



Oncoplastic breast surgery combining partial mastectomy with immediate breast reshaping using multiple local flaps for a patient with slim body

Yuko Kijima^{1,2,3} · Munetsugu Hirata³ · Yoshiaki Shinden³ · Toshiaki Utsumi¹ · Zenichi Morise² · Shoji Natsugoe³

Received: 14 November 2018 / Accepted: 18 January 2019 / Published online: 25 January 2019
© The Japanese Breast Cancer Society 2019

Abstract

Oncoplastic breast surgery (OBS), which combines the concepts of oncologic and plastic surgery, is becoming more common worldwide. We report the results of OBS in a Japanese patient with early breast cancer located on the outer lower quadrant area. We performed OBS combining partial mastectomy with immediate breast reshaping using multiple adipofascial cutaneous flaps and free dermal fat graft because she refused any other OBS. We selected three local flaps to repair the defect. Perioperative and postoperative complications were not seen. The cosmetic findings 3 years after surgery were not excellent, but the patient was satisfied with the results. OBS combining partial mastectomy with immediate breast reshaping using a combination of several flaps was successfully performed in a patient with early breast cancer.

Keywords Breast cancer · Oncoplastic breast surgery · Slim body · Volume replacement · Adipofascial flap

Introduction

Oncoplastic techniques, which combine the concepts of oncologic and plastic surgery, are becoming more common, especially in Western countries [1, 2]. There are many different oncoplastic surgical techniques, one of which involves careful planning of skin and parenchymal excisions, reshaping of the gland after parenchymal excisions, and repositioning of the nipple areola complex to the center of the breast mound with or without correction in the contralateral breast to achieve better symmetry [3–5]. We previously reported that resection of upper deformities followed by immediate volume displacement using a local flap or distant autologous

graft resulted in good outcomes [6–9] for patients with slim bodies and small breasts.

We herein report our rare experience of oncoplastic breast surgery (OBS) combining partial mastectomy with immediate breast reshaping using multiple flaps for early breast cancer located on the outer lower quadrant area of a slim Japanese woman to avoid using implants, myocutaneous flap, or flaps requiring vessel anastomosis.

Patient

A 45-year-old Japanese woman noticed a breast mass located on the outer lower quadrant area of the right breast. She went to a hospital and received fine needle aspiration biopsy, cytology was negative for malignancy. She did not receive a 6-month follow-up examination. Three years later, she noticed that the number of masses had increased from 1 to 3, and returned to the same hospital. At that hospital, she received cytological examination twice, which were both negative for malignancy. She received tumorectomy under local anesthesia at that hospital. The pathological diagnosis of the masses was invasive ductal carcinoma, pathological margin-positive, via incision on the inframammary line. She was introduced to our hospital for further examination and additional surgical treatment for local therapy and the

✉ Yuko Kijima
ykijima@fujita-hu.ac.jp

¹ Department of Breast Surgery, School of Medicine, Fujita Health University, 1-98 Dengakugakubo, Kutsukakecho, Toyoake, Aichi 470-1192, Japan

² Department of Digestive Surgery, School of Medicine, Fujita Health University, 1-98 Dengakugakubo, Kutsukakecho, Toyoake, Aichi 470-1192, Japan

³ Department of Digestive Surgery, Breast and Thyroid Surgery, Kagoshima University Graduate School of Medical and Dental Sciences, 8-35-1 Sakuragaoka, Kagoshima 890-8520, Japan

lymph nodes. CT, ultrasonography, and bone scintigraphy revealed that there were intraductal components of the breast cancer in the remnant gland and axillary lymph node metastasis, but no distant metastasis. She was diagnosed as having T1cN2aM0 Stage IIIA breast cancer, according to TNM classification [10], in the outer lower quadrant area. The patient did not suffer from systemic disease or distant metastasis. She was slim, and her breasts were non-ptotic. Informed consent was obtained from the patient for immediate repair of the partial defect. She refused immediate breast reconstruction using any breast implant, myocutaneous flap, or autologous breast reconstruction by vessel anastomosis. The reasons were that she wanted to avoid possible adverse event due to implant-based breast reconstruction, to avoid scarify any muscle, and to avoid being introduced another hospital to receive breast reconstruction by vessel anastomosis. She only agreed to immediate volume replacement using local flaps and free dermal fat graft. We planned partial mastectomy and axillary lymph node dissection followed by immediate volume replacement using multiple local flaps and free dermal fat graft from the lateral abdomen as oncologic breast surgery.

Surgical procedure and design

The patient was seen by the breast surgeon (Y.K) 2 days before surgery so that the surgeon could plan the operation and make drawings. The surgical scar, located just on the inframammary line at 7–9 o'clock, was planned to be removed because of the possibility that cancerous components were implanted at the time of the initial operation.

For OBS combining partial mastectomy with immediate breast reshaping using multiple local adipofascial flaps, incision lines were drawn in blue ink along an inframammary line from 6 o'clock to the axillary area. The remnant lesions and resection area were drawn as a red circle and dotted area with black ink, respectively, on the outer lower quadrant area. Two local adipofascial flaps were drawn by dotted lines in blue ink, and the attached de-epithelialized dermis was also drawn with dotted-blue ink. The free dermal fat graft, measuring 12 × 4 cm in size, was planned to be harvested from the right lateral abdomen (Fig. 1).

Axillary lymph node dissection

Partial mastectomy followed by axillary lymph node dissection was done via the same incision.

Partial mastectomy in cylinder-shaped resection and volume displacement using multiple adipofascial cutaneous flaps and free dermal fat graft

Cylinder-shaped gland and the initial operation scar were removed together. During the operation, several surgical margins were histologically examined to ensure that cancerous lesions were completely removed (Fig. 2a–c). A thoracodorsal adipofascial flap with a crescent-shaped dermis was raised according to the marked lines (Fig. 2d). Some perforators were reserved as much as possible in accordance to a former report [11]. Next, we de-epithelialized the crescent-shaped area just on the inframammary line, and

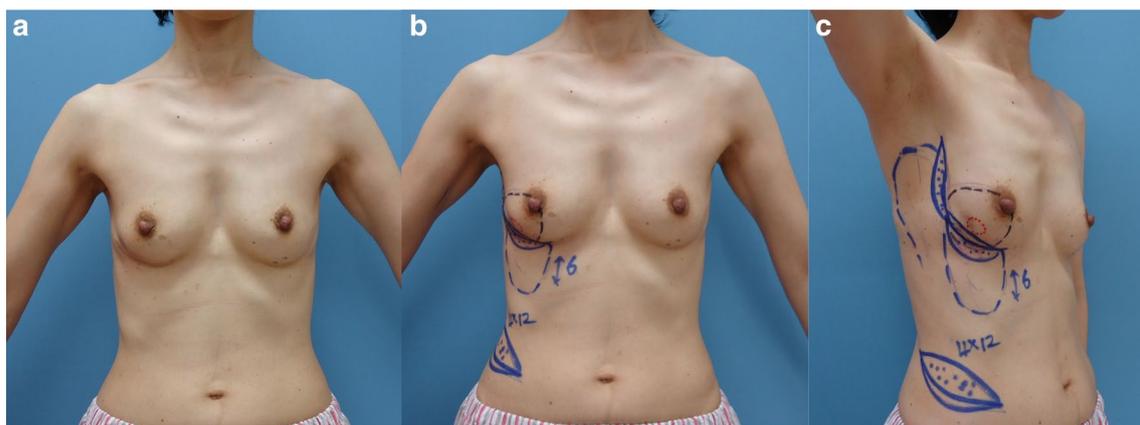


Fig. 1 **a** Preoperative findings of a 45-year-old woman with a slim body and non-ptotic breasts. **b, c** Surgical scar due to the initial operation located just on the inframammary line at 7–9 o'clock on the right breast. Incision lines were drawn in blue ink along an inframammary line from 6 o'clock to the axillary area. The remnant lesions and resection area were drawn as a red circle and dotted area with

black ink, respectively, on the outer lower quadrant area. Two local adipofascial flaps were drawn with a dotted line in blue ink, and the attached de-epithelialized dermis was also drawn with dotted-blue ink. A free dermal fat graft, measuring 12 × 4 cm in size, was planned to be harvested from the right lateral abdomen

raised an inframammary adipofascial flap (Fig. 2e). Then, we de-epithelized a leaf-shaped area on the lateral abdomen, and harvested free dermal fat by attaching subdermal fatty tissue to the dermis (Fig. 2f, g). We placed it so that the dermis side of the free dermal fat graft adhered to the serratus anterior muscle (Fig. 2h). Some sutures were added. Next, we pulled up the inframammary adipofascial cutaneous flap to the cranial side to cover the free dermal fat graft.

Some sutures were added between the edge of the flap and the remnant gland (Fig. 2i). We rotated the thoracodorsal adipofascial flap with a crescent-shaped dermis, covered the new breast mound, and fixed it using absorption thread (Fig. 2j–l). Finally, continuous closed suction drains were inserted into the subcutaneous defect at the donor site, axilla, and reconstructed breast. Several anchor sutures were added to the donor site using bolsters (Figs. 2m, 3).

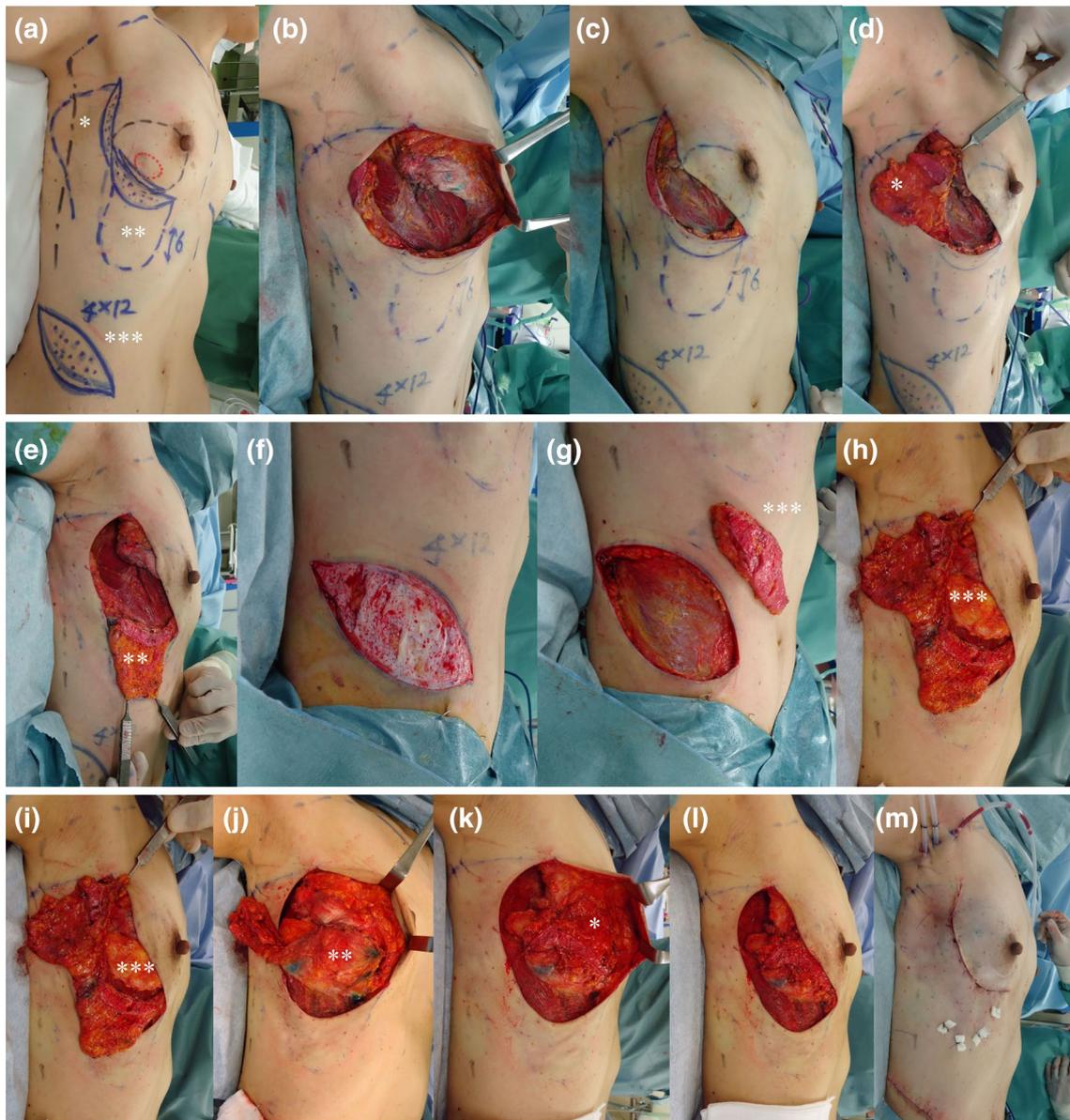


Fig. 2 **a, b** Cylinder-shaped gland and initial operation scar were removed together. **c, d** A thoracodorsal adipofascial flap (single asterisk) with crescent-shaped dermis was raised according to the marked lines. **e** An inframammary adipofascial flap was raised (double asterisks). **f, g** A leaf-shaped area on the lateral abdomen was de-epithelized and free dermal fat was harvested by attaching the subdermal fatty tissue to the dermis (triple asterisks). **h, i** A free dermal fat graft (triple asterisks) was placed on the surface of the anterior serratus muscle. Some sutures were

added. **j** The inframammary adipofascial cutaneous flap (double asterisks) was rolled up to the cranial side to cover the free dermal fat graft. **k, l** Finally, a thoracodorsal adipofascial flap with a crescent-shaped dermis (single asterisk) was rotated onto the surface of the inframammary adipofascial flap, and fixed using absorption thread to the remnant gland. **m** Continuous closed suction drains were inserted into the subcutaneous defect at the donor site, axilla, and reconstructed breast. Several anchor sutures were added to the donor site using bolsters

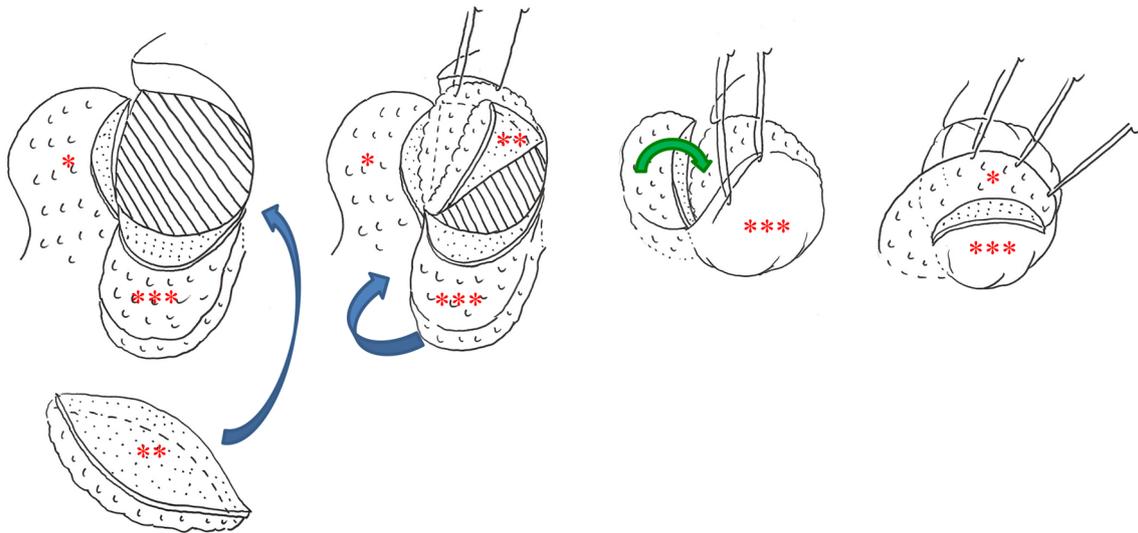


Fig. 3 Scheme of defect repair. A thoracodorsal adipofascial flap (single asterisk) with crescent-shaped dermis, an inframammary adipofascial flap was raised (double asterisks) and a free dermal fat graft (triple asterisks)

Intraoperative and postoperative records

A total operation period was 155 min and a plastic period was 90 min, respectively. Intraoperative bleeding was 50 g. Postoperative hospital stay was 12. On restricted area (3 × 1 cm) of the skin flap closed to incision, wound healing delayed which resulted in cure without any surgical treatment. White scar was formed on that area.

Results

Out of dissected 21 lymph nodes, one was diagnosed as being metastasized. In resected breast tissue, 3 × 3 mm of invasive lesion was left just under the resected skin. All margins were free from cancer involvement not only intraductal but also invasive component. Pathologically, she was diagnosed as pT1N1aM0 stage IIA. Estrogen receptor, progesterone receptor, HER2 status, and MIB-1 index were positive, positive, negative, and 30%, respectively. The patient received postoperative radiation therapy for the remnant gland and systemic hormone therapy. Although the volume of the outer lower area of the breast was insufficient and the ideal roundness of the breast was not naturally kept, the level and position of the nipple and the projection of the breast were still symmetrical 3 years after surgery (Fig. 4a, b). By mammography and CT scan, the three flaps were judged to have fulfilled the defect completely (Fig. 5a, b). There has been no distant or local recurrence to present.

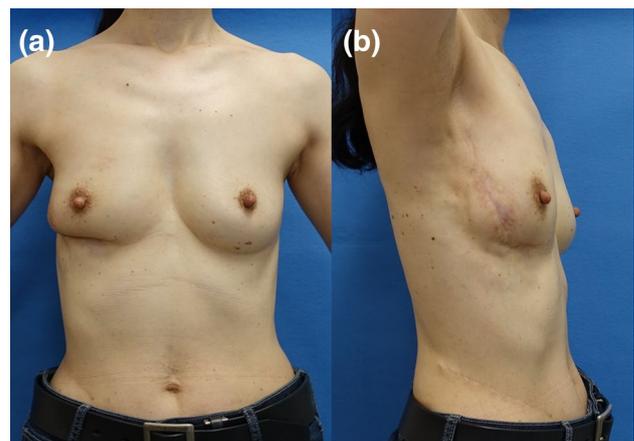
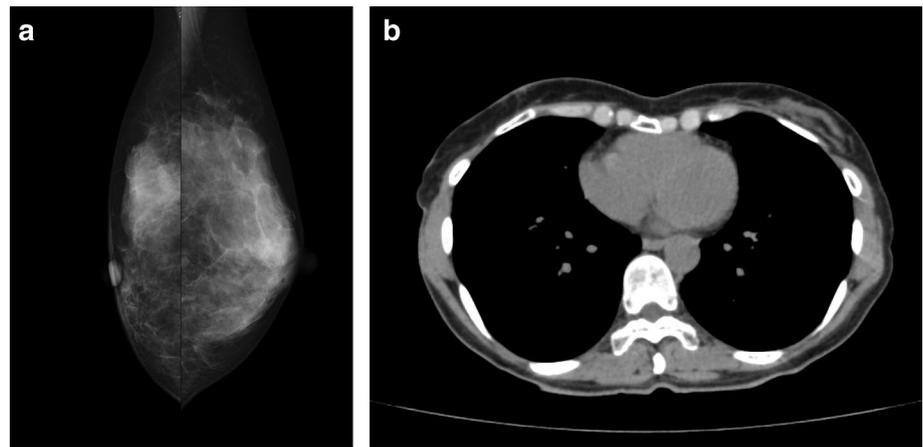


Fig. 4 Postoperative findings 3 years later. **a, b** Macroscopic findings

Discussion

The era of breast-conserving therapy (BCT) was heralded by landmark prospective randomized clinical trials conducted by Fisher and Veronesi that demonstrated equivalent survival with BCT and conventional treatment when comparing surgery of small tumors [12, 13]. The main aims of breast-conserving therapy are both locoregional control and survival, and a good cosmetic outcome. Volume replacement is one of the main types of oncoplastic breast surgery, along with volume displacement [14]. Obtaining clear excision margins with BCT for large tumors is difficult and the cosmetic outcome is often poor [15–17]. Up to 20–30% of patients post-BCT present with residual deformities, which

Fig. 5 Mammography and CT findings 3 years later. On lower half of the right breast, density is lower than that of healthy left breast. **a** Mammography findings. **b** CT findings



may be further exacerbated by adjuvant chemotherapy [18–20]. The tumor size in relation to the breast size is one of the most important factors to determine a cosmetically favorable result [21].

The oncological safety of BCT is demonstrated by the status of surgical margins. Difficult cases for margin assessment include patients in post-neoadjuvant chemotherapy, and those with ductal carcinoma in situ, lobular carcinoma, or multifocal disease. Intraoperative margin assessment appears to reduce the re-excision rate while minimizing the extra tissue resected [22]. Frozen section is a reliable option for intraoperative margin assessment that guides the surgeon in excision and parenchymal flap planning. In conventional BCT without volume replacement or volume displacement, re-excision rates are as high as 20–70%. Patients with focally positive margins have a relative risk of local breast cancer recurrence of almost 15 times that of patients with negative margins [23]. In our case, tumorectomy was performed to get a histological diagnosis at another hospital and resulted in positive margins. We carefully determined the surgical margins far from the operation scar with a 3-cm distance to avoid re-positive margins.

For patients with a slim body and cancer lesions located on the lower area of the breast, the cosmetic outcome might worsen. We previously reported some volume replacement techniques for such patients. According to the cancerous location, we selected a single flap to repair the defect at the time of partial resection. The volume of the flap, which is a complex of fatty and cutaneous tissue, sometimes depends on the thickness of the fatty tissue close to the breast defect. We selected the latissimus dorsi muscle flap for immediate volume replacement for a patient treated with a slim body under a decision of larger resection due to cancer spread [24]. In this case, we avoid performing immediate volume replacement using a myocutaneous flap and artificial breast implant due to the patient's wishes. We selected a combination of multiple flaps and free dermal fat graft which we had experience of using alone because it was expected

that the defect size would be larger than that possible to be repaired by single flap. Another volume replacement technique using a perforator flap might be sufficient to provide enough volume to repair the defect without any combination. Because we did not have any experience of volume replacement using such a perforator flap, we selected a combination of multiple local flaps which resulted in a successful procedure.

Superior points are to avoid total mastectomy for a patient indicative for breast-conserving surgery, to minimize the breast deformity, and to avoid adverse event due to breast reconstruction using tissue expander, silicon breast implant such as infection, capsule contracture, deviation of the implant, etc. Inferior points are that we cannot show the evidence of this procedure because it is our first report. It is difficult to repair the defect for patients with extremely thin patient. We think that it is necessary for a surgeon to experience an immediate volume replacement using one flap before a combination of multiple flaps.

For a patient in need of partial resection of a large area of the breast, immediate volume replacement using multiple local flaps, such as adipofascial cutaneous flap, and free dermal fat graft is one of the best surgical options for oncoplastic breast surgery. It would also be indicative for a patient who does not want to receive implant-based breast reconstruction or who wants to avoid receiving volume displacement using a muscle-cutaneous flap. This surgery is expected to become one of the choices of oncoplastic surgery for patients with non-ptotic or small breasts.

Funding We have no funding source.

Compliance with ethical standards

Conflict of interest We declare no financial relationships or other interests associated with this manuscript, which might be construed as constituting a conflict of interest.

References

- Audretsch WP, Rezai M, Kolotas C, et al. Onco-plastic surgery: “target” volume reduction (BCT-mastopexy), lumpectomy reconstruction (BCT-reconstruction) and flap-supported operability in breast cancer. In: Proceeding 2nd European congress on senology; October 2–6, 1994; Vienna, Austria, pp 139–157.
- Audretsch WP, Rezai M, Kolotas C, et al. Tumor-specific immediate reconstruction (TSIR) in breast cancer patients. *Perspect Plast Surg.* 1998;11:71–106.
- Masetti R, Pirulli PG, Magno S, et al. Oncoplastic techniques in the conservative surgical treatment of breast cancer. *Breast Cancer.* 2000;7:276–80.
- Kijima Y, Yoshinaka H, Funasako Y, et al. Oncoplastic surgery after mammary reduction and mastopexy for bilateral breast cancer lesions: reports of a case. *Surg Today.* 2008;38:335–9.
- Zaha H, Hakazu O, Watanabe M, Higa M. Breast-conserving surgery using reduction mammoplasty. *Jpn J Breast Cancer.* 2008;223:211–5 (**in Japanese with English abstract**).
- Kijima Y, Yoshinaka H, Funasako Y, et al. Immediate reconstruction using thoracodorsal adipofascial flap after partial mastectomy. *Breast.* 2009;18:126–9.
- Kijima Y, Yoshinaka H, Owaki T, Aikou T. Early experience of immediate reconstruction using autologous free dermal fat graft after breast conservational surgery. *J Plast Reconstr Aesthet Surg.* 2007;60:495–502.
- Kijima Y, Yoshinaka H, Hirata M, et al. Clinical and pathological evaluation of implanted free dermal fat graft after breast cancer surgery: a retrospective analysis. *Surgery.* 2012;151:444–55.
- Kijima Y, Yoshinaka H, Funasako Y, et al. Immediate breast reconstruction using autologous free dermal fat graft provides better cosmetic results for patients with upper inner cancerous lesion. *Surg Today.* 2011;41:477–89.
- Sobin LH, Gospodarowicz MK, Wittekind Ch. TNM classification of malignant tumours, 8th ed. New York: Wiley; 2017.
- Kijima Y, Yoshinaka H, Hirata M, et al. Immediate reconstruction using a modified thoracodorsal adipofascial cutaneous flap after partial mastectomy. *Breast.* 2011;20:464–7.
- Fisher B, Anderson S, Bryant J, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. *N Engl J med.* 2002;347:1233–41.
- Veronesi U, Casinelli N, Mariani L, et al. Twenty-year follow-up of a randomized study comparing breast-conserving surgery with radical mastectomy for early breast cancer. *N Engl J med.* 2002;347:1227–32.
- Grubnik A, Benn C, Edwards G. Therapeutic mammoplasty for breast cancer: oncological and aesthetic outcomes. *World J Surg.* 2013;37(1):72–83.
- Dewar JA, Benhamou S, Benhamou E, et al. Cosmetic results following lumpectomy axillary dissection and radiotherapy for small breast cancers. *Radiother Oncol.* 1988;12:273–80.
- Sacchini V, Luini A, Tana S, et al. Quantitative and qualitative cosmetic evaluation after conservative treatment for breast cancer. *Eur J Cancer.* 1991;27:1395–400.
- Amichetti M, Busana L, Caffo O. Long-term cosmetic outcome and toxicity in patients treated with quadrantectomy and radiation therapy for early-stage breast cancer. *Oncology.* 1995;52:177–81.
- Rose MA, Olivotto I, Cady B, et al. Conservative surgery and radiation therapy for early breast cancer. Long-term cosmetic results. *Arch Surg.* 1989;124:153–7.
- Abner AL, Recht A, Vicinit FA, et al. Cosmetic results after surgery, chemotherapy, and radiation therapy for early breast cancer. *Int J Radiat Oncol Biol Phys.* 1991;21:331–8.
- Moro G, Ciambellotti E. Evaluation of the esthetic results of conservative treatment of breast cancer. *Tumori.* 1993;79:258–61.
- Clough K, Cuminet J, Fitoussi A, et al. Cosmetic sequelae after conservative treatment for breast cancer: classification and results of surgical correction. *Ann Plast Surg.* 1998;41:471–81.
- Sabel MS. Surgical considerations in early-stage breast cancer: lessons learned and future directions. *Semin Radiat Oncol.* 2011;21:10–9.
- Schnitt SJ, Abner A, Gelman R, et al. The relationship between microscopic margins of resection and the risk of local recurrence in patients with breast cancer treated with breast-conserving surgery and radiation therapy. *Cancer.* 1994;74:1746–51.
- Kijima Y, Yoshinaka H, Shinden Y, et al. Oncoplastic breast surgery for centrally located breast cancer: a case series. *Gland Surg.* 2014;3(1):62–73.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.