



Modified goldilocks nipple-sparing mastectomy with immediate prepectoral implant-based reconstruction: a case report

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Background: Nearly 80% of women who undergo post-mastectomy reconstruction opt for implant-based reconstruction. Preservation of the nipple-areolar complex (NAC) in nipple-sparing mastectomy (NSM) significantly improves patient satisfaction; however in women with macromastia or breast ptosis, NAC preservation carries an increased risk of nipple ischemia. Traditional options have included free nipple grafts or a staged reconstruction, however in patients with aggressive or multifocal breast cancer, this is not feasible due to the need for timely oncologic resection. The Goldilocks mastectomy, which utilizes redundant adipodermal tissue to recreate a breast mound, was originally designed for women with large or ptotic breasts who did not desire post-mastectomy reconstruction. However, this technique has been modified in several ways. In this case report, we present our approach to a patient with breast ptosis and multifocal breast cancer who desired NAC preservation, volume preservation and mastopexy using the modified Goldilocks technique with pre-pectoral implant-based reconstruction.

Case Description: A 38-year-old woman, with a bra size of 36C, presented with grade II, multifocal, estrogen receptor positive, progesterone receptor negative, human epidermal growth factor receptor-2 positive right breast infiltrating ductal carcinoma. The patient's aesthetic goals included: preservation of the NACs, elevation of NAC position, reduction in areola diameter, and maintenance of breast volume using implant-based reconstruction. As a result of her multifocal breast cancer, she was not a candidate for staged mastopexy followed by mastectomy and reconstruction. Therefore, the patient underwent bilateral Goldilocks NSM, right sentinel lymph node biopsy, and immediate implant-based reconstruction using the modified Goldilocks technique with acellular dermal matrix (ADM). At 3-month follow-up, the patient was satisfied with the overall aesthetic outcome of her breasts.

Conclusions: We present a patient with breast ptosis and multifocal breast cancer who desired NAC preservation and implant-based reconstruction, but was not a candidate for staged reoperation. This case report is the first to describe a modified Goldilocks NSM with pre-pectoral implant-based reconstruction.

Keywords: Breast cancer; nipple sparing mastectomy (NSM); goldilocks; breast ptosis; case report

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Introduction

Recent reports by the American Society of Plastic Surgeons demonstrate that nearly 80% of women who undergo mastectomy and reconstruction opt for prosthetic-based reconstruction (1). Preservation of the nipple-areolar

complex (NAC) in nipple-sparing mastectomy (NSM) significantly improves patient satisfaction and psychosexual wellbeing (2). While able to achieve highly aesthetic results in women with non-ptotic, small/moderate-sized breasts, preserving the NAC carries an increased risk of nipple ischemia in patients with macromastia or breast ptosis due

to compromised blood supply (3). Thus, in this subset of women who desire NAC preservation, traditional options include free nipple grafts or staged reconstruction with reduction mammoplasty/mastopexy followed by NSM with prosthetic insertion (4). However, in patients with aggressive or multifocal breast cancer, a staged reconstruction is not feasible due to the need for timely oncologic resection.

The Goldilocks mastectomy was originally designed for women with large or ptotic breasts who did not desire prosthetic-based reconstruction and were not candidates for lengthy autologous reconstruction (5). The technique utilizes redundant adipodermal tissue preserved during the mastectomy to recreate a breast mound, but the resultant breast often lacks volume and projection (5,6). In this case report, we present our approach to a patient with breast ptosis and multifocal breast cancer who desired NAC preservation, volume preservation and mastopexy using the modified Goldilocks technique with pre-pectoral implant-based reconstruction. We present the following case in accordance with the CARE reporting checklist (available at <https://gs.amegroups.com/article/view/10.21037/ggs-22-74/rc>).

Case presentation

A 38-year-old woman, with a BMI of 25 and bra size of 36C, presented with grade II, multifocal, ER positive, PR negative, HER-2 positive right breast infiltrating ductal carcinoma. She had undergone neoadjuvant chemotherapy with excellent clinical response. Pre-operative breast evaluation revealed pendulous breasts with grade 2 ptosis, and right and left breast midclavicle-to-inframammary fold (IMF) measurements were 34 and 33 cm, respectively, with a bilateral base width of 12 cm. The patient's goals were: preservation of the NACs, elevation of NAC position, reduction in areola diameter, and maintenance of breast volume using implant-based reconstruction. As a result of her multifocal breast cancer, she was not a candidate for staged mastopexy followed by mastectomy and reconstruction. She also did not want breast conservation therapy with radiation. Therefore, the patient underwent bilateral Goldilocks NSM, right sentinel lymph node biopsy, and immediate implant-based reconstruction using the modified Goldilocks technique with acellular dermal matrix (ADM) (SurgiMend, Integra LifeSciences, Princeton, NJ, USA) (*Figure 1*).

Preoperatively, a standard Wise pattern skin incision was marked with the patient standing to provide access to the parenchyma, tighten the skin envelope and elevate

the NAC (*Figure 1A*). Intraoperatively, with the patient supine, the NAC was incised to a diameter of 38 mm, and the surrounding inferior adipodermal pedicle was de-epithelialized bilaterally. The inferior pedicle, with the attached NAC, was then elevated off the parenchyma to the level of the IMF to create an adipodermal flap based off of chest wall perforators. Mastectomy flaps were then raised followed by dissection of the breast parenchyma and pectoralis major fascia off the chest wall.

Indocyanine green angiography was performed to ensure adequate perfusion of the mastectomy flaps and NACs (*Figure 2*). Following confirmation of flap viability, 190 mL Mentor high-profile implants were chosen based on the patient's preference and anatomy. The implants were wrapped circumferentially in ADM and then placed in the pre-pectoral plane, with the adipodermal flap acting as an inferior sling to provide inferior support and anterior coverage (*Figure 1B*). The nipple was then exteriorized through the keyhole and the incision closed in layered fashion (*Figure 1C*).

At one-week follow-up, the patient's breasts appeared symmetric with expected postoperative edema and ecchymoses. Her incisions were healing well, and her bilateral NACs appeared well-perfused with no signs of ischemia, dehiscence, or infection (*Figure 1D*). At three-month follow-up, the patient demonstrated good breast symmetry, NAC position, and NAC viability (*Figure 3*). The patient was pleased with the overall aesthetic outcome.

All procedures performed in this study were in accordance with the ethical standards of the institutional and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

There is a paucity of cases describing patients who have ptotic breasts and desire NAC preservation with implant-based reconstruction, but are not candidates for staged reoperation. Since its original report, the Goldilocks technique has been modified and adapted in several ways, to include use of implant-based reconstruction, NAC viability or free nipple grafts, and the addition of ADM (7-9). This case report presents the detailed technique of using an inferior adipodermal flap in immediate pre-pectoral implant-based reconstruction to achieve an aesthetically

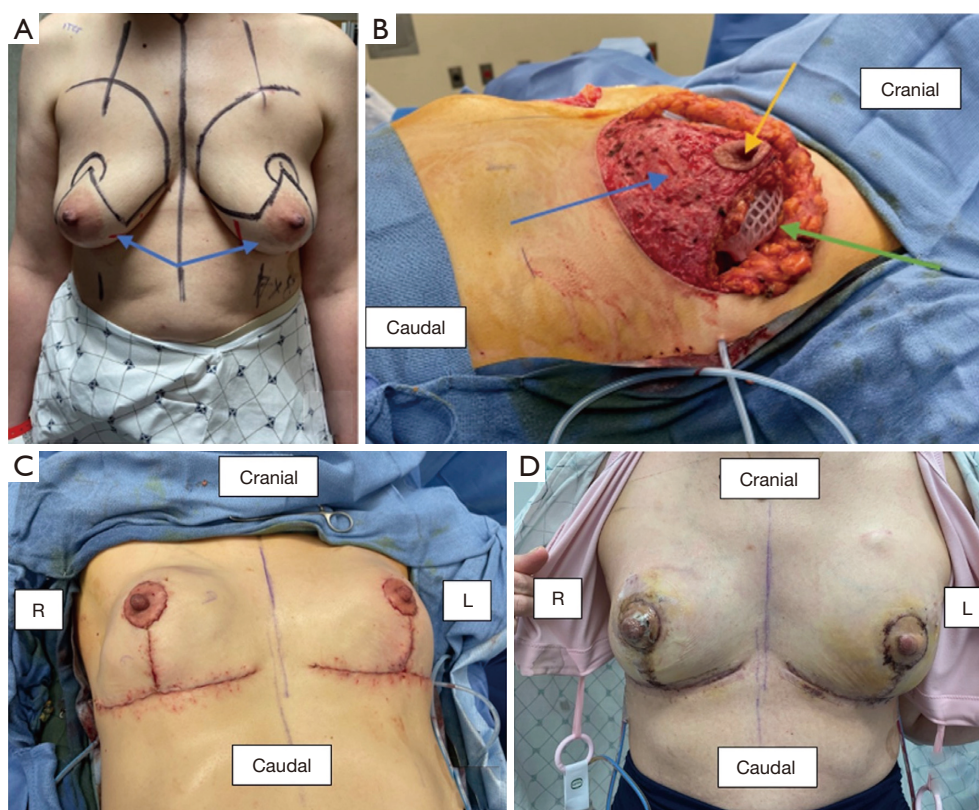


Figure 1 Perioperative photos. (A) Preoperative Wise-pattern markings. Blue arrows indicate area of de-epithelialization. (B) Intraoperative placement of ADM-implant (green arrow) in breast pocket created using an inferior adipodermal flap (blue arrow) to provide blood supply to the NAC (orange arrow). (C) Immediate postoperative photo. (D) One-week postoperative visit showing continued NAC viability. L, left; R, right; ADM, acellular dermal matrix; NAC, nipple-areolar complex.

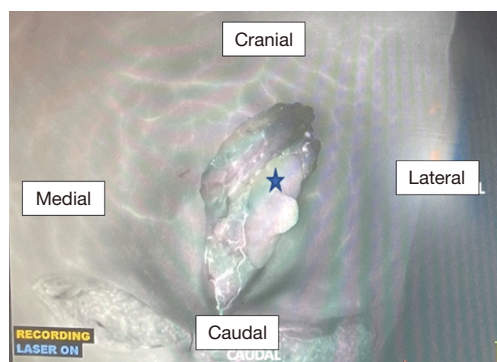


Figure 2 Intraoperative indocyanine green angiography. Indocyanine green angiography of the left breast performed intraoperatively prior to implant insertion showing adequate perfusion to the NAC (star). NAC, nipple-areolar complex.

pleasing and safe outcome in patients with ptotic breasts who desire NAC preservation. NSM with prosthetic-based

reconstruction presents a technical challenge in patients with large or ptotic breasts due to poor control of the skin envelope/NAC position and high risk of ischemia (3). Traditionally, these issues have been addressed by either staging the reconstruction or performing a free nipple graft (3,7). However, neither of these options are ideal as staging the reconstruction delays oncologic therapy and increases overall treatment cost, while free nipple grafts may have loss of projection and pigment changes over time.

To meet our patient's goals, we performed a Wise pattern NSM with immediate implant-based reconstruction. Her implants were placed in the pre-pectoral position to prevent animation deformity and to decrease pain. Given the elevated risk of implant exposure from pre-pectoral implant placement and Wise pattern skin incisions, we performed a modified Goldilocks procedure by elevating an adipodermal flap to preserve perfusion to the NAC while simultaneously providing support and coverage for the implant.

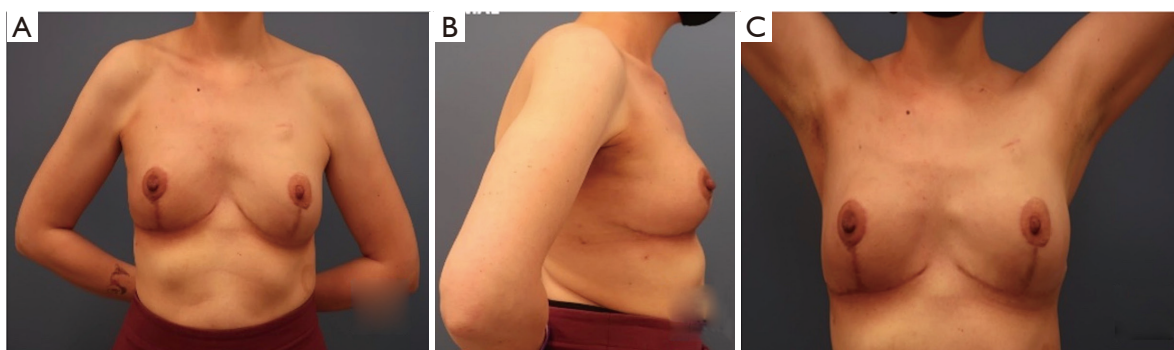


Figure 3 Postoperative photos. Three months postoperatively, pedicled nipple-areola complexes and IMF incisions are well-healed. (A) Anterior view in back-scratch position. (B) Right lateral view in back-scratch position. (C) Anterior view in butterfly position. IMF, inframammary fold.

The modified Goldilocks NSM using an inferior adipodermal flap in conjunction with ADM is a safe and effective strategy for immediate implant-based reconstruction in patients with large or ptotic breasts who desire nipple preservation.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at <https://gs.amegroups.com/article/view/10.21037/gS-22-74/rc>

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://gs.amegroups.com/article/view/10.21037/gS-22-74/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written

consent is available for review by the editorial office of this journal.

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