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The American Brachytherapy Society consensus statement for accelerated partial breast irradiation

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ABSTRACT

PURPOSE: To develop clinical guidelines for the quality practice of accelerated partial breast irradiation (APBI) as part of breast-conserving therapy for women with early-stage breast cancer.
METHODS AND MATERIALS: Members of the American Brachytherapy Society with expertise in breast cancer and breast brachytherapy in particular devised updated guidelines for appropriate patient evaluation and selection based on an extensive literature search and clinical experience.
RESULTS: Increasing numbers of randomized and single and multi-institution series have been published documenting the efficacy of various APBI modalities. With more than 10-year followup, multiple series have documented excellent clinical outcomes with interstitial APBI. Patient selection for APBI should be based on a review of clinical and pathologic factors by the clinician with particular attention paid to age (≥50 years old), tumor size (≤3 cm), histology (all invasive subtypes and ductal carcinoma *in situ*), surgical margins (negative), lymphovascular space invasion (not present), and nodal status (negative). Consistent dosimetric guidelines should be used to improve target coverage and limit potential for toxicity following treatment.
CONCLUSIONS: These guidelines have been created to provide clinicians with appropriate patient selection criteria to allow clinicians to use APBI in a manner that will optimize clinical outcomes and patient satisfaction. These guidelines will continue to be evaluated and revised as future publications further stratify optimal patient selection. © 2013 Published by Elsevier Inc. on behalf of American Brachytherapy Society.

Keywords: Breast cancer; Partial breast irradiation; Brachytherapy; Guidelines; Breast-conserving therapy

Introduction

Breast-conserving therapy (BCT) represents one of the seminal treatment breakthroughs in the management of breast cancer. With more than 20-year followup, multiple randomized trials have found comparable outcomes between BCT and mastectomy, allowing women to choose to preserve their breast without compromising their ability to be cured of their cancer (1–3). Beyond simply preserving the breast, BCT has been associated with improved quality of life, including social functioning, body image, and physical functioning, compared with mastectomy (4). Radiation therapy (RT) represents an integral part of BCT as multiple trials have documented increased rates of ipsilateral breast tumor recurrence (IBTR) in women undergoing breast-conserving surgery (BCS) without RT; even among women considered at low risk for IBTR, RT has been associated with a significant reduction in IBTR (Table 1) with a meta-analysis confirming these findings and identifying a breast cancer mortality benefit (1, 5–9). One factor that often prevents women from receiving BCS followed by adjuvant RT is the length of treatment

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Table 1
Breast-conserving therapy with or without RT

Trial	Number of patients	Trial randomization	Followup (mo)	Limiting factors	Local recurrence	
					RT (%)	No RT (%)
NSABP B-06 (1)	1851	Lumpectomy ± RT	248		14	39
NSABP B-21 (5)	1009	Lumpectomy + tamoxifen ± RT	87	T < 1 cm	3	16
Canadian Multi-Institutional (6)	769	Tamoxifen ± RT	66	>50 y old	.6	7.7
CALGB 9343 (7)	636	Tamoxifen ± RT	126	>70 y old	1	7
Milan (8)	580	Quadrantectomy ± RT	109	T ≤ 2.5 cm	5.8	23.5

RT = radiation therapy; NSABP = National Surgical Adjuvant Breast and Bowel Project; CALGB = Cancer and Leukemia Group B; T = tumor size.

required. Traditional whole-breast irradiation (WBI) typically requires 5–6 ½ weeks with studies demonstrating that 25% or more of women fail to receive adjuvant radiation after BCS (10, 11). Accelerated partial breast irradiation (APBI) represents a technique that allows for the delivery of adjuvant therapy after BCS in 1 week or less with multiple techniques available at this time to deliver APBI; intraoperative partial breast irradiation is an another alternative that delivers a single fraction of RT in the perioperative period. APBI allows for women who may otherwise forgo adjuvant RT the ability to complete treatment in an efficient manner and is increasingly being used with a 10-fold increase noted between 2002 and 2007 (12).

With the increased use of APBI, evidence-based guidelines are necessary to guide clinicians with regard to appropriate patient evaluation and selection. Although the American Brachytherapy Society (ABS) has previously provided guidelines for APBI, these guidelines have been updated to reflect the significant increase in published data and changes in clinical practice since the previous publication (13).

Methods and materials

The ABS guidelines for APBI were composed by members of the ABS with expertise in breast cancer and in particular breast brachytherapy. The goals of this effort were to update the previous guidelines based on a review of new data addressing the efficacy and toxicity of APBI. Clinical guideline development was initiated with a systematic review of the literature with a focus on randomized trials, multi-institution series, and single institution reports addressing clinical outcomes and toxicities. Five randomized trials were identified along with 41 nonrandomized studies (Phase I/II, single institution, and multi-institution). Although randomized trials were evaluated, because of the short followup of more recent trials, outdated or nonstandard techniques of older trials, and a lack of power in several trials, focus was placed on nonrandomized data when creating the final guidelines. Current recommendations or guidelines previously published (by other societies) were evaluated as well. Following a discussion of the literature, the revised guidelines were established by consensus among the authors based on the review of the literature on the topic and their expert opinions. When evaluating the data available and establishing guidelines, the study design and limitations of studies were also taken into consideration. Furthermore, guidelines were made with the knowledge that current guidelines may be changed moving forward based on future published data, in particular data from randomized trials.

Evaluation of specific guideline recommendations

With regard to age criteria for the application of APBI, this guideline remains unchanged because of a lack of significant new data supporting a change in the recommendation. Specifically, no APBI studies were identified that conclusively established age as risk factor for an increased risk of IBTR when applying the technique beyond that already identified when using BCT in general with standard WBI.

When evaluating tumor size, the threshold was kept at 3 cm, consistent with the previous ABS guidelines and other consensus guidelines and inclusion criteria for randomized trials. No data were identified to suggest that APBI should or could be applied after neoadjuvant chemotherapy for patients with tumors >3 cm. Similarly, when evaluating nodal status, only node-negative patients were included consistent with the previous ABS guidelines and other consensus guidelines.

For surgical margins, the recommendation was based on recently published data and confirmed with other consensus guidelines. Specifically, very few published studies were identified that conclusively established (or suggested) that APBI could be applied safely in other clinical settings (i.e., focally positive margins, etc.). The exclusion of lymphovascular space invasion (LVSI) was based on a combination of recently published APBI data and consensus agreement with previously published guidelines.

For histology, a change was made to incorporate all invasive subtypes and ductal carcinoma *in situ* (DCIS) because no new data were identified establishing any other subtype that resulted in a higher risk of IBTR. Specifically, the inclusion of DCIS was based on a large number of new publications supporting the clinical efficacy of APBI in patients with DCIS. With regard to the invasive lobular carcinomas (ILC), although there still remains limited data regarding APBI and lobular carcinomas, the guideline was modified to include lobular carcinomas based on (*1*) the