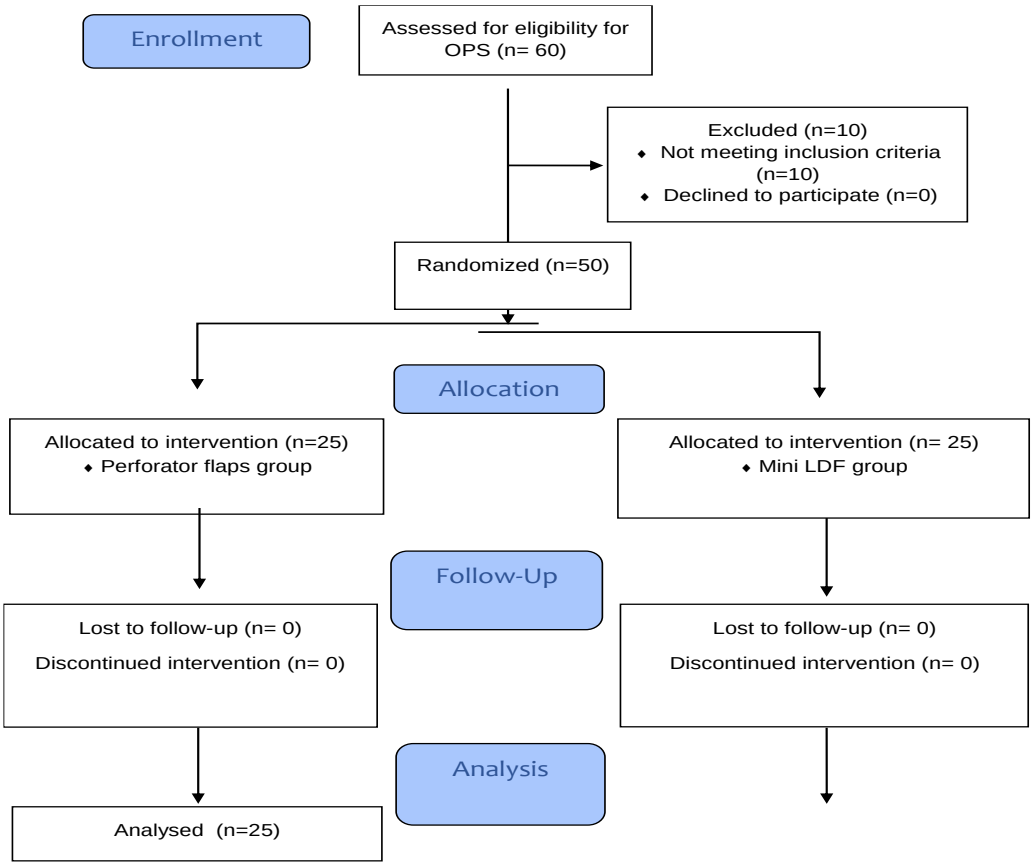

Figure (17): Flow chart showing our study design.

The demographic characteristics (Age, body mass index and ASA), comorbidities (DM, HTN) and history of breast surgeries were insignificantly different between the two studied groups. The breast characteristics (cup size, ptosis and side affected) were insignificantly different between the two studied groups. The tumor characteristics (number of masses, multicentricity, multifocality, tumor site and size) were insignificantly different between the two studied groups **(Table 1).**

Table (1): Demographic characteristics, comorbidities, breast characteristics and tumor characteristics among the two studied groups.

	Perforator flaps group N=25	**Mini LDF group N=25**	**Test of significance**
Demographic characteristics			
Age/years	42.08±7.45	41.64±9.51	t=0.182 p=0.856
BMI (kg/m^2)	30.83±4.54	33.15±4.62	t=1.79 p=0.08
ASA **I** **II**	 21 (84) 3 (12)	 19 (76.0) 5 (20.0)	 MC=0.600 P=0.741
Comorbidities	4 (16)	4 (16)	FET=0.0 P=1.0
DM	1 (4.0)	1 (4.0)	FET=0.0 P=1.0
HTN	1 (4.0)	2 (8.0)	FET=0.355 P=1.0
Previous breast Surgeries	0	2 (8.0)	FET=2.08 P=0.490
Breast characteristics			
Cup **A** **B** **C**	 5 (20) 13 (52) 4 (16)	 4 (16) 10 (40) 6 (24)	 MC=3.19 P=0.527
Ptosis **1** **2** **3**	 10 (40) 11 (44) 4 (16)	 6 (24) 15 (60) 4 (16)	 MC=1.62 P=0.446
Left side	15 (60)	16 (64)	p=0.771
Tumor characteristics			
Number of masses **One** **Two** **Three**	 21 (84) 3 (12) 1 (4)	 15 (60) 6 (24) 4 (16)	 MC=3.80 P=0.150
Tumor size	2.768	3.232	P=0.262
Multicentricity	2 (8.0)	4 (16.0)	FET=0.758 P=0.667
Multifocality	2 (8.0)	6 (24.0)	FET=2.38 P=0.247
UOQ	20 (80)	16 (64)	χ2=1.59 P=0.208
LOQ	3 (12.0)	1 (4.0)	FET=1.08 P=0.609
Zone **A** **B** **C**	 3 (12) 15 (60) 5 (20)	 3 (12) 16 (64) 6 (24)	 MC=2.12 P=0.713

LICAP flap was performed on 15 (60%) patients, TDAP flap was performed on 6 (24%) patients, LTAP flap was performed on 3 (12%) patient and combined LICAP & LTAP flaps were

performed on 1 (4%) patient. Mini LDF was performed on 14 (56%) patients and extended mini-LD flap including anterior and posterior chest wall fat was performed on 11 (44%) patients **(Table 2).**

Table (2): Surgical technique distribution among the studied groups.

	Perforator flaps group N=25	**Mini LDF group N=25**
LICAP	15(60)	0
TDAP	6 (24)	0
LTAP	3 (12.0)	0
LICAP & LTAP	1 (4.0)	0
Mini LDF	0	14 (56.0)
Extended mini-LD flap	0	11 (44.0)

As regard the tumor size and staging, there was no significant difference in the tumor size, extent and TNM staging distribution between cases of the two groups (P =0.047). As regard the postoperative pathologic grading of the resected tumor, the Incidence of grade 0, I and II of breast cancer was significantly higher in the perforator flaps group compared to the mini LDF group while incidence of pathologic grade III was significantly higher in the mini LDF group compared to the perforator flaps group (P =0.043) **(Table 3).**

Table (3): Postoperative pathologic staging and grading of resected tumor among studied groups.

	Perforator flaps group N=25	**Mini LDF group N=25**	**Test of significance**
Tumor Staging: Stage 0 Stage IA Stage IIA Stage IIB	 4(16) 4(16) 9(36) 4(16)	 3(12) 3(12) 7(28) 7(28)	 MC=2.35 P=0.798
Grading: Grade II Grade III	 15(60) 4(16)	 12(48) 12(48)	MC=8.13 P=0.043*

As regard the objective evaluation of the aesthetic outcome among the studied groups, the breast symmetry index (BSI) was significantly higher in the mini-LDF group compared to the perforator flaps group (P <0.001). Observer 1 and 3 reported a significantly better breast volume symmetry in the perforator flaps group compared to the mini LDF group (P <0.001), while observer 2 reported insignificant difference in breast volume symmetry between the studied groups. Observer 1, 2 and 3 reported a significantly better shape of breast mound, NAC position, NAC symmetry, and IMF in the perforator flaps group compared to the mini LDF group (P <0.05). (P <0.05) **(Table 4).**

Table (4): Objective evaluation of aesthetic outcome among studied groups.

		Perforator flaps group N=25	Mini LDF group N=25	Test of significance
Breast symmetry index (BSI)		2.40±1.68	4.88±2.19	t=4.49 p<0.001*
Breast volume symmetry	**Observer 1**	4.28±0.84	3.36±0.86	t=3.82 p<0.001*
	Observer 2	4.32±0.98	3.28±1.10	t=1.66 p=0.104
	Observer 3	4.36±0.86	3.36±1.04	t=3.82 p<0.001*
Shape of breast mound	**Observer 1**	4.12±0.72	3.56±0.77	t=2.65 p=0.01*
	Observer 2	4.16±0.89	3.40±1.0	t=2.82 p=0.007*
	Observer 3	4.28±0.79	3.48±0.918	t=3.29 p=0.002*
NAC position	**Observer 1**	4.76±0.52	4.24±1.09	t=2.14 p=0.03*
	Observer 2	4.72±0.54	3.92±1.12	t=3.23 p=0.002*
	Observer 3	4.80±0.50	3.84±1.03	t=4.19 p<0.001*
NAC symmetry	**Observer 1**	4.0±1.04	3.20±1.0	t=2.77 P=0.008*
	Observer 2	4.16±0.99	3.12±0.93	t=3.58 P=0.001*
	Observer 3	4.16±0.89	3.12±0.93	t=4.03 p<0.001*

The subjective evaluation of patient satisfaction regarding breast symmetry, breast volume, ptosis, shape of breast mound, NAC position and symmetry showed significantly better results in the perforator flaps group compared to the mini LDF group (P <0.05) **(Table 5).**

Table (5): Subjective evaluation of patient satisfaction among studied groups.

Breast symmetry	4.36±0.86	3.36±1.04	t=3.71 p=0.001*
Breast volume	4.20±0.76	3.48±0.91	t=3.01 p=0.004*
Shape of breast mound	4.28±0.79	3.48±0.92	t=3.29 p=0.002*
NAC position	4.80±0.50	3.84±1.03	t=4.19 p<0.001*
NAC symmetry	4.16±0.89	3.12±0.93	t=4.03 p<0.001*

The operative time, the length of hospital stay and the incidence of further action required such as mastectomy, NAC amputation, pus drainage & removal of necrosis, refationing of wound gap, drain reinsertion and evacuation of hematoma or seroma were insignificantly different between the two studied groups (p=0.713) **(Table 6).**

Table (6): The operative measures among studied groups.

	Perforator flaps group N=25	Mini LDF group N=25	Test of significance
Operative time in hours	2.74±0.82	2.34±0.911	t=1.64 p=0.107
Hospital stay period (days)	2.28±1.06	2.56±1.66	t=0.710 p=0.481
Further action required;	4(16)	5(20)	$\chi 2$=0.136 p=0.713
Mastectomy **NAC amputation** **Pus drainage** **Refationing of wound gap** **evacuation of hematoma** **evacuation of seroma** **Drain reinsertion**	1(4) 1(4) 1(4) 0 1(4) 0 0	0 0 0 1(4) 1(4) 1(4) 2(8)	MC=7.02 P=0.426

The incidence of overall complications and major complications such as hematoma, major wound gap, complete flap loss and minor complications such as SSI, minor wound gap, skin ecchymosis, seroma, partial flap ischemia/loss, flap retraction and traumatic fat necrosis were insignificantly different between the two studied groups (P=0.156) **(Table 7).**

Table (7): Distribution of complications among studied groups.

	Perforator flaps group N=25	Mini LDF group N=25	Test of significance
Overall complications	11(44)	16(64)	χ^2=2.01 p=0.156
Major complications	4(16)	5(20)	χ^2=0.136 p=0.713
Minor complications	9(36)	14(56)	χ^2=2.01 p=0.156
Hematoma	3(12)	1(4)	FET=1.09 P=0.609
SSI	1(4)	2(8)	FET=0.355 P=1.0
Minor wound gap	4(16)	6(24)	χ^2=0.500 p=0.480
Major wound gap	0	4(16)	FET=4.35 P=0.110
Marked seroma	4(16)	6(24)	χ^2=0.500 p=0.480
Complete flap loss	0	0	
Partial flap loss	0	4(16)	FET=4.35 P=0.110
Flap retraction	3(12)	5(20)	χ^2=0.595 p=0.440
Traumatic fat necrosis	7(28)	13(52)	χ^2=3.0 p=0.083

The shoulder mobility early post-operatively, 3month post-operatively and 6 months postoperatively was significantly better in the perforator flaps group compared to the mini LDF group (p=0.001, 0.001 and 0.003 respectively). Regarding shoulder mobility early post-operatively,

3month post-operatively and 6 months post-operatively, poor and average shoulder mobility were significantly higher in the mini LDF group compared to the perforator flaps group, while good and excellent shoulder mobility were significantly higher in the perforator flaps group compared to the mini LDF group (P=0.01, 0.016 and 0.029 respectively) **(Table 8).**

Table (8): The effect of technique on shoulder mobility among studied groups.

Effect on shoulder mobility	Perforator flaps group N=25	Mini LDF group N=25	Test of significance
Postoperatively	2.64±0.86	1.80±0.76	t=3.65 p=0.001*
Poor **Average** **Good** **Excellent**	3(12) 6(24) 13(52) 3(12)	10(40) 10(40) 5(20) 0	MC=11.33 P=0.01*
3 Month postoperatively	2.60±0.91	1.76±0.83	t=3.40 p=0.001*
Poor **Average** **Good** **Excellent**	3(12) 8(32) 10(40) 4(16)	11(44) 10(40) 3(12) 1(4)	MC=10.36 P=0.016*
6 Month postoperatively	2.68±0.90	1.88±0.88	t=3.18 p=0.003*
Poor **Average** **Good** **Excellent**	3(12) 6(24) 12(48) 4(16)	10(40) 9(36) 5(20) 1(40)	MC=9.05 P=0.029*

DISCUSSION

Breast conservative therapy (BCT) is oncologically safe. About 70% of patients with early stage (I-II) breast cancer can successfully save their breast tissue with 5-year survival rate comparable to that of mastectomy. An undesirable cosmetic result is frequently caused by asymmetry of breast volume or nipple or skin retraction during simple BCS with primary closure **[7]**. Many clinical trials have demonstrated the benefits of BCS in the management of early breast cancer as it enhances the patient's self-esteem and lowers the psychological morbidity **[8, 9]**.

However, small and medium sized breasts pose a significant challenge for BCS because a breast is typically left twisted or disfigured after a basic tumor excision or even the adoption of a simple OPS procedure seems to be difficult in achieving the best cosmetic outcome, particularly when more than 20% of the breast volume is removed **[10-12]**.

In recent times, combining oncoplastic procedures with breast preservation yields improved aesthetic and oncologic outcomes. The oncoplastic approaches that are used more frequently are contralateral breast surgery as well as volume displacement or replacement techniques, reduction mammoplasty/masthopexy methods, local flaps and LDF or mini-LD myocutaneous flaps. **[13, 14]**.

Due to its stability and adaptability as an autologous flap, the LDF represents a significant volume-replacement option. In certain circumstances, it could be used for entire breast reconstruction following mastectomy or to repair a significant quadrantectomy defect **[16]**. The use of chest wall fasciocutaneous pedicled perforators as ICAP, TDAP and LTAP flaps for partial breast reconstruction is a newer option for breast volume replacement **[15]**.

The main objective of our study was to find a suitable method for volume replacement (partial reconstruction) in small and medium-sized breasts that would produce good cosmetic outcomes with the least complications and side effects without compromising the effectiveness of tumor resection. It aimed to evaluate the aesthetic and functional outcomes of perforator flaps in comparison to mini-LDF in partial breast reconstruction. It included 50 patients with T1-T3, N0-N1, M0 primary breast cancer, 25 cases underwent partial breast reconstruction with mini-LDF and 25 cases underwent partial breast reconstruction with pedicled perforator flaps.

Regarding the aesthetic outcomes, our study's independent observer panel evaluation (using a 5-point scale) revealed good to excellent results in 18 patients (64%), fair results in 7 patients (25%), a poor result in 2 patients (7%) and a bad result in 1 patient (4%) with an average score of 4.25/5. In contrast, the surgeon's assessment revealed good to excellent results in 24 patients (85%), fair results in 3 patients (11%), and a bad result in 1 patient (4%). The patient self-assessment revealed satisfied to extremely satisfied results, neutral findings in 6 patients (21%) and unhappy to

very dissatisfied results in 3 patients (11%), with an average score of 2.8/4. On a scale of 1 to 4, **Munhoz** had an average end result of good to very good in 30 patients (88.2%), a satisfactory result in 3 patients (8.8%), and a poor result in 1 patient (3%) **[20].**

The current study found that the Breast symmetry index (BSI) was significantly higher in the mini LDF group compared to the perforator flaps group (P <0.001). Observer 1 and 3 reported a significantly better breast volume symmetry in the perforator flaps group compared to the mini LDF group (P <0.001), while observer 2 reported insignificant difference in breast volume symmetry between the two studied groups. Additionally, the current study found that Observer 1, 2 and 3 reported a significantly better shape of breast mound, NAC position and symmetry in the perforator flaps group compared to the mini LDF group (P <0.05).

The subjective evaluation of patient satisfaction in the current study regarding breast symmetry, breast volume, ptosis, shape of breast mound, NAC position and symmetry showed significantly better results in the perforator flaps group compared to the mini LDF group (P <0.05).

Spiegel and Zafar et al., performed 124 local perforator flap procedures for primary volume replacement in conjunction with BCT, which is consistent with our findings. More than half (56.8%) of the patients who underwent VR BCT believed that their breasts were better or the same as they were prior to surgery, and none believed that their breasts were significantly worse. **[21]**

In contrast to our findings, **Adler *et al*. [22]** noted that better preservation of the posterior axillary fold with the TDAP flap may result in a somewhat better aesthetic outcome. There was no discernible difference between the two study groups' patient satisfaction in the **Abdelrahman et al**., **[19]** study (LD flap versus TDAP flap).

Regarding the postoperative complications, we saw issues in 27 cases (54%). Out of the 34 patients included, 13 individuals experienced immediate difficulties from **Munhoz [20]**, while 5 patients experienced delayed sequelae. Twelve patients (24%) from our study, three (8.8%) from **Munhoz's [20]** study, one (1) from **Ojeda's [17]** study, and three (3%) from Hamdi's 2008 study all experienced wound dehiscence. 10 instances (20%) in our study, 5 cases (14.7%) in **Munhoz's** study, 5 cases (22.7%) in **Ojeda's** study **[17]** and 4 cases in Hamdi's 2008 study showed seroma formation towards the back. **Yang [18]** did not report seroma development in cases involving perforator flaps, only in 11 cases involving LDF. Although it wasn't noted in other research, infection happened in 3 patients (6%) in our study and 1 instance (2.9%) in **Munhoz's [20]**.

In our investigation, no case of flap loss and 20 cases of fat necrosis were identified (40%). No entire loss occurred in Munhoz, however there were 3 cases of partial loss (8.8%) and 2 cases of fat necrosis (5.8%). In two ICAP cases, Yang had fat necrosis; in the other cases, there was no other type of flap loss. Hamdi saw one complete loss and two partial losses in TDAP flaps **[17, 20, 23]**.

As regard the shoulder motility assessment, the current study found that the shoulder motility in the early post-operative period, 3month post-operatively and 6 months post-operatively was significantly better in the perforator flaps group compared to the mini LDF group (p=0.001, 0.001 and 0.003 respectively), where poor and average shoulder motility were significantly higher in the mini LDF group compared to the perforator flaps group. In line with our findings, **Abdelrahman *et al*.**, **[19]** demonstrated that patients in each group had significantly decreased shoulder function deficit over time when compared at 3-, 6-, and 12-month intervals (P 0.001).

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CONCLSUION:

The use of local pedicled perforator flaps has allowed surgeons to replace large breast defects. They are good and reliable option for partial breast reconstruction, minimizing donor-site morbidity, preserving the underlying muscle, and minimizing the seroma formation rate. The cosmetic and functional results of breast reconstruction by perforator flaps are far superior to the reconstruction by the Mini-LDF. There is still some uncertainty that needs to be investigated further and we still want an algorithm for selecting the best oncoplastic approach based on the earlier parameters.

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