INTRODUCTION

Simple closure of defects after central tumor and nipple-areola complex (NAC) resection gave cosmetic outcomes so poor that mastectomy was traditionally considered. Several oncoplastic techniques have been proposed for patients with subareolar breast cancer, some of which may require more than one operation.

There are also immediate breast and NAC reconstruction techniques using volume displacement or replacement, such as latissimus dorsi myocutaneous flap, anterior intercostal artery perforator flap, keyhole-shaped flap, and Grisotti’s flap. However, these approaches require recruitment of additional tissue in the used flaps. To overcome these problems, we developed an immediate neo-NAC reconstruction technique aiming to improve the cosmesis after central lumpectomy. Our technique involved double opposing rotational peri-areolar flaps, C-V nipple flap with inner dermal core, and the “round block” procedure.

PATIENTS AND METHODS

Six patients with subareolar breast cancer, aged 36–76 years, were treated with breast-conserving and NAC resection followed by immediate neo-NAC reconstruction. Axillary lymph node dissection was performed if indicated. All patients underwent preoperative imaging examination, and surface markers were applied for location and range of breast tumor.
Suitability
This technique can be used for small-volume breasts with minimal or little ptosis.

Surgical Strategy
The surgical strategy is composed of central quadrantectomy, including NAC and tumor, 2 medial and lateral peri-areolar flaps, a C-V flap, and the round block procedures. Figure 1 shows detailed schematic stages I–VI of the developed neo-NAC reconstruction technique. **Stage I** (preoperative design): An eccentric ellipse is drawn around the proposed central quadrantectomy area with 2 “crab claw shaped” peri-areolar flaps (b) and the NAC located in the inferior pole. The ellipse is extended superiorly to encompass the neo-NAC position with the neo-nipple located on the edge of remaining local skin after nipple-areolar excision. A parallel hemi-circumferential ring is marked around the upper half of ellipse outline for the round block procedures. **Stage II and III**: Perform central quadrantectomy, including NAC and tumor, with a column of tissue from the subcutaneous layer down to the pectoral, then bring the defect together with 2 or 3 layers of glandular suture using the purse-string technique to obtain a central projection of the mammary cone. The operation is continued with management of designed 2 medial and lateral peri-areolar flaps. The medial and lateral borders of the flap are performed extending from the medial and lateral margins of the neo-NAC to give a “crab claw” shaped appearance skin and subcutaneous tissue flap. **Stage IV and V**: The flaps are advanced and rotated in opposite directions toward each other to cover the large part of defect after central quadrantectomy, and the opposite poles are closed in a hemi-circumferential fashion. Flap edges are sutured with interrupted, non-absorbable sutures. In this way, the lower portion of neo-NAC is created simultaneously. The skin between the 2 rings around the upper portion of neo-NAC is carefully de-epithelialized during the round block procedures. The dermal graft harvested from de-epithelialization is rolled tightly and held in place with a 3/0 Vicryl suture so that a cylindrical central pillar of the nipple reconstruction (d) is formed. The designed C-V flap is elevated from the

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![Fig. 1. Schematic of the authors’ technique, stages I–VI. (I) Preoperative design. For illustration purpose, (a) shows proposed removal area with tumor involving the lower subareolar region and NAC; only the partial upper portion of areola is preserved (arrow head). (b) Arrows denoting 2 “crab foot shaped” medial (arrow head) and lateral (double arrow heads) peri-areolar flaps. (c) A V-C nipple flap. (d) The area of de-epithelialized or excised skin at the edge of neo-NAC. “x” indicates tumor. (II) Central lumpectomy and flaps’ elevation. (III) NAC and tumor were removed together with central lumpectomy cavity and area of V-C and peri-areolar flaps. (IV) Appearance of advancement of glandular tissue and flaps that were mobilized and sutured to fill the central breast while creating neo-NAC. The edge of the neo-NAC was epithelialized and packed into the neo-nipple. (V) Reduction of the diameter of the outer skin margin using a purse-string suture. (VI) Final result following closure of the skin incision.](image-url)
underlying subcutaneous tissue, and the donor sites are closed with interrupted nonabsorbable sutures. The “V” flaps are rolled and sutured together in a ying-yang fashion, and the cylindrical compacted graft is placed in its erect position into the trough formed by the V flaps so that the core volume of nipple is augmented with axial rigidity. The C flap is folded over and sutured to the V flaps to complete the nipple reconstruction.14,15

**Stage VI:** Lastly, the round skin defects along the edge of the NAC are closed by a continuous running stitch technique using purse-string sutures for control of neo-areola diameter, shape, and project.16 Figure 2 shows the surgical procedure intraoperatively.

**RESULTS**

With this novel approach, we successfully achieved satisfactory results for 6 patients. All central breast cancers were completely excised with negative margins. The neo-NAC positions were well centered, and the neo-nipple remained conspicuous (Fig. 3). (See figure 1, Supplemental Digital Content 1, which displays a 52-year-old woman with a right subareolar breast cancer (grade 3 DCIS, 2.0 cm) who elected to have central lumpectomy, NAC resection, and immediate breast reconstruction. The patient’s clinical result is shown at 3 months after radiation therapy. http://links.lww.com/PRSGO/B571.) (See figure 2, Supplemental Digital Content 2, which displays the same patient as in Fig. 2: Preoperative (A) and 3 months postoperative (B) picture of NAC reconstruction demonstrating good NAC symmetry. Although the left breast is smaller, its contour and natural shape have been preserved. http://links.lww.com/PRSGO/B572.) (See figure 3, Supplemental Digital Content 3, which displays a 75-year-old woman with a left subareolar breast cancer (IDC and DCIS, 2.5 cm in size) who elected to have central lumpectomy, NAC resection, and immediate neo-NAC reconstruction. The patient’s clinical result is shown at 6 months after radiation therapy. http://links.lww.com/PRSGO/B573.)

The patients were well pleased with the cosmetic results that were maintained over the long term. But notably, the breast of one 52-year-old patient showed mild central depression deformities after postoperative radiation, and the breast of one 73-year-old patient had small surface necrosis at the edge between the peri-areolar flaps, which delayed wound healing.

**DISCUSSION**

The surgical options for NAC involved central tumors include simple or modified ellipse excisions, round block purse-string excisions with poor cosmetic outcomes, volume displacement, and volume replacement techniques with more ideal cosmetic outcomes. Patients with large ptotic breasts are good candidates for volume displacement procedures, such as wedge excision and Grisotti flap. The procedure is usually bilateral for symmetry.17 Volume replacement techniques using local flap to correct partial breast defects and restore NAC are preferable in patients with smaller, non-ptotic breasts. However, these sophisticated approaches require recruitment of additional tissue in the used flaps, which increases the risk of adjacent tissue distortion, resulting in alteration of the final breast contour. Moreover, postoperative radiotherapy
can result in retraction of scar outside the region of the NAC at breast and dislocate the neo-NAC position. Our approach fulfilled patients’ desire to have a one-stage procedure in which the double rotational peri-areolar flaps, C-V flap, and round block technique can create neo-NAC that has adequate long-term projection and provides satisfactory results. This technique is ideal for patients with small central breast cancers that involve the NAC or are located close to the NAC. It is also beneficial to operate on patients with larger subareolar tumors or Paget’s disease. However, one disadvantage of our technique is the high-riding of the neo-NAC location. Care should be taken in designing the neo-NAC position and areolar excision to avoid malposition.

CONCLUSION

We describe our new approach for immediate reconstruction of the NAC after central lumpectomy, with excellent results in patients who are not accepting of a notably smaller breast or bilateral operation.

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