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Experience with partial breast irradiation for treatment of breast cancer at a community-based cancer center

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Abstract

BACKGROUND: Many patients after lumpectomy have barriers to whole breast radiation. Accelerated partial breast irradiation (APBI) was introduced at our institution as an alternative.

METHODS: Retrospective review of patients who were treated with ABPI from March 2003 to December 2011 was conducted. Results of demographics, tumor pathology, infection, and recurrence were reviewed.

RESULTS: Two hundred ninety-four patients received 298 treatments of APBI. The mean follow-up was 58.5 months. Using the American Society for Radiation Oncology criteria, 101 patients were suitable, 142 cautionary, and 52 patients were unsuitable. The average age was 65 with a range of 37 to 93. In our study, true local recurrence occurred in only 1.0% (n = 3). Patients recurring in the same breast elsewhere was 2% (n = 6).

CONCLUSIONS: Outcomes after treatment with APBI were excellent, and breast recurrence was similar to whole breast irradiation. It may safely be offered to patients with less than suitable criteria or barriers to whole breast radiation.

In the United States, 226,000 women are diagnosed with a new breast cancer each year. The surgical options for most of these women are either breast conservation therapy (BCT) or mastectomy. When these options are presented to patients, the one caveat is that women electing to have BCT require the addition of radiation. Both NSABP B06 and B17, even after 20 years, continue to show a local control advantage in the group with breast conservation that had added whole breast radiation.[1,2] Those women who do not choose to have radiation have an average recurrence risk of 27.9%.[2,3] The standard whole breast radiation currently used requires the patient to have 4 to 6.5 weeks of radiation for completion of therapy.

Although radiation therapy facilities are readily found in urban and metropolitan areas, patients in small and rural communities can have difficulty with access to radiation therapy close to home. Elderly patients also may have barriers, such as transportation, even in urban areas. Recognizing this struggle, accelerated partial breast radiation (APBI) was introduced as an alternative at our institution in 2003. When the program was started, multicatheter interstitial implants were used and then transitioned to a predominantly intracavitary approach. Guidelines set forth by the American Society for Radiation Oncology (ASTRO)

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influenced our practice over this time period. Before the ASTRO guidelines, the criteria we used were those set by the American Society of Breast surgeons. These criteria were far less stringent, and after the ASTRO guidelines, we became more concerned about choosing patients appropriately. We reviewed our experience and patient outcomes.

Methods

A retrospective review of all patients treated with PBI from March 2003 to December 2011 was conducted. We included demographics and tumor pathology with prognostics in the review. The patients were then categorized based on the current ASTRO guidelines of suitability (Table 1). All patients received high-dose brachytherapy twice daily for 10 fractions in 5 days to a dose of 34 gray. Initially, adjunctive imaging was not always obtained, but additional imaging has now become part of preoperative workup. Currently, every patient considered for APBI now has adjunctive imaging. Most patient's breast tissue in this review was evaluated with breast-specific gamma imaging or MRI before proceeding with APBI to rule out multifocal disease. We followed the institutional review board protocol for data review.

Over the time period of review, APBI was performed with multicatheter interstitial implants, Mammosite, Contura, and SAVI intracavitary devices. Toward the end of the review, multichannel balloon catheters were also used. Our current practice is to place a cavity evaluation balloon device at the time of surgery. CT imaging is performed postoperatively to evaluate the cavity and conformance to the balloon. Once pathology is available, usually within 48 hours, confirming clear margins and negative nodes, then the true intracavitary device is placed. Physics and treatment planning is then completed and treatment commences. The patient then receives 2 treatments per day for 5 days. The planning target volume for intracavitary devices used was 10 mm from cavity surface. The treatments each day are separated by 6 hours.

Table 1 ASTRO criteria[4]

Suitable	Cautionary	Unsuitable
Age >60	Age 50–59	Age <50
Size <2.0 cm	Size 2.1–3.0 cm	BRCA mutation
Margins >2.0 mm	Margins negative but >2.0 mm	Size >3.0 cm
ER positive	ER	Margin positive
Invasive ductal	ER negative	Node positive (or unknown)
Node negative (i−, i+)	Invasive lobular	Neoadjuvant LVSI extensive
No neoadjuvant	DCIS	
LVSI negative	Her2 Neu+	
	LVSI focal	

ASTRO = American Society for Radiation Oncology; DCIS = ductal carcinoma in situ; ER = estrogen receptor; LVSI = lymphovascular invasion.

Table 2 Rates of recurrence local, elsewhere, and contralateral

	Breast reoccurrence	%	Minimum (248) follow-up, 58.5 mo (%)
True local	3	1	1.2
Elsewhere	6	2	2.4
Ipsilateral	9	3.1	3.6
Contralateral	8	2.7	3.2

Results

There were 294 patients who received 298 treatments from March 2003 to December 2011. The median follow-up was 58.5 months. Forty patients had multicatheter therapy, 241 patients had single catheter balloon therapy, and 17 patients multichannel single catheter therapy. Applying current ASTRO guidelines, we classified 101 patients as suitable for APBI, 142 patients cautionary for APBI, and 52 patients unsuitable for APBI category.

The average age of the women in our review was 65 although the age ranged from 37 to 93 years. There were 20 patients younger than 50 years, which represented 6% of the overall treatment group. Women older than 75 years comprised about 20% of the overall treatment group.

There were 19 different surgeons who performed lumpectomies for our APBI group; however, 1 surgeon performed 80% of the operations. Pathology of the treatment group included 203 invasive ducal carcinomas, 10 invasive lobular carcinomas, 12 mucinous carcinomas, 66 ductal carcinoma in situ, 2 tubular adenocarcinomas, and 1 signet cell carcinoma. Tumor size varied from 1 to 35 mm; the median tumor size was 11 mm. The mean margin size was 6.5 mm. There were 17 patients in our series with a margin of 1 mm, and there were none with positive margins.

Metastasis without local breast reoccurrence was seen evenly throughout the 3 ASTRO categories. Eight people had distant metastasis with 3 dead from disease. Additional recurrence data can be seen in Tables 2, 3 and 4. We defined a cancer occurrence in the same breast as an "elsewhere" cancer if it was located more than 2 cm away from the original treatment bed.

Table 3 Recurrence stratified by risk determined by ASTRO

ASTRO criteria	Suitable (n = 101)	Cautionary (n = 142)	Unsuitable (n = 51)	All (n = 294)
Local	0	2	1	3
Elsewhere	2	3	1	6
Contralateral	4	4	0	8
Metastasis	2	3	3	8

ASTRO = American Society for Radiation Oncology.