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Original article

Management of central breast tumours with immediate reconstruction of the nipple-areola complex; a suggested guide

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ABSTRACT

Background: Breast conserving surgery (BCS) for central breast tumours with immediate reconstruction of the nipple-areola complex (NAC) is a relatively new addition to the surgical palette of the oncoplastic surgeon. Most oncoplastic techniques presented to date have only been suitable for women with large breasts.
Methods: From 2012 to 2013, a series of eligible women with central breast cancers were treated with BCS and NAC reconstruction. According to breast size and shape, three different procedures were performed.
Results: 20 women were operated, 13 by breast reduction techniques and 7 by anterior intercostal perforator flaps (AICAP flaps). Overall cosmetic results were good to excellent for breast shape, symmetry and neo-nipple projection.
Conclusion: We present a guideline for selecting the best available surgical technique for immediate NAC reconstruction in women with any breast type, size or shape and describe a new replacement technique using a local perforator flap.

Introduction

The aesthetic appearance of the breast is highly dependent on the size, shape and position of the nipple-areola complex (NAC) [1]. When treating women with malignant breast tumours involving the NAC, it is important to bear this in mind. The cosmesis is important for the psychological well-being of breast cancer patients, and reconstruction of the NAC adds an important feature to the reconstructed breast [2].

Traditionally, women with central breast tumours have been excluded from breast conserving surgery (BCS), based on a fear of unacceptable cosmetic results after removal of the NAC. Even today, after the introduction of oncoplastic surgery, central breast tumours are more likely to be treated with mastectomy compared with tumours of any other location. Danish national data from 2009 to 2012 show that central tumours accounted for 13.2% of all breast tumours [3]. Only 37.5% of these patients were treated with BCS compared with 76.9% of patients with tumours in other locations. The percentage of BCS for central tumours increased from 28.8% in 2009 to 41.6% in 2012, along with the development of new surgical techniques.

When performing traditional BCS for central breast tumours, the NAC and the tumour are excised en bloc, and the defect is closed by wedge excision or purse string suture. A large proportion of these women are dissatisfied with the cosmetic result [4,5].

Oncoplastic techniques have changed the concept of breast cancer surgery over the past decade [6–9], and have been proven to be as safe oncologically as traditional BCS [10,11]. This surgical evolution has provided a range of different breast reduction techniques with local flaps to reconstruct the areola after oncologic excision of the NAC [12–15], and some authors suggest immediate reconstruction of the entire nipple–areolar complex [16–18]. Local flaps from the thoracic wall may be good alternatives for selected patients [19]. However, selecting the optimal technique for each patient is difficult. Many factors affect the final cosmetic result; tumour size and location, breast size and shape, pre- or post-operative adjuvant treatment, co-morbidity, smoking habits, age and patient preference [20].

Abbreviations: anterior intercostal artery perforator flap, AICAP; breast conserving surgery, BCS; inframammary fold, IMF; inframammary fold-areola distance, IMF-a; nipple-areola complex, NAC; sternal notch-nipple distance, SN-N.

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We suggest a guideline for selecting the optimal surgical technique for central tumours in any breast type, size or shape, and describe a new replacement technique for immediate NAC reconstruction in small- to medium-sized breasts.

Patients and methods

Patients with histologically verified ductal carcinoma in situ (DCIS) or stage I–II breast cancer involving the NAC were selected for combined BCS and oncoplastic surgery with immediate reconstruction of the NAC. Oncologic exclusion criteria were the same as for all other BCS: multicentric carcinoma, inflammatory breast cancer, contraindication for radiotherapy and patient preference.

Only patients with direct clinical or radiologic involvement of the NAC, and patients with positive frozen section of the terminal ducts under the NAC were included in this study.

Preoperative data included clinical and radiologic tumour size. Breast measurements were recorded preoperatively, including distance from sternal notch to nipple (SN-N), distance from inframammary fold to areola (IMF-a), breast volume and areolar size. Data collected postoperatively at clinical follow-up visits at 2 weeks and at 12–18 months included histologic tumour size, histologic type, margin status, resection weight, complications and patient satisfaction. The overall cosmetic result was evaluated by three independent breast surgeons and three cosmetic plastic surgeons based on anonymised before-and-after photos using a five-point scale suggested by Clough et al. (5 = excellent, 4 = good, 3 = fair, 2 = poor, 1 = bad) [21]. Three criteria were evaluated separately: overall breast shape, breast symmetry and neo-nipple projection/neo-areolar size. The cosmetic outcome was determined by the average (mean) of their scores. The cosmetic evaluations were done before referral to tattooist.

Oncologic operative procedures

Danish national guidelines for oncologic surgery were followed [3]. The lumpectomy specimen was examined peroperatively by pathologic macro evaluation. A free margin of 5 mm was accepted. Lumpectomies from patients with non-palpable tumours were confirmed by radiologic examination. At final histology, patients with <2 mm microscopically free margin were treated with re-resection or mastectomy. Surgical clips were placed in the tumour cavity to guide postoperative radiotherapy. Patients with positive sentinel lymph node biopsy or preoperative histologically verified axillary metastases had axillary lymph node dissection done in the same procedure and included lymph nodes from levels 1 and 2, and level 3 only if clinically involved.

Oncoplastic operative procedures

The patient referred to oncoplastic surgery was given the choice between local excision with purse string suture or oncoplastic surgery with reconstruction of the NAC. The patient was informed thoroughly and shown drawings and photos of previous patients.

The procedures are divided into three types, and a guideline for selecting the optimal oncoplastic technique is depicted in the flowchart in Fig. 1.

Type 1: mastopexy/-reduction with neo-NAC on an inferior pedicle

Preoperative markings: A standard Wise-pattern is marked on the skin with the patient standing. The final position of the neo-NAC can be placed at the original position of the NAC or lifted to the preferred position (SN-N = 20–23 cm). The neo-NAC and its pedicle are both based on tissue from the lower pole of the breast,

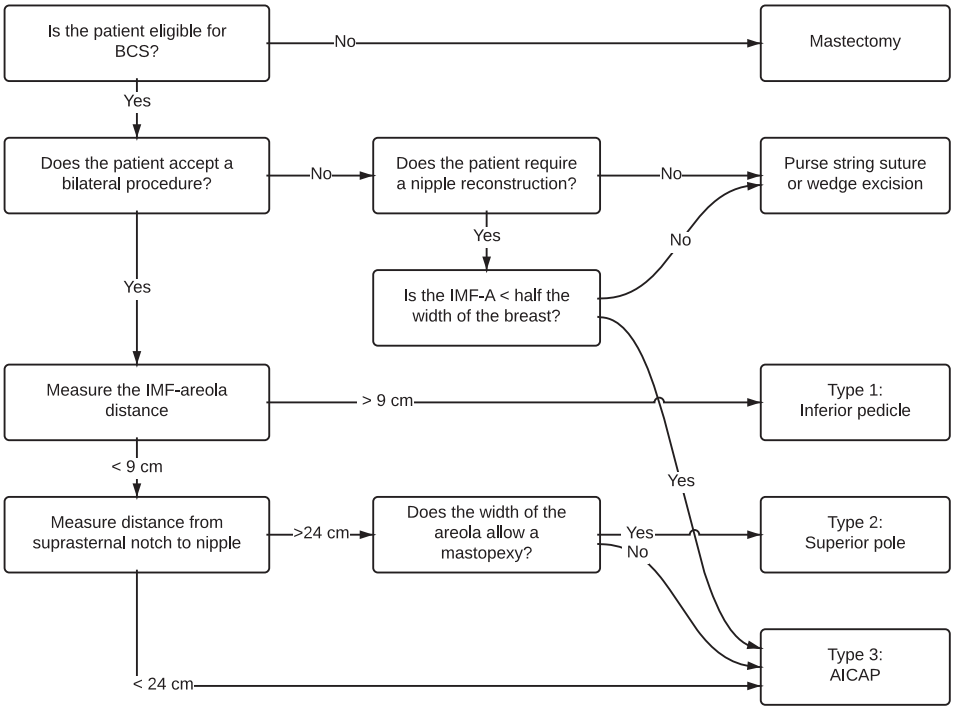

Fig. 1. Guideline for choice of procedure for central tumours: After discussing BCS versus mastectomy, it is important to establish whether the patient will accept a bilateral procedure. Procedures that alter the shape of the breast considerably are not recommended to women who do not wish a symmetrisation operation on the contralateral breast. Then the degree of ptosis is measured, and the key measurements are the distance from the sternal notch to the nipple (SN-N), and from the inframammary fold (IMF) to the lower boarder of the areola (IMF-a). Breast volume and degree of ptosis is of less importance. If the IMF-a is longer than 9 cm, a reduction/mastopexy procedure with inferior pedicle is preferred. If the SN-N is longer than 24 cm, a reduction type procedure with nipple reconstruction from upper pole skin can be done, depending on the width of the areola. If the answers are negative to the previous questions, an AICAP-flap may be the best choice.