

# BREAST CONSERVATIVE SURGERY. A SURGICAL PROCEDURE WHICH COMBINES ONCOLOGICAL SAFETY AND ESTHETIC EFFECT

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## ABSTRACT

In the last twenty years, the surgical treatment of breast cancer (BC) has known a substantial progress, evolving from radical mastectomy – a mutilating procedure commonly performed in until 1970s – to breast conservative surgery (BCS) which allows the removal of the entire breast parenchyma saving the skin envelope of the mammary gland, and sentinel lymph node biopsy that helped reducing the complication rate associated with radical axillary dissection. As it has been proved that BCS and radical mastectomy are associated with similar survival rates, BCS or "skin sparing mastectomy" is nowadays considered to be an oncologically safe procedure in locally advanced BC if the surgical resection criteria is respected: negative surgical margins of resection with an entire removal of all the malignant breast tissue and the maintain of aesthetic result. Moreover, owing to the development of novel oncoplastic techniques and the fact that performing BCS allows the preservation of the skin and sometimes the nipple-areola complex (NAC), BCS techniques such as the skin – sparing mastectomy and nipple-areola complex mastectomy are currently considered mainstay treatment of early stage BC without compromising the oncological safety of mastectomy.

**Keywords:** breast cancer, conservative mastectomy

## Abbreviations:

BC = breast cancer;

BCS = breast conservative surgery;

NAC = nipple-areola complex;

SSM = skin-sparing mastectomy;

NSM = nipple-sparing mastectomy;

DCIS = ductal carcinoma in situ;

NAC = nipple-areola complex;

## INTRODUCTION

Breast cancer (BC) is the most common female cancer almost one million women being diagnosed annually worldwide. However, in recent years BC has registered a low mortality rate mainly in developed, high-income countries (1).

New developments have been registered in the surgical management of BC, the oncological safety of the surgical resection combined with the aesthetic result being the goals that any modern surgeon should achieve (2).

Successful implementation of the screening programs and the population's increased awareness of the gravity of the disease have led to a higher rate of early-stage BC detection, hence being more eas-

ily to promote the use of BCS in the clinical practice. Generally, BCS techniques are performed for T1 and T2 BC tumors without forgetting to pay attention to the fact that a complete remove of the tumor as well as a satisfactory cosmetic result are mandatory (3). The former aspect – obtaining of negative surgical margins – is required in order to minimize the risk of the rate of ipsilateral breast recurrences, which, in case of appearance, are associated with a low breast cancer – specific survival rate, while the latter mentioned aspect – the cosmetic result – causes less physical deformity and reduces possible fears related to the treatment such as changes in body image, sexuality and treatment-related distress (4).

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Locally advanced BC patients generally benefit from neoadjuvant chemotherapy that reduces the volume of the tumor and makes possible performing afterwards BCS techniques. However, it is important to know that is imperiously to consider pathologic response after neoadjuvant chemotherapy. In case of evidence of a small tumor with reduced volume with peripheric small nodules – the so called “mosaic” pattern, a total mastectomy should be performed in the second step of the treatment as the incidence of local recurrence if BCS is applied is still relative high (5).

Other situations in which BCS are not indicated include (6):

- Multicentric disease;
- Inflammatory BC;
- Contraindications to perform radiotherapy after BCS: pregnancy, previous breast-conserving therapy, diseases of the connective tissue;
- Indication to contralateral prophylactic mastectomy;
- Predisposition to breast cancer such as presence of germline BRCA1 or BRCA2 mutation.

Scientific evidence has continuously demonstrated that BC targeted systemic therapies are efficient in BC women a fundamental statement that resulted in a change from aggressive surgery – Halsted radical mastectomy-to more conservative surgical procedures which allow the preservation of skin and/or the NAC followed by reconstructive techniques using either autologous tissue or implant-based techniques (7).

Freeman has been the first who initially reported the procedure of “subcutaneous mastectomy” in patients with benign breast tumors (8). In malignant tumors, the “skin-sparing mastectomy” has been described by Toth and Lappert in 1991 who achieved a complete removal of the tumor as well as preserving the native breast cancer which automatically has resulted in a good aesthetic result (9). As various studies have reported that the local recurrence rate of radical modified mastectomy (Madden) and BCS are similar, the skin-sparing mastectomy procedure is considered to be the gold standard option in early stage BC and in some situations of locally-advanced BC (10,11). As a skin-sparing mastectomy also implies the removal of the NAC, immediate or delayed techniques aimed at the achievement of a satisfactory nipple reconstruction have progressively developed. However a nip-

ple-sparing mastectomy seems to be a valuable option with both therapeutic and prophylactic indications (12).

In this review our goal was to present the indications, advantages and oncologic safety of the two most common performed conservative mastectomies: skin-sparing mastectomy (SSM) and nipple-sparing mastectomy (NSM).

## INDICATIONS TO CONSERVATIVE MASTECTOMY

BCS is a valuable alternative to women with small-medium size breast diagnosed with unifocal BC located in the central or in the inner quadrant(s). After bringing to attention the possible risk of leaving residual disease, patients with small to medium size breast and moderate or no ptosis diagnosed with unifocal breast cancer located in the lower outer quadrant can be supposed to BCS (13). Locally-advanced BC patients can benefit BCS procedures only if a good pathologic pattern – either pathologic complete response or concentric shrinkage – are demonstrated to be obtained after systemic neoadjuvant chemotherapy with a significant reduction in the tumor volume (14). Among the criteria used in selecting candidates for BCS after neoadjuvant chemotherapy we mention (15):

- Residual tumor size < 5 cm;
- No evidence of multicentric lesion;
- Absence of extensive intramammary lymphatic invasion/extensive microcalcification;
- Complete resolution of skin edema.

With regard to the risks associated with skin-sparing mastectomy, it appears that women who suffer from obesity, diabetes or who smoke, as well as those who received adjuvant radiotherapy are at risk of developing infections or skin necrosis if they opt for a skin-sparing mastectomy (16).

The NSM is preferred if a prophylactic mastectomy (e.g. presence of BRCA 1 or BRCA 2 mutations) is required without forgetting to intraoperative assess the involvement of the nipple-areola complex (17).

Among the contraindication of the nipple-sparing mastectomy we mention (18):

- Tumors with centrally localized or close to the nipple-areola complex;
- Severe breast ptosis.

Risk of the nipple-sparing mastectomy refer to: loss of sensibility of the nipple, partial or total necrosis of the NAC.

## ONCOLOGICAL SAFETY OF SKIN-SPARING MASTECTOMY

Apart from the above mentioned inclusion criteria for skin-sparing mastectomy in patients with early-stage and non-invasive BC, this technique can also be used with prophylactic intention in women at high risk of developing BC who choose to receive a prophylactic mastectomy. The technique implies a complete dissection above the superficial fascia and the removal all the malignant breast tissue leaving only the epidermis, dermis and a small volume of the subcutaneous fat (19).

Patani and coworkers showed that the local recurrence rate after SSM and non SSM are similar (20). Moreover, SSM seems to be an independent predictor of obtaining close or positive margins. However, after a deep analyzation of the skin flaps specimens some authors did not conclude that the recurrence rates after SSM and non SSM are similar (21). For example, Torresan et al (22) proved that skin flaps thicker than 5 mm contain residual disease while Ho et al (23) that the residual malignant tissue in the skin flaps specimens are usually placed at the level of the skin projection of the tumor.

Even though many studies proved that the local recurrence rate after nipple – or SSM are similar (24,25), Rocco and coworkers (19) have reported a local recurrence rate between 0% and 7% in patients submitted to SSM compared to that of 10% after 20 years of follow-up in patients submitted to NSM. On the other hand, lower recurrence rate after NSM which range between 1% and 3% have also been reported in women diagnosed with ductal in situ carcinoma (DCIS) (26), while Carlson and his coworkers (27) that only one patient of 539 presented with a local recurrence after 65 months of follow-up following SSM for DCIS. They demonstrated that the tumor size, nodal status and the presence of the lymphovascular invasion are the most important predictors of recurrence with local recurrence rates of 3%, 10% and 11% for T1, T2 and T3 tumors respectively.

Apart from tumor size, stage and lymph node involvement, a poor differentiation of the tumor constitutes a risk factor of developing a recurrence, the rate reported from HO and coworkers (23) after 75 month of follow-up being 4.5% quite similar to the 5.6% reported rate from Spiegel and Butler (28) in 117 patients treated with SSM after 9.8 years of follow-up.

## ONCOLOGICAL-SAFETY OF NIPPLE-SPARING MASTECTOMY

As regards the incidence of BC in the NAC, the reported results in the literature are contradictory. For example, Laronga et al. (29) proved that risk factors of NAC involvement are centrally localized breast tumors, multicentricity, and the presence of metastatic lymph nodes. The reported incidence of tumors in the NAC has been reported to be influenced by the pathological definition of the NAC involvement, the histopathologic result (e.g. DCIS) as well as the volume of the tumor, and the selection criteria of the patients who can receive NAC (23).

Other study conducted by Cense and coworkers (30) took into consideration the volume of the tumor, the distance between tumor and NAC and confirmation of positive LN and found almost 58% of the mastectomy specimens presented involvement of the NAC. In contradiction to these results, the study of Simmons (31) showed that only 0,9% of the mastectomy specimens had nipple/areola involvement.

The local recurrence rate after performing NSM has been reported to be between 0% and 24,1% these percentages depending on the time of follow-up, the characteristics of the women included in different studies as well as the pre-and intraoperative procedures (e. g. preoperative breast magnetic resonance imaging, intraoperative radiotherapy) (32,33).

## IMPORTANCE OF THE ESTHETIC EFFECT

There are many incision methods which can be used to ease the mastectomy and the reconstruction, to preserve the NAC blood flow and to obtain good aesthetic results. However, necrosis is more frequently when periareolar incisions are used compared to the transareolar approach (23).

BCS are generally most frequently preferred as it has been shown that they are both oncologically safe and they confer better esthetic outcomes (23). With regard to the differences between SSM and NSM in terms of aesthetic results, Gerber and coworkers (34) showed that both after SSM and NSM the patients declared that the aesthetic outcome is good or excellent. 74% and 26% of the patients who underwent NSM have reported excellent respectively good cosmetic effect, while the results were excellent, good and fair in 59%, 22% and 20%, respectively in women who received SSM.

Other study regarding the patient satisfaction showed that women are more satisfied in terms of body image, sexuality, cosmetic results and mutilation feeling after NSM than after SSM (35). Hence, we can conclude that the preservation of the nipple-areola complex offers the women the possibility of conserving body image.

## CONCLUSIONS

Conservative mastectomies offer a better quality of life for women with breast cancer. The low rates

of local recurrence, the 5-year survival rates of more than 95% as well as the satisfactory esthetic results are other proofs that BCS can be associated with good cosmesis and maintenance of woman body image without compromising the oncological safety of mastectomy.

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