CASE REPORT

Nagoya J. Med. Sci. **88**. 157–161, 2026
doi:10.18999/nagjms.88.1.157

A case of reconstruction for triple-negative metaplastic breast cancer that enlarged rapidly during neoadjuvant immunochemotherapy

Kazuhiro Toriyama[1], Souji Yoshimura[1], Ryota Nakamura[1], Yumi Wanifuchi-Endo[2] and Tatsuya Toyama[2]

[1]*Department of Plastic and Reconstructive Surgery, Nagoya City University Graduate School of Medical Sciences, Nagoya, Japan*
[2]*Department of Breast Surgery, Nagoya City University Graduate School of Medical Sciences, Nagoya, Japan*

ABSTRACT

We report a case of reconstruction for triple-negative metaplastic breast cancer that rapidly enlarged during neoadjuvant immunochemotherapy, requiring semi-emergency surgery. A 47-year-old female with metaplastic carcinoma (cT2N0M0, stage IIA) received pembrolizumab, paclitaxel, and carboplatin in a neoadjuvant fashion. Rapid tumor enlargement and axillary lymph node swelling occurred during the first cycle of immunochemotherapy, necessitating semi-emergency surgery to prevent tumor rupture (cT4bN1M0, stage IIIB). Right mastectomy with partial pectoralis major muscle resection and axillary lymph node dissection were performed, exposing the ribs and sternum. Reconstruction utilized an internal mammary artery perforator flap with caudal rotation-advancement, followed by meshed skin grafting. Despite partial epidermal necrosis, wound closure was achieved after 3 weeks. Chemotherapy resumed 4 weeks after surgery; radiation therapy was initiated 4.5 months later. The patient remains disease-free 18 months after surgery. To our knowledge, mastectomy with pectoralis major resection and internal mammary artery perforator flap reconstruction for a triple-negative metaplastic breast cancer that had rapidly progressed during neoadjuvant therapy has not been previously reported.

Keywords: adjuvant chemotherapy, internal mammary artery perforator flap, neoadjuvant immunochemotherapy, semi-emergency surgery, triple-negative metaplastic breast cancer

INTRODUCTION

Surgery is generally the first-line treatment for metaplastic breast carcinomas, which are typically resistant to chemotherapy.[1] Triple-negative carcinomas respond better to immunochemotherapy than to chemotherapy alone.[2,3] Oncology cases involving urgent surgery, adjuvant chemotherapy, and postoperative radiation are challenging for plastic surgeons. We report a

Received: June 6, 2025; Accepted: August 5, 2025

Corresponding Author: Kazuhiro Toriyama, MD, PhD
Department of Plastic and Reconstructive Surgery, Nagoya City University Graduate School of Medical Sciences, 1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya 467-8602, Japan
Tel/Fax: +81-52-858-7514, E-mail: toriyama@med.nagoya-cu.ac.jp

patient with triple-negative metaplastic breast cancer that rapidly progressed during neoadjuvant immunochemotherapy and required semi-emergency resection with immediate reconstruction using an internal mammary artery perforator flap with caudal rotation-advancement and meshed skin grafting.[4] Skin grafting or a latissimus dorsi or rectus abdominis flap could also have been considered as alternatives. Even though partial epidermal necrosis occurred in the postoperative period, wound closure was achieved after 3 weeks.

CASE PRESENTATION

A 47-year-old female presented with a right breast fibroadenoma that had been enlarging over the previous 6 months. It was initially diagnosed 10 years previously. A core needle biopsy was consistent with invasive carcinoma, and she was referred to our hospital for further care. The final pathological diagnosis was triple-negative (negative for the estrogen and progesterone receptors and the human epidermal growth factor receptor 2) metaplastic carcinoma, nuclear grade 3. According to the General Rules for Clinical and Pathological Recording of Breast Cancer, 18th edition,[5] the tumor was classified as cT2N0M0 (stage IIA). The patient had no previous history of diabetes mellitus and had never smoked. She was treated using the Keynote-522 regimen with pembrolizumab once every 3 weeks, paclitaxel once weekly, and carboplatin once every 3 weeks for the first 12 weeks.[2,3] Physical examination 1 week after treatment initiation revealed rapid tumor progression, with enlargement from 40 mm to 68 mm; 1 week later, the tumor had progressed to 80 mm. During week 2 of cycle 1, the tumor rapidly enlarged in conjunction with development of axillary lymph node swelling and skin redness, which required urgent surgery to prevent tumor rupture. At this point, the patient was re-staged as cT4bN1M0 (stage IIIB) (Fig. 1).

We performed a right mastectomy, maintaining a 1 cm margin from the site where skin invasion was suspected. Because only the thinly stretched pectoralis major muscle and its fascia remained between the tumor and the chest wall, these structures were resected as well. Axillary lymph nodes were systematically dissected up to level 2. Flap reconstruction was planned because her ribs and sternum were partially exposed (Fig. 2A).

The exposed ribs and sternum were covered using an internal mammary artery perforator flap with caudal rotation-advancement (Fig. 2B).[4] The newly created skin defect over the pectoralis

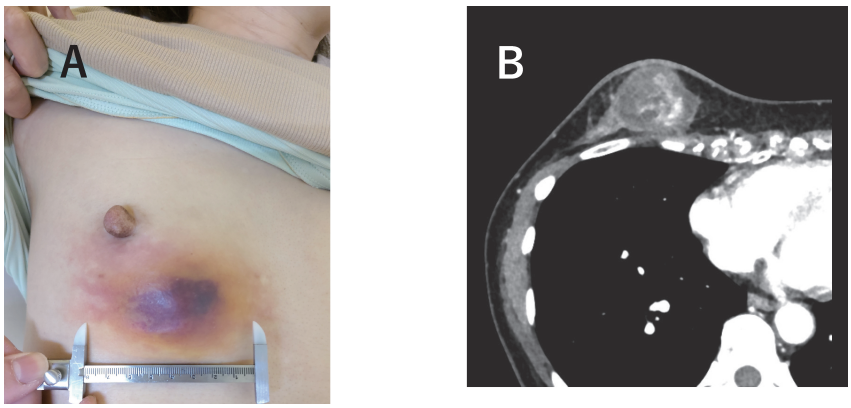

Fig. 1 Preoperative findings
Fig. 1A: Anterior chest photograph
Fig. 1B: Axial computed tomography image

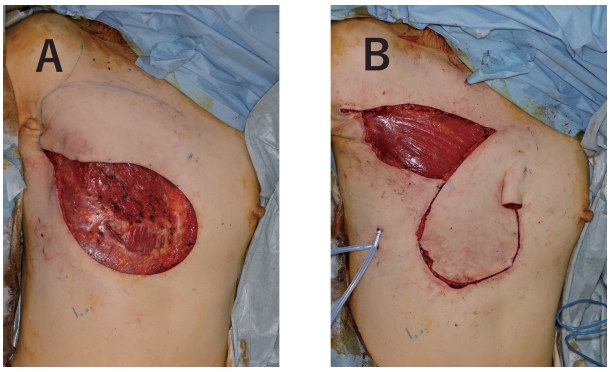

Fig. 2 Operative photographs
Fig. 2A: Post-resection clinical photograph
Fig. 2B: Photograph following flap transfer

major muscle was then covered using a meshed skin graft from the thigh.

Although partial epidermal necrosis of the flap occurred, wound closure was achieved 3 weeks after surgery. The final pathological diagnosis was triple-negative metaplastic carcinoma. All lymph nodes were negative, and the treatment effect was grade 2a. Chemotherapy was resumed 4 weeks after surgery, and radiation therapy was initiated 4.5 months later. Six months after surgery, oral levothyroxine was initiated to treat hypothyroidism. At the 18-month follow-up, the patient was disease free. From a cosmetic perspective, although the skin graft area over the pectoralis major muscle and the dog ear of the flap had become noticeable, she was not agreeable to additional revision under general anesthesia. Therefore, only the dog ear was surgically corrected under local anesthesia (Fig. 3).

She remains under close surveillance.

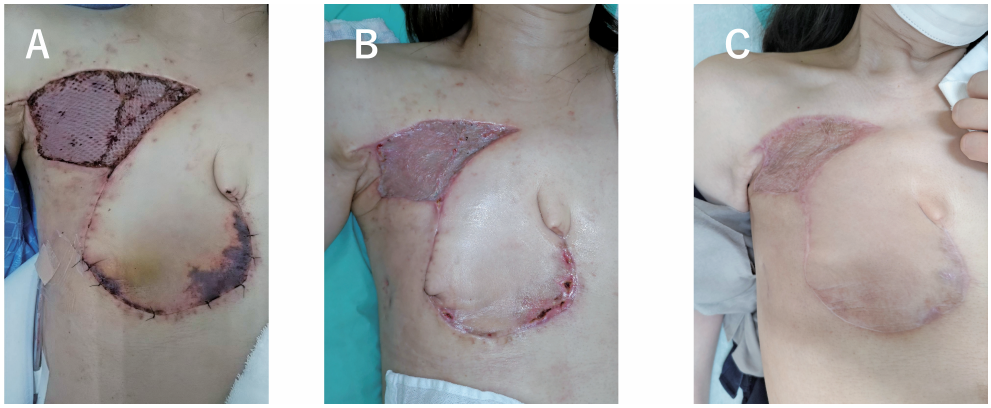

Fig. 3 Postoperative clinical course
Fig. 3A: Partial epidermal necrosis was observed on postoperative day 9.
Fig. 3B: The necrosis had become localized by postoperative day 20.
Fig. 3C: Postoperative 18 months prior correction

DISCUSSION

Metaplastic breast carcinoma exhibits inherent resistance to conventional neoadjuvant chemotherapy—pathological complete response rates are as low as 20%.[6] Approximately 50% of patients show no clinical response or clinicoradiological progression during neoadjuvant therapy.[6] Based on our review of the PubMed database, semi-emergency surgery and reconstruction owing to tumor progression during neoadjuvant chemotherapy have not been previously reported. In our patient, the tumor doubled in size during the first cycle of immunochemotherapy, which was accompanied by skin erythema and axillary lymph node swelling, necessitating semi-emergency surgery to prevent tumor rupture. Flap surgery was subsequently required because we also had to resect the erythematous skin and underlying tissue.

Planning skin and soft tissue reconstruction of the chest in the context of comprehensive breast cancer treatment poses a significant challenge for plastic surgeons. Options include skin grafting and various flaps, including internal mammary artery perforator, latissimus dorsi, and rectus abdominis flaps. Theoretically, skin grafting can be applied to exposed ribs with intact periosteum. Skin grafts occasionally fail due to desiccation. In addition, skin graft failure may occur after radiation therapy owing to radiation-induced tissue damage. Therefore, skin grafting is usually not the optimal reconstructive choice.

In our patient, the exposed ribs and sternum involved half of the chest wall and crossed the midline, so an internal mammary artery perforator flap was used.[4] Flap rotation was performed to cover across the midline without needing to make any incisions on the contralateral side. Such a flap does not require position changes during surgery, provides good color matching, and covers the defect with appropriate tissue thickness. However, because it results in a new skin defect, a mesh split-thickness skin graft was placed over the exposed pectoralis major muscle. The widened area of the flap developed partial necrosis but subsequently healed.

Although the deltopectoral flap is an alternative option for extensive defects, it has a limited arc of rotation due to its dependence on three perforators and requires skin grafting at the donor site on the shoulder.[4] Muscle flaps are also an appropriate option for reconstructing extensive chest wall defects involving skin and subcutaneous tissue. Latissimus dorsi and rectus abdominis flaps are commonly used options. The latissimus dorsi flap can cover a wide area with skin and muscle, but requires intraoperative position changes.[7] The rectus abdominis flap can also cover a relatively wide area, but the abdominal fat is frequently thick, creating unevenness that may require skin grafting in areas of discrepancy.[8]

From the patient's perspective, the cosmetic outcome of the operation is an important consideration. The patient in this case later expressed dissatisfaction with the mesh skin graft over the pectoralis major muscle, saying "I disliked seeing the muscle through it." She is currently receiving psychological support owing to fatigue, frustration with her condition, and anxiety. This feedback is entirely valid, and we should have chosen a sheet-type split-thickness skin graft instead of a mesh graft. Achieving an acceptable cosmetic outcome after chemotherapy and radiation therapy can be quite challenging because of multiple factors, including complications associated with chemotherapy, tissue changes following radiation, and the psychology and mindset of each individual patient.

CONCLUSIONS

This case reports reconstruction for triple-negative metaplastic breast cancer that rapidly enlarged during neoadjuvant immunochemotherapy. The internal mammary artery perforator flap

with skin grafting proved effective for covering exposed ribs and sternum, although challenges remained regarding aesthetic satisfaction.

ETHICAL APPROVAL

Written informed consent was obtained from the patient for the publication of this case report and the accompanying images. This single case report, performed under standard insurance coverage, does not require ethical review as per Nagoya City University Hospital guidelines.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

FUNDING

None.

ACKNOWLEDGMENT

We thank Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript.

REFERENCES

1 Püsküllüoğlu M, Konieczna A, Świderska K, et al. Treatment outcomes and prognostic factors in nonmetastatic metaplastic breast cancer patients: a multicenter retrospective cohort study. *Acta Oncol.* 2024;63:620–635. doi:10.2340/1651-226X.2024.40413

2 Ladwa A, Elghawy O, Schroen A, Abernathy K, Schlefman J, Dillon P. Complete response of triple-negative metaplastic carcinoma of the breast using pembrolizumab. *Case Rep Oncol.* 2023;16(1):1129–1135. doi:10.1159/000534146

3 Schmid P, Cortes J, Dent R, et al. Overall survival with pembrolizumab in early-stage triple-negative breast cancer. *N Engl J Med.* 2024;391(21):1981–1991. doi:10.1056/NEJMoa2409932

4 Nishimon M, Ohara H, Ohara K, Ogata H, Kishi K. Clinical application of the internal mammary artery perforator adipofascial flap. *Plast Reconstr Surg Glob Open.* 2019;7(3):e2062. doi:10.1097/GOX.0000000000002062

5 Japanese Breast Cancer Society, ed. *General rules for clinical and pathological recording of breast cancer.* 18th ed. Published in Japanese. Kanehara Publishing; 2018.

6 Wong W, Brogi E, Reis-Filho JS, et al. Poor response to neoadjuvant chemotherapy in metaplastic breast carcinoma. *NPJ Breast Cancer*. 2021;7(1):96. doi:10.1038/s41523-021-00302-z

7 Apffelstaedt J. Indications and complications of latissimus dorsi myocutaneous flaps in oncologic breast surgery. *World J Surg*. 2002;26(9):1088–1093. doi:10.1007/s00268-002-6277-9

8 Lin YN, Ou-Yang F, Hsieh MC, et al. Use of extended pedicled transverse rectus abdominis myocutaneous flap for extensive chest wall defect reconstruction after mastectomy for locally advanced breast cancer. *Ann Plast Surg*. 2020;84(1S Suppl 1):S34–S39. doi:10.1097/SAP.0000000000002188