

Conservative mastectomies: an overview

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Abstract: Conservative mastectomies provide removal of the entire breast parenchyma, saving the outer covering of the mammary gland with the possibility of performing an immediate reconstruction preserving women body image. We rationalised and systematically organized our reconstructive algorithms giving a new different light to mastectomies, the so-called “conservative mastectomies”, an oxymoron indicating skin-sparing mastectomies (SSM), nipple-areola complex-sparing mastectomies (NSM) and skin-reducing mastectomies (SRM). Eventhough randomized controlled trials comparing conservative mastectomies with traditional mastectomy and breast conserving surgery would be ausplicable in order to achieve higher levels of evidence, we could confidently conclude that conservative mastectomies offer the psychological advantages of good cosmesis and maintenance of woman body image without compromising the oncological safety of mastectomy.

Keywords: Skin-sparing mastectomy (SSM); nipple-sparing mastectomy (NSM); breast cancer

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Eighties saw the flames of Halsted mastectomy's hell to extinguish (1), showing the heaven of Fisher lumpectomy (2) and Veronesi quadrantectomy (3).

In the late 1990's the two separate worlds of mastectomy and breast conserving surgery started to work together with the development of oncoplastic breast surgery: breast reconstruction became a standard procedure and a huge range of surgical techniques with a progressive reduction of aggressiveness have been offered to women facing the diagnosis of breast cancer, achieving optimal oncological and reconstructive results.

In the XXI century breast cancer surgery did not represent a dichotomous choice anymore. Higher sensitivity of diagnostic imaging, new genetics investigations and opportunity for risk reducing procedures led to a renewed increase of mastectomy rates during the first decade of 2000's (4,5) that are continuing to grow (6).

A higher percentage of women well informed about the equivalence in terms of survival between breast conserving treatments (BCT) and mastectomy starts to

prefer undergoing a mastectomy followed by immediate reconstruction.

We rationalised and systematically organized our reconstructive algorithms giving a new different light to mastectomies, the so-called “conservative mastectomies” (7), an oxymoron indicating skin-sparing mastectomies (SSM), nipple-areola complex-sparing mastectomies (NSM) and skin-reducing mastectomies (SRM).

Conservative mastectomies provide removal of the entire breast parenchyma, saving the outer covering of the mammary gland [subcutaneous fat, skin and nipple (if oncologically safe)] with the possibility of performing an immediate 1- or 2-stage implant-based reconstruction or an immediate autologous tissue reconstruction, preserving women body image.

SSM was first described in 1991 by Toth and Lappert as an effort to maximize skin preservation to improve cosmetic outcome and facilitate reconstruction (8).

Mastectomy with preservation of the skin and the nipple-areola complex (NAC) was first described even before than

SSM: Rice and Stickler in 1951 presented the “adenomammectomy” for benign diseases (9) and Freeman in 1962 introduced the term “subcutaneous mastectomy” (10).

Other authors in the last 15 years used the terms “total skin-sparing mastectomy”, “nipple-sparing mastectomy” or “NAC-sparing mastectomy”.

NSM is similar to SSM for the dissection of skin flaps, but also consider the respect of the NAC.

Obviously the additional preservation of the NAC makes the procedure more technically demanding, with the need of complete removal of the retroareolar ducts and preservation of nipple vascularisation.

Some authors recommend the nipple eversion during surgery and the use of sharp dissection instead of electrocautery to limit thermal injury and increase NAC preservation rates (11). We recently proposed the use of hydrodissection in order to facilitate the sub-areolar breast tissue removal (12).

Some authors attempted to precondition the NAC by dissecting it under local anesthesia from the underlying breast tissues several days before the mastectomy to stimulate blood flow from the peripheral skin (13,14). Performing this approach, the authors present the advantage of retroareolar biopsy before mastectomy and the biopsy specimen could be submitted to permanent histological analysis.

Usually, the retroareolar tissues are removed at the time of the conservative mastectomy and the specimen is analyzed by frozen section.

Other authors used intraoperative radiotherapy of the NAC when the frozen section of retroareolar tissue is negative, as a risk-reducing technique for local recurrence (15).

An appropriate incision for NSM should ease both the mastectomy and the reconstruction, preserve the NAC blood flow and guarantee a good cosmetic result.

Several incisions have been proposed to achieve these goals: periareolar/circumareolar (+/- inferolateral or superolateral extension or omega), radial (straight, lateral or vertical), inframammary, inverted-T and transareolar (16-19).

Trans-areolar and periareolar/circumareolar incisions present the highest risk of NAC necrosis, while lateral radial incision ease the glandular dissection and the access to the axilla for sentinel lymph node biopsy, leaving the NAC untouched (15,20,21).

When an envelope reduction is required, in large and ptotic breasts, we advice a “Wise Pattern” access. Such an approach was criticized in the past for the high complication rate due to the risk of skin necrosis (22). We

developed and presented in 2006 a technical modification of “Wise Pattern” mastectomies, we called “skin reducing mastectomy (SRM)” (23), expanding the implant-based breast reconstructive opportunities and choices and achieving good oncological and cosmetic results (24,25).

Some surgeons also presented minimally-invasive video-assisted techniques through a mid-axillary skin incision (26-28).

Survival of the NAC is one of the most important issues when performing a NSM. Complete necrosis of the nipple rates range from 0% to 60% (17,29). Factors affecting NAC vascularisation are smoking habit, young age and type of skin incision (30).

Other common complications are capsular contracture following implant-based reconstruction and skin flap ischaemia.

Implant-based reconstruction is extensively used in association with conservative mastectomies, both 1-stage (direct-to-implant) and 2-stage (expander to implant).

Two-stage reconstruction is preferred in case of compromised blood supply reducing the retroareolar pressure, skin tension and flap ischaemia in the immediate postoperative days (31).

The implant is always positioned under a muscular pocket created by the pectoralis major and the serratus muscles. Human acellular dermal matrices and synthetic meshes could provide lower pole coverage allowing a direct-to-implant reconstruction (32,33).

When post-operative radiation is required on the basis of nodal status and a 2-stage expander-to-implant reconstruction has been performed, we prefer to deliver radiation soon after the replacement of the expander with the permanent implant (34).

We consider autologous myocutaneous flaps reconstruction [deep inferior epigastric perforator (DIEP)] only for previously irradiated patients, as we presented with our “extra-projected surgical model” for breast reconstruction (35).

Our pathway of research and development is actually moving through advancements in biomaterials together with enhanced fat grafting techniques, achieving the next step of reconstruction: the “hybrid reconstruction”, that will allow immediate breast reconstruction combining the use of fat and implants, a safe approach also for radiotreated patients.

Conservative mastectomies provide a better quality of life for women with breast cancer. The preservation of the nipple-areola complex in particular offers the possibility of

preserving the woman body image.

Even if the studies indagating conservative mastectomies are low-evidenced, the low rates of local recurrence reported in several large retrospective series and prospective cohorts with 5-year survival rates of more than 95% reassure both patients and surgeons.

Eventhough randomized controlled trials comparing conservative mastectomies with traditional mastectomy and breast conserving surgery would be auspicable in order to achieve higher levels of evidence to answer to many open questions (the minimum distance between tumor and nipple, maximum tumor size, best skin incision, type of reconstruction), we could confidently conclude that conservative mastectomies offer the psychological advantages of good cosmesis and maintenance of woman body image without compromising the oncological safety of mastectomy.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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