

Breast Conservation Therapy in the 21st Century

It has been approximately 25 years since the NCI issued its first consensus statement recommending breast conservation therapy (BCT) as the preferred approach for women with early stage breast cancer (1). This followed publication of randomized trials which indicated that breast conservation, consisting of lumpectomy, axillary node dissection (ALND), and whole breast radiation, achieved equivalent distant metastasis-free and overall survival when compared with modified radical mastectomy. This represented a major advance in breast cancer treatment and hundreds of thousands of patients have since been successfully treated with a breast preserving approach, avoiding the disfigurement associated with breast removal.

A number of advancements in local-regional treatments have further improved the outcome of BCT compared to the first clinical trials. To advise practitioners on current standards of local-regional treatments, the American College of Radiology (ACR) has published a series of appropriateness criteria for BCT. The most recent of these publications appears in this issue of the *Breast Journal*, written by a multidisciplinary panel of breast cancer experts who carefully reviewed and considered outcomes from clinical trials with the addition of expert opinions when necessary (2). The resulting publication provides an important summary of the current state of many issues concerning breast conservation, including a discussion of patient and disease characteristics that should be considered in the determination of decisions regarding local-regional treatment management. The updated ACR appropriateness criteria also highlights advances in breast conservation treatment, including discussions of partial breast irradiation and hypofractionated radiation dose scheduling, both of which can significantly reduce the length of a radiation treatment course. The ACR appropriate criteria publication is an invaluable resource for providing primary care practitioners, patients and oncology specialists an overview of the

current state of breast conservation treatment for early stage invasive breast cancer. In this accompanying editorial, we wish to further discuss the current state of breast conservation, specifically highlighting treatment advances that have improved the outcome of this treatment approach for breast cancer patients.

OUTCOMES OF BCT IN THE 21ST CENTURY

Based on the randomized trials conducted in the 1980s, BCT has been accepted as a standard-of-care treatment approach for patients with unifocal stage I and II breast cancer. Despite this, some clinicians remain hesitant in adopting breast conservation as an alternative to mastectomy, in part because of the perception that mastectomy is a more radical or more aggressive approach. One reason for this perception concerns the risk of developing a recurrence in the treated breast. The early BCT trials reported in-breast recurrence rates of approximately 1% per year. Accordingly, with 15–20 year follow-up, up to one in five women would require another intervention for treatment of recurrence or a second cancer within the treated breast. With this information, many elected to have their breast removed to avoid the psychological and physical consequences of a local recurrence. It is clear that this thought process has led to an under utilization of BCT. In a snapshot of national patterns of care for patients treated in 1994, only 42% of stage I or II breast cancer patients were treated with BCT (3). The BCT rate was higher, but still only 60%, for patients treated in a National Comprehensive Cancer Network center in the years of 1997–2002 for a diagnosis of ductal carcinoma in situ or stage I–II breast cancer (4).

It is important for patients and providers to recognize that advances in all multidisciplinary aspects of breast cancer care have significantly improved breast cancer outcomes. Improvements in mammography and ultrasound have led to better localization for surgical approaches. In addition, surgeons and pathologists now more optimally coordinate the handling of pathology specimens, with a greater emphasis being placed on achieving negative margins. Radiation

treatment advances have included three dimensional imaging of target volumes and normal tissues to assure adequate dose delivery to the regions of interest and selective avoidance of critical tissues, such as the heart. Finally, the important role of systemic treatments has become more fully realized and the routine use of adjuvant systemic therapies decreases the risk of local-regional recurrence following BCT.

Collectively, these multidisciplinary treatment advances have fundamentally changed the risk of recurrence within the treated breast. Indeed, the risk of developing a breast recurrence is currently almost 50% less than that reported in the early clinical trials. For example, in a report of our institutional experience of BCT (lumpectomy + whole breast radiation), the 5 year risk of in-breast recurrence for 974 patients between 1973 and 1993 was 5.7%. However, for 381 patients treated during the years of 1994–1996, the 5 year recurrence risk was only 1.3% (5). Similar improvements have been noted in publications from other institutions and in recent clinical trials investigating local-regional treatments, many of which had difficulty in meeting their statistical objectives due to a much lower than expected event rate.

The success of modern day BCT in terms of low in-breast recurrence rates now approximates the rates associated with mastectomy in early stage disease. Breast conservation should be thought of as an equivalent “comprehensive” modality similar to that of mastectomy. Indeed, the radiation component of BCT treatment can extend the volume treated beyond that which is included in a standard mastectomy. This may be of therapeutic value particularly for patients with lymph node positive disease, in which the recurrence rates after mastectomy are higher than those in patients with lymph node negative disease.

BUILDING ON THE SUCCESSFUL RESULTS OF BCT

With the achievement of low local failure rates with BCT, more recent investigations have focused on minimizing the associated toxicities, costs, and inconvenience of treatment. A major advance in breast surgery has been the adoption of sentinel lymph node surgery as an alternative to ALND. Randomized trials have indicated that sentinel node surgery offers similar therapeutic efficacy as more extensive axillary dissection for patients with clinically node-negative disease (6). In addition, for patients treated with BCT, a recent

randomized trial found that ALND may also be unnecessary for selected patients with a positive sentinel node (7). Advances in radiation oncology have also improved outcomes. Examples include development of new techniques that utilize diaphragmatic motion to displace the heart away from the left breast, completely eliminating the heart from the treatment field. Another advance has been the ability to modulate the intensity of dose over the three-dimensional volume of the treated breast. Three-dimensional dose modulation can decrease dose inhomogeneity, which in randomized trials was shown to reduce acute and late skin and cosmetic complications of treatment.

A second focus of recent research has been to minimize the cost and inconvenience with local-regional treatments. Replacement of ALND with sentinel node surgery avoids the need for hospitalization and axillary drains and shortens postoperative recovery time. Convenience of radiation treatments has also been addressed. Randomized trial data indicate that in postmenopausal patients with stage I disease, a 3–4 week course of breast radiation has the same degree of efficacy and safety as a conventional 5–6 week course (8). The techniques of partial breast radiation attempt to shorten the treatment course to an even greater extent, to 1 week or less. These approaches are being investigated in randomized trials and the initial rates of success with partial breast radiation appear promising. The ultimate convenience would be to eliminate radiation completely. However, numerous trials have attempted to do this without success. As highlighted in the article by Bellon *et al.*, the one subgroup in which this may be an appropriate option are patients over the age of 70 with stage I estrogen receptor-positive disease who are treated with hormonal therapy.

In conclusion, the outcomes for patients undergoing breast conservation are now outstanding with very low rates of recurrence and treatment related morbidity. Women presenting with early stage disease should be fully educated with the current data and encouraged to consider this treatment option without any fear that this “less aggressive” therapeutic approach puts them at any increased risk for disease recurrence.

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