

Oncoplastic technique in breast conservative surgery for locally advanced breast cancer

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Abstract: Locally advanced breast cancer (LABC) should be taken into decision making when planning breast conservative surgery, but this procedure should be done on the principle of oncologic safety in order to achieve negative surgical margin and maintain aesthetic result. This procedure should be offered as the choice of treatment in selected patients.

Keywords: Breast conservative surgery; locally advanced breast cancer (LABC); neoadjuvant chemotherapy



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Introduction

Breast-conservation therapy (BCT) is a valuable component of breast cancer surgery in patients who need to preserve the breast and the data show that it has an equivalent survival benefit compared with the conventional mastectomy (1). The lumpectomy and oncoplastic resection are different conceptually. Lumpectomy usually requires a margin of a few millimeters whereas oncoplastic resection usually includes a margin of a few centimeters. Resection of large tumors and locally advanced breast cancer (LABC) can be challenging, in view of the breast conservation surgery (BCS). For making the BCS effective and oncologically safe, there is a need to completely remove all foci of the cancers with an adequate surgical margin width giving enough histological normal tissue and maintaining the cosmetic result of the breast and there are no deformity sequelae.

Inclusion criteria for BCT

The BCT is generally reserved for patients with T1 and T2

tumor. However, the ratio between size of the tumor and the breast is important because the surgeon will plan to remove the tumor with adequate margin and good cosmetic result.

In patients with LABC, giving of neoadjuvant chemotherapy can down stage the tumor for BCS but the surgeon must realize that there are three types of patterns of response after receiving chemotherapy. The first pattern is pathologic complete response in that the gross tumor has totally disappeared. The second pattern is concentric shrinkage in that the tumor has shrunk to a small volume and there is no residual nodule in the peripheral area. The third pattern is mosaic pattern (multifocal residual) in that the tumor has shrunk to small volume like the concentric pattern but it has still many small nodules in the edge of the tumor.

In this condition, BCS is not proper to perform due to high incidence of local recurrence although the tumors will respond well as shown in *Figure 1*. The total mastectomy is the good procedure for the third pattern of response. When the mastectomy has been done in the mosaic pattern, the margin of resection is crucial because the surgeon can archive the negative margin in two conditions. The first

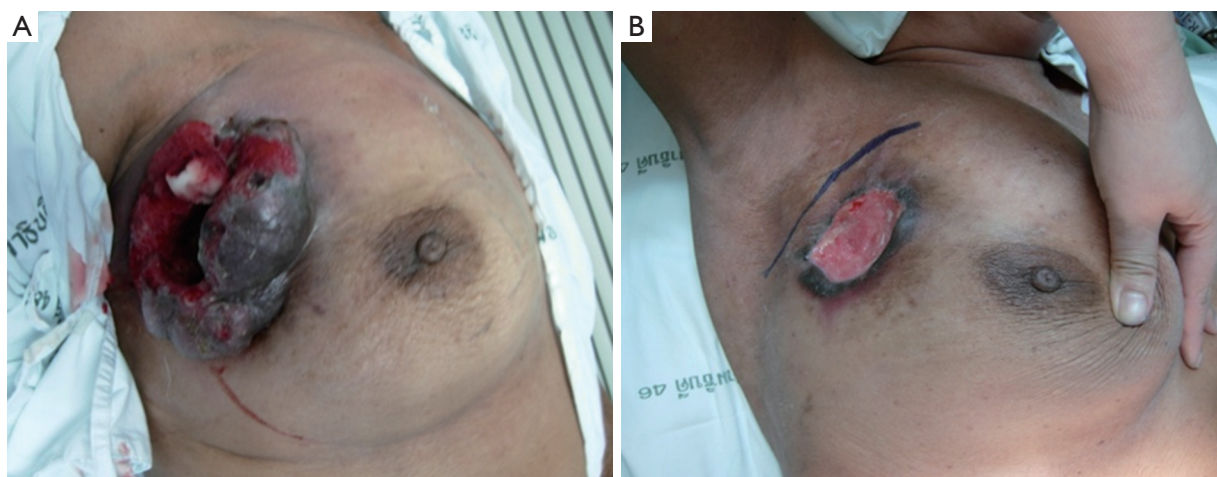


Figure 1 Patient presented with LABC and plan to give neoadjuvant chemotherapy. (A) T4b lesion at right breast before giving neoadjuvant chemotherapy; (B) The tumor has shrunk to small volume after receiving six cycles of FAC regimen (the types of patterns of response can't be assessed whether concentric shrinkage or mosaic pattern. However, we can't see whether there are still many small nodules outside the edge of the tumor or not).

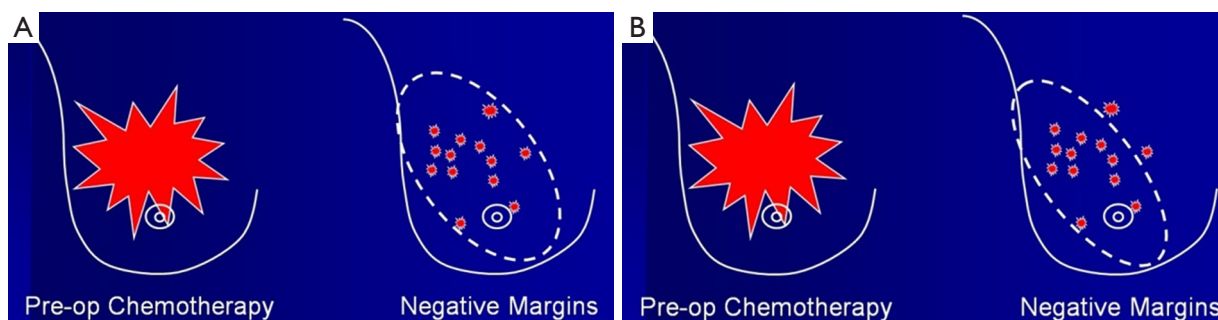


Figure 2 The third pattern of response is mosaic pattern (multifocal residual). (A) This is the real negative margin after removing tumor in mosaic pattern; (B) There are still many small nodules outside the edge of skin incision after finishing the operation but the surgeon can't identify these nodules and the pathological result shows negative margin.

condition is the exact negative margin and there is no residual tumor in the chest wall (*Figure 2A*). The second one is the presence of foci of tumors outside the skin incision (*Figure 2B*) but pathological report is also negative margin. The third response can be evaluated by physical examination, mammogram, breast ultrasound and magnetic resonance imaging (MRI). In the patient considering to receive neoadjuvant chemotherapy, photographs and measurement are useful in recording the extent of initial skin lesions such as the small nodules around the primary lesion or area of skin metastases (*Figure 3A*) because these nodules sometimes disappear after responding to chemotherapy (*Figure 3B*). Using a radio-opaque marker or tattooing the skin of the breast is another method for identifying the tumor location.

Mammography and ultrasound have been used to evaluate the tumor response after giving neoadjuvant chemotherapy but both techniques cannot differentiate the mass density due to fibrotic lesion of the dead tumor from the viable tumor. The false-positive rates of mammography and breast ultrasound may be 50% or higher (2).

MRI can improve the assessment of neoadjuvant chemotherapy response with sensitivity ranging from 70% to 100% and 50-100% specificity when the tumors respond to chemotherapy, MRI can show the loss of enhancement and MRI is related with pathologic response of residual disease 36-96%. However, MRI cannot detect the absence of residual tumors foci and underestimate the residual noninvasive lesion in the breast following neoadjuvant chemotherapy (3).

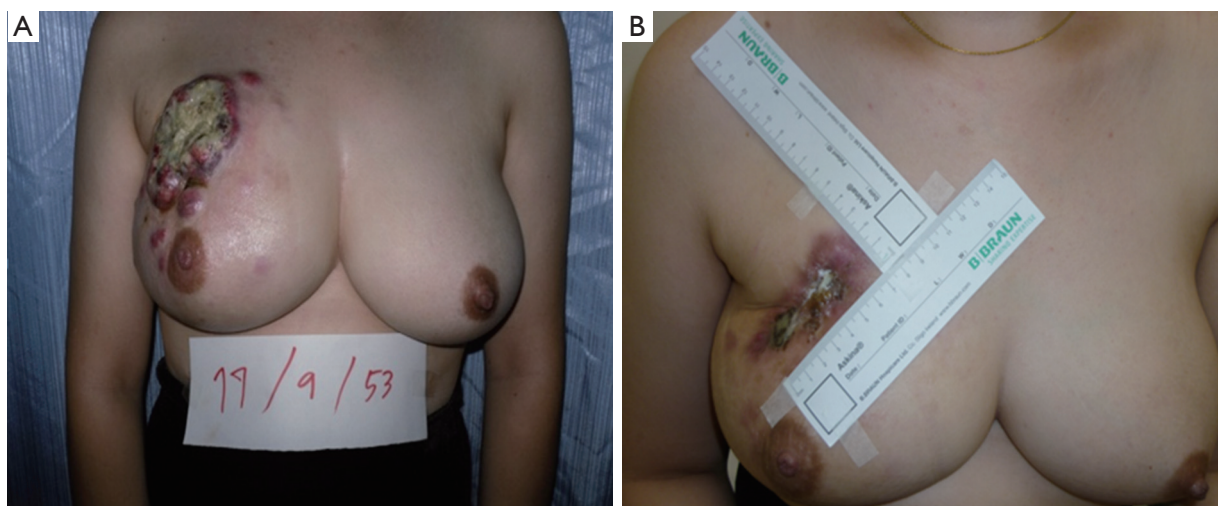


Figure 3 Photographs and measurement in planning neoadjuvant chemotherapy. (A) There are many skin nodules or skin metastases before giving neoadjuvant chemotherapy; (B) The tumor has shrunk to small volume after receiving six cycles of PACS-01 regimen and the previous skin nodules can't be seen if the photographs have not recorded these lesions.

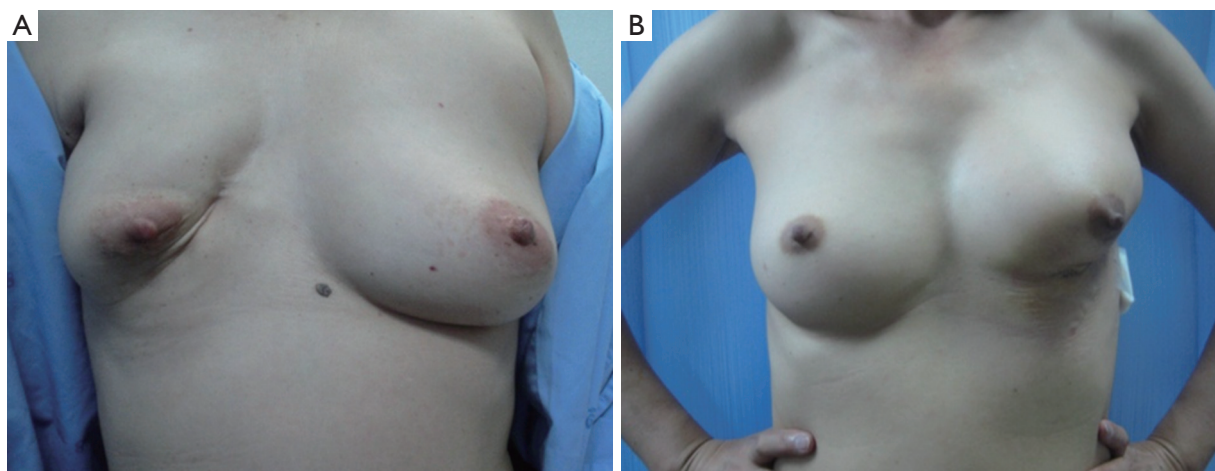


Figure 4 Cosmetic sequelae after breast conservative surgery. Type II, deformity of the breast after BCS, compatible with partial reconstruction and breast conservation.

The following are selective criteria for selecting candidates for breast-conserving surgery after neoadjuvant chemotherapy (4):

- Complete resolution of skin edema;
- Residual tumor size <5 cm;
- No evidence of multicentric lesion;
- Absence of extensive intramammary lymphatic invasion/ extensive microcalcification.

Cosmetic sequelae after BCS can occur in patients with large tumors and there is a need to remove the large volume of breast tissue. There are three types of cosmetic sequelae after BCS. Type I is asymmetrical breasts with no deformity

of the treated breast. Type II is deformity of the treated breast, compatible with partial reconstruction and breast conservation. Type III is major deformity of the breast, requiring mastectomy (5).

If 20-50% of breast volume resection can be estimated after finishing the operation, cosmetic sequelae type II deformity can occur (*Figure 4*) (5). Reshaping the breast by using oncoplastic technique such as the latissimus dorsi flap is required to fill the defect after removing large volume of the breast from BCS (6). This oncoplastic technique can prevent and correct the deformity with a good cosmetic outcome (*Figure 5*).

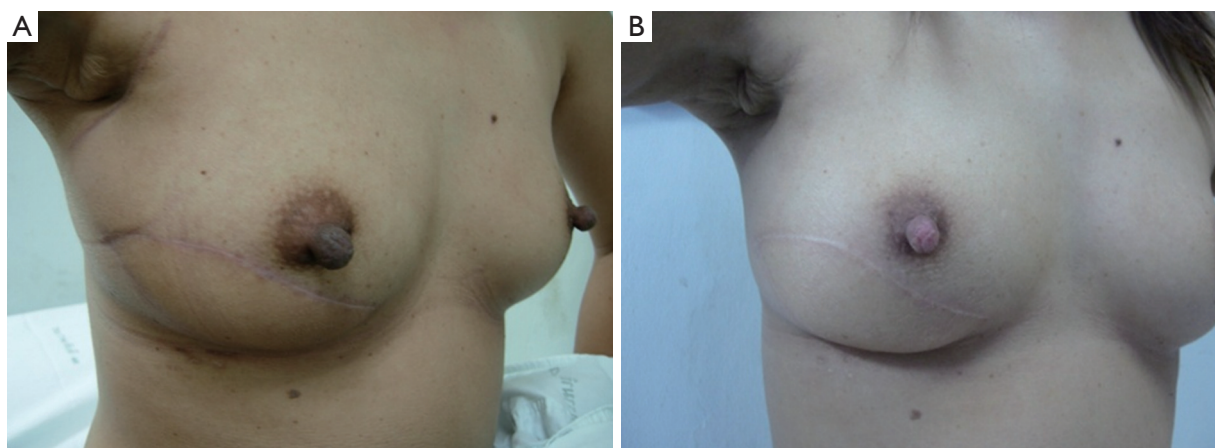


Figure 5 In the patient with 50% of breast volume resection in lower quadrant, reconstructing the breast by using oncoplastic technique such as the latissimus dorsi flap is needed to fill the defect after removing large volume of the breast from BCS.

Absolute contraindication of breast conserving therapy

Absolute contraindications for BCT are as follows (7):

- Diffuse suspicious or malignant appearing microcalcifications on mammography;
- Extensive disease that cannot be removed by local excision through a single incision that gets the negative margins with good cosmetic result;
- Positive pathologic margin;
- Patients who have received previous radiation to the breast or chest wall;
- Pregnant women who plan to give the radiation therapy during pregnancy.

The patients who develop breast cancer during pregnancy must avoid radiation therapy due to the internal scatter of the radiation from treatment reaching to the fetus.

Relative contraindication of breast conserving therapy

The following can be considered as relative contraindications of the BCT:

- Active connective tissue disease especially scleroderma and lupus;
- Tumor greater than 5 cm in diameter;
- Focally positive pathologic margins after BCS;
- Patients ≤ 35 yr. or patients with a known BRCA1/2 mutation gene.

Patients with systemic lupus erythematosus and scleroderma are significant risk for breast fibrosis with pain

and chest wall necrosis.

In patients with LABC in which the tumor to breast size ratio is unfavorable is crucial. After removing the tumor in the patients with large breasts, the breast parenchyma defect can be repaired with tissue rearrangement. Reduction mammoplasty techniques can be done at the opposite breast due to symmetry of both sides (*Figure 6*). This procedure can achieve the greatest benefit from radiation therapy due to reducing the size of the breasts and the patients have a greater degree of dose homogeneity with standard two-dimensional dose compensation techniques.

Margin status in BCS for LABC after neoadjuvant chemotherapy

The studies showed BCS for LABC after neoadjuvant chemotherapy is feasible and safe and associated with acceptable local recurrence rates (8-12). As with oncologically breast cancer procedure, the primary goal is to remove the tumor with negative margins. Surgical excision doesn't attempt to remove the whole previous neoadjuvant volume of lesion because the goal of wide excision is to remove any residual lesion with 1 cm of clear margins. If the lesion after responding to neoadjuvant chemotherapy can be observed in mammography such as microcalcification or spiculated lesion, specimen mammography should be sent to confirm that the whole lesion is removed (*Figure 7*). If there is no detectable residual lesion in the patient who achieve a clinical complete response, a 2-cm specimen with the metallic marker in the center is suggested (13).

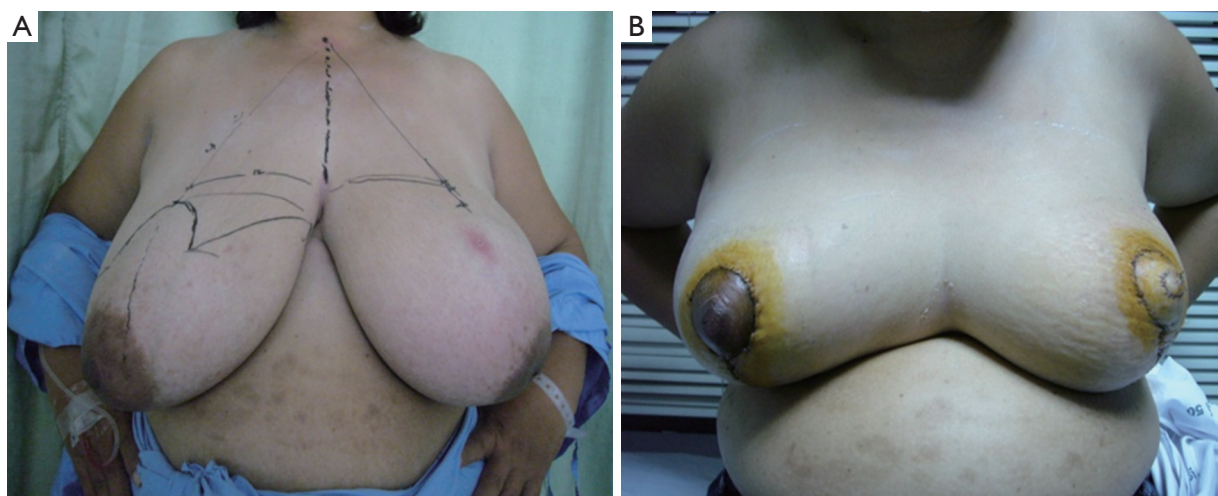


Figure 6 The patient presenting with LABC at left breast and had the large breasts with severe ptosis of both breasts. (A) Preoperative, quadrantectomy for left breast; (B) Postoperative, quadrantectomy with tissue rearrangement at left breast and reduction mammoplasty techniques was done at the opposite breast due to symmetry of both sides.

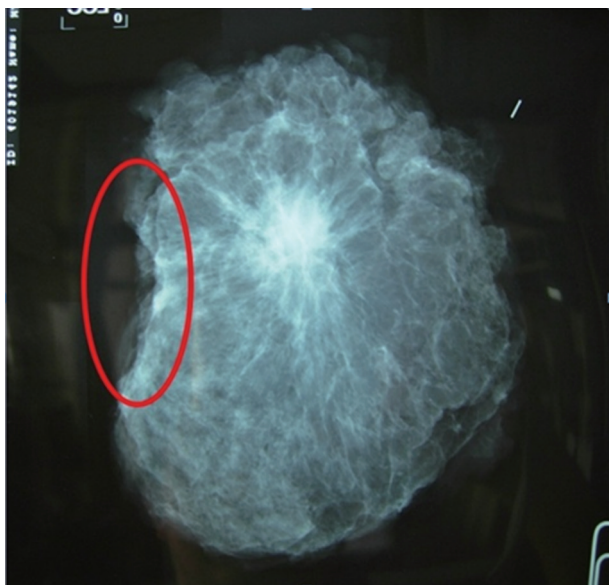


Figure 7 Specimen mammography showed incomplete wide excision of the spiculated lesion after giving neoadjuvant chemotherapy.

Conclusions

For selected LABC patients (adequate reduction in the tumor size and no evidence of residual nodules in the peripheral area after giving chemotherapy), BCS can be an appropriate local treatment option with acceptable local recurrence rates. Oncoplastic surgery for LABC is safe and effective. Using oncoplastic technique in patients who need

to remove the large volume of breast tissue, can prevent and correct the deformity with a good cosmetic outcome.

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