Cross-sectional Study

A single centre experience of local perforator flaps in oncoplastic breast surgery; a cross-sectional study

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A R T I C L E   I N F O

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A B S T R A C T

Background & objectives: Various oncoplastic techniques have emerged over the years to preserve breast cosmesis and symmetry without compromising the principles of tumor excision. One of the newer techniques for breast volume replacement to achieve symmetry and cosmesis is the use of fasciocutaneous pedicled chest wall perforator flaps or local perforator flaps (LPF). The objectives of this study were to document the details of the surgical procedure as well as patient-reported satisfaction and well-being following the procedure using a validated BREAST-Q tool among Pakistani women.

Materials & methods: This cross-sectional study was conducted from March 2019 to February 2021 enrolling 25 female patients who underwent breast conservative surgery using LPF for breast tumors at The Aga Khan University Hospital, Karachi. Data related to the procedure was collected on a pre-designed proforma. Cosmetic outcomes and patient satisfaction were evaluated using 2 scales from BREAST-Q BCT domain version 2.0. The questionnaire was self-administered by the patients during their routine follow-up in the clinic. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Mean (SD)/median (IQR) were computed for quantitative variables and frequency and percentages were calculated for qualitative variables. 2 sample t-test was applied. P-value ≤ 0.05 was considered significant.

Results: 25 patients underwent LPF with a mean age of 47 ± 13.1 years. 8 LICAP, 7 AICAP, and 10 LTAP flaps were performed. Two postoperative complications of wound site erythema were encountered. 23 women were eligible for the BREAST-Q survey. Median (IQR) postoperative satisfaction with breasts and physical well-being chest (equivalent Rasch transformed score) was 100 (41) and 76 [18] respectively. We found high satisfaction with breasts and comparable physical well-being among Pakistani women after LPF surgeries.

Conclusion: Local perforator flaps in oncoplastic breast-conserving surgery are a good option showing high satisfaction with breasts and physical well-being in Pakistani women.

1. Introduction

Breast cancer is the most common cancer worldwide among women in industrialized and developing countries and is the leading cause of cancer-related deaths in females [1,2]. In Pakistan, there has been a gradual increase in the number of breast cancer cases with a prevalence

Abbreviations: LPF, Local perforator flap; BCS, Breast conservation surgery; OPS, Oncoplastic surgery; ICAP, Intercostal artery perforator; LTAP, Lateral thoracic artery perforator; DICAP, Dorsal intercostal artery perforator; LICAP, Lateral intercostal artery perforator; AICAP, Anterior intercostal artery perforator; IMF, Inframammary fold; ERC, Ethical Review Committee; AKUH, Aga Khan University Hospital; UOQ, Upper outer quadrant; LOQ, Lower outer quadrant; LIC, Lower inner quadrant.

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The intercostal artery perforators arising from the vascular arcade between the aorta and the internal mammary vessels as described by Hamdi et al., in 2006. Dorsal intercostal artery perforator (DICAP) flap, Lateral intercostal artery perforator (LICAP) flap, Anterior intercostal artery perforator (AICAP) flap. (Permission for adaptation taken from Prof. Moustapha Hamdi. Illustration by Ms. Raazia Nadeem).

Fig. 1. The intercostal artery perforators arising from the vascular arcade between the aorta and the internal mammary vessels as described by Hamdi et al., in 2006. Dorsal intercostal artery perforator (DICAP) flap, Lateral intercostal artery perforator (LICAP) flap, Anterior intercostal artery perforator (AICAP) flap. (Permission for adaptation taken from Prof. Moustapha Hamdi. Illustration by Ms. Raazia Nadeem).

2. Methods

This cross-sectional study was conducted after seeking approval from the institutional Ethical Review Committee (ERC# 2020-3379-10190) of The Aga Khan University Hospital (AKUH) and registered with ClinicalTrials.gov (NCT05389605) [14] and it fulfills the STROCSS criteria [15] for cross-sectional studies. Eligibility criteria were to include all patients who were suitable for breast conservation and underwent a pedicled fasciocutaneous LPF for immediate partial breast reconstruction at AKUH. The first case of pedicled fasciocutaneous LPF for partial breast reconstruction was performed in May 2018. Although various types of LPF have been described and performed worldwide, we have only performed 3 types of LPF i.e., LICAP flap, AICAP flap, and LTAP flap, the results of which are being reported.

Data on flap dimensions, location of perforators, location of the tumor and its size, the volume of breast tissue excised, operative time, number and duration of drains placed, duration of hospital stay, and any morbidity was collected from patient’s medical records. The location of vessels (Fig. 2). LTAP flap for breast reconstruction has an advantage over other forms of pedicled perforator flaps; it has a secure vascular supply, has a transversely oriented scar that easily hides in the bra line, greater flap mobility and reach can be achieved with a narrow pedicle with minimal donor site morbidity and can also include LICAP for better flap perfusion [9]. The perforators are identified by a handheld Doppler (8 Hz) preoperatively (Fig. 3) [8,11]. Both ICAP and LTAP flaps are considered safe and reliable for immediate partial breast reconstructions with good cosmetic outcomes and minimal morbidities as compared to traditional myocutaneous flaps [8,9,11]. Their utility has now extended beyond breast cancers to tumors where size reduction with neoadjuvant chemotherapy is not possible, such as sarcomas and phyllodes tumors. Patient selection with good surgical technique following appropriate oncological principles is vital for the safety and good outcomes of these flaps. These techniques have recently been adopted in our institution and no studies have been published from Pakistan yet. Therefore, the objectives of this study were to evaluate the surgical techniques of pedicled fasciocutaneous LPF in partial breast reconstruction in a tertiary care hospital of Pakistan and to assess cosmetic outcomes and patient satisfaction following LPF in oncoplastic breast-conserving surgery (OPS) using the validated BREAST-Q survey [13].

Fig. 2. Illustration demonstrating perforator anatomy of the lateral chest wall. Thoracodorsal artery (TDA), Lateral thoracic artery (LTA), Lateral thoracic artery perforator (LTAP), and Lateral intercostal artery perforator (LICAP). (Illustration by Dr. Rehan Nasir Khan).
perforators was determined against the breast meridian, infra-mammary fold (IMF), and lateral breast curve as defined by the primary surgeon.

The BREAST-Q© is an established tool used to study the impact and effectiveness of breast surgery from the patient’s perspective and is the intellectual property of Drs. Andrea Pusic, Anne Klassen and Stefan Cano. The BREAST-Q© is owned by Memorial Sloan Kettering Cancer Center and The University of British Columbia (Copyright ©2012, Memorial Sloan Kettering Cancer Center and The University of British Columbia). It fulfills the Rasch and traditional psychometric criteria making it a new, cost-effective, and analytic patient-centered satisfaction measuring tool for breast surgery used worldwide [13]. Answers to the scales are converted to a number from 0 (worst) to 100 (best) using the Q-Score program [13]. License to use BREAST-Q© was acquired and 2 scales, “satisfaction with breasts – postoperative” and “physical well-being: chest – postoperative”, from version 2.0 BCT-module were selected and translated into Urdu with permission from copyright holders. These scales were used for the assessment of cosmetic outcomes and patient satisfaction after a minimum of 3 months of surgery. Written and informed consent in English or Urdu was obtained from all study subjects during their routine follow-up in clinic for the patient satisfaction survey after explaining the purpose of the study. Hard copies of the proforma were handed over to them in their preferred language (English or Urdu) after their agreement to participate. Patients selected the most appropriate answers from the list of provided options for themselves. If any patient was unable to read, her attendant assisted her, otherwise, the researcher read the questions and their options to her one by one. A separate consent for breast photographs (of selected cases) was taken and anonymized non-identifiable images were used.

For evaluation of surgical techniques, since this was a review of cases already operated, none of the cases were excluded. For cosmetic outcomes and patient satisfaction, patients who had lost to follow, expired, subsequently underwent a mastectomy, or did not consent to participate in the study were excluded.

2.1. Vascular and flap anatomy

Hamdi et al. first described the anatomy, classification, and surgical technique of ICAP flaps for partial breast reconstruction in 2004 [8]. The cutaneous perforator branches of anterior and posterior intercostal arteries form an arcade between internal mammary vessels and the aorta. From this arcade, multiple perforators arise which are classified into dorsal, lateral, and anterior perforators [5,11]. DICAP arises from the vertebral segment of the intercostal vessels. LICAP originates from the costal segment while AICAP arises from the anterior intercostal artery through the rectus abdominis or the external oblique muscles (Fig. 1) [11].

2.2. Lateral intercostal artery perforator (LICAP) flap

The LICAP is mostly located between the 4th to 6th intercostal space, approximately 0.8–3 cm from the anterior border of latissimus dorsi muscle, in the vicinity of the intersection of breast meridian with inframammary fold, at the angle between lateral breast curve and horizontal line level with IMF or just lateral to the lateral breast curve. As large as 25 × 20 cm flaps can be raised. Posteriorly, the flap should be at least 5 cm behind the posterior axillary line to include the lateral cutaneous branch of the posterior intercostal arteries. The pedicle’s length of 3–5 cm is adequate to reach a defect over the lateral or superior part of the breast. The flap can easily be folded on itself or rotated to fill a breast defect for partial breast reconstruction after a quadrantectomy Fig. 3. (A) Handheld Doppler used for localization of perforators preoperatively and (B) intraoperatively.

Fig. 4. Three most common sites of LICAP in relation to the breast meridian, IMF, and lateral breast curve [1]. point where the meridian crosses the IMF [2], in the angle between the lateral breast curve and a horizontal line level with the IMF [3], just lateral to the lateral breast curve. (Published with permission from Prof. Douglas MacMillan. Illustration by Dr. Rehan Nasir Khan).
2.3. Anterior intercostal artery perforator (AICAP) flap

The AICAP flap is based on a perforator of the anterior intercostal artery. The perforator can be located using a unidirectional doppler 1–3 cm lateral to the sternal border. The flap is then designed around the perforator, usually longitudinally or obliquely towards the shoulder. Dissection for the flap is done from lateral to medial and distal to cranial ends. The pectoralis major muscle or the rectus abdominis muscle, depending on the location of the perforator, is split and the perforator is dissected towards the anterior intercostal or internal mammary vessels. AICAPs arising from the internal mammary vessels are found closer to the sternal margin and are larger, especially, at the level of the second and third intercostal spaces (Figs. 1 & 6) [11,12].

2.4. Lateral thoracic artery perforator (LTAP) flap

The lateral thoracic artery most commonly arises from the axillary artery and less frequently from the subscapular and thoracodorsal arteries. The lateral thoracic artery initially runs under the lateral edge of the pectoralis major muscle, then lies on the serratus anterior fascia before piercing this above the level of the nipple. A vertically oriented direct cutaneous branch on the lateral chest wall arises from the lateral thoracic artery in up to 85% of individuals. Smaller perpendicular perforators arise from this cutaneous branch on which an LTAP flap is based. In patients with an absent lateral thoracic artery, an accessory lateral thoracic artery can be used which arises either from the axillary artery or thoracodorsal artery [9].

The LTAP is found in the 3rd and 4th intercostal spaces within 2 cm of the lateral breast crease. It can be difficult to fully differentiate LTAP from LICAP using the hand-held doppler, thus the final decision on the type of flap is only made on perforator exploration. The lateral breast crease is used as the initial anterior and superior aspect of the flap marking. The remaining flap is then drawn in account of perforator position, size of flap required, and available skin laxity. There does not appear to be a restriction on the size of the flap compared to the available axillary tissue. Flap height is usually restricted to 8–10 cm (although more may be achieved), and flap length may be up to 30 cm (usually a lesser length is used). Indeed, many of these flaps are small volume flaps to replace defects of less than 100 cc. The LTAP flaps conceal the donor site scar well within the brassiere straپline (Figs. 2 & 7) [9].

2.5. Data analysis

The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 23. The quantitative variables were reported as mean (SD)/median (IQR) depending on the normality of the data and the qualitative variables were reported as frequency and percentages. The qualitative variables were assessed by the independent t-test/Mann-Whitney U test as appropriate. The qualitative variables were assessed by the Chi-square/Fisher’s exact test as appropriate. A p-value of <0.05 was considered significant throughout the study.

3. Results

A total of 25 female patients underwent partial breast reconstruction with LPF in our institution from May 2018 to February 2021. Patient’s age, tumor details (including clinical and histological tumor size, volume of excised breast specimen, laterality, location of the tumor within the breast, tumor biology), and any systemic therapy received before surgery to downsize are shown in Table 1.

The mean age of women at the time of surgery was 47 ± 13.1 (range 31–74) years. None of the patients were smokers and all breast cancer patients were non-stage IV at presentation. 56% of the tumors were located in the right breast, with 44% in the upper outer quadrant (UOQ), 24% in the lower outer quadrant (LOQ), 12% at 12 O’ clock position, and 20% in the lower inner quadrant (LIQ). LPF procedures were performed for invasive ductal carcinoma in 16 women (64%), while the rest...
were performed for invasive lobular carcinoma (n = 3, 12%), malignant phyllodes tumor (n = 1, 4%), encapsulated papillary carcinoma (n = 2, 8%), metaplastic carcinoma (n = 2, 8%) and mucinous carcinoma (n = 1, 4%). The maximum clinical dimension of the tumor was 9 cm (range 2–9 cm, mean 4.08 ± 1.92) and the maximum histological dimension of the tumor, including microcalcifications, as per the histopathology report was 7.1 cm (range 1–7.1 cm, mean 3.91 ± 1.68). The median volume of the excised specimen was 104 cm³ (range 42–1080 cm³). 7 out of 25 patients received some form of neoadjuvant systemic therapy intending to downsize before surgical intervention.

Surgical details including the type of flap, flap dimensions, number and location of perforators, duration of surgery, and hospital stay are shown in Table 2.

8 patients underwent a LICAP flap for LOQ tumors in 5 cases and UOQ tumors in 3 cases, 7 AICAP flaps were done all for LIQ tumors and 10 LTAP flaps were performed for 7 tumors in UOQ and 3 tumors at 12 o’clock locations. The location of all perforators was found to be anatomically the same as described in the literature with AICAP located medial to meridian near IMF, LTAP between 8 and 10 cm below the posterior axillary fold, and LICAP along the lateral breast curve. More than 1 perforator was identified in 14 flaps. 2 LICAP flaps included strong LTAPs which were identified during dissection and utilized for flap perfusion. Up to 3 perforators were identified in one LICAP flap.

Flaps up to 15 cm in length and 8 cm in breadth were raised (range: 5–15 cm, mean ± SD: 8.6 ± 4.17, range: 2.5–8 cm, mean ± SD: 4.9 ± 2.1 respectively for flap length and breadth). All flaps were rotated around their axis to fill the breast defect rather than flipping 180°. Flap skin was used to cover breast defects in 5 (20%) cases. A single drain was placed in all the cases with insertion at the lateral chest wall in the midaxillary line draining the breast cavity as well as the flap donor site. Duration of drain placement varied between 3 and 14 days with removal if the fluid output was less than 25 cc in a day. Duration of surgery from the time of first incision (excluding any axillary surgery) was between 45 and 253 min [median (IQR): 105 (25)]. 9 patients had their LPF surgery as a daycare procedure and the duration of the entire hospital stay ranged from 5 to 52 h [median (IQR): 24 (41)]. Only 2 donor site wounds showed erythema during the first post-operative week which were managed conservatively with broad-spectrum antibiotics. None of the patients required readmissions or serum aspirations, except one patient who eventually underwent mastectomy due to involved margins.

### Table 1
Patient’s age, tumor, and therapy characteristics.

| Variables         | n (%): Frequency (n = 25) | Mean ± SD: Median (IQR) |
|-------------------|--------------------------|-------------------------|
| Age (in years)    | 47 ± 13.1                | 25 (14)                 |
| Clinical tumor dim | 4.08 ± 1.92              | 105 (25)               |
| Histological dim  | 3.91 ± 1.68              | 104 (113)              |
| Volume of excised | 104 (113)                |                         |

### Table 2
Surgical details including the type of flap, flap dimensions, number and location of perforators identified, duration of surgery, and hospital stay.

| Variables                  | Frequency (n = 25) | Percent |
|----------------------------|-------------------|---------|
| **Type of Flap**           |                   |         |
| LICAP                      | 8                 | 32.0    |
| AICAP                      | 7                 | 28.0    |
| LTAP                       | 10                | 40.0    |
| **Location of Main Perforator** |               |         |
| Medial to the meridian at IMF | 7              | 28.0    |
| 8–10 cm below the posterior axillary fold | 10 | 40.0 |
| LICAP + LTAP               | 2                 | 8.0     |
| Lateral breast curve       | 6                 | 24.0    |
| **Number of perforators**  |                   |         |
| Identified                 | 11                | 44.0    |
| 2                          | 13                | 52.0    |
| 3                          | 1                 | 4.0     |

**Variables with Dimensions**

| Variables                  | Frequency (n = 25) | Percent |
|----------------------------|-------------------|---------|
| Flap Length (in cm)        | 8.6 ± 4.17        |         |
| Flap Breadth (in cm)       | 4.9 ± 2.1         |         |
| Duration of Surgery (in minutes) | 105 (25) |         |
| Duration of Hospital Stay (in hours) | 24 (41) |         |

All values are presented as frequency percentages, mean ± SD, or median (IQR).
after the AICAP flap for malignant phyllodes in LIQ.

The number of perforators identified and utilized along with flap-type is demonstrated separately in Table 3.

One patient underwent mastectomy for a malignant phyllodes tumor with involved margins while the other patient expired after 22 months of surgery due to brain metastasis. So, 23 out of 25 patients were eligible and responded to the BREAST-Q® survey. The median Q-scores of the BREAST-Q® BCT domains were for “Satisfaction with breast – Postoperative” 100 (IQR 41) and “Physical Well-being chest – Postoperative” 76 (IQR 18) - Table 4.

In the study-specific questionnaire regarding postoperative satisfaction with breasts, 95.6% (n = 22) of the women were somewhat satisfied or very satisfied with their appearance in the mirror when clothed and 82.6% (n = 19) when unclothed. 91.3% (n = 21) were somewhat satisfied or very satisfied with the shape of the operated breast in a bra and felt normal in their clothes. 86.9% (n = 20) of the women showed satisfaction with each of the remaining items of how their operated breast sat or hung, with the smooth shape of the operated breast, were able to wear fitted clothes with satisfaction, with the contour of the operated breast, normal appearance of breast and symmetry in terms of size and appearance - Table 5.

In the study-specific questionnaire regarding postoperative physical well-being chest, 56.5% (n = 13) of the women had some difficulty in lifting or moving the ipsilateral arm, 21.7% (n = 5) women had some difficulty in sleeping due to discomfort in the operated breast, 8.7% (n = 2) felt tightness in the operated breast all of the time, 34.8% (n = 8) felt pulling in the operated breast some or all of the time, 30.4% (n = 7) reported of tenderness in the operated breast, 39.1% (n = 9) of the women had sharp pains in the breast area some or all of the time, 73.9% (n = 17) had aching feeling in the operated breast, 73.9% (n = 17) had difficulty laying on the side of her lumpectomy breast while only 4.3% (n = 1) woman reported of lymphedema in ipsilateral arm some of the time - Table 6.

We observed that out of 23 participants, 6 (26%) had a postoperative physical well-being chest score of <76 while 17 (74%) had scores of >76. Determinants for patient satisfaction in the BREAST-Q® BCT domain “Physical Well-being chest” below median value (Q-score < 76) in the univariate analysis were found to be mean flap length greater than 10.16 cm, mean flap breath greater than 5.03 cm and volume of excised breast specimen greater than 120.25 cm³, however, none of these values were statistically significant. Age and type of flap also did not have any effect on poor Q-scores – Table 7.

One patient had the worst Q-scores for satisfaction with breast and physical well-being chest (40 and 21 respectively). On reviewing her details, she was 34 years old and had undergone an LTAP flap for metaplastic carcinoma with poor response to neoadjuvant chemotherapy. Her maximum tumor dimension was 6.5 cm, with excised breast specimen volume of 1080 cm³ (greatest volume in our sample), flap length and breadth of 15 cm and 8 cm, respectively (largest flap dimensions in our sample). Post-operative pictures of different local perforator flaps are shown in figure-8.

4. Discussion

The previous two decades have seen a remarkable evolution in terms of various breast conservation techniques, thus improving cosmesis [16]. Local perforator flaps, albeit an older concept, has been reintroduced and standardized for partial breast reconstructions by Hamdi et al., and later adapted with various modifications worldwide [8,11,17,18]. Harvesting the perforator flaps has reduced the use of traditional myocutaneous flaps in partial breast reconstructions, thereby, reducing the morbidities associated with muscle dissection, such as seroma formation, persistent pain, and shoulder strength deterioration, as well as providing a greater avenue for flap design [11,19,20]. The use of LPF in our institution began in 2018 and so far, 25 cases have been performed with only 2 minor complications of wound site erythema.

LICAP flaps are used for lateral breast defects because of their location and the short length of pedicle [11]. AICAP flaps are most suitable for LIQ/medial tumors [12,21], whereas the LTAP flaps are mostly used for upper and lower lateral defects as well as for the defects in the upper domains.

| Domains                  | Median | IQR | Range     | n  | %    |
|--------------------------|--------|-----|-----------|----|------|
| Satisfaction with breast | Postoperative | 100 | 40–100    | 23 | 82.6%|
| Physical Well-being Chest| Postoperative | 76  | 21–100    | 18 | 95.6%|

Table 4
Q-scores for BREAST-Q® BCT domains.

| Domains                  | Very Dissatisfied n (%) | Somewhat Dissatisfied n (%) | Somewhat Satisfied n (%) | Very Satisfied n (%) |
|--------------------------|-------------------------|----------------------------|--------------------------|----------------------|
| How you look in the mirror clothed? | 1 (4.3) | 7 (30.4) | 15 (65.2) |
| The shape of your lumpectomy breast when you are wearing a bra? | 2 (8.7) | 7 (30.4) | 14 (60.9) |
| How normal you feel in your clothes? | 2 (8.7) | 6 (26.1) | 15 (60.5) |
| Being able to wear clothing that is more fitted? | 3 (13) | 5 (21.7) | 15 (60.2) |
| How your lumpectomy breast sits/ hangs? | 2 (8.7) | 7 (30.4) | 14 (60.9) |
| How smoothly shaped your lumpectomy breast looks? | 1 (4.3) | 2 (8.7) | 7 (30.4) | 13 (56.5) |
| The contour (outline) of your lumpectomy breast? | 3 (13) | 6 (26.1) | 14 (60.9) |
| How equal in size your breasts are to each other? | 3 (13) | 7 (30.4) | 13 (56.5) |
| How normal your lumpectomy breast looks? | 1 (4.3) | 2 (8.7) | 8 (34.8) | 12 (52.2) |
| How much your breasts look the same? | 3 (13) | 7 (30.4) | 13 (56.5) |
| How you look in the mirror unclothed? | 4 (17.4) | 5 (21.7) | 14 (60.9) |

n = 23, missing = 2.

Table 5
Descriptive statistics of answers to the study-specific questionnaire “Satisfaction with breasts – Postoperative” domain.

| Type of Flap | Number of Perforators Identified |
|-------------|---------------------------------|
| LICAP       | 1                               |
| AICAP       | 5                               |
| LTAP        | 5                               |
| Total       | 11                              |

Table 3
Number of perforators identified with different flaps.
7 cm of flap breadth [21]. Our AICAP flaps measured 8.5 cm and 5.5 cm in maximum length and breadth respectively. Lopez et al. looked into the characteristics of AICAP flaps in lateral chest wall tissue for LTAP flaps, McCulley states a maximum LICAP flap length and breadth were 10 cm and 5 cm respectively. Due to the laxity of the breasts fully covered at all times with loose clothing thereby not exposing the contour and scars and increased practice of offering mastectomy rather than conservation by general surgeons in our part of the world, hence making women more satisfied when their breasts are conserved.

Table 6

| None of the time n (%) | Some of the time n (%) | All of the time n (%) |
|-----------------------|-----------------------|----------------------|
| Difficulty lifting or moving your arm? | 10 (43.5) | 13 (56.5) |
| Difficulty sleeping because of discomfort in your breast area? | 18 (78.3) | 5 (21.7) |
| Pulling in your breast area? | 21 (91.3) | 2 (8.7) |
| Tenderness in your breast area? | 15 (65.2) | 6 (26.1) |
| Sharp pains in your breast area? | 16 (69.6) | 6 (26.1) |
| Aching feeling in your breast area? | 14 (60.9) | 8 (34.8) |
| Difficulty laying on the side of your lumpectomy breast? | 6 (26.1) | 16 (69.6) |
| Swelling of the arm (lymphedema) on the side(s) that you had your breast surgery? | 2 (8.7) | 15 (65.2) |

n = 23, missing = 2.

Table 7

| Type of Flap | LICAP | LTAP |
|--------------|-------|------|
| Flap Length (in cm) mean ± SD | 10.16 ± 3.65 | 10.16 ± 3.65 |
| Flap Breadth (in cm) mean ± SD | 5.03 ± 0.66 | 5.03 ± 0.66 |
| Age | 49.5 ± 17.45 | 49.5 ± 17.45 |
| Volume of excised specimen (in cm³) median (IQR) | 120.25 (359) | 120.25 (359) |

Table 7 Determinants for patient satisfaction in the BREAST-Q® BCT domain “Physical Well-being chest” below median value (Q-score < 76) by univariate analysis.

Though not statistically significant, a 34-year-old patient in our study with the worst Q-scores of 40 and 21 for satisfaction with breasts and physical well-being – chest respectively, had undergone a 15 × 8 cm LTAP flap with specimen volume of 1080 cm³ for a lactation associated metaplastic carcinoma which was progressing on neoadjuvant chemotherapy. These were the greatest dimensions of flap and specimen volume in our series for an unresponsive tumor. These figures should be kept in mind when planning flaps of larger size with good patient counseling related to the postoperative quality of life, especially in younger women.

To the best of our knowledge, this is the first study of its kind being reported from our part of the world, with no previous publication on LPF from Pakistan, and the only study in which patient satisfaction and physical well-being were assessed after LPF for partial breast reconstruction using BREAST-Q. The study findings are consistent with other studies showing that BREAST-Q is a good tool for assessment of patient satisfaction and well-being after different surgical procedures in breast cancer cases [28–32].

An important limitation of the study is the short follow-up time and small sample size as the surgical technique has recently been adopted in our institution. Moreover, there was a lack of comparison between preoperative assessment of breast satisfaction and physical well-being and postoperative assessment as only the postoperative patients were contacted for BREAST-Q survey. Radiation effects are also not taken into account separately.

5. Conclusion

By using the BREAST-Q validated survey tool, we have observed that our patients are very satisfied and have good physical well-being after local perforator flaps in oncoplastic breast-conserving surgery. Our early experience with this innovative procedure has been satisfactory with minimal perioperative morbidities making it suitable for partial breast reconstructions, particularly in multifocal tumors and in large tumors not responding to systemic treatment. Due to the relatively short follow-up long-term outcomes such as post-radiation appearance and appropriate breast cancer surveillance are yet to be determined.

Provenance and peer review

Not commissioned, externally peer-reviewed.
Fig. 8. Post-operative pictures of various local perforator flaps. (A, B) Anterior and lateral views of LICAP flap, (C, D) Anterior views of AICAP flap and its scar near the infra-mammary fold, (E, F) pre-operative markings and (F) immediate post-operative view of LTAP flap, (H, I) LTAP flap performed for a T4 lesion, (J, K) Anterior and lateral views of predominant LICAP flap also supplied by concomitant LTAP.
Ethical approval was given, by whom and the relevant Judgement’s reference number

Ethical approval was given by the institutional Ethical Review Committee (ERC# 2020-3379-10190) of The Aga Khan University Hospital (AKUH).

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Author contribution

Dr. Sana Zeeshan (corresponding author): Conceptualization, Methodology, Validation, Investigation, Resources, Data curation, Writing – Original Draft, Visualization, Project administration.

Dr. Lubna Vohra – Data curation, Writing – Review & Editing, Supervision, Resources.

Dr. Uzma Shamsi – Validation, Formal analysis, Investigation, Writing – Review & Editing.

Dr. Nida Zahid - Validation, Formal analysis, Investigation, Writing – Review & Editing.

Dr. Danish Ali - Writing – Review & Editing, Resources, Visualization.

Dr. Nargis Khan - Software, Validation, Investigation, Data curation, Project administration.

Dr. Cristina Garusi – Supervision, Writing – Review & Editing.

Conflicts of interest

Declarations of interest: none.

Research registration Unique Identifying number (UIN)

1 Name of the registry: ClinicalTrials.gov.

2 Unique Identifying number or registration ID: NCT05389605.

3 Hyperlink to your specific registration (must be publicly accessible and will be checked): https://clinicaltrials.gov/ct2/show/NC T05389605.

Guarantor

I, Dr. Sana Zeeshan, take full responsibility of the work. I had access to patient’s data throughout the study period and controlled the decision to publish.

Dr. Sana Zeeshan.
