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Therapeutic Mammoplasty in Selected East Asian Patients: Oncologic Safety and Cosmetic Outcomes

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Abstract

Background

Therapeutic mammoplasty (TM) is a well-established oncoplastic breast-conserving technique. However, evidence on oncologic safety and cosmetic outcomes in East Asian populations remains extremely limited. This study evaluated outcomes of TM with contralateral reduction mammoplasty in an East Asian cohort.

Methods

We conducted a single-center retrospective observational study of consecutive patients who underwent TM with simultaneous contralateral reduction mammoplasty for breast cancer between April 2014 and March 2024. Primary endpoint was oncologic safety, assessed by positive margin rate and local recurrence. Secondary endpoints included 1-year cosmetic outcomes assessed using BCCT.core and a blinded physician-rated Harvard scale. Perioperative complications, reoperations, and predictors of poor cosmetic outcomes were also analyzed.

Results

A total of 104 patients were included. The mean age was 59.6 ± 10.6 years, mean body mass index was 28.4 ± 5.1 kg/m², and mean tumor size was 22.0 ± 11.5 mm. Positive margins occurred in five patients (4.8%); of these, four underwent additional resection and one received boost irradiation alone. At a median 58.6-month follow-up, no local recurrences occured, while one patient (1.0%) developed distant recurrence. Perioperative complications occurred in 27 patients (26.0%), and reoperation was required in 6 patients (5.8%); no cases of nipple necrosis were reported. Among 100 evaluable patients, Excellent/Good cosmetic outcomes were achieved in 83.0% according to BCCT.core and 79.0% according to the Harvard scale. Boost irradiation and perioperative chemotherapy were associated with poorer cosmetic outcomes.

Conclusions

In this East Asian cohort undergoing TM with contralateral reduction mammoplasty, the procedure demonstrated favorable oncologic safety and cosmetic outcomes.

Introduction

Breast cancer (BC) is a malignancy with a steadily increasing global burden. According to the World Health Organization (WHO), an estimated 2.3 million individuals were diagnosed with BC and approximately 670,000 died from the disease in 2022 [1]. Furthermore, if current incidence trends

continue, an estimated 3.2 million new BC cases and 1.1 million BC-related deaths are projected annually by 2050 [2]. These data emphasize the growing global importance of BC care. Although systemic therapies for BC have advanced remarkably, surgery remains the cornerstone of curative treatment for primary BC.

BC surgery is broadly classified into breast-conserving surgery (BCS) and mastectomy. While BCS preserves the breast, postoperative deformity may become prominent depending on the resection volume and tumor location, making the maintenance of cosmetic outcomes a major challenge. To address this issue, surgical approaches that combine oncologic resection with plastic surgical techniques have been developed, enabling breast conservation even in cases where acceptable cosmesis would otherwise be difficult to achieve. These procedures are collectively referred to as oncoplastic breast-conserving surgery (OBCS) and are based on the concept, proposed by Werner Audretsch and colleagues in the late 1980s, of simultaneously pursuing oncologic radicality and aesthetic outcomes [3].

Compared with mastectomy followed by reconstruction, OBCS has been suggested to offer advantages in patient-reported outcomes (PROs), with studies demonstrating better breast satisfaction, psychosocial quality of life, and sexual well-being [4, 5]. In addition, from a cost perspective, OBCS with radiotherapy has been reported to be comparable to mastectomy with immediate reconstruction in terms of total treatment cost [6], highlighting its value as a treatment option. OBCS can be broadly categorized into volume displacement techniques, which utilize remaining breast tissue, and volume replacement techniques, which use tissue from outside the breast [7]. Among these, therapeutic mammoplasty (TM) is a representative volume-displacement technique. By applying skin-incision designs used in aesthetic breast reduction surgery, TM enables simultaneous tumor resection, breast reduction, and mastopexy, thereby facilitating relatively large resections or resections in anatomically challenging locations while maintaining cosmesis [8, 9]. A distinctive feature of TM is its potential to improve breast shape compared with the preoperative condition while achieving adequate tumor excision.

To date, evidence regarding the oncologic and cosmetic outcomes of TM has largely been derived from studies conducted in Western populations [10, 11]. However, it remains unclear whether these findings can be directly extrapolated to East Asian populations, which include many patients with relatively smaller breast volumes. Therefore, the present study aimed to evaluate the utility of TM in East Asian patients with BC from the perspectives of oncologic safety and cosmetic outcomes.

Patients and Methods

Study design and patients

This single-center retrospective observational study consecutively included patients who underwent TM for BC with simultaneous contralateral reduction mammoplasty at Nakagami Hospital between April

2014 and March 2024. A total of 104 patients were included in the analysis, all of whom were Asian (Japanese). The study was approved by the Institutional Review Board of Nakagami Hospital (approval No. 2026012). The requirement for informed consent was waived due to the retrospective design, and an opt-out approach was adopted.

Endpoints and definitions

The primary endpoint was oncologic safety, assessed by the positive margin rate and local recurrence rate. A positive margin was defined as ink on tumor for invasive carcinoma and as a margin-to-lesion distance of ≤ 2 mm for ductal carcinoma in situ (DCIS). Local recurrence was defined as recurrence in the ipsilateral breast, chest wall, skin, or regional lymph nodes, whereas distant recurrence was defined as any recurrence outside these sites.

The secondary endpoint was cosmetic outcome, evaluated using frontal photographs obtained 1 year postoperatively. Cosmetic outcome analysis included 100 patients after excluding 4 without 1-year postoperative photographs.

Cosmetic outcomes were assessed using two methods: objective evaluation with BCCT.core [12, 13] and subjective physician assessment. For the latter, three physicians not involved in the surgery (two breast surgeons and one plastic surgeon) independently evaluated the photographs using the Harvard scale (Excellent/Good/Fair/Poor) under blinded conditions with respect to clinical information. The final subjective rating was determined by the median score. For descriptive analyses, BCCT.core results were dichotomized into favorable (Excellent/Good) and unfavorable (Fair/Poor) cosmetic outcomes. The same dichotomization was applied in predictor analyses.

Data collection and clinicopathologic variables

Clinical data were extracted from medical records, including patient characteristics (age, body mass index [BMI], comorbidities, smoking history, breast volume, and ptosis grade), tumor factors (tumor size, stage, location, and number of lesions), surgical factors (incision design, pedicle type, resection weight, and resection ratio), and adjuvant treatments (radiotherapy, boost irradiation, chemotherapy, and endocrine therapy).

Breast ptosis was assessed using the Regnault classification. Perioperative complications were defined as surgical-site complications occurring within 30 days after surgery. Complications were recorded separately for the ipsilateral and contralateral sides, and cases requiring surgical intervention were also documented. Follow-up duration was calculated from the date of surgery to the date of the last hospital visit.

MRI-based breast volumetry and resection ratio

Breast volume was measured using preoperative contrast-enhanced breast magnetic resonance imaging (MRI) acquired in the prone position (echo-sharing 3D gradient-echo Dixon sequence) and analyzed with a 3D medical imaging workstation Ziostation2 (Ziosoft Inc., Tokyo, Japan). The breast region was delineated on each slice and reconstructed three-dimensionally to calculate volume. Boundaries were defined as follows: anteriorly, the skin surface; posteriorly, the anterior surface of the pectoralis major muscle; inferiorly, the inframammary fold; and medially, laterally, and cranio-caudally along the breast contour. The breast resection ratio was calculated by dividing specimen weight by breast volume after converting specimen weight (g) to volume (mL). Assuming a specimen density of 1.0 g/mL, specimen volume was considered equivalent to specimen weight. Accordingly, the resection ratio (%) was defined as: [specimen weight (g) / breast volume (mL)] × 100.

Statistical analysis

Patient characteristics and treatment outcomes are presented as means (standard deviations) for continuous variables and as frequencies and percentages (%) for categorical variables. Multivariable logistic regression analyses were performed to identify independent risk factors for unfavorable cosmetic outcomes, defined as BCCT.core Fair/Poor. Analyses were conducted using complete cases, excluding centrally located tumors because of the small sample size (n = 3), resulting in a total of 83 patients being included in the multivariable analysis.

Covariates were selected a priori based on previous literature and clinical relevance and included age, BMI (≥ 25 vs. <25 kg/m²), current smoking status, diabetes mellitus, hypertension, preoperative ptosis grade (≥ 2 vs. 0–1), tumor location (lower inner quadrant [LIQ], upper outer quadrant [UOQ], and lower outer quadrant [LOQ], with upper inner quadrant [UIQ] as the reference), ipsilateral side resection ratio (≥ 15% vs. <15%), absolute difference in bilateral resection ratio (≥ 5% vs. <5%), nipple–areola complex (NAC) pedicle match, resection site match, perioperative chemotherapy, endocrine therapy, boost irradiation, and the interval from surgery to radiotherapy (per 10-day increase). Odds ratios, 95% confidence intervals, and p-values are reported. A two-sided p-value < 0.05 was considered statistically significant. All analyses were performed using R software version 4.3.1 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Patient characteristics

A total of 104 patients who underwent TM with simultaneous contralateral reduction mammoplasty were included. Baseline characteristics are summarized in Table 1. The mean age was 59.6 ± 10.6 years, and the mean BMI was 28.4 ± 5.1 kg/m²; 80 patients (76.9%) had a BMI ≥ 25 kg/m². The mean tumor size was 22.0 ± 11.5 mm. Clinical stage distribution was as follows: Stage 0 in 7 patients (6.7%), Stage I in 48 (46.2%), Stage II in 45 (43.3%), and Stage III in 4 (3.8%). Tumor location was UIQ in 25 patients (24.0%),

LIQ in 13 (12.5%), UOQ in 41 (39.4%), LOQ in 22 (21.2%), and central quadrant in 3 (2.9%). Regarding multiplicity, 95 patients (91.3%) had a single lesion and 9 (8.7%) had multiple lesions.

The mean breast volume was 781.8 mL on the ipsilateral side and 807.2 mL on the contralateral side. Ptosis grade was ≥ 2 in 71 patients (68.3%).

Surgical and treatment characteristics

Surgical and treatment characteristics are summarized in Table 2. The mean operative time was 144.3 minutes, and the mean estimated blood loss was 49.1 mL. The mean resection weight was 120.5 g on the ipsilateral side and 119.6 g on the contralateral side. Regarding skin-incision design, vertical and Wise patterns were used in 95 (91.3%) and 9 (8.7%) patients, respectively, on the ipsilateral side, whereas vertical, Wise, and round-block patterns were used in 94 (90.4%), 8 (7.7%), and 2 (1.9%) patients, respectively, on the contralateral side. For NAC pedicle selection, superior/superomedial, central mound, inferior, and lateral pedicles were used in 47 (45.2%), 36 (34.6%), 14 (13.5%), and 7 (6.7%) patients, respectively, on the ipsilateral side, and in 64 (61.5%), 36 (34.6%), 4 (3.8%), and 0 (0.0%) patients, respectively, on the contralateral side. NAC pedicle type matched between breasts in 75 patients (72.1%) and did not match in 29 (27.9%). The mean resection ratio was 14.4% on the ipsilateral side and 13.5% on the contralateral side. On the ipsilateral side, the resection ratio was < 15% in 61 patients and ≥ 15% in 38, with 5 classified as unknown. The absolute difference in bilateral resection ratio was < 5% in 66 patients (63.5%) and ≥ 5% in 30 (28.8%), with 8 (7.7%) classified as unknown.

Regarding adjuvant treatment, chemotherapy was administered in 39 patients (37.5%). Radiotherapy was administered in 100 patients (96.2%), omitted in 3 (2.9%), and unknown in 1 (0.9%); boost irradiation was performed in 8 patients (7.7%). Among patients who did not receive chemotherapy, the mean interval from surgery to initiation of radiotherapy was 45.8 days, whereas the overall mean interval was 57.6 days. Endocrine therapy was administered in 90 patients (86.5%).

Surgical complications

Surgical complications are summarized in Table 3. Perioperative complications, including wound edge necrosis, hematoma, and infection, occurred in 27 patients (26.0%). Ipsilateral side complications were observed in 23 patients (22.1%), including wound edge necrosis in 10 (9.6%), hematoma in 7 (6.7%), and infection in 6 (5.8%). Contralateral-side complications occurred in 8 patients (7.7%), including hematoma in 4 (3.8%) and wound edge necrosis in 4 (3.8%). Because some patients experienced multiple and/or bilateral complications, the sum of side-specific complications does not equal the total number of patients.

Oncologic outcomes

Oncologic outcomes are also summarized in Table 3. Positive margins were observed in 5 patients (4.8%). Of these, 4 underwent additional resection to achieve margin negativity, and 1 was managed with

boost irradiation. At a median follow-up of 58.6 months, no local recurrences were observed, and distant recurrence occurred in 1 of 104 patients (1.0%). No contralateral BCs were observed during follow-up.

Cosmetic outcomes

Cosmetic outcomes are summarized in Fig. 1. In the objective assessment using BCCT.core, outcomes were rated as Excellent in 20 patients (20.0%), Good in 63 (63.0%), Fair in 15 (15.0%), and Poor in 2 (2.0%), with Excellent/Good observed in 83 patients (83.0%). In the subjective assessment using the Harvard scale, outcomes were rated as Excellent in 27 patients (27.0%), Good in 52 (52.0%), Fair in 19 (19.0%), and Poor in 2 (2.0%), with Excellent/Good observed in 79 patients (79.0%). Postoperative ptosis grade was ≥ 2 in only 5 patients (4.8%). The distribution of postoperative ptosis grades is shown in Supplementary Fig. 1.

Predictor analysis of cosmetic outcomes

Predictor analysis of cosmetic outcomes is summarized in Table 4. Boost irradiation and perioperative chemotherapy were significantly associated with unfavorable cosmetic outcomes. In the tumor-location analysis (with UIQ as the reference), no location showed a statistically significant association; however, LOQ tumors tended to be associated with unfavorable outcomes. Concordance of resection site and NAC pedicle type between breasts was not significantly associated with cosmetic outcomes. ipsilateral side resection ratio ≥ 15% and an absolute difference in bilateral resection ratio ≥ 5% were also not significantly associated with cosmetic outcomes. The interval from surgery to radiotherapy initiation was likewise not significantly associated with cosmetic outcomes.

Representative cases

Case 1 (Fig. 2)

A 67-year-old woman with a BMI of 36.5 and comorbid diabetes mellitus and hypertension presented with a solitary 56-mm lesion in the UIQ (cTisN0M0). Although the lesion size would generally indicate mastectomy, TM with simultaneous contralateral reduction mammoplasty was performed at the patient’s request for breast reduction. Preoperative ptosis grade was 2, and MRI-based breast volumes were 1,147 mL (ipsilateral side) and 1,211 mL (contralateral side). A vertical pattern with a central mound pedicle was used bilaterally. Final pathology revealed DCIS with negative margins.

The patient developed wound necrosis at the vertical scar and underwent debridement; radiotherapy was completed without boost irradiation. At 2.4 years of follow-up, no recurrence was observed. At 1 year postoperatively, the cosmetic outcome was rated Excellent by BCCT.core and Good by the Harvard scale, with improved ptosis and good symmetry despite residual scarring.

Case 2 (Fig. 3)

A 57-year-old woman with a BMI of 30.0 presented with a solitary 30-mm BC in the LIQ (cT2N0M0). Preoperative ptosis grade was 2, and breast volumes were 954 mL (ipsilateral side) and 974 mL

(contralateral side).

TM was performed using a vertical pattern with a superior pedicle, and the contralateral breast was treated with the same design to achieve symmetry. Margins were negative, and no perioperative complications occurred. Adjuvant letrozole and radiotherapy without boost irradiation were administered.

At 3.0 years of follow-up, no recurrence was observed. At 1 year postoperatively, the cosmetic outcome was rated Good by BCCT.core and Excellent by the Harvard scale, with grade 1 ptosis and good shape symmetry.

Discussion

In this analysis of 104 patients who underwent TM with contralateral reduction mammoplasty, the positive margin rate was low (4.8%), and no locoregional recurrence—including ipsilateral breast recurrence and regional nodal recurrence—was observed at a median follow-up of 58.6 months. Although caution is warranted because definitions of positive margins and pathologic backgrounds vary across studies, the reported frequency of tumor on ink in conventional BCS is approximately 9%–14% [14–16]. Therefore, the margin outcomes in the present study may be considered relatively favorable. Margin negativity is directly associated with local control. The Society of Surgical Oncology/American Society for Radiation Oncology guideline indicates that positive margins (ink on invasive cancer or DCIS) increase the risk of ipsilateral breast tumor recurrence by at least twofold, and that this disadvantage is not offset by boost irradiation or systemic therapy [17]. Accordingly, in addition to the low positive margin rate observed in this cohort, confirmation of margin negativity through additional resection in most margin-positive patients likely contributed to the favorable local control outcomes.

Two main factors may explain the low positive margin rate observed in this study. First, OBCS allows wider excision than conventional BCS while preserving cosmesis. Because OBCS enables adequate resection volumes while maintaining breast shape, previous studies have reported lower rates of margin involvement and re-excision compared with conventional BCS [18–20]. In direct comparisons, Gulcelik et al. reported a lower positive margin rate with TM (8.4%) than with standard BCS (11%) [21], while Di Micco et al. reported reductions in both margin involvement (16% to 4%) and re-excision rates (16% to 3%) [22]. Thus, the findings of the present study are consistent with prior reports.

Second, improved preoperative assessment of disease extent using contrast-enhanced breast MRI may have contributed to improved margin outcomes. Obdeijn et al. reported that preoperative MRI increased the proportion of patients undergoing wider excision and reduced both tumor-positive margins and reoperation rates (tumor-positive margins, 15.8% vs. 29.3%; reoperation, 18.9% vs. 37.4%) [23]. Gommers et al. similarly demonstrated that preoperative MRI was independently associated with a lower risk of positive margins [24]. Collectively, these findings suggest that the favorable margin outcomes observed in this study may reflect not only the surgical advantages of TM but also improved lesion localization and resection planning facilitated by MRI. However, randomized trials have not consistently

demonstrated a reduction in reoperation rates with preoperative MRI and have raised concerns regarding increased mastectomy rates [25]. Therefore, MRI should be interpreted in conjunction with other imaging modalities and clinical findings rather than relied upon in isolation.

In the present study, cosmetic outcomes were assessed using both objective evaluation (BCCT.core) and subjective physician assessment (Harvard scale), providing a multidimensional perspective. At 1 year postoperatively, the Excellent/Good rate by BCCT.core was 83.0%, which is comparable to or slightly better than previously reported outcomes after BCS (typically 70%–80%) [13, 26–28]. In contrast, Gulis et al. reported an Excellent/Good rate of 89.0% for TM in a Western cohort [29], which was slightly higher than that observed in this study.

One possible explanation is racial or ethnic differences in scar characteristics. BCCT.core incorporates multiple parameters, including symmetry, skin color differences, and scarring [30]. Thus, even when similar breast symmetry is achieved, more prominent scar pigmentation or hypertrophy may result in lower scores. In Asian patients, post-inflammatory hyperpigmentation and hypertrophic scarring are well-recognized concerns, and similar findings have been reported in studies of post-breast surgery scarring [31, 32]. Because BCCT.core was developed using European datasets, East Asian patients may be relatively disadvantaged in objective assessments due to scar-related features despite favorable morphologic outcomes. In addition to postoperative scar management, selecting reduction techniques that minimize visible scarring may further improve cosmetic outcomes [33].

In addition to cosmetic assessment, we examined factors associated with cosmetic outcomes. Evidence on predictors of cosmetic outcomes after TM remains limited, particularly in the context of contemporary OBCS, and our findings may help expand the current evidence base. In the present multivariable analysis, boost irradiation and perioperative chemotherapy were identified as independent predictors of unfavorable cosmetic outcomes. Although boost irradiation is widely used to improve local control, it may adversely affect cosmesis through dose-related late effects, including fibrosis, skin changes, contracture, and breast distortion. Long-term results from the EORTC “boost versus no boost” trial demonstrated improved local control with boost irradiation but also increased late fibrosis and poorer breast appearance, highlighting the trade-off between oncologic benefit and cosmetic outcomes [34]. A recent systematic review similarly identified higher boost doses and adjuvant chemotherapy as factors associated with fibrosis and unfavorable cosmetic outcomes after breast-conserving therapy [35], although evidence specific to complex oncoplastic procedures remains limited. The association between perioperative chemotherapy and poorer cosmesis may reflect impaired tissue repair, enhanced late radiation effects, or treatment-intensity confounding, as chemotherapy is more often administered to patients with biologically higher-risk disease who may also require more extensive local treatment. Accordingly, residual confounding cannot be excluded despite multivariable adjustment.

Concordance of NAC pedicle type between the ipsilateral and contralateral breasts was not significantly associated with cosmetic outcomes. On the ipsilateral side, surgical design is influenced not only by breast size and ptosis but also by tumor location and the anticipated direction of tissue displacement.

These findings suggest that strict mirroring of operative techniques on the contralateral side is not necessary to achieve satisfactory cosmesis. Similarly, concordance of resection site between breasts was not a significant predictor, indicating that contralateral procedures may be tailored to optimize overall breast symmetry rather than replicate tumor location [36, 37].

Another notable finding was the absence of a significant association between tumor location and cosmetic outcome. In conventional BCS, the UIQ has traditionally been regarded as one of the most challenging locations from an aesthetic standpoint [38, 39]. In the present study, however, cosmetic outcomes in this region were comparable to those in other quadrants, suggesting that TM may mitigate the location-specific cosmetic disadvantages typically encountered with standard BCS. This observation supports the applicability of TM across a broad range of tumor locations.

Importantly, an ipsilateral side resection ratio ≥ 15% was not identified as a significant predictor of poor cosmetic outcome. Although this finding should be interpreted with caution given the wide confidence interval, it suggests that relatively large partial resections may remain cosmetically acceptable when appropriate volume-displacement techniques are employed. Similarly, an absolute difference in bilateral resection ratio ≥ 5% was not significantly associated with unfavorable cosmetic outcomes. These findings indicate that postoperative appearance after bilateral TM may depend less on strict matching of resection volume and more on the effectiveness of overall breast reshaping and restoration of symmetry. In other words, the goal of contralateral surgery is not to replicate the resection ratio of the ipsilateral side, but to optimize the final three-dimensional breast balance. Collectively, these results suggest that, in bilateral TM, cosmetic outcomes are influenced more by the quality of breast remodeling and symmetry-oriented surgical planning than by resection volume metrics alone.

Perioperative complications, including wound edge necrosis, hematoma, and infection, occurred in 26.0% of patients, whereas only 5.8% required surgical intervention. In the study by Gulis et al. [29], the overall complication rate was similar (27%), but the rate of surgical intervention was higher (17%), suggesting that the safety profile observed in this study is at least comparable. TM involves greater tissue mobilization and longer incision lines than conventional BCS, which may increase the risk of wound complications. However, even in bilateral procedures with simultaneous contralateral reduction mammoplasty, the need for reoperation remained limited. Overall, TM with contralateral reduction mammoplasty appears to be a clinically acceptable and safe approach in appropriately selected patients, provided that complication risk is carefully managed.

These findings suggest that TM with contralateral reduction mammoplasty can achieve favorable oncologic and cosmetic outcomes in selected East Asian patients. However, several limitations should be acknowledged. First, this was a single-center retrospective study without a comparison group (e.g., conventional BCS), precluding direct comparisons between surgical approaches. Second, the cohort consisted exclusively of Japanese patients treated at a single institution and represents a selected TM-eligible population rather than the broader East Asian population. Therefore, these findings should not be generalized to all East Asian patients or to all individuals undergoing BCS, but rather interpreted as

supporting the feasibility and potential value of TM in appropriately selected patients with relatively large and ptotic breasts. Third, although cosmetic outcomes were assessed using BCCT.core and physician evaluation, PROs, such as the BREAST-Q [40], were not included, and the patient perspective was not fully captured.

Conclusion

In this selected East Asian TM-eligible population, TM with contralateral reduction mammoplasty was associated with favorable oncologic safety and cosmetic outcomes. Future prospective studies incorporating comparison groups, as well as multicenter collaborative studies are warranted to validate these findings in broader and more diverse patient populations.

Declarations

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Compliance with Ethical Standards

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical approval

This retrospective study involving human participants was approved by the Institutional Review Board/Ethics Committee of Nakagami Hospital (Approval No. 2026012).

Informed consent

For this type of study formal consent is not required. Information about this study was disclosed on the institutional website, and participants were given the opportunity to opt out.

Author contributions

Conceptualization: Ryohei Katsuragi and Hisamitsu Zaha; Methodology: Ryohei Katsuragi, Hisamitsu Zaha; Formal analysis: Shunichiro Orihara; Investigation and data curation: Ryohei Katsuragi, Norie Abe, Maho Okiyama, and Ayako Koki; Writing – original draft: Ryohei Katsuragi; Writing – review and editing: Ryohei Katsuragi, Hisamitsu Zaha, Norie Abe, Shunichiro Orihara, Maho Okiyama, Ayako Koki, and Toshihiko Satake; Supervision: Hisamitsu Zaha and Toshihiko Satake. All authors read and approved the final manuscript.

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Tables

Tables 1 to 4 are available in the Supplementary Files section.

Figures

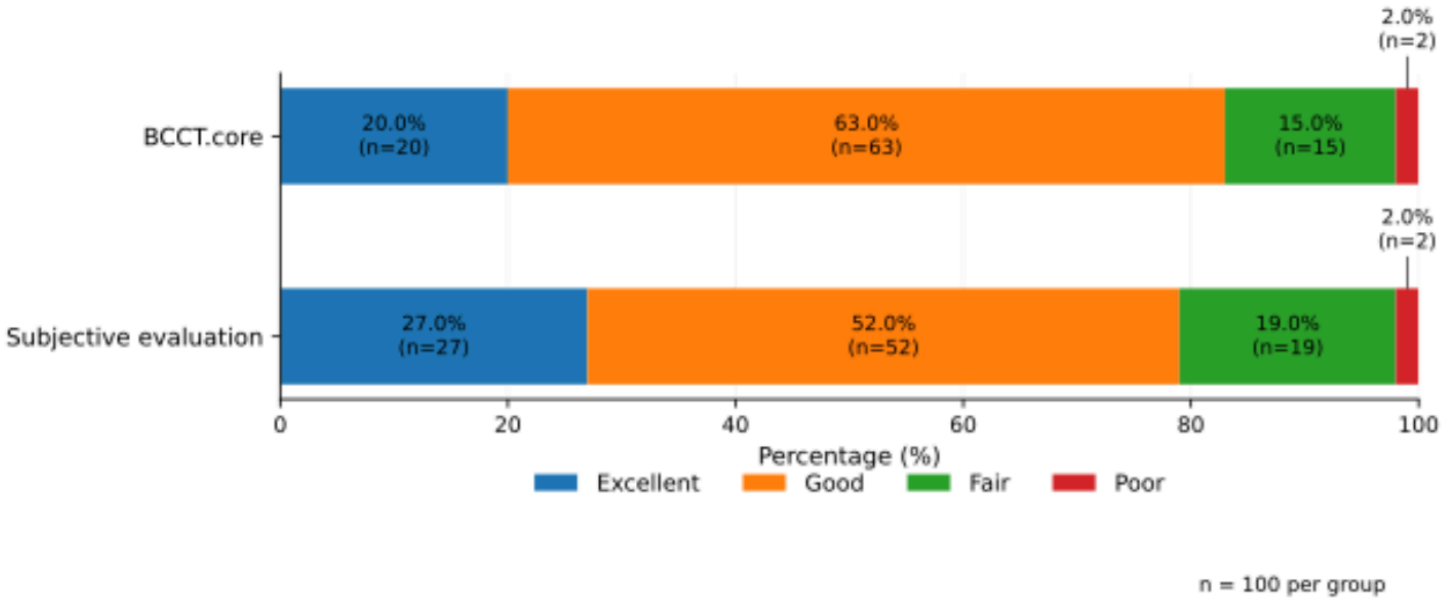


Figure 1

Cosmetic outcomes by BCCT.core and subjective evaluation

A 100% stacked bar chart showing the distribution of cosmetic outcome categories in patients with available 1-year postoperative photographs (n = 100). Cosmetic outcomes were categorized as Excellent, Good, Fair, and Poor for both BCCT.core (objective evaluation) and subjective evaluations. Values are presented as percentages (n). Favorable cosmetic outcomes (Excellent + Good) were observed in 83.0% (83/100) by BCCT.core and 79.0% (79/100) by subjective evaluation, whereas unfavorable cosmetic outcomes (Fair + Poor) were observed in 17.0% (17/100) and 21.0% (21/100), respectively.

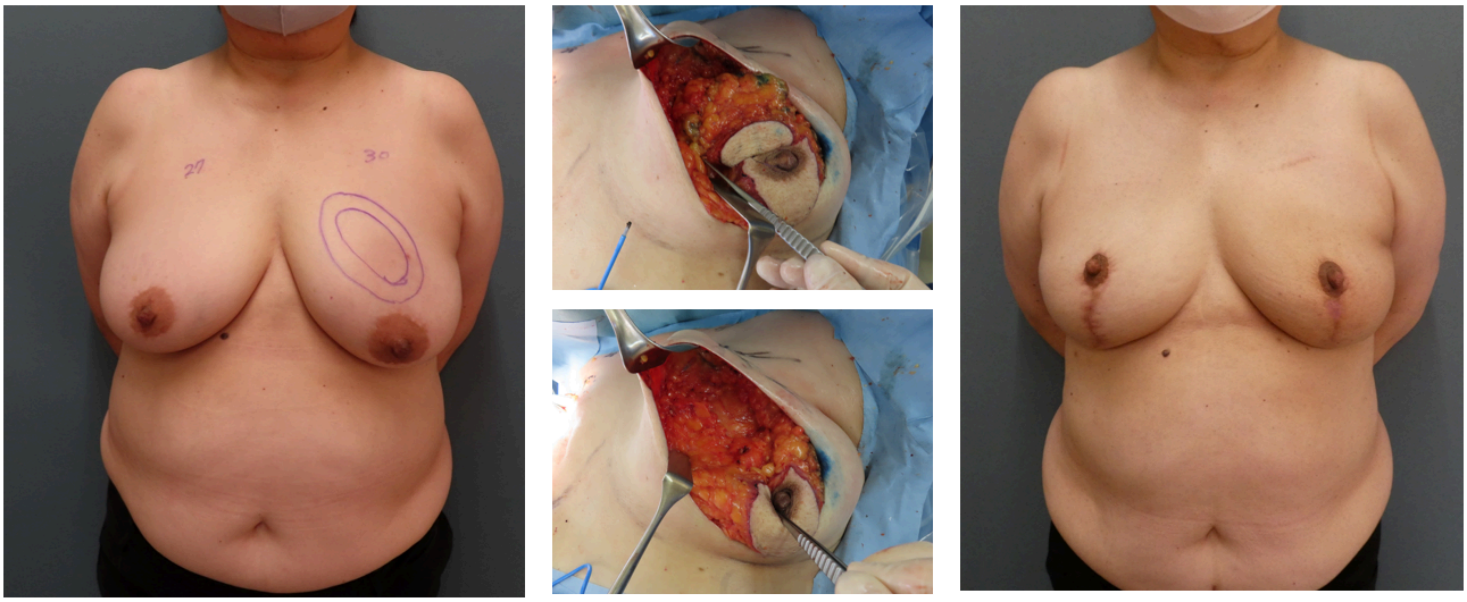


Figure 2

Representative case 1

A 67-year-old woman with a solitary 56-mm lesion in the upper inner quadrant underwent bilateral therapeutic mammoplasty with simultaneous contralateral reduction mammoplasty, using a vertical pattern and a central mound pedicle. The final diagnosis was ductal carcinoma in situ, with negative margins. Although the postoperative wound necrosis of the vertical scar required debridement, good symmetry and improved ptosis were observed. One year postoperatively, the cosmetic outcome was rated as excellent by BCCT.core and good by the Harvard scale. No recurrence was observed at 2.4 years of follow-up.

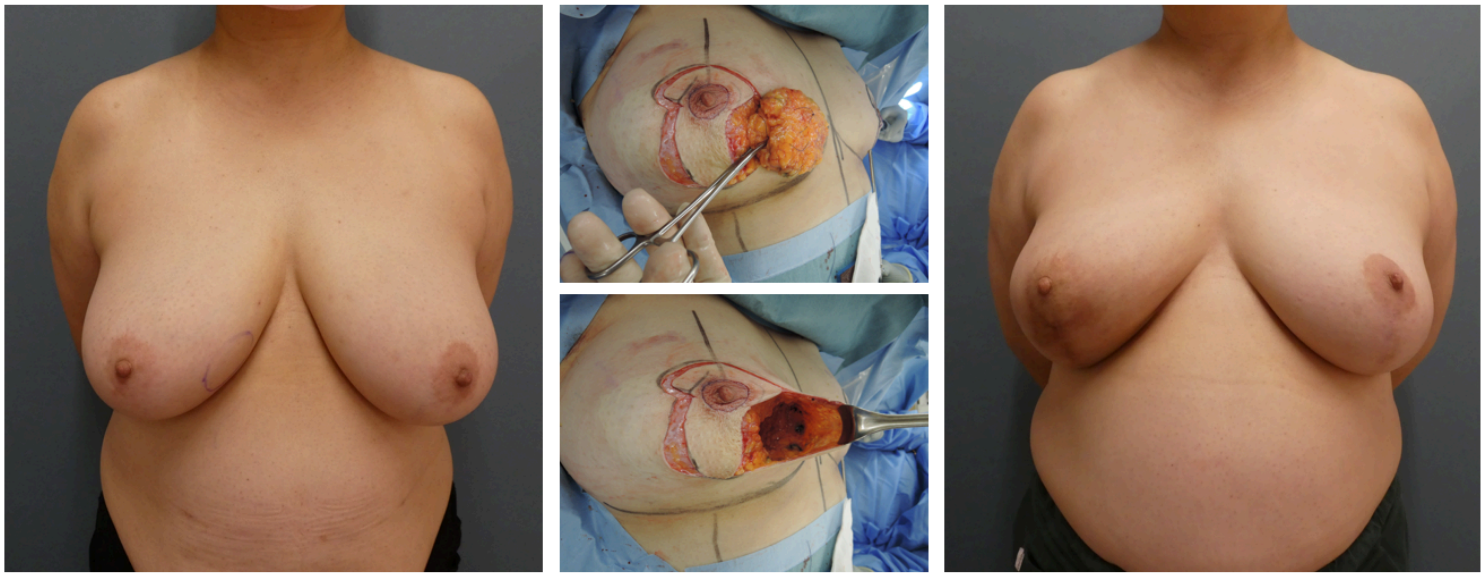


Figure 3

Representative case 2
A 57-year-old woman with a solitary 30-mm breast cancer in the lower inner quadrant underwent therapeutic mammoplasty with simultaneous contralateral reduction mammoplasty using a vertical pattern and superior pedicle bilaterally. At 1 year postoperatively, cosmetic outcome was rated Good by BCCT.core and Excellent by the Harvard scale, with grade 1 ptosis and good symmetry. No recurrence was observed at 3.0 years of follow-up.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Tables.docx
- SupplementaryFigure.pptx