

Outcomes of Pre- Versus Post-Mastectomy Radiation Therapy in Immediate Autologous and Implant-Based Breast Reconstruction: A Multicenter Propensity-Matched Analysis



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INTRODUCTION

- Post-Mastectomy Radiation Therapy (PMRT) is the standard of care for patients at high risk of locoregional recurrence¹
- When administered alongside immediate autologous breast reconstruction, PMRT has been shown to negatively impact flap viability and cosmesis of the reconstructed breast³
- Pre-Mastectomy radiation therapy (Pre-MRT) has emerged as a strategy to avoid irradiating the newly reconstructed breast while permitting resection of irradiated tissue at the time of reconstruction ^{2,3}
- Early studies suggest Pre-MRT improves aesthetic outcomes without compromising oncologic safety

Is Pre-MRT associated with improved surgical and oncologic outcomes?

METHODS

INCLUSION CRITERIA

- Individuals 18 years and older with invasive breast cancer or breast carcinoma in situ
- Underwent mastectomy with immediate autologous or implant-based reconstruction
- Received radiation therapy within either:
 - 1 year and 1 day before surgery (Cohort 1, Pre-MRT)
 - 1 day and 1 year after surgery (Cohort 2, PMRT)

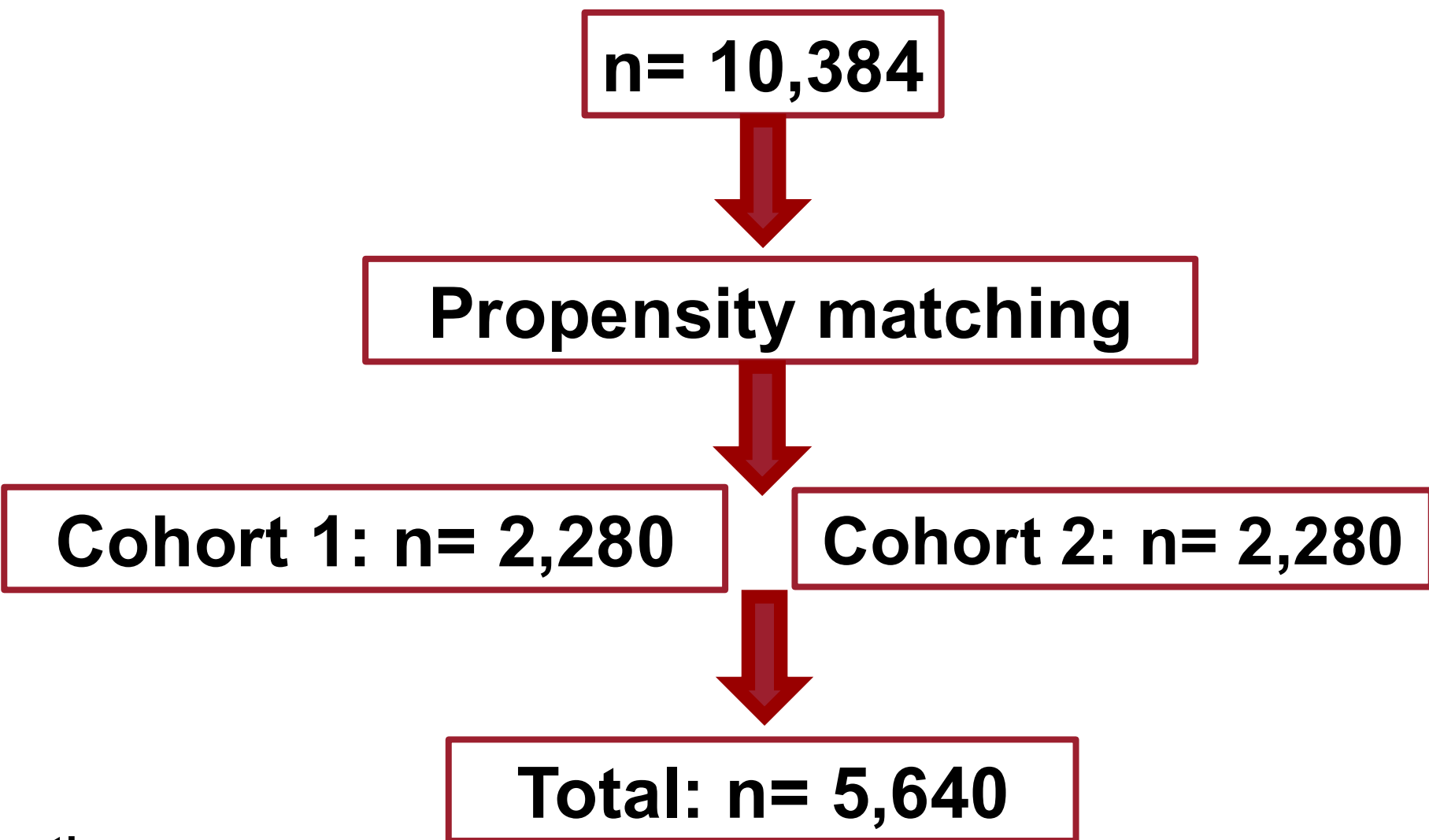


FIGURE 1 – Cohort selection

RESULTS

n	5,640
Age (Mean ± SD)	
Cohort 1	56.2 ± 11.7
Cohort 2	56.1 ± 11.8
Sex	
Female	
Cohort 1	2,761 (97.9%)
Cohort 2	2,769 (98.2%)
Male	
Cohort 1	10 (0.4%)
Cohort 2	10 (0.4%)
Diagnosis	
Malignant neoplasm of breast	2,803 (99.4%)
Cohort 1	2,812 (99.7%)
Cohort 2	
Carcinoma in situ of breast	
Cohort 1	1,125 (39.9%)
Cohort 2	1,096 (38.9%)

TABLE 1 – Clinicodemographic features between study cohorts

Oncologic Outcomes	Pre-MRT vs PMRT at 90 days	Hazard Ratio (p-value) at 90 days	Pre-MRT vs PMRT at 1 year	Hazard Ratio (p-value) at 1 year
Regional Lymph Node Spread	10.5% vs 21.9%	0.44 (p<0.001)	17.4% vs 26.7%	0.592 (p<0.001)
Distant Metastasis	10.9% vs 22.4%	0.44 (p<0.001)	18.2% vs 27.6%	0.601 (p<0.001)

TABLE 3 – Oncologic Outcomes at 90 Days and 1-Year Post-mastectomy with Reconstruction

Surgical Outcomes	Pre-MRT vs PMRT at 90 days	Hazard Ratio (p-value) at 90 days	Pre-MRT vs PMRT at 1 year	Hazard Ratio (p-value) at 1 year
Overall Complications	14.6% vs 5.2%	2.96 (p=0.065)	19.2% vs 14.6%	1.41 (p<0.001)
Reintervention	4.2% vs 0.7%	6.00 (p=0.017)	27.7% 15.0%	2.12 (p<0.001)

TABLE 2 – Surgical Outcomes at 90 Days and 1-Year Post-mastectomy with Reconstruction

DISCUSSION

- Of 10,384 patients who met inclusion criteria, propensity score matching resulted in 2,820 patients in each cohort
- At 90 days, Pre-MRT was significantly associated with lower rates of regional lymph node spread compared to PMRT (10.5% vs. 21.9%; HR 0.44)
- This trend persisted at 1 year, with 17.4% of Pre-MRT patients experiencing regional lymph node spread versus 26.7% in the PMRT group
- At 1-year, Pre-MRT was associated with a significantly higher risk of overall complications (HR 1.41)
- At 1-year, Pre-MRT was also associated with a significantly higher risk of reinterventions (HR 2.12)

Our findings suggest that Pre-MRT is associated with improved oncologic outcomes but worsened surgical outcomes

QUESTIONS & FUTURE WORK

- What patient selection criteria (tumor stage, comorbidities, smoking status, BMI) most strongly influence the benefit of Pre-MRT?
- How do aesthetic outcomes and patient-reported satisfaction compare between Pre-MRT and PMRT cohorts?
- What is the long-term oncologic safety of Pre-MRT beyond 1 year?
- How does radiation dosing, fractionation, and timing relative to surgery affect reconstructive outcomes?

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