Hypofractionated Whole-Breast Irradiation with Concomitant Boost following Breast Conservation Surgery in Early-Stage Breast Cancer

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Introduction

Initial results from RTOG 1005, reported Hypofractionated whole breast (H-WBI) with concomitant boost (CB) over 15 fractions (Fx) was non-inferior to sequencial boost in terms of local control, adverse events, and cosmesis. Herein, we reported outcomes of H-WBI with CB in patients with high-risk invasive breast cancer and ductal carcinoma in situ (DCIS), with majority treated in the prone position at our institution.

Methods and Materials

This retrospective, single-institution study

Eligible patients were females with pathologically confirmed breast cancer diagnosed between February 2013 and March 2025.

Inclusion criteria

- Treatment with breast-conserving surgery with or without lymph node sampling followed by adjuvant radiation; **40Gy/15Fx to the whole breast and concomitant boost 48Gy/15Fx to the lumpectomy cavity**
- Diagnosis of either pure DCIS or invasive carcinoma stage T1-2
- Clinically and/or pathologically negative lymph nodes

Exclusion criteria

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

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

Results

Table 1 Patient Characteristics

	Total (n=412)
Age at diagnosis	
Median (IQR)	60 (52, 68)
Race, n (%) (n=402)	
White	338 (82.1%)
Black or African American	47 (11.4%)
Asian	17 (4.1%)
Unknown	10 (2.4%)
Ethnicity, n (%) (n=410)	
NOT Hispanic or Latino	402 (97.6%)
Hispanic or Latino	8 (1.9%)
Unknown	2 (0.5%)
Tumor Histology, n (%)	
DCIS	59 (14.3%)
IDC	294 (71.4%)
ILC	44 (10.7%)
Mixed IDC/ILC	7 (1.7%)
Other	8 (1.9%)
T Stage, n (%)	
In situ	59 (14.3%)
1	269 (65.3%)
2	84 (20.4%)
N Stage, n (%)	
0	351 (85.2%)
Nx	61 (14.8%)
Grade, n (%)	
1	64 (15.5%)
2	171 (41.5%)
3	177 (43.0%)
Margins, n (%)	
R0	398 (96.6%)
R1	14 (3.4%)
DCIS, n (%)	
Absent	180 (43.7%)
Present	232 (56.3%)
ER, n (%)	
Negative	107 (26.0%)
Positive	305 (74.0%)
PR, n (%)	
Negative	149 (36.2%)
Positive	263 (63.8%)
HER2, n (%) (n=353)	
Negative	288 (81.6%)
Positive	65 (18.4%)
Oncotype Dx Score, n (%) (n=353)	
Yes	164 (46.5%)
No	189 (53.5%)
Oncotype Dx Score (n=164)	
Median (IQR)	17.5 (11, 27)

Table 2 Treatment Characteristics

	Total (n=412)
Surgical Intervention, n (%)	
Lumpectomy	73 (17.7%)
Lumpectomy and SLNB	336 (81.6%)
Lumpectomy and ALND	3 (0.7%)
Surgical Reconstruction, n (%)	
Yes	23 (5.6%)
No	389 (94.4%)
Type of Reconstruction, n (%) (n=23)	
Immediate	23 (100.0%)
Systemic Therapy (e.g., chemotherapy, immunotherapy), n (%)	
Yes	162 (39.3%)
No	250 (60.7%)
Timing of Therapy, n (%) (n=162)	
Neoadjuvant	44 (27.2%)
Adjuvant	115 (71.0%)
Neoadjuvant and Adjuvant	3 (1.9%)
Endocrine Therapy, n (%)	
Yes	277 (67.2%)
No	135 (32.8%)
Treatment Position, n (%)	
Supine	19 (4.6%)
Prone	393 (95.4%)
Radiation Therapy Technique, n (%)	
3D	412 (100.0%)

Between February 2013 and March 2025, a total of **412 patients** were included in this study.

Table 3 Adverse Events

	Grade 0	Grade 1	Grade 2	Grade 3	N/A*
Acute Toxicity					
Dermatitis	130 (33.4%)	240 (61.7%)	19 (4.9%)	0 (0%)	23
Fatigue	126 (32.2%)	257 (65.7%)	7 (1.8%)	1 (0.3%)	21
Breast Pain	262 (68.6%)	117 (30.6%)	3 (0.8%)	0 (0%)	30
Breast Edema	164 (65.9%)	85 (34.1%)	0 (0%)	0 (0%)	163
Pruritus	188 (76.4%)	57 (23.2%)	1 (0.4%)	0 (0%)	166
Skin Hyperpigmentation	165 (63.7%)	94 (36.3%)	0 (0%)	0 (0%)	153
Late Toxicity at 6-month					
	Grade 0	**Grade 1**	**Grade 2**	**Grade 3**	**N/A***
Fatigue	109 (55.1%)	86 (43.4%)	3 (1.5%)	0 (0%)	214
Skin Hyperpigmentation	49 (21.9%)	175 (78.1%)	0 (0%)	0 (0%)	188
Skin Hypopigmentation	153 (91.6%)	14 (8.4%)	0 (0%)	0 (0%)	245
Fibrosis	88 (50.9%)	85 (49.1%)	0 (0%)	0 (0%)	239
Breast Atrophy	113 (72.4%)	40 (25.6%)	3 (1.9%)	0 (0%)	256
Lymphedema	227 (88.7%)	27 (10.5%)	2 (0.8%)	0 (0%)	156
Late Toxicity at 1-year					
	Grade 0	**Grade 1**	**Grade 2**	**Grade 3**	**N/A***
Fatigue	107 (63.3%)	61 (36.1%)	1 (0.6%)	0 (0%)	243
Skin Hyperpigmentation	71 (37.8%)	117 (62.2%)	0 (0%)	0 (0%)	224
Skin Hypopigmentation	145 (91.8%)	13 (8.2%)	0 (0%)	0 (0%)	254
Fibrosis	70 (43.8%)	89 (55.6%)	1 (0.6%)	0 (0%)	252
Breast Atrophy	79 (54.9%)	61 (42.4%)	4 (2.8%)	0 (0%)	268
lymphedema	195 (86.3%)	31 (13.7%)	0 (0%)	0 (0%)	186

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

Table 4 Cosmetic Outcome

Cosmetic Outcome at 1-year	Total (n=274)
Excellent	191 (69.7%)
Good	73 (26.6%)
Fair	10 (3.6%)
Poor	0 (0%)
Cosmetic Outcome at 3-year	**Total (n=89)**
Excellent	51 (57.3%)
Good	28 (31.5%)
Fair	10 (11.2%)
Poor	0 (0%)

Figure 1: Disease-free Survival

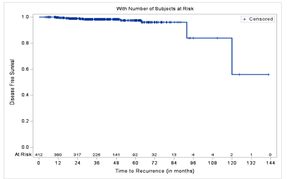


Figure 2: Local Recurrence-free Survival

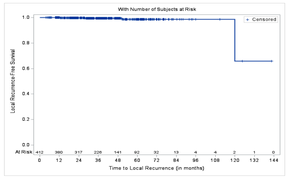
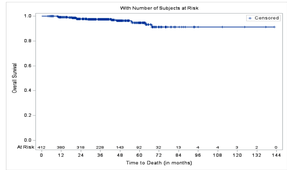


Figure 3: Overall Survival



The median follow-up for this cohort was 39 months. Ten disease-free survival (DFS) events were observed. The 3-year DFS rate was 98.3%, and the 5-year DFS rate was 97.5%. Local recurrence-free survival at 3 and 5 years was 99.4% and 98.6%, respectively. Overall survival (OS) rates at 3 and 5 years were 97.5% and 94.7%, respectively (**Figures 1-3**).

Conclusions

Combination of hypofractionation with concomitant boost for early-stage invasive high-risk breast cancer and DCIS resulted in favorable oncological outcomes, toxicity, and cosmetic outcomes. This study reports real-world experience from a single institution using H-WBI with a CB to the lumpectomy cavity, delivered in the prone position, for early-stage breast cancer. Longer follow-up is warranted to better assess clinical outcomes with this treatment approach.

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References

1. NRG RTOG 1005: A Phase III Trial of Hypo Fractionated Whole Breast Irradiation with Concurrent Boost vs. Conventional Whole Breast Irradiation Plus Sequential Boost Following Lumpectomy for High Risk Early-Stage Breast Cancer Vicini, F.A. et al. International Journal of Radiation Oncology, Biology, Physics, Volume 114, Issue 3, S1

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