



One-stage vs. two-stage approach for partial breast reconstruction with lateral chest wall perforator flaps



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ARTICLE INFO

Keywords:

LICAP flap
Breast cancer
Breast conservation surgery
Partial breast reconstruction
2-stage approach
Two-stage approach

ABSTRACT

Background: The lateral chest wall perforator flaps offer an excellent option for partial breast reconstruction (PBR) in women undergoing breast conservation surgery (BCS) for laterally placed tumours in small to moderate non-ptotic breasts.

Methods: We have performed 40 PBR, including LICAP (Lateral intercostal artery perforator) and LTAP (Lateral thoracic artery perforator) flaps over a three-year period. 29 were performed as one-stage whilst 11 were performed as two-stage approach. The latter approach was undertaken for patients with high tumour to breast ratio in an attempt to extend the indication for breast conservation.

Results: Out of 40 patients, 27 were symptomatic and 13 were screen-detected with a mean age of 49 years. The overall median tumour size on pre-op imaging was 35 mm and was 47 mm for the ones selected for two-stage approach. 11 patients underwent neo-adjuvant chemotherapy and additional 14 had adjuvant chemotherapy. All but one patient had adjuvant radiotherapy to the breast. 4 patients (10%) required further surgery to the breast due to incomplete cancer excision; 2 underwent successful re-excision and 2 (5%) were recommended completion mastectomy. A high satisfaction scores were reported both by the patients and surgical team with regards to the aesthetic outcome. There were no significant differences observed in complications, aesthetic outcome or patient satisfaction levels with the two approaches. Patients undergoing two-stage approach had an extra periareolar scar (in majority of the cases), which faded well with radiotherapy.

Conclusion: We recommend considering two-stage approach in women with high tumour to breast size ratio to ensure successful BCS prior to PBR.

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1. Introduction

The history of use of lateral chest wall flaps for breast reconstruction dates back to 1986. Holmstrom and Lossing et al. described Lateral thoracodorsal flap, a random pattern local fascio-cutaneous flap used to assist implant reconstruction after mastectomy for breast cancer [8]. The concept of Oncoplastic Breast Surgery has led to emergence of techniques to facilitate partial breast reconstruction; lateral chest wall perforator flaps being one of them. These flaps extend the indications for breast conservation surgery and are associated with minimal procedure related morbidity resulting in quick recovery and excellent aesthetic outcomes.

The lateral chest wall flaps are pedicled perforator flaps that could be based on either Lateral intercostal artery perforators (LICAP) or branch of Lateral thoracic artery (LTAP) [11]. The other vessels that could be used are anteromedial perforators of

intercostal vessels and thoracodorsal artery perforator flap (TDAP) [6]. These flaps have been used for partial breast reconstruction predominantly for lateral defects after cancer resection [5] and for autologous breast augmentation after massive weight loss [10,1,3].

The flap is designed on the lateral chest wall by pinching redundant roll of fat with variable extension around the back depending on the tissue needed to fill the defect. The flap is oriented parallel to the skin tension lines with the tip curving up posteriorly parallel to the underlying ribs and following the angiosome description [12]. The perforators are preferably marked pre-operatively with a hand-held Doppler with the patient lying down simulating the intra-operative position and the flap design can be moved to ensure the inclusion of more than one perforators.

In this article, we are sharing our experience with the lateral thoracic wall perforator flaps for partial breast reconstruction (PBR) to facilitate breast conservation surgery in women with breast cancer. This is a single-center, single surgeon series with prospective data collection. Three-quarter cases were done using one-stage approach and a quarter with two-stage approach.

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2. Methods

This study was performed at Oxford University Hospital, UK. This is a prospective single surgeon series of partial breast reconstruction with lateral chest wall perforator flaps over a three-year period between 2011–2014.

The data was collected prospectively and updated regularly by collating from histological records, radiological reports for any imaging performed, operative notes for weight of the specimen and type of flap and letters from the oncologists with regards to the treatment received after surgery. The same surgical team followed up the patients regularly in order to keep an eye any complications or significant events.

The primary outcomes studied were a) need for further breast surgery due to incomplete cancer excision b) rate of complications after PBR and c) aesthetic outcomes as assessed by the surgical team and the patients. The study was carried out as a part of routine clinical care with approval to audit the outcomes. The hospital ethical and clinical guidelines were adhered to and patients' permission was obtained to use their anonymised photographs for educational and publication purposes.

The questionnaire used to assess the patient reported outcomes was Body Image Scale (Appendix A) that has been validated for use in women undergoing surgery for breast cancer [9]. The scores were added for all the questions, total could range from 10–40, 10 being the best and 40, worst. The anonymised questionnaires were sent out by a member of the surgical team between 4–6 months after the completion of radiotherapy. As this questionnaire is a validated tool, it did not require local ethics approval. Two surgeons (one trainee and one senior surgeon) reviewed pre-operative, and 12-months post-op photographs (2 views, frontal and oblique) for each patient, the aesthetic outcomes were marked subjectively using Harris scale (poor, fair, good or excellent).

The data were statistically described in terms of mean median and range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables (tumour size) between the study groups was done using 2-tailed Student *t* test.

3. Results

40 cases were carried out from year 2011–2014 with a median follow-up of 27 months (12–49 months). The mean age was 49 years (range from 42–69 years) and 4 patients were active smokers at presentation. All patients were diagnosed pre-operatively with biopsy proven DCIS or invasive breast cancer. The patients were offered the choice of breast conservation surgery or mastectomy and were counseled with regards to the pros and cons of the two options. All these patients had tumour to breast volume ratio of greater than 20% so simple lumpectomy would have resulted in significant breast distortion after radiotherapy. Majority of the patients were not candidates for mammoplasty because of either small size of the breasts or non-ptotic breasts, however, small number of patients preferred PBR to mammoplasty in order to keep their breast size and prevent scars on the contralateral breast. Table 1 gives the distribution of the breast-cup size prior to

Table 1
Details of the median tumour size in relation to the bra cup.

| Breast size | Number of patients (%) | Median tumour size on imaging (pre-op) |
|-------------|------------------------|--|
| A | 3 (7.5%) | 21 |
| B | 7 (17.5%) | 41 |
| C | 16 (40%) | 35 |
| D | 14 (35%) | 43 |

Table 2

Distribution of the clinic-pathological and treatment parameters in our series.

| Tumour characteristics and treatment | Number of patients (%) (total:40) |
|---|--------------------------------------|
| Symptomatic presentation | 27 (67%) |
| Screen detected cancers | 13 (33%) |
| Invasive Cancers | 35 (87%) |
| DCIS only | 5 (13%) |
| Tumour size (on histology) excluding NAC: | 29 (72%) |
| 1–2 cm | 6 |
| 2–5 cm | 15 |
| > 5 cm | 3 |
| Multifocal | 5 |
| Post Neo-adjuvant chemotherapy | 11 (28%) |
| pCR | 3 |
| T1 | 1 |
| T2 | 4 |
| T3 | 2 |
| *Tumour grade (invasive cancer only) | |
| Gr 1 | 5 (14%) |
| Gr 2 | 16 (46%) |
| Gr 3 | 14 (40%) |
| *Node positive at diagnosis | 7 (20%) |
| *Axillary Nodes positive (total) | 21 (60%) |
| *Triple negative cancers | 6 (17%) |
| *ER positive cancers | 27 (77%) |
| *Her-2 positive cancers | 6 (17%) |
| *Neo-adjuvant chemotherapy (NAC) | 11 (31%) |
| *Chemotherapy (adjuvant and NAC) | 25 (71%) |
| Adjuvant radiotherapy | 39 (1 declined) |
| *Adjuvant endocrine therapy | 26 (74%) |

NAC: Neoadjuvant chemotherapy.

pCR: pathological complete response.

* This information applies to invasive cancers (35 in total).

surgery and corresponding tumour size suggested on pre-operative imaging. All tumours were located in the outer half of the breast.

All patients were assessed by 2-view digital mammogram and ultrasound of the affected breast and axilla. MRI was limited to fewer (19) patients, the indications being tumour size discrepancy, invasive lobular cancer and patients undergoing neoadjuvant chemotherapy. 21 patients had positive lymph nodes; 7 at presentation (proven by ultrasound guided nodal biopsy) and rest after sentinel lymph node biopsy. 11 patients underwent neoadjuvant chemotherapy including all 7 patients with positive nodes at presentation and others were either triple negative or with a large primary cancer.

3.1. Patient characteristics (Table 2)

27 patients presented with symptoms and 13 were screen-detected cancers. 35 had invasive cancer and 5 had DCIS only. The overall median tumour size judged on pre-op imaging was 35 mm and mean tumour size was 33 mm (ranging from 15–75 mm). The procedure was performed as one-stage procedure (Fig. 1) in 29 patients and as 2-stage procedure (Fig. 2) for 11 patients. The latter approach was adopted in women with high tumour to breast ratio, thus bordering on to recommendation for mastectomy. These women preferred breast conservation surgery, therefore wide local excision was performed first and the cavity was maintained patent with normal saline in order to ensure clear margins prior to committing to partial breast reconstruction. The pathology was fast-tracked and once margin clearance was ensured, patients was brought back for surgery within 2–4 weeks of initial surgery for

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