

Review Article

Breast Conserving Surgery-What, When and for Whom?

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Abstract:

Breast conservation surgery and radiation therapy to the breast has revolutionized the treatment of breast cancer over the last few decades. Surgical direction had seen a heightened interest in the performance of cosmetically superior partial and segmental resections in breast conservation as well as increased demand by patients for breast preservation. The broadening of approaches to delivery of breast irradiation from whole breast to accelerated partial breast has allowed more patients to opt for breast conservation and allowed for what appears to be comparable measurable outcomes in emerging data. As well, the addition of state-of-the-art chemotherapeutic and hormonal therapies has allowed improved outcomes of patients from both local regional recurrence and overall survival standpoints. This paper will provide an overview of BCS including patients selection, prerequisite, indications, contraindications, procedures, complications and follow up.

Key words: Breast carcinoma, Breastconserving surgery, Mastectomy, Oncoplastic surgery.

Introduction:

Much has changed in the management of breast cancer especially over the last few decades. The shift from the Halstedian radical mastectomy to Breast Conserving Surgery (BCS) serves as a remarkable example of the advances in surgical care of the breast cancer patient. The Breast conservation has improved the quality of life for many patients in terms of retention of body image and overall decreased physical morbidity. The data also support that BCS affords patients' the same overall survival without statistically significant increased local recurrence rates. The continued success of BCS has evolved from advances in surgical techniques and pathologic analyses with the application of state-of-the-art radiation and chemotherapeutic regimens¹.

History of surgical management:

The initial surgical treatment of breast cancer was typically wide excision, but was associated with a high

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rate of local recurrence and poor survival. William Halsted popularized radical mastectomy in 1894. Radical mastectomy (RM) resulted in a significant drop in the local recurrence rate, but the curative potential remained limited. Attempt with extended radical mastectomy, which included internal mammary node dissection, failed to improve survival. At different times, modified radical mastectomy (MRM), total (Simple) mastectomy, and more recently, skin sparing mastectomy (SSM) and nipple sparing mastectomy (NSM) were introduced.

Although MRM is a less morbid procedure compared to RM, the patient will still acquire a loss of the breast. The attempt to preserve the breast without compromising survival brought up the use of breast conserving therapy (BCT). This includes breast conserving surgery and breast radiotherapy. Although BCT and breast conserving surgery (BCS) are used interchangeably, strictly speaking BCT includes both BCS and breast radiotherapy.

BCS is an important part of the breast-conserving therapy, which may be defined as a combination of conservative surgery for resection of the primary tumor with or without surgical staging of the axilla, followed by radiotherapy for the eradication of the residual microscopic disease of breast with or without adjuvant systemic therapy².

What is BCS?

BCS refers to an operation that aims to remove breast cancer while avoiding a mastectomy. Other terms for

this operation include: lumpectomy, wide local excision, segmental resection, lumpectomy and quadrantectomy. BCS has been increasingly accepted as an alternative to mastectomy in specific patients, as it provides tumor removal while maintaining an acceptable cosmetic outcome.

Indications of BCS:

For clinical stages I and II breast cancer, breast-conserving surgery, with radiotherapy and possibly chemotherapy may be indicated if one or two sentinel lymph nodes are found to have cancer which is not extensive¹. In this case, the sentinel lymph nodes would be examined, and lymphadenectomy as further evaluation is not indicated as this result from the sentinel lymph nodes is sufficient to recommend treatment.

BCS may also be used in cases of biopsy-proven invasive breast cancer or biopsy-proven ductal carcinoma in situ (DCIS). In the assessment of the tumor, the surgeon should assess the ability to resect the tumor with clear margins while providing a cosmetic result that is acceptable to the patient³.

Shared decision-making:

Shared decision-making is an important consideration in breast-conserving surgery. It is estimated that between 50% and 70% of patients are active participants in the decision making of breast cancer surgery. The time following a cancer diagnosis may be filled with fear, vulnerability, and a sense of being overwhelmed at the amount of information being provided by physicians as well as accessed on the internet. Each patient has their own set of unique characteristics, which may make it challenging to read information online and apply that information to a specific individual circumstance. In addition, there are several important misconceptions regarding breast-conservation surgery for patients and clinicians to keep in mind.

Contraindications of BCS:

Absolute contraindications, which are reasons why the procedure absolutely cannot be done, includes

1. Pregnancy is an absolute contraindication to the use of breast irradiation. In some cases, it may be possible to perform breast-conserving surgery in the third trimester and treat the patient with radiation after delivery. □□□
2. Two or more primary tumors in separate quadrants of the breast or with diffuse malignant-appearing micro calcifications.

3. A history of prior therapeutic irradiation to the breast that would require re-treatment to an excessively high total dose.
4. Persistent positive margins after reasonable surgical attempts: the importance of a single focally positive microscopic margin needs further study and may not be an absolute contraindication.
5. Inflammatory breast cancer.
6. Diffuse or indeterminate micro-calcifications on mammography.

Relative contraindications encompass situations of higher risk of complications to the patient that may be outweighed by other considerations, such as the benefit to the patient. Relative contraindications include

1. Previous breast radiation therapy.
2. Connective tissue disease such as Scleroderma, Sjogren Syndrome, Lupus, and Rheumatoid arthritis may result in an increased risk of radiation toxicity.
3. Very large tumor size relative to breast volume³.

Prerequisites of BCS.

The prerequisites for BCS include a histological diagnosis of cancer, preferably by needle biopsy, sufficient breast imaging to define the extent of the lesion, a complete medical history and physical examination, and a fully informed discussion with the patient of all surgical options, including the risks and benefits of each approach.

Imaging should always include bilateral mammography. Ultrasound is appropriate whenever the sensitivity of mammography is reduced by breast density and/or younger age. MRI is not mandatory, but may be useful whenever tumor size and extent are incompletely characterized by physical examination, mammography, and ultrasound. Most candidates for BCT have stage I-II disease and a metastatic workup is not required. Nonpalpable lesions should be localized preoperatively by guide wire, radioactive seed or, when appropriate, intraoperative ultrasound⁴.

Technique of BCS:

BCS is done under local anesthesia with sedation, regional anesthesia or general anesthesia, in the supine position, with the patient's arm abducted at 90 degrees and sterilely draped into the operative field. Prophylactic antibiotics are given prior to induction.

The skin incision should be planned to optimize cosmesis and allow adequate exposure of the tumor site; this is best accomplished by a circumareolar incision for central lesions and an incision in the natural skin lines of the breast ("Kraissl lines") for most other sites. The incision should be placed to optimize

skin-sparing in the event that a mastectomy is unexpectedly required. Excision of overlying skin is appropriate to encompass adherent tumor but should otherwise be done selectively as it may leave the breast (and possibly the nipple) asymmetric. Cancers adherent to the nipple/areola can be encompassed by a central lumpectomy with removal of the overlying structures. Excision of core needle biopsy tracts is unnecessary. Incisions for more complex oncoplastic resections incorporating breast reduction or mastopexy should be designed jointly with the consulting plastic surgeon.

As for excisional breast biopsy procedures, every effort should be made to remove specimens intact, not piecemeal. Excisions carried from the subdermal plane to the pectoral fascia will not require re-excision for a positive anterior or posterior margin. All specimens should be oriented by the surgeon using sutures, clips, or ink; labeled appropriately; and submitted fresh for identification of the margins (or intraoperative margin assessment), following each institution's protocol. Specimen x-rays or intraoperative ultrasound should confirm removal of the lesion, clips placed (at the preference of the radiation oncologist) to mark the excision cavity, and the excision defect closed in layers as cosmetically as possible⁴.

Edges of excised tissue:

There is no common definition of optimal edges - tumor free margin, it is common, even after consensus of Milan, that edge is 1 cm wide if possible, with possibility that postoperative irradiation can destroy microscopic remains of disease⁵.

Types of surgical edges:

- * Positive edges - tumor cells are present at the edge;
- * Focal presence of tumor cells - at least three fields of view at low enlargement tumor cells are visible or are at the edge;
- * More than focal presence - tumor cells are present in more than three fields of view at low enlargement;
- * Narrow edges - tumor cells are 1/2 mm from edges;
- * Negative edges - there are no tumor cells or the distance between edges and tumor cells is more than 1 mm.

Basic question for each surgeon is: how much healthy tissue should be removed to achieve clean edges, since positive edges are usually "frontline" of local recurrence, axillary and remote metastatic disease. Answer lies in direct dependency of size and histology characteristics of tumor, and methods of preoperative tumor detection, and surgeon experience⁵.

Complications of BCS:

Seroma formation, arm morbidity (arm swelling, arm pain, arm numbness, arm stiffness, shoulder stiffness, shoulder pain, and nerve injury), phantom breast syndrome, delayed cellulitis and pain syndromes of the chest wall, axilla, and upper extremity are known complications after breast cancer treatment. Some of these complications especially arm morbidity is less common in BCT as compared to mastectomy, and less frequent with sentinel lymph node biopsy than after axillary lymph node dissection.

Oncoplastic surgery:

Oncoplastic surgery is an important consideration in breast-conserving surgery that integrates plastic surgery principles into breast cancer surgery in order to preserve aesthetic outcomes and quality of life, without compromising local control of the cancer. It is based on three surgical principles: ideal breast cancer surgery with free tumor margins, immediate breast reconstruction, and immediate symmetry with the other breast. Oncoplastic approaches to breast-conserving surgery may require a close partnership among surgeons who specialize in surgical oncology and plastic surgery. Oncoplastic surgery is not only limited to breast-conserving surgery, as the techniques and principles of plastic surgery can be applied to mastectomy as well.

Follow-up care after BCS instead of.

Clinical history, physical examination, and breast imaging are the most effective means of follow-up. Physical examination should be performed every three to six months for the first three years following surgery, and every six months in years four and five. After five years, annual physical examinations provide adequate follow-up. Patients at exceptionally high risk of recurrence or development of a second primary tumor should be watched more closely.

Mammography is important for the early recognition of recurrence. Unfortunately, changes seen on mammography resulting from surgical therapy and irradiation (such as scarring, skin thickening, and masses representing postoperative fluid collections) may mimic the signs of malignancy. A baseline mammogram should be obtained approximately six months after tumor excision and the completion of all treatments. Mammography should then be done at least annually.

Other imaging studies may be necessary in symptomatic patients. Patients with bone pain should be screened by bone scan for bone secondaries.

Detailed laboratory follow-up is expensive and has not been shown to improve survival. Randomized control trials have not shown survival benefit from the routine use of bone scan and computed tomographic scan for asymptomatic patients with Stage I or Stage II breast cancer⁶.

Conclusion:

Although getting a microscopic negative margin is still challenging, BCS as a surgical technique has revolutionized the surgical treatment of early breast cancer. BCS has not only provided an acceptable oncological outcome, but has diminished the psychological burden, offered better cosmetic results, and reduced postoperative complications.

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