Outcomes of Once Daily and Twice Daily Accelerated Partial Breast Irradiation Regimens In Hormone Receptor Positive Breast Cancer: A Single Institution Experience

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Abstract

Accelerated partial breast irradiation (APBI) offers effective local control for low-risk, hormone receptor positive breast cancer, but the optimal external beam regimen remains undefined. We retrospectively evaluated outcomes of two APBI regimens used at our institution: **38.5 Gy in 10 twice-daily fractions versus 28.5 Gy in 5 once-daily, non-consecutive fractions**. Among 399 postmenopausal women with DCIS or early-stage invasive breast cancer treated between 2017 and 2025, both regimens achieved excellent 3-year outcomes: ipsilateral breast tumor recurrence (1% vs. 2%, p=0.46), disease-free survival (99% vs. 98%, p=0.79), and overall survival (99% vs. 99%, p=0.53). However, the 38.5 Gy group experienced significantly more grade 1–2 dermatitis, hyperpigmentation, and fibrosis. No grade ≥3 toxicities occurred in either cohort. One-year Physician-reported cosmetic outcomes were excellent or good in 98.4% of patients in both groups. While both regimens were effective and well tolerated, the 28.5 Gy schedule demonstrated lower toxicity and improved convenience, supporting its use in appropriately selected patients.

Introduction

APBI has demonstrated non-inferior in-breast recurrence rates compared to whole breast irradiation in low-risk hormone receptor positive breast cancer patients across multiple randomized clinical trials. However, optimal external beam APBI fractionation, dosing, and technique remain undefined. This study evaluates outcomes of two APBI regimens used at our institution: 38.5 Gy in 10 twice-daily (BID) fractions and 28.5 Gy in 5 once-daily fractions on non-consecutive days.

Methods and Materials

This retrospective, single-institution study

Eligible patients were females with pathologically confirmed breast cancer diagnosed between January 2017 and March 2025.

Inclusion criteria

- Age ≥ 50 years
- Treatment with breast-conserving surgery with or without lymph node sampling followed by APBI
- Diagnosis of either pure ductal carcinoma in situ (DCIS) or invasive tumors < 3 cm in size
- Clinically and/or pathologically negative lymph nodes
- Negative surgical margins.

Exclusion criteria

- Had previously received breast irradiation
- Radiation treatment information was unavailable

Outcomes of interest include ipsilateral breast tumor recurrence (IBTR), disease-free survival (DFS), overall survival (OS), radiation toxicities (graded by CTCAE v5.0), and physician-reported (Harvard scale) cosmetic outcomes.

Results

Patients treated with APBI between January 2017 and March 2025 were included. **399 patients met eligibility: 142 in the 38.5 Gy (BID group) and 257 in the 28.5 Gy (OD group).**

Results

Table 1 Patient Characteristics

	Total (n=399)	BID Group (n=142)	OD Group (n=257)	P-value
Age at diagnosis				0.42
Median (IQR)	66 (59, 72)	66 (58, 70)	66 (60, 72)	
Race, n (%)				0.75
White	345 (86.5%)	122 (85.9%)	223 (86.8%)	
Black or African American	41 (10.3%)	15 (10.6%)	26 (10.1%)	
Asian	8 (2.0%)	3 (2.1%)	5 (1.9%)	
American Indian	1 (0.3%)	1 (0.7%)	0 (0.0%)	
Multiple Races/Other	2 (0.5%)	1 (0.7%)	1 (0.4%)	
Unknown	2 (0.4%)	0 (0%)	2 (0.8%)	
Ethnicity, n (%)				0.75
Non-Hispanic	389 (97.5%)	140 (98.6%)	249 (96.9%)	
Hispanic	3 (0.8%)	1 (0.7%)	2 (0.8%)	
Unknown	7 (1.8%)	1 (0.7%)	6 (2.3%)	
Breast Laterality, n (%)				0.89
Left	199 (49.9%)	68 (47.9%)	131 (51.0%)	
Right	191 (47.9%)	71 (50.0%)	120 (46.7%)	
Bilateral	9 (2.3%)	3 (2.1%)	6 (2.3%)	
In-breast Location*, n (%)				0.35
Central	32 (7.8%)	8 (5.5%)	24 (9.1%)	
Lower inner quadrant	21 (5.1%)	10 (6.9%)	11 (4.2%)	
Lower outer quadrant	31 (7.6%)	10 (6.9%)	21 (8.0%)	
Upper inner quadrant	93 (22.8%)	29 (20.0%)	64 (24.3%)	
Upper outer quadrant	231 (56.6%)	88 (60.7%)	143 (54.4%)	
Tumor Histology, n (%)				0.02
DCIS	72 (18.0%)	16 (11.3%)	56 (21.8%)	
IDC	282 (70.7%)	110 (77.5%)	172 (66.9%)	
ILC	29 (7.3%)	12 (8.5%)	17 (6.6%)	
Mixed IDC/ILC	7 (1.8%)	2 (1.4%)	5 (1.9%)	
Other	6 (1.5%)	0 (0.0%)	6 (2.3%)	
Missing	3 (0.8%)	2 (1.4%)	1 (0.4%)	
pT Stage, n (%)				0.01
In situ	72 (18.0%)	16 (11.3%)	56 (21.8%)	
1	317 (79.4%)	120 (84.5%)	197 (76.7%)	
2	10 (2.5%)	6 (4.2%)	4 (1.6%)	
Invasive Status				0.01
Pre-invasive (In situ)	72 (18.0%)	16 (11.3%)	56 (21.8%)	
Invasive (pT1, pT2)	327 (82.0%)	126 (88.7%)	201 (78.2%)	
pN Stage, n (%)				<0.01
0	320 (80.2%)	126 (88.7%)	194 (75.5%)	
Nx	79 (19.8%)	16 (11.3%)	63 (24.5%)	
Grade, n (%)				0.05
1	158 (39.6%)	67 (47.2%)	91 (35.4%)	
2	215 (53.9%)	65 (45.8%)	150 (58.4%)	
3	26 (6.5%)	10 (7.0%)	16 (6.2%)	
Lymphovascular Space Invasion, n (%)				0.15
Yes	14 (3.5%)	2 (1.4%)	12 (4.7%)	
No	385 (96.5%)	140 (98.6%)	245 (95.3%)	
ER, n (%)				0.43
Positive	393 (98.5%)	141 (99.3%)	252 (98.1%)	
Negative	6 (1.5%)	1 (0.7%)	5 (1.9%)	
% ER+ (n=391)				0.70
Median (IQR)	99 (95, 100)	99 (95, 100)	99 (95, 100)	
PR, n (%)				0.34
Positive	373 (93.5%)	135 (95.1%)	238 (92.6%)	
Negative	26 (6.5%)	7 (4.9%)	19 (7.4%)	
% PR+ (n=372)				0.89
Median (IQR)	95 (70, 99)	95 (60, 99)	95 (70, 99)	
HER2*, n (%)				0.73
Positive	323 (98.8%)	124 (98.4%)	199 (99.0%)	
Negative	3 (0.9%)	1 (0.8%)	2 (1.0%)	
Unavailable	1 (0.3%)	1 (0.8%)	0 (0.0%)	
Oncotype Dx Score†, n (%)				0.42
Yes	199 (60.9%)	73 (57.9%)	126 (62.7%)	
No	128 (39.1%)	53 (42.1%)	75 (37.3%)	
Oncotype Dx Score (n=199)				0.90
Median (IQR)	14 (9,18)	13 (9,18)	14 (9,18)	

* Based on 408 lesions, †Only in invasive cases = 327 patients
Abbreviations : IQR; Interquartile range, DCIS; Ductal carcinoma in-situ, IDC; Invasive ductal carcinoma, ILC; Invasive lobular carcinoma, ER; Estrogen receptor, PR; Progesterone receptor, HER2; Human epidermal growth factor receptor 2
Data are presented as n (%) unless otherwise indicated.

Table 2 Treatment Characteristics

	Total (n=399)	BID Group (n=142)	OD Group (n=257)	P-value
Surgical Intervention, n (%)				0.01
Lumpectomy	95 (23.8%)	23 (16.2%)	72 (28.0%)	
Lumpectomy and SLNB	302 (75.7%)	118 (83.1%)	184 (71.6%)	
Lumpectomy and ALND	2 (0.5%)	1 (0.7%)	1 (0.4%)	
Surgical Reconstruction, n (%)				1.00
Yes	4 (1.0%)	1 (0.7%)	3 (1.2%)	
No	394 (99.0%)	141 (99.3%)	253 (98.8%)	
Type of Reconstruction, n (%) (n=4)				0.25
Immediate	3 (75.0%)	0 (0.0%)	3 (100.0%)	
Delayed	1 (25.0%)	1 (100.0%)	0 (0.0%)	
Endocrine Therapy, n (%)				0.56
Yes	343 (86.0%)	124 (87.3%)	219 (85.2%)	
No	56 (14.0%)	18 (12.7%)	38 (14.8%)	
Systemic Therapy (e.g., chemotherapy, immunotherapy), n (%)				0.35
Yes	5 (1.3%)	3 (2.1%)	2 (0.8%)	
No	394 (98.7%)	139 (97.9%)	255 (99.2%)	
Radiation Therapy Technique, n (%)				0.29
3DCRT	396 (99.2%)	140 (98.6%)	256 (99.6%)	
IMRT/VMAT	3 (0.8%)	2 (1.4%)	1 (0.4%)	
Treatment Position, n (%)				0.71
Supine	16 (4.0%)	5 (3.5%)	11 (4.3%)	
Prone	383 (96.0%)	137 (96.5%)	246 (95.7%)	
Treatment Duration (days)				<0.01
Median (IQR)	9 (6, 10)	6 (6, 6)	10 (9, 10)	

Abbreviations: IQR; Interquartile range, DCIS; SLNB; Sentinel lymph node biopsy, AXLD; Axillary lymph node dissection, 3DCRT; 3D-conformal radiotherapy, IMRT; Intensity Modulated Radiation Therapy, VMAT; Volumetric Modulated Arc Therapy
Data are presented as n (%) unless otherwise indicated.

Table 3 Physician-Reported (Harvard) Cosmesis

Cosmetic Outcome at 1-year (p-value=0.15)	Total (n=304)	BID Group (n=100)	OD Group (n=204)
Excellent	241 (79.3%)	84 (84.0%)	157 (77.0%)
Good	58 (19.1%)	15 (15.0%)	43 (21.1%)
Fair	5 (1.6%)	1 (1.0%)	4 (1.9%)
Poor	0 (0%)	0 (0%)	0 (0%)
Cosmetic Outcome at 3-year (p-value=0.83)	**Total (n=90)**	**BID Group (n=17)**	**OD Group (n=73)**
Excellent	65 (72.2%)	53 (72.6%)	12 (70.6%)
Good	22 (24.5%)	18 (24.6%)	4 (23.5%)
Fair	2 (2.2%)	1 (1.4%)	1 (5.9%)
Poor	1 (1.1%)	1 (1.4%)	0 (0.0%)

Figure 1 Disease-Free Survival

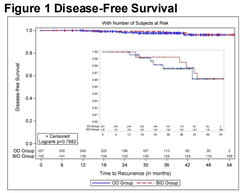


Figure 2 Overall Survival

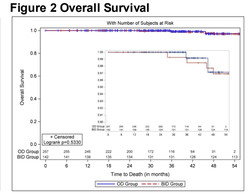


Table 4 Adverse Events

Acute Toxicity	BID Group				OD Group				p-value
	Grade 0	Grade 1	Grade 2	N/A*	Grade 0	Grade 1	Grade 2	N/A*	
Dermatitis	54 (38.3%)	86 (61.0%)	1 (0.7%)	1	175 (71.4%)	69 (28.2%)	1 (0.4%)	12	<0.01
Fatigue	70 (50.0%)	69 (49.3%)	1 (0.7%)	12	99 (38.5%)	154 (59.9%)	4 (1.6%)	0	0.07
Breast Pain	119 (85.6%)	20 (14.4%)	0 (0%)	3	202 (84.5%)	37 (15.5%)	0 (0%)	18	0.88
Breast Edema	6 (85.7%)	1 (14.3%)	0 (0%)	135	179 (80.3%)	44 (19.7%)	0 (0%)	34	1.00
Pruritus	4 (66.7%)	2 (33.3%)	0 (0%)	136	201 (93.9%)	13 (6.1%)	0 (0%)	43	0.06
Skin Hyperpigmentation	6 (66.7%)	3 (33.3%)	0 (0%)	133	181 (81.9%)	40 (18.1%)	0 (0%)	36	0.37
Late Toxicity at 6-month	**BID Group**				**OD Group**				**p-value**
	Grade 0	Grade 1	Grade 2	N/A*	Grade 0	Grade 1	Grade 2	N/A*	
Fatigue	7 (58.3%)	5 (41.7%)	0 (0%)	130	92 (46.5%)	101 (51.0%)	5 (2.5%)	59	0.67
Skin Hyperpigmentation	7 (14.9%)	40 (85.1%)	0 (0%)	95	79 (60.8%)	50 (38.5%)	1 (0.8%)	127	<0.01
Skin Hypopigmentation	11 (100.0%)	0 (0%)	0 (0%)	131	116 (96.7%)	4 (3.3%)	0 (0%)	137	1.00
Fibrosis	8 (36.4%)	14 (63.6%)	0 (0%)	120	63 (50.8%)	59 (47.6%)	2 (1.6%)	133	0.46
Breast Atrophy	6 (75.0%)	2 (25.0%)	0 (0%)	134	74 (63.2%)	41 (35.0%)	2 (1.7%)	140	0.75
Lymphedema	93 (98.9%)	1 (1.1%)	0 (0%)	48	127 (96.2%)	5 (3.8%)	0 (0%)	125	0.40
Late Toxicity at 1-year	**BID Group**				**OD Group**				**p-value**
	Grade 0	Grade 1	Grade 2	N/A*	Grade 0	Grade 1	Grade 2	N/A*	
Fatigue	9 (64.3%)	4 (28.6%)	1 (7.1%)	128	91 (52.3%)	78 (44.8%)	5 (2.9%)	83	0.24
Skin Hyperpigmentation	8 (20.5%)	31 (79.5%)	0 (0%)	103	98 (67.6%)	47 (32.4%)	0 (0%)	112	<0.01
Skin Hypopigmentation	14 (100.0%)	0 (0%)	0 (0%)	128	136 (95.8%)	6 (4.2%)	0 (0%)	115	1.00
Fibrosis	7 (18.4%)	31 (81.6%)	0 (0%)	104	71 (49.0%)	72 (49.7%)	2 (1.4%)	112	<0.01
Breast Atrophy	10 (55.6%)	8 (44.4%)	0 (0%)	124	79 (56.4%)	60 (42.9%)	1 (0.7%)	117	1.00
lymphedema	88 (100.0%)	0 (0%)	0 (0%)	54	148 (96.1%)	6 (3.9%)	0 (0%)	103	0.09

Data are presented as n, %.
*N/A = Not applicable for two main reasons; (1) the data were not documented in patients' charts and (2) the patient did not return for follow-up

With a median follow-up of 3.4 years, 10 local recurrences were observed; four in the BID group and six in the OD group. The 3-year IBTR for BID group was 1% and OD group was 2%, p-value = 0.46. The 3-year DFS was 99% in the BID group and 98% in the OD group, p-value = 0.79 Three-year OS was 99% in both groups, p = 0.53. (Figure 1,2)

Conclusions

Both APBI regimens utilized in our study—38.5 Gy in 10 twice-daily fractions and 28.5 Gy in 5 once-daily fractions—delivered using 3D-conformal technique in the prone position, yielded excellent outcomes in patients with low-risk breast cancer. The 28.5 Gy regimen, however, demonstrated a lower incidence of both acute and late toxicities and may be preferable in this patient population given its increased convenience and lower toxicity profile. Longer follow-up is warranted to confirm toxicity and clinical outcomes.

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References

1. Whelan, T. J. *et al.* External beam accelerated partial breast irradiation versus whole breast irradiation after breast conserving surgery in women with ductal carcinoma in situ and node-negative breast cancer (RAPID): a randomised controlled trial. *The Lancet* **394**, 2165-2172, doi:10.1016/S0140-6736(19)32515-2 (2019).
2. Meattini, I. *et al.* Accelerated Partial-Breast Irradiation Compared With Whole-Breast Irradiation for Early Breast Cancer: Long-Term Results of the Randomized Phase III APBI-IMRT-Florence Trial. *J Clin Oncol* **38**, 4175-4183, doi:10.1200/JCO.20.00650 (2020).
3. Bazan, J. G. *et al.* Favorable Rates of Excellent or Good Cosmetic Outcomes in Patients Treated With Carefully Planned Accelerated Partial Breast Irradiation Delivered Twice Daily or Once Every Other Day. *Pract Radiat Oncol*, doi:10.1016/j.prro.2025.04.011 (2025).

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