

Impact of Advances in Breast Cancer Management on Reconstructive and Aesthetic Breast Surgery

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KEYWORDS

- Breast cancer • Breast reconstruction • Prophylactic mastectomy
- Skin sparing and nipple-areola sparing • Stem cells for breast reconstruction

KEY POINTS

- Because plastic surgeons are increasingly involved in prophylactic, ablative and restorative surgeries related to the breast cancer, it is imperative that they can offer all technical variants of these surgeries (e.g., prophylactic mastectomy), matching patient oncological needs with high cosmetic expectations and understand the implications of the technical choice on future risks and surveillance requirements.
- The ability to determine adequate margins after presurgical radiation or neoadjuvant chemotherapy; experience in reconstruction in cases with intraoperative or accelerated partial irradiation; ability to manage breast cancer in patients with previous aesthetic surgery; and the ability to supplement tissue rearrangement repairs with small, well-vascularized flaps or alloplastic materials are characteristic of oncoplastic surgeons who are comfortable with all aspects of breast cancer management and who have mastered advanced techniques.

INTRODUCTION

It is difficult to find an example of a multidisciplinary clinical niche showing more rapid growth and greater diversity than breast cancer care.¹ In the 1980s, indications for breast reconstruction were liberalized as a result of increasing experience with various procedures, including microsurgery; development of implants, including tissue expanders designed for breast reconstruction; recognition of the beneficial psychological effects of breast reconstruction; and, most importantly, because of the clinical evidence that reconstructive procedures did not negatively affect the result of mastectomy (at that time the mainstay of the primary breast cancer treatment). Breast reconstructive procedures seem

not to worsen the incidence of local and distant disease-free or overall survival in patients subjected to either mastectomy or different forms of breast conservation surgery (BCS) that were established in the 1990s. However, the natural evolution of breast cancer development risk assessment, the advances in diagnostic and surveillance methods, and the changes in the design of comprehensive breast cancer management necessitate the ongoing evaluation of reconstructive approaches to ensure that they do not hinder cancer detection or treatment. Similar concerns are shared in the context of aesthetic breast procedures. Many advances stem from past controversies; whether or not to reconstruct was itself recently a controversy. Practice

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guidelines for the management of breast cancer do not include detailed recommendations regarding aesthetic or reconstructive approaches.^{2,3} Without knowledge of controversies and recognition of advances in oncological breast care, plastic surgery would not be on par, both conceptually and technically, with quality medicine and surgery.^{1,4} This article shows how current diagnostic and therapeutic advances affect plastic surgery and how advances in plastic surgery affect breast care.

IMPACT OF PREVENTIVE, DIAGNOSTIC, AND BREAST MANAGEMENT ADVANCES ON RECONSTRUCTIVE AND AESTHETIC BREAST SURGERY

Prophylactic Mastectomy

One of the most effective options in preventing breast cancer is prophylactic mastectomy (PM). In high-risk patients, PM may be performed as a bilateral procedure; for women undergoing surgical treatment of unilateral breast cancer, there remains much debate about the role of contralateral PM (CPM). Supporters of CPM cite general statistics showing that CPM identifies occult malignancy in approximately 5% of cases and that CPM also decreases the risk of future contralateral breast cancer in more than 90% of cases.⁴ A woman is considered to be at high genetic risk for the development of breast cancer if she has a BRCA1 or BRCA2 gene mutation or her family history suggests an autosomal dominant pattern of inheritance.⁵ A woman with breast malignancy who presents at a young age or has relatives affected by breast cancer should consider testing for BRCA1 and BRCA2 mutations. Plastic surgeons counseling patient candidates for breast reconstructive or aesthetic surgeries have to be familiar with breast cancer risk assessment and recommend appropriate work-up (genetic testing, imaging).^{3,6} Breast cancer reducing strategies, other than PM or CPM, include ovarian ablation, endocrine treatment (eg, tamoxifen), and lifestyle adjustments.⁶ It is a difficult decision whether to undergo PM or CPM and, from the technical standpoint, timing of these procedures also matters (discussed later). Skeptics point out that the risk of breast cancer in the contralateral breast is overestimated and that breast cancer prevention strategies other than CPM are underappreciated. However, improvements in outcomes of breast reconstruction (BR) and high patient satisfaction rates from both PM and BR (90% range) boost plastic surgeons' confidence and lower the threshold for PM/BR recommendation as an option.^{7,8} Furthermore, in arguing for PM or CPM, it could be claimed that risks and consequences

of ovarian ablation and other breast cancer risk-reducing strategies are underestimated.⁹

Because plastic surgeons are increasingly involved in both PM and CPM, it is imperative that they can offer all technical variants of PM to match patient oncological needs and understand the implications of the technical choice for future risks and surveillance requirements. Regarding the simple or skin-sparing type of PM, because all types of mastectomy leave some breast tissue behind, subcutaneous mastectomy (in which nipple-areola complex [NAC] is preserved along with a minuscule layer of supporting breast tissue and terminal ducts segments) is associated with a greater risk of development of breast cancer than total mastectomy. More invasive forms of PM should therefore be recommended to high-risk women; however, strict selection criteria have not been established for the patients with breast cancer who are the best candidates for NAC-sparing mastectomy with an acceptably low risk of NAC tumor involvement.¹⁰ Total mastectomy, which includes the removal of breast tissue, NAC, and the axillary tail, is generally considered the preferred procedure for PM and is often followed by immediate BR.^{11,12}

Skin and Nipple-Areola-Sparing Mastectomy

Skin sparing, skin reducing, and NAC sparing are key technical issues in BCS. They are important considerations in either prophylactic or therapeutic setting. Skin-sparing mastectomy is typically defined as the removal of the breast, NAC, previous biopsy incisions, and skin overlying superficial tumors (in therapeutic mastectomy). The cosmetic outcome significantly improves with the preservation of the skin envelope and the inframammary crease in particular.^{2,13} Skin-sparing therapeutic mastectomies are predominantly performed in patients with in situ T1 or T2 lesions. Skin-sparing mastectomy and immediate autologous tissue reconstruction is a common method of managing primary malignancies (in particular multifocal lesions) with good aesthetic outcomes.

Could this approach be used for the previously irradiated breast? Observations indicate that skin-sparing mastectomy (SSM) and immediate autologous BR or a combination of flaps and implants give satisfactory cosmetic outcomes and oncological outcomes. Even when SSM and immediate BR are applied for the treatment of recurrent lesions, the rate of further recurrences is acceptably low (approximately 10%, comparable with salvage mastectomy) (**Fig. 1**).¹⁴

The next step in improving aesthetic outcomes is to preserve the NAC. However, whether the NAC

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