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Original article

Optimizing the nipple-areola sparing mastectomy with double concentric periareolar incision and biodimensional expander-implant reconstruction: Aesthetic and technical refinements

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ABSTRACT

Although the biodimensional anatomical expander-implant system (BEIS) is a reliable technique, little information has been available regarding outcome following nipple-areola sparing mastectomy (NSM). To perform the resection of glandular tissue, while improving the surgical access and maintaining the nipple-areola vascularization we have developed a new approach for NSM based on the double concentric periareolar incision (DCPI). The purpose of this study is to analyze the feasibility, surgical planning and its outcome following NSM. 18 patients underwent NSM reconstructions. Mean time of follow-up was 29 months. The technique was indicated in patients with small/moderate volume breasts. Flap complications were evaluated and information on aesthetic results and patient satisfaction were collected. 83.3% had tumors measuring 2 cm or less (T1) and 72.1% were stage 0 and I. All patients presented peripherally tumors located (at least 5 cm from the nipple). Skin complications occurred in 11.1%. One patient (5.5%) presented small skin necrosis and a wound dehiscence was observed in one patient (5.5%). The aesthetic result was good/very good in 94.4 percent and the majority of patients were very satisfied/satisfied. No local recurrences were observed. All complications except one were treated by a conservative approach. DCPI–BEIS is a simple and reliable technique for NSM reconstruction. The success depends on patient selection, coordinated planning with the oncologic surgeon and careful intra-operative and post-operative management.

Introduction

Skin-sparing mastectomy (SSM) has demonstrated to be an oncologically safe procedure for the treatment of early-stage breast cancer.[1–11] In recent years, a debate has developed about the opportunity of extending preservation of the skin to include the nipple-areola complex (NAC).[12–21] Thus, the nipple-areola sparing mastectomy (NSM) is an alternative to the mastectomy which aims at avoiding the removal of the NAC and the positive consequences for immediate reconstruction.[12–17]

Described in the 90s,[22] the biodimensional anatomical expander-implant system (BEIS) avoids the upper-pole fullness and permits, final post-operative adjustments in breast volume and symmetry.[22–24] When combined with NSM, the best skin quality match with the contralateral breast and better results and symmetry can be achieved.

The objectives of NSM reconstruction are resection of the breast tissue while restoring the breast volume and minimal deformity. To achieve these goals, numerous approaches have been proposed. Usually, the reconstructive options are usually based on patient preference, body habitus, and surgeon experience. These reconstructive techniques can be performed with implant only, expander implant, implant associated with pedicled latissimus dorsi muscle (LD) flap, a transverse rectus abdominis musculocutaneous flap (TRAM) or deep inferior epigastric adipocutaneous free tissue transfer flap (DIEP). However, the impasse of the access incision

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with no complications has drawn attention in the literature. Since the rationale for NSM is the aesthetic outcome, the necrotic complications of extensively undermined NAC are of importance.

Thus, we have developed a new approach for candidates to NSM based on the double concentric periareolar incision (DCPI). The objective of this technique is resection of glandular tissue, while improving the surgical access and maintaining the vascularization of the NAC via the subdermal plexus. Although the use of BEIS in breast reconstruction has been previously described,[22–30] little information is available regarding clinical outcome following SSM[24,30] and especially NSM reconstruction. In addition, there are no previous detailed clinical reports that specifically address operative planning and the use of the DCPI. The purpose of this study is to describe experience with NSM, with particular attention to the areola approach, surgical technique and reconstruction. The demographic characteristics and post-operative outcome regarding NAC complications and reconstruction were retrospectively collected and evaluated.

Patients and methods

Between January 2000 and August 2007, 172 patients submitted to SSM and immediate reconstruction at the Hospital das Clínicas-University of São Paulo Medical School (HC-FMUSP) and the senior author's (A.M.M.) private practice were reviewed. All patients were first seen preoperatively by a multidisciplinary team who indicated the SSM technique. During the 90-month period, 18 patients were submitted to DCPI and BEIS (McGhan 150) reconstruction. The implant has a textured surface outer silicone shell with two internal chambers (the outer chamber contains silicone gel, up to 50% of the final volume). The technique was indicated in patients with small or moderate volume breasts (cup size A and B) without ptosis or Grade I of ptosis (minor)[43] (Table 1). This includes slim patients without enough abdominal tissue to perform the reconstruction by abdominal flaps, those with previous abdominoplasty or who refused additional scars. Minimum follow-up was 6 months, with an average of 29 months postoperative (range, 6–62 months). Information on patient satisfaction and complications were collected. Oncologic information on tumor size, axillary lymph node surgery and adjuvant radio and chemotherapy were collected. All patients were followed during the post-operative period by the breast surgeon and oncologist who indicated the appropriate surveillance method. Normally a physical exam and mammography were performed 6–8 months after surgery. Flap (breast skin and NAC) complications were evaluated and included partial and total necrosis, wound dehiscence, infection, hematoma and seroma. The aesthetic evaluation took place in a special outcome evaluation clinic and was performed by the patient, as well as the surgeon and one independent observer (a layperson who was not directly involved in patient care). The aesthetic parameters were based on three different categories (breast shape, NAC shape, breast symmetry and NAC symmetry, each with four subscales (very good, good, satisfactory and poor). A scale wherein the overall result was defined and rated from 4 to 1 (4 = very good, 3 = good, 2 = satisfactory and 1 = poor). The average result of each item was used as a final result (Table 4). An acquired-informal questionnaire was used to grade the patient's level of satisfaction with the aesthetic results. The patients classified their level of satisfaction as very satisfied, satisfied, disappointed or regretted their decision. Data was collected retrospectively from personal communications, physical examinations, and charts.

Table 1
Inclusion criteria for double concentric periareolar incision and BEIS[a] reconstruction

Inclusion criteria
Small/medium volume breasts (cup size A/B)
No ptosis/Grade I of ptosis[b]
Medium/large areola (minimum diameter 3.5 cm)
Sufficient cutaneous coverage after skin-sparing mastectomy (4–5 mm width)
Adequate quality of skin/soft tissue (positive capillary refill and dermal bleeding)
No previous radiation therapy
No previous breast incisions

[a] BEIS: McGhan 150 biodimensional anatomical expander-implant system.
[b] Ptosis classification (Regnault[43]).

Oncologic data

Tumor size, stage and local recurrences: of the 18 patients, 15 (83.3 percent) had tumors measuring 2 cm or less (T1) and 3 (16.6 percent) had tumors between 2 and 4 cm (T2). All patients presented tumors located peripherally (at least 5 cm from the nipple). According to the American Joint Committee on Cancer – AJCC, 7 (38.8 percent) patients were stage 0, 6 (33.3 percent) were stage I, and 5 (27.7 percent) were stage II. No patient in this study had stage III or IV disease. Initial preoperative planned periareolar SSM was performed in 14 patients (77.7 percent). In 4 patients (22.2 percent), an initial conservative breast surgery through the periareolar approach with complete removal of the breast quadrant harboring the primary cancer was attempted. In these patients, the intra-operative surgical margins (frozen sections) were compromised and a NSM was indicated.

Axillary lymph node dissection: 10 patients (55.5 percent) underwent a total axillary lymph node dissection (levels I, II and III) and in 8 (44.4 percent) the axillary region was preserved due to sentinel lymph node biopsy. Axillary dissection was performed via an areolar incision in 11 patients (61.1 percent). In 7 patients (38.8 percent) an additional axillary incision was necessary to perform the lymphadenectomy.

Patient selection

Selection criteria are demonstrated in Table 1. Patients were first seen in the preoperative period by a multidisciplinary team and according to the breast volume, ptosis and tumor size/location, included an evaluation by the plastic surgeon. Breast ptosis was classified according to the system introduced by Regnault,[43] and patients with no ptosis and small ptosis were included. Breast volume was classified according to the determination of bra size (include band size, bust circumference, and cup size). In our sample, only patients with breast size A and B were included in the study.

Patients with small areola (less than 3.5 cm) are not good candidates, chiefly if the breast is large. These patients were excluded. Patients with previous radiotherapy and breast incisions were excluded.

Skin flap/soft-tissue evaluation

Only patients with adequate cutaneous and soft-tissue coverage after skin-sparing mastectomy were included. For this objective a meticulous intra-operative clinical examination of the dissected mastectomy flaps was performed before the indication of this technique. Skin flaps that were too thin (less than 4–5 mm width) or too irregular with the presence of patches of exposed dermis on the undersurface were considered unsufficient/inadequate. In addition, in all cases a direct observation of flap color, capillary refill and dermal bleeding from the skin edges was performed before the indication of the procedure. Flaps without signals of blood circulation were considered inadequate. In these cases, the