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Original article

Skin/nipple sparing mastectomies and implant-based breast reconstruction in patients with large and ptotic breast: Oncological and reconstructive results

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ABSTRACT

In this study we performed 77 procedures on 65 patients fulfilling the oncological criteria for skin-sparing mastectomy and presenting with large or medium size breasts. All the operations were performed as a single-stage procedure with an anatomical prosthesis allocated into a compound pouch, made up of the pectoralis major, serratus anterior fascia, and a lower dermal adipose flap. The medium size of the anatomical implants employed was 444.3 cc. The implant removal rate was 14.2%. At a median follow-up of 36 months we reported a 0.5% local recurrence rate per year. The overall specific survival rate was 98.2%. This study confirms the safety and effectiveness of this technical variation of skin and nipple-sparing mastectomies. All breast, irrespective of mammary shape and size, can be reconstructed with medium size implants and, if required, contralateral adjustments. The overall complication rate is in keeping with previous studies.

1. Introduction

During the last few years, skin- and nipple-sparing mastectomies have gained widespread acceptance and are currently considered standard treatment in early-stage breast cancer.[1–3] The preservation of most of the breast envelope has allowed surgeons to reduce the disfiguring impact previously associated with mastectomies. Whereas in the past, reconstruction of large breasts generally demanded the use of myocutaneous flaps, modern implant-based procedures have allowed surgery to become less aggressive in this respect.

In this study, we investigate the outcome of a technical modification of skin- and nipple-sparing mastectomies (skin-reducing mastectomy).[4]

2. Patients and methodology

2.1. Population and statistics

Fifty-eight patients affected by early-stage breast cancer requiring a mastectomy and 17 women selected to undergo a risk-reducing procedure were consecutively enrolled in this study, for a total number of 77 operations in 65 patients.

Statistical comparisons used the χ^2 test and Fisher's exact test. The Kaplan–Meier method was used to calculate the oncological outcome.

2.2. Oncological indications

We offered this technique to women diagnosed with multicentric invasive breast cancer, extensive ductal carcinoma *in situ* (DCIS), or Paget's disease of the nipple (associated with an underlying invasive or *in situ* breast cancer).

We also included patients with a poor response to neo-adjuvant chemotherapy, and those in whom mastectomy was recommended because of positive margins at re-excision.

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Nipple preservation, in neoplastic patients, was used where disease was localised 2 cm (or more) far from the nipple–areola complex. No intra-operative or postoperative radiotherapy was applied to the nipple–areola complex.

All women who underwent a prophylactic procedure received a pre-operative genetic counselling with evaluation of *BRCA-1* and *BRCA-2* mutations in the family history clinic in our institution or elsewhere.

2.3. Reconstructive indications, surgical technique, postoperative evaluation of results

The operations were performed by a team made up of plastic surgeons and surgical oncologists or by a single oncoplastic surgeon at the Istituto Nazionale Tumori, Milano, or at Ospedale Morgagni-Pierantoni in Forlì.

All women in this study presented with large and ptotic breasts. The reconstructive admission criteria also included:

a. Distance between areola and infra-mammary fold $\geq$8 cm
b. Distance between sternal notch and nipple >25 cm.

All reconstructions were accomplished in one-stage using permanent silicone gel implants (ALLERGAN® Style 410-510). A contralateral symmetrisation could also be performed during the same operation, according to patients' and surgical needs.

An accurate survey of morphological characteristics of the breast was performed pre-operatively.

The pre-operative assessment began by marking the position of the new nipple along the mid-clavicular line at a distance of between 19 and 23 cm; further markings followed as for a normal breast reduction or mastopexy with inverted T. We then erased the semicircular drawing of the Wise pattern and extended the two vertical limbs to the new nipple position. (Fig. 1)

The skin was incised in its full thickness along the vertical limbs of the reduction pattern, but in the infra-mammary line the incision did not extend beyond the epidermis. A dermal flap was then created, de-epithelialising the skin between the infra-mammary line and the medial and lateral arms of the reduction pattern. Before starting the mastectomy, the lower flap was sculpted down to the infra-mammary fold; in some cases an axillary dissection or sentinel node biopsy could be performed through the same access.

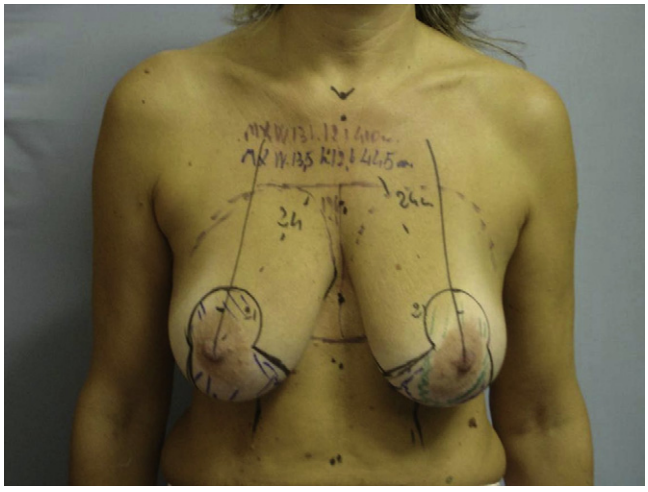

Fig. 1. The pro-operative project of skin-reducing mastectomy and contralateral adjustment.

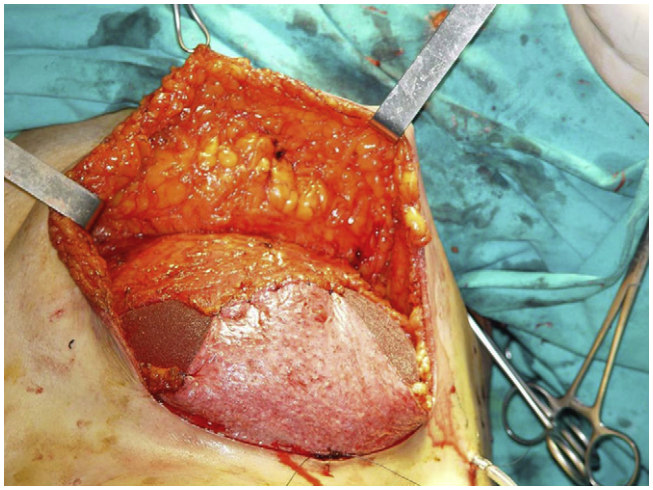

Fig. 2. A permanent implant is allocated in the compound pouch.

The reconstruction was performed dissecting the inferior and lower-medial insertions of the pectoralis major that were sutured to the superior border of the dermal flap and the serratus fascia laterally. An anatomically shaped permanent prosthesis could therefore be located in the pouch (Fig. 2). The nipple was usually reconstructed in a second step under local anaesthesia. In selected cases, a nipple auto-transplantation could be performed with a full-thickness skin graft. In a few cases, we reconstructed the nipple intra-operatively with local skin flaps.

(Fig. 3) Women with small peripherally located or multicentric breast cancers, or who were scheduled for 'risk-reducing' procedures were treated using this technique with preservation of the nipple–areola complex on a superior dermal–adipose flap.

A double intra-operative frozen section (on the mastectomy specimen and on the retro-areolar tissue) was performed to demonstrate absence of disease in the terminal ducts.

2.4. Staging, postoperative treatment and follow-up

All women underwent complete systemic staging with liver ultrasound scan, bone scan, and chest X-rays. Patients with post-operative stage III disease underwent a whole body CT scan.

Post-mastectomy radiotherapy was performed in all patients with 4 or more positive lymph nodes with tumour size >5 cm.

Fig. 3. Nipple sparing-skin reducing mastectomy.