Oncoplastic breast surgery using latissimus dorsi myocutaneous flap in patients with clinical T2, T3 breast cancers

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Abstract

Purpose: The purpose of this study is to use latissimus dorsi myocutaneous flap surgery for breast reconstruction after breast cancer surgery in patients with clinical T2, T3 breast cancers.

Methods: We performed 48 oncoplastic breast reconstructions in patients with clinical T2, T3 breast cancers from 2010 to 2011, and evaluated the cosmetic outcomes and complications.

Results: The cosmetic outcomes were excellent in all patients. The complications included one case of flap necrosis, which was successfully treated with revisions.

Conclusion: Oncoplastic breast reconstruction using latissimus dorsi myocutaneous flap is a viable option for patients with clinical T2, T3 breast cancers.
고수희, 배영태

등을 평가하였다.
결과: 병기 IIA, IIB, IIIA, IIIB의 환자 수는 각각 12예 (25.0 %), 16예 (33.3 %), 11예 (22.9 %), 9예 (18.8 %)이었다. 합병증은 수술 도중 또는 이후에 볼 수 없었으며, 공여부

seroma는 10.4 %에서 관찰되었다. 평균 26.2 개월간의 추적조사기간에 국소 영역재발과

든 장기 재발은 관찰되지 않았으며 미용적 평가는 40 예는 우수(excellent)로 평가되었으며

8 예는 양측 유방이 비대칭을 보여 좋음(good)으로 평가되었다. 

결론: 부분유방절제술 후 넓은 결손을 광배근피판술로써 즉시 재건하는 숏식은 낮은 합병

증과 미용적으로 우수 혹은 좋은 결과를 보였다. 유방 절제술 후 유방 보존 수술의 적응

증을 확장하는 데 유용 할 수 있을 것이다.

Key words: Breast neoplasm, oncoplastic surgery, immediate reconstruction

Introduction

Oncoplastic procedures combine oncologic surgery with reconstructive surgery to achieve wide tumour-free margins while optimising the cosmetic outcome. Radiation therapy following breast conserving surgery (BCS) has enhanced the volume loss and severe distortion (Fig. 1). By replacing the resected volume with autogenous tissue, deformity is prevented and the shape and size of the reconstructed breast approaches normal. Among technical options, the latissimus dorsi myocutaneous (LD) flap remains a useful procedure because of its outstanding aesthetic results and well-known anatomy. Neither size nor multifocality is an absolute contraindication for BCS on the condition that margins are fully safe. However, care should be taken to avoid extended practice of BCS in the case of tumors \( >4 \text{cm} \).

The aim of the present study was to evaluate demographic characteristics and cosmetic outcome after immediate conservative breast surgery deformity reconstructions using the latissimus dorsi myocutaneous flap in patients with clinical T2, T3 breast cancers.

Patients and methods

1. Patients

This is a retrospective study. The authors reviewed the medical records of 48 patients with clinical T2, T3 breast cancers according to the American Joint Committee on Cancer (AJCC) TNM staging system who underwent partial mastectomy and immediate reconstruction with LD flap (one-stage
procedure) from July 2010 to November 2011. The main indications for LD flap reconstruction were severe breast skin and glandular defects in patients without enough breast tissue to undergo the reconstruction with mammoplasty techniques. The authors evaluated postoperative photographs for symmetry and shape of the breast, projection, and overall aesthetic results, and the entire cosmetic effect by bad, fair, good and excellent. Lastly, donor site morbidity, including seroma, contour deformity, and scarring were included in the survey.

2. Methods

Surgical procedure includes preparation for LD flap, flap harvesting, position change for partial mastectomy, preparation for partial mastectomy, SNB with or without axillary dissection, flap mobilization and reconstruction.

1) Surgical procedure for LD flap (Fig. 2A-E).

The patient was placed in a lateral decubitus position with the upper arm located on an armrest in an abducted position. Based on the tumour location and the necessary pedicle length, the place of the donor site on the latissimus dorsi was chosen. An island of muscle covered with subcutaneous tissue was formed according to the volume required to fill the breast defect. The donor site incision was as for a classic LD flap (or oblique fusiform skin paddle). After identifying the anterior border of the latissimus dorsi, its superficial face is detached from the skin. Then, its deep face is detached from the thoracic wall, and the pedicle was located. The muscle was resected, taking the entire muscle attached to its main pedicle. The tendon was dissected to its origin and the muscle was rotated and placed in front. The motor nerve was not severed. The obtained LD flap was put in a subcutaneous pocket in the posterior axillary fold. In quilting flaps, skin flap fixation using using monosyn 3–0 sutures 3–4 cm apart started at the base of the upper flap (below the folded LD muscle) as high as possible in relation to the posterior axillary fold and at the inferior limit of the LD resection in relation to the iliac crest, advancing in both directions to within a few cm of the back wound. Two drains were inserted and the skin flaps were closed over vacuum. Drainage tubes were usually discontinued after 7 to 10 days or when the output was less than 25 cc within a 24-hour period.

2) Surgical procedure for partial mastectomy (Fig. 2E)

After the patient was placed in the supine position and preparation was
made again, partial mastectomy was performed in all patients using previously described, standard surgical techniques. The tumor, with a surgical margin of approximately 1 cm to 2 cm of normal breast tissue, was resected. The tumour-bearing quadrant of the breast was separated from the deep and superficial structures. After the cavity wall was inked in situ with methylene blue, then circumferential biopsies were taken from breast normal tissue of the cavity wall in a clockwise direction.

3) Surgical procedure for breast reconstruction (Fig. 2 F)

For transposition of the LD flap a tunnel was made between the axilla and the breast defect. The tissue island was transferred to the tumour excision site. In this position, the division of the humeral attachment of the muscle was performed only when necessary to obtain adequate excursion. The flap was then modelled by folding and suturing the distal margins to produce a shape which matches the resection defect. A number of interrupted absorbable sutures were placed between the margins of the resection defect and the flap. These were tied and the position and the shape of the flap was checked. This step may need to be repeated until the position of the flap matches that of the resection specimen. Finally the tendinous end of the flap was sutured to fascia of pectoral muscle to prevent retraction of the flap and traction on the pedicle. The wound was closed over vacuum drains.

Results

Median age was 42.2 years (32–74). Median body mass index was 23.1 (18.0–29.3). Median operative time was 212 min (180–259). The median size of the tumor determined clinically was 3.3 cm (2.2–5.6). Median pathologic tumor size was 3.6 cm (2.2–5.7). Median weight of breast tissue excised from the breast containing the tumor was 152.9 g (70.6–270.9). Median operative time was 212 min (80–219). Patients stayed in the hospital for a median duration of 11 days (7–114) (Table 1). Tumor histology is shown in Table 2. There were 44 patients (91.7%) with invasive ductal carcinoma and 4 (8.3%) patients with invasive lobular carcinoma. The Classification of the tumors is shown in Table. The numbers of patients with stage IIA, IIB,IIIA, and IIIB were 12 (25.0%), 16 (33.3%), 11 (22.9%), 9(18.8%) respectively (Table 2). There was no complications were seen during or after surgery.
However, seroma was observed in 10.4 percent of patients. All patients remained free of local, regional and distant recurrence at a median follow-up of 26.2 months. Early cosmetic evaluation at a median follow-up of 26.2 months showed excellent results in all 40 patients (Fig. 3, Table 3). Eight cases with slight asymmetry were scored as good.

**Discussion**

BCS, consisting of lumpectomy followed by radiotherapy, has become the standard form of treatment for invasive breast carcinomas up to 4 cm and 5 cm and is increasingly being used for ductal carcinoma in situ (DCIS) and larger tumors. However, with BCS for large tumors, there can be difficulty in obtaining clear excision margins, and the cosmetic outcome is often poor. In this article, inclusion criteria were patients with T2, T3 and any lymph node status. Two major goals of BCS are to achieve local control of the tumor and to preserve the esthetic appearance of the breast. However, it may occasionally be difficult for the surgeon to meet both of these goals. In literatures, the percentage of incomplete margins ranged from 10% to 30%. One of the main advantages of oncoplastic surgery is the possibility of reducing the number of surgeries, for that reason, the authors support a one-stage procedure, which we consider a good choice so long as adequate margins are obtained. If the defect is too large to be filled using local tissue alone, a distant flap will be required. Among technical options, the authors generally avoid using transverse rectus abdominis muscle flaps to repair partial mastectomy defects. Instead, they usually choose the LD flap for this purpose. Because the latissimus dorsi myocutaneous flap is relatively easy to raise and is extremely reliable. In this article, the entire operation was performed in 4 hours, allowing two patients to be treated on a single day. In our experience, the most common use of the LD flap for breast-conservation surgery reconstruction has been in patients who underwent extensive breast tissue resection because of large tumors or compromised breast margins. With a median eight of 152.9 g for our excision specimens, our study shows that it is feasible and can be done with LD flap for post BCS reconstruction. Regarding complication rates, seroma was observed in 10.4 percent of patients. Some authors have advocated the use of scalpel dissection to reduce dorsal seroma formation. This is partially true because of the
thermal injury of the wide fascial wound layers or the subcutaneous fat tissue. Others have mentioned the use of quilting stitches with absorbable sutures \(^{19-21}\) and a diet low in ong-chain triglycerides for obese patients.\(^{22}\) The authors used electrocautery dissection and quilting sutures in harvesting LD flap. All patients remained free of local, regional and distant recurrence at a median follow-up of 26.2 months. Regrading cosmetic outcomes, unfavourable cosmetic results following BCS are seen in 20–30% of patients.\(^{15,23,24}\) Breast conservation therapy can be complicated by significant contour deformities,\(^{25}\) which can result in poor aesthetic outcomes and difficulties with activities of daily living. Unfortunately, patients who desire reconstruction of contour deformities after partial mastectomy usually present after radiation therapy, which may increase the risk of complications and often necessitates the use of autologous tissue for reconstruction.\(^{26}\) These patients often have hopes of secondary correction; unfortunately, the results are often disappointing.\(^{27}\) In present article, cosmetic outcomes was excellent or good with oncoplastic breast surgery using LD Flap.

**Conclusion**

Immediate repair of large defects after partial mastectomy with a LD flap results in a lower risk of complications and better aesthetic outcomes and might be useful in extending the BCS and provides an alternative to conventional breast conserving surgery and mastectomy in patients with large-sized breast cancers.

**References**

17. Raja MAK, Straker VF, Rainsbury


Table 1. Clinicopathologic characteristics in this study

<table>
<thead>
<tr>
<th>Variables</th>
<th>No of cases (%)</th>
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<tr>
<td>Median age (yrs, range)</td>
<td>42.2 (32-74)</td>
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<tr>
<td>Median body mass index (kg/m², range)</td>
<td>23.1 (18.0-29.3)</td>
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<tr>
<td>Median clinical tumor size (cm, range)</td>
<td>3.3 (2.2-5.6)</td>
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<tr>
<td>Median pathologic tumor size (cm, range)</td>
<td>3.6 (2.2-5.7)</td>
</tr>
<tr>
<td>Median excised breast volume (mm³, range)</td>
<td>152.9 (70.6-270.9)</td>
</tr>
<tr>
<td>Median operative time (min, range)</td>
<td>212 (180-259)</td>
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<tr>
<td>Median hospital stay (day, range)</td>
<td>11 (7-114)</td>
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<tr>
<td>Median follow-up period (mo, range)</td>
<td>26.2 (15-42)</td>
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Table 2. Histopathologic characteristics in this study

<table>
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<tr>
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<tbody>
<tr>
<td>Histology</td>
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<tr>
<td>Invasive ductal carcinoma</td>
<td>44 (91.7%)</td>
</tr>
<tr>
<td>Invasive lobular carcinoma</td>
<td>4 (8.3%)</td>
</tr>
<tr>
<td>Tumor stage</td>
<td></td>
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<tr>
<td>Stage IIA</td>
<td>12 (25.0)</td>
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<tr>
<td>Stage IIB</td>
<td>16 (33.3)</td>
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<tr>
<td>Stage IIIA</td>
<td>11 (22.9)</td>
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<tr>
<td>Stage IIIB</td>
<td>9 (18.8)</td>
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Table 3. Cosmetic outcome

<table>
<thead>
<tr>
<th>Cosmetic outcome</th>
<th>No of cases (%)</th>
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<tbody>
<tr>
<td>Excellent</td>
<td>40 (83.3)</td>
</tr>
<tr>
<td>Good</td>
<td>8 (16.7)</td>
</tr>
<tr>
<td>Fair</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
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Fig. 1. A photograph shows unfavourable cosmetic result following BCS without oncoplastic breast surgery. Radiation therapy after surgery has enhanced the volume loss and severe distortion.
Fig. 2. Preoperative marking for elliptical transverse skin paddle and inferior tip of the scapula are marked for orientation (A). The transverse skin paddle is marked for incision along the bra line to conceal the final scar (B). The flap pedicle is being harvested (C). And then the obtained LD flap is going to be placed in the posterior axillary fold, LD flap is mobilized from axillary incision and then attached only by its neurovascular bundle with division of its humeral head (D). Transferred LD flap through a subcutaneous tunnel and the skin island of the LD flap is deepithelialised (E). Postoperative view of complete closure of axillary and breast circumareolar incisions (F).
Fig. 3. Intra operative views show partial mastectomy defect by transillumination which are marked with dot circles (A,C,E), and postoperative views show excellent outcomes (B,D,F).