

Nipple-Areolar-Complex Sparing Breast-Conserving Surgery as an Acceptable Treatment Option for Patients With Centrally-located Breast Cancer: a Case Report

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For centrally-located breast cancer (CLBC), the nipple-areolar-complex (NAC) preservation surgery had not been generally recommended because of their highly malignant involvement into the NAC. However, the recent preliminary studies, performing nipple-sparing mastectomy (NSM), have shown that NAC-preserving surgery is clinically and oncologically sound treatment in some selected patients. Under these backgrounds, we performed the NAC-sparing breast-conserving surgery with immediate latissimus dorsi muscular flap reconstruction for fifty-six year-old woman, who had a 12 mm-sized periareolar breast cancer located at 1.5 cm distant from her nipple. She has not presented any signs of recurrences to date (for 30 months since the operation). This procedure can be an option for the selected cases of CLBC.

Key Words: Breast cancer, Nipple-areola-complex, Breast-conserving surgery, Reconstruction, Central location

INTRODUCTION

In centrally-located breast cancer (CLBC), total mastectomy had been preferentially performed because of the presumed high risk of cancerous involvement with the nipple-areolar-complex (NAC) (1,2). However, the recent advances of oncoplastic techniques have shown the breast-conserving surgery (BCS) with plastic-reconstruction proves not only to improve cosmetic outcomes but also to be oncologi-

cally safe in the early CLBC (3). Moreover, the current researches also have shown that the NAC-preserving surgery, has been challenging as nipple-sparing mastectomy (NSM), can be an oncologically sound approach in some selected patients (4-13). Although NSM is a very promising treatment for the patient with breast cancer, this approach has not been prevalent yet in Japanese surgeon because it is still limited to the experienced plastic surgeon. Then, we present herein a case, undergoing nipple-sparing wide excision with immediate reconstruction of the latissimus dorsi muscular flap for CLBC, in which no recurrence has been found for 30 months after the operation. We recognized this procedure to be an option for some patients with CLBC under the sufficient informed consent.

CASE REPORT

A 56-year-old woman was referred to our hospital for being detected the abnormality of her left breast by screening mammography (MMG). She did neither complain of any subjective lesions nor was found to have the objective abnormalities in her left breast. However, the MMG showed the tumorous shadow with a spicula-like distortion near the nipple (Fig. 1). Neither MMG nor magnetic resonance imaging showed any calcifications, indicating the malignant infiltration into the retroareolar ducts. The ultrasonography presented the tumor, 12X7X9 mm in size,

Abbreviations: BCS: Breast-Conserving Surgery

CLBC: Centrally-located breast cancer

NAC: Nipple-areola-complex

SSM: Skin-sparing mastectomy

NSM: Nipple-sparing mastectomy

MMG: mammography

LR: Local recurrence rate

DR: Distant recurrence rate

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at 15 mm distant from the nipple without any signs of ductal invasion (Fig. 2). The core needle biopsy revealed a solid tubular carcinoma containing a scirrhous carcinoma-like component. Because she desired to have her NAC preserved, NAC-sparing wide excision with immediate reconstruction of the

latissimus dorsi muscular flap was chosen under the sufficient informed consent.

In the operation, a horizontal medial incision starting at the upper part of the NAC in about 3 cm diameter was made. The tumor was resected as obtaining at least 2 cm margins. The lactiferous ducts

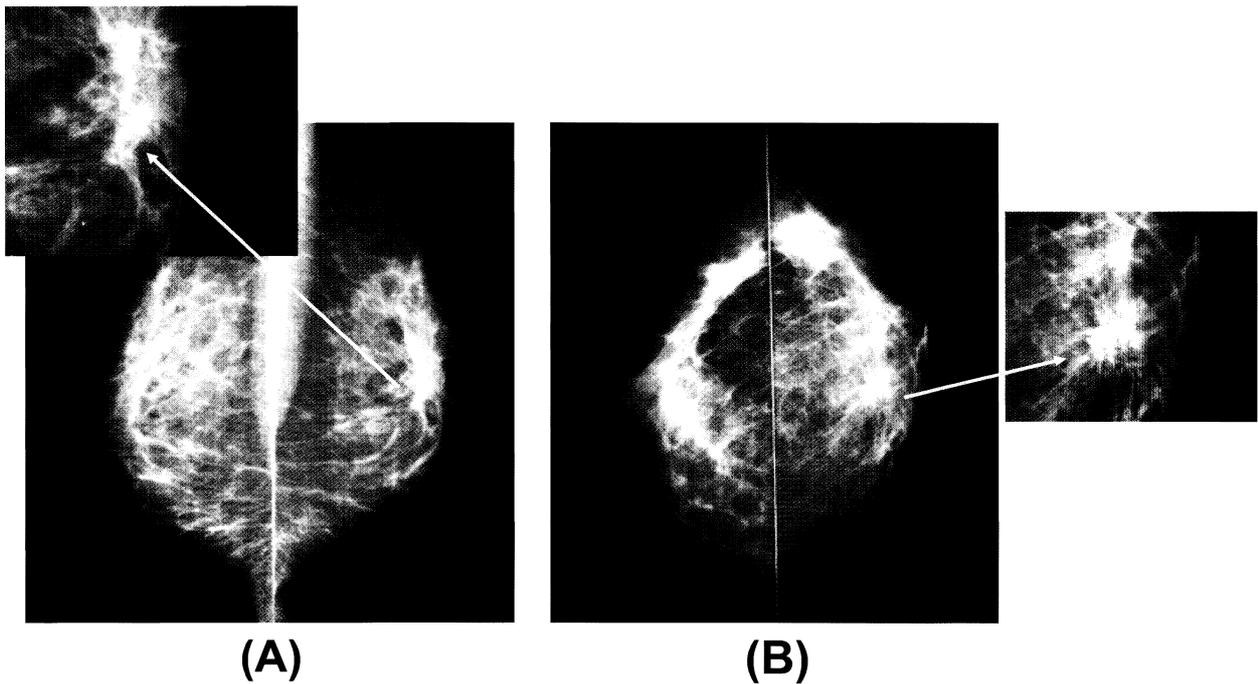


Fig. 1. The high-density shadow with spicula-like distortion is seen near the NAC in MMG (arrows).
 (A): medio-lateral oblique projection
 (B): cranio-caudal projection

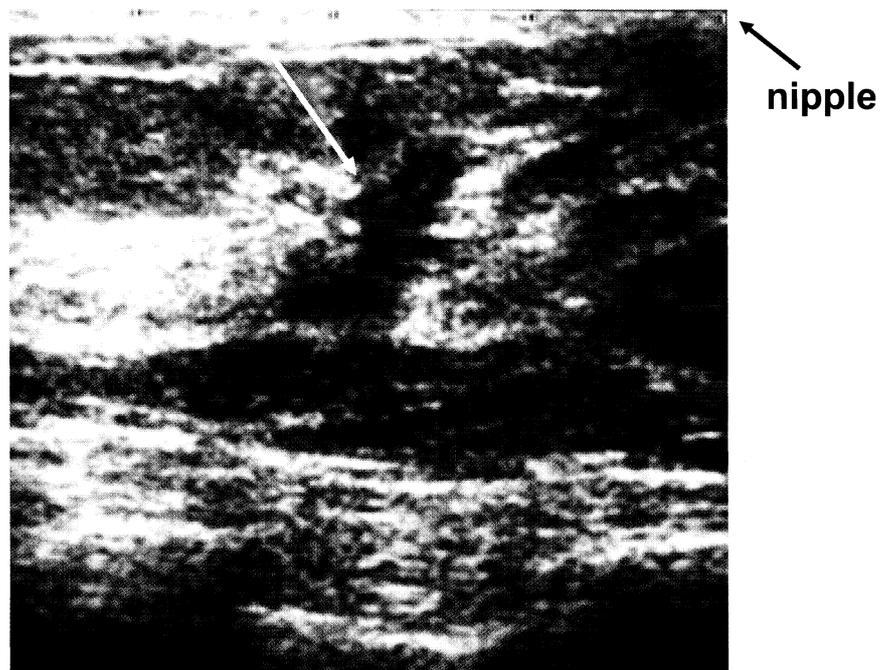


Fig. 2. 12x7x9mm-sized polygonal hypoechoic shadow is seen at 1.5 cm distant from the NAC in ultrasonography (arrow).

were divided and ligated proximally beneath the nipple. Superior, inferior, medial, lateral, and subareolar margins were separately submitted to pathologic laboratory, which showed them to be free from cancers. The intraoperative MMG for the specimen showed the margins were also free from the tumor. The central defect after the wide excision was filled with the mounted latissimus dorsi muscle through the incision of lateromammary fold. In this case, sentinel lymph node biopsy was negative, so that the further axillary

dissection was omitted (Fig. 3(A)(B)). The excised specimen was 10X7X3 cm in size. The final histological examination confirmed the specimen to be mainly formed by a solid-tubular carcinoma partly by the papillotubular and scirrhous carcinoma-like components, and the tumor margins were free from cancer. The lymphovascular invasions were not found. The nuclear grade and atypia were each 1 point (Fig. 4). The immunohistochemical study showed that the estrogen and progesterone receptors

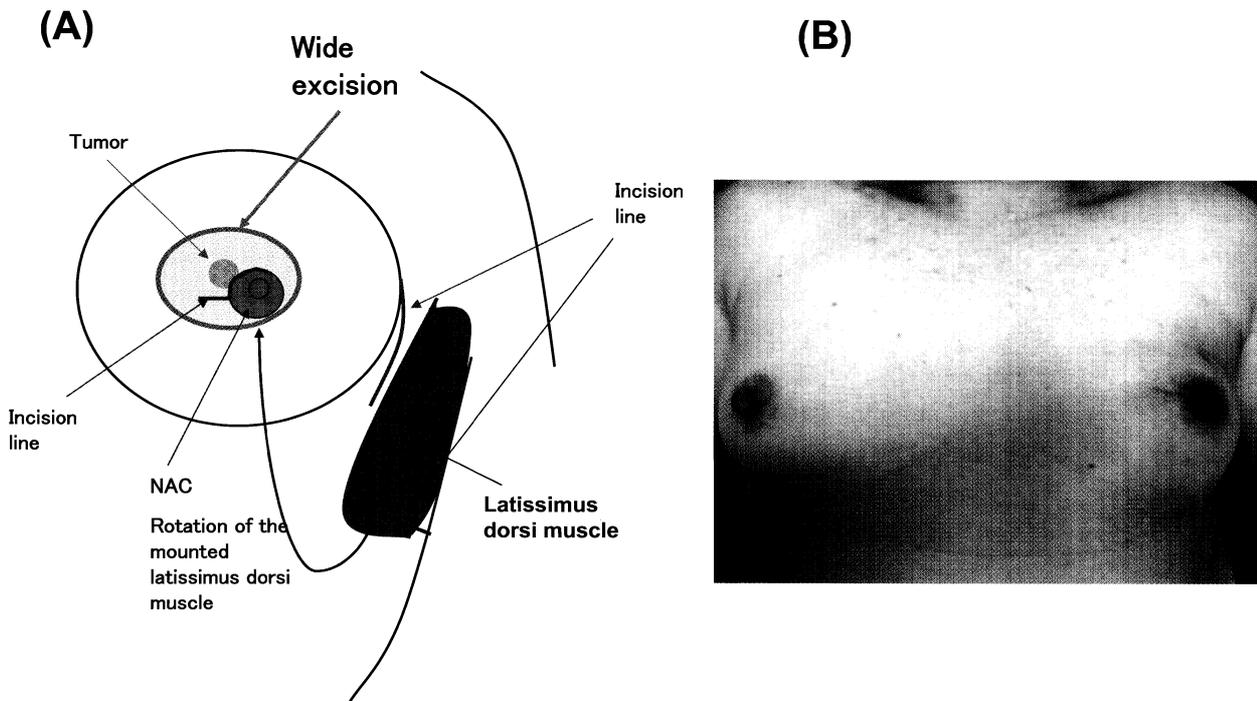


Fig. 3. (A): operation schema
(B): relatively good cosmesis at 30 months after the operation

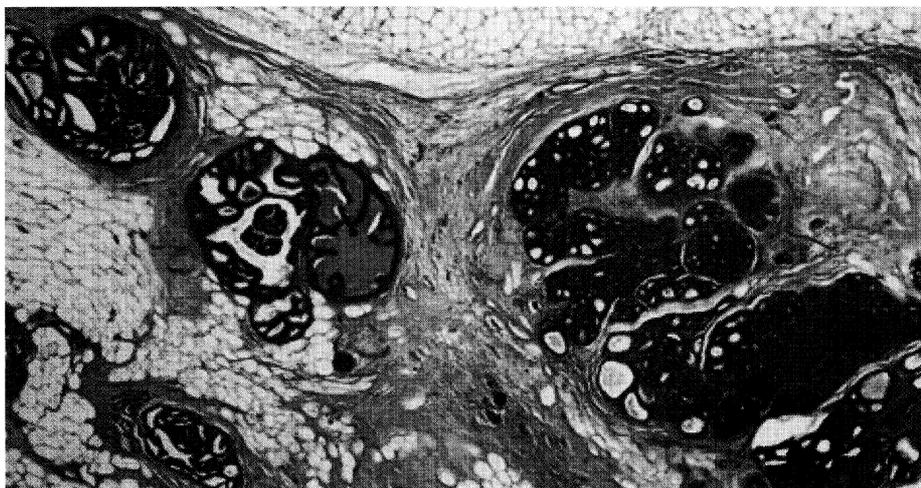


Fig. 4. Microscopic finding of the tumor shows invasive solid-tubular carcinoma containing the components of papillotubular and scirrhous type carcinoma. (HE staining, X25)

were positive, and HER-2 receptor was negative. Thereafter, whole breast irradiation therapy, total dose of 60 Gy, was achieved and aromatase inhibitor (letrozole) has been prescribed for the patient, who has presented no signs of recurrences to date (30 months since the operation).

DISCUSSION

The surgical management of breast cancer is still evolving to include more conservative and cosmetic approaches. The patient concerns about cosmesis have led surgeons to explore the approaches that combine oncologic safety and aesthetic results. Currently, skin-sparing mastectomy (SSM) with immediate reconstruction has become the accepted treatment for the patients, who might have required mastectomy in the previous criteria (5,14,15). However, the removal of NAC changes in natural sensation and appearance, so that even if the reconstruction of NAC is performed, it may not gain the entire satisfaction of the patients (4). So, every effort to preserve NAC has been driven by patients' psychological and aesthetic concerns. Following the promising results of SSM, the procedure preserving the NAC, namely nipple-sparing mastectomy (NSM) has been considered for selected patients.

Indeed, the rate of NAC involvement has been reported in range widely from 0% to 58% in the previous literatures. This discrepancy is likely due to the significant differences among the studies in the methods of pathologic assessment, in the criteria for patient selection, as well as in the number of cases examined (2,6,7,9,14,16-22). In fact, preoperatively, the exact prediction of the malignant involvement into NAC seems to be impossible. However, several predictive indicators of NAC involvement have been presented, including tumor size (2,6,16,18,19), tumor distance from the nipple (2,6,14,16,18-20), node status (2,6,14,16,18), and multicentricity or multifocality (14). Cence *et al* reviewed the literatures dealing with NAC involvement, and concluded that the most important predictors were the tumor-nipple distance and the tumor size (6). By multivariate logistic regression analysis for predicting NAC involvement, Loewen *et al* showed the formula using the single factor, tumor-nipple distance obtained from

mammography (20). Simmons *et al* performed a retrospective analysis of 217 patients treated with SSM and examined the nipple involvement. The overall frequency of nipple involvement was 10.6% (23 of 217 cases). The only reliable predictor of nipple involvement was tumor location (16).

Based on the concept that NAC involvement is rare in the selected patients, several clinical preliminary studies performing NSM have been presented recently (Table 1) (4-13). Gerber *et al* performed NSM in 61 cases, of which indications were tumor-nipple distance (>2 cm), no extensive intraductal component of the tumor, and intraoperatively estimated clear margins of the retroareolar tissue by a frozen-section analysis. They showed local recurrence rate (LR) was 5%, distant recurrence rate (DR) was 23%, in the patients with NAC preservation. These results were the near as those with SSM (6% in LR, and 20% in DR) or as those with modified radical mastectomy (8% in LR, and 21% in DR) (4). Benediktsson and Perbeck have reported the results of 216 cases undergone NSM, after a median follow up of 13 years. The only indication for the NAC preservation was a negative intraoperative frozen-section. Their LR was 28.4%, falling to 8.5% in the patients receiving the postoperative radiotherapy. All the patients with local recurrence were treated by salvage surgery, and the local recurrence was not found to be associated with the overall survival (13).

These promising results of NSM mentioned above, encourage us to preserve the NAC in this presenting case. Indeed, the excision of NAC has been believed to be essential for centrally-located breast cancer (CLBC) because the rate of NAC involvement was absolutely higher in CLBC than that in the other quadrant breast (1,2,16). One study showed NAC involvement was found in 27.3% after the surgery for CLBC (16). However, if the results are interpreted by contraries, we can say "about 70% cases in CLBC are free of NAC involvement". Therefore, CLBC itself does not represent an absolute contraindication for NAC preservation. Dole *et al* reported the 25 cases of CLBC, in which BCS were performed. They showed one local recurrence (4%) and 100% of overall survival for 48 months (median follow-up). The authors advocated that the surgical clear margins by an intraoperative frozen-section, the small tumors, and

Table 1. Previous Reports of Nipple-sparing Mastectomy

Author	Year	Cases	Indications	Follow-up	LR	DR	OS
Gerber (4)	2003	61	N-T distance > 2 cm	59 months	5%	23%	15%
Crowe (8)	2004	44	Tumor size < 3.5 cm Exclude CLBC, NC, IC	6 weeks	NR	NR	NR
Caruso (9)	2006	50	Tumor size < 2cm	66 months	2%	10%	92%
Sacchini (10)	2006	123	N-T distance < 1 cm Tumor size < 1.5 cm	22.4 months	3.3%	0.8%	0.8%
Petit (11)	2006	102	Exclude CLBC IORT was done.	13 months	0.9%	NR	NR
Ueda (5)	2008	33	NR	53 months	9.1%	NR	NR
Patani (12)	2008	9	N-T distance > 2.5 cm	34 months	0%	0%	NR
Benediktsson & Perbeck (13)	2008	216	NR	13 years	20.8%*	NR	80.5%*

All studies confirmed the negative margin of the NAC at frozen-section analysis.

Abbreviations: N-T distance = Nipple- tumor distance, NR= not reported,

LR= local recurrence rate, DR= distant recurrence rate,

OS= overall survival, NI= NAC involvement, NC= neoadjuvant chemotherapy,

IC= inflammatory cancer, CLBC= centrally located breast cancer

IORT= intra-operative radiotherapy

* = rate at 10 years

() = reference number

the postoperative radiation therapy were needed for the patient selection (23). The more recent clinical studies have cleared that BCS with immediate reconstruction, followed by radiation therapy for CLBC, achieves the same radicality as for the other quadrants and obtains a good cosmetic result (1,2,24). Even though, in our case, the nipple-tumor distance was quite close (about 1.5 cm), the preoperative examinations (US, MMG) did not show any signs of intraductal involvement of the tumor (for instance : microcalcifications) and the tumor size was small (12mm in size), so that the nipple-sparing surgery was indicated after confirming the surgical clear margins by the intraoperative frozen-section analysis. Consequently, the lower malignant potential of the tumor revealed by the final pathological result may reconfirm the validity of the indication chosen in our

case.

Considering the previous reports and this case, the nipple-sparing surgery for CLBC can be possible if the adequate patients selection is achieved. We recommend the selection criteria in the followings : the negative margins obtaining by the intraoperative frozen-section analysis, at least more than 1 cm distant from the nipple, less than 2 cm in tumor size, without any signs of intraductal involvement by radiological examinations, and the postoperative radiotherapy.

Although NSM should be considered more in future in point of the esthetical aspect, this approach is still limited to an experienced plastic surgeon. Under this circumstance, the wide excision with immediate reconstruction of the latissimus dorsi muscular flap was chosen, in our case, which still seems to be an option for the small CLBC. The strict selection of the

patients, the sufficient informed consent, and the careful follow-up will be needed to achieve nipple-sparing surgery for CLBC. Further clinical studies are mandatory to establish the reliable criteria for the nipple-sparing surgery for CLBC.

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