

The Impact of Oncoplastic Reduction on Initiation of Adjuvant Radiation and Need for Re-Excision: A Database Evaluation

Jennifer Shah BA¹, Kelsey Lipman MD¹, Nathan Makarewicz BA¹, Rachel Pedreira MD¹, Rahim Nazerali MD¹
1 Division of Plastic and Reconstructive Surgery, Stanford University, Stanford, CA



Introduction

Breast cancer is the leading cause of cancer-related mortality for women globally (1). Breast conservation therapy (BCT) via lumpectomy and adjuvant radiation therapy is currently a mainstay of treatment, ensuring effective oncologic resection while also preventing excessive loss of breast tissue.

Unfortunately, selective excision of cancerous tissue can negatively affect breast symmetry, leading to suboptimal aesthetic outcomes and reduced patient satisfaction (2, 3). Oncoplastic reduction offers a solution to this aesthetic problem and has been hypothesized to reduce rates of margin re-excision and cancer recurrence in both the affected and contralateral breast (4).

Currently, little is known about the impact of oncoplastic reduction on the rate of post-operative complications or its effect on the initiation of adjuvant radiation therapy. Considering the rise of oncoplastic reduction and a gap in the literature, this study leverages national data to analyze outcomes. Using the retrospective Clinformatics® database, we compared the impact of BCT ± oncoplastic reduction on complication rates, timing of adjuvant radiation therapy, and margin re-excision.

Methods

Data Collection

- Database: Clinformatics Data Mart (retrospective)
- Years included: 2003 – 2020

Patient Information

- Inclusion criteria: Adult females with a breast cancer diagnosis and a minimum of 6 months continuous enrollment before and after the index procedure who also received adjuvant radiotherapy in the post-surgical year
- Number of patients who met inclusion criteria: 53,165
- Surgical intervention: BCT ± oncoplastic reduction
- Sample size (intervention group, OCT): 1,552 (2.9%)
- Sample size (comparison group): 51,613 (97.1%)
- Relevant covariates: Patient age, year of surgery, comorbidities (Elixhauser index), diabetes, obesity, weight loss diagnosis

Analysis

- Outcome measures: Rate of non-surgical complications, rate of surgical complications, time to adjuvant radiation, rate of subsequent lumpectomy or conversion to completion mastectomy (proxy for positive margins)
- Statistical analysis: Chi squared, multivariate logistic regression
- Statistical outputs: Odds ratio, P value (<0.05)

Results

Table 1: Demographics

Patient Characteristics	BCT Alone (n = 51,613) No. (%)	BCT + OCR (n = 1,552) No. (%)	P value
Mean Age (years)	61.55	57.94	<0.001
Surgery Year (mean ± SD)	2012 ± 4.6	2015 ± 3.65	<0.001
No. Comorbidities (Elixhauser Index)			
0 or 1	4487 (9)	130 (8)	0.900
2	5859 (11)	183 (12)	
3	6531 (13)	191 (12)	
>3	34736 (67)	1048 (68)	
Diabetes Diagnosis	13428 (26)	353 (23)	0.004
Obesity Diagnosis	14820 (29)	692 (45)	<0.001
Weight Loss Diagnosis	4847 (9)	115 (7)	0.008

Table 2: Study Outcomes

Outcome Measures	BCT Alone No. (%)	BCT + OCR No. (%)	P value
Total Complications	6850 (13)	505 (33)	<0.001
Days to Radiation, Mean (± SD)	88.12 (±66.51)	84.55 (±60.63)	0.847
Underwent Subsequent Lumpectomy or Completion Mastectomy	13704 (27)	243 (16)	<0.001

Non-Surgical Complications

Hematoma or Hemorrhage	404 (0.8)	13 (0.8)	0.809
Seroma	1307 (2.5)	23 (1.5)	0.009
Wound Dehiscence	402 (0.8)	62 (4.0)	<0.001
Postoperative Infection	573 (1.1)	32 (2.1)	<0.001
Fat Necrosis	1456 (2.8)	66 (4.3)	0.001
Tissue Necrosis	182 (0.4)	29 (1.9)	<0.001
Non-Specified Complication	3045 (5.9)	357 (23.0)	<0.001

Surgical Complications

Evacuation of Hematoma or Hemorrhage	244 (0.5)	18 (1.7)	<0.001
Evacuation of Seroma	304 (0.6)	14 (0.9)	0.115
Other Fluid Collection or Drainage	174 (0.3)	14 (0.9)	<0.001
Tissue Debridement	76 (0.2)	27 (1.7)	<0.001

Summary of Findings:

- Patients undergoing BCT + OCR are 2.7x more likely to experience a complication compared to BCT alone (Figure 1).
- Patients undergoing BCT + OCR are 0.5x as likely to need re-excision of margins compared to BCT alone (Figure 2).
- There is no significant impact of OCR on time to adjuvant radiation therapy (Figure 3).

Figure 1: Complication Rate

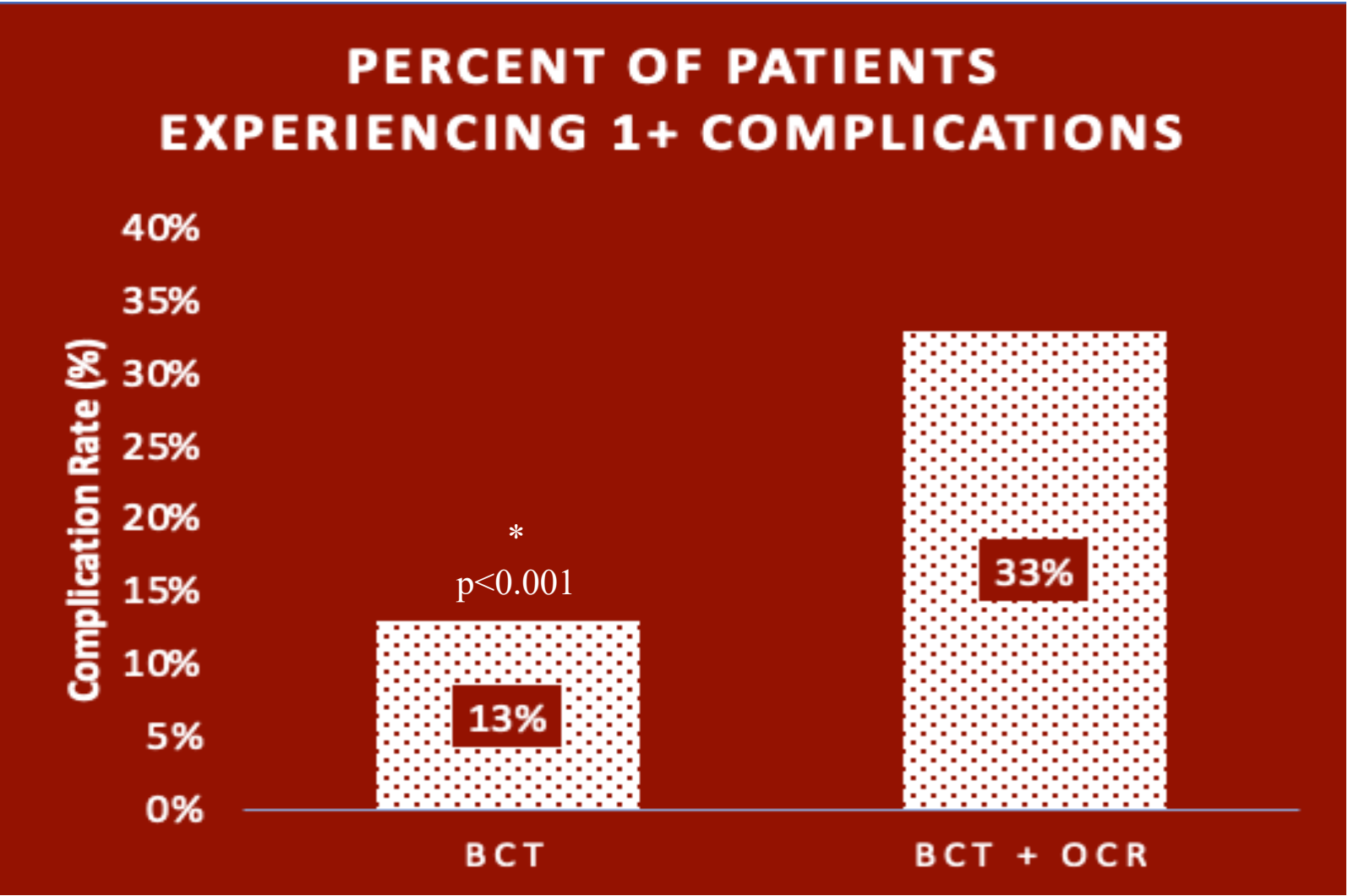


Figure 2: Re-Excision Rate

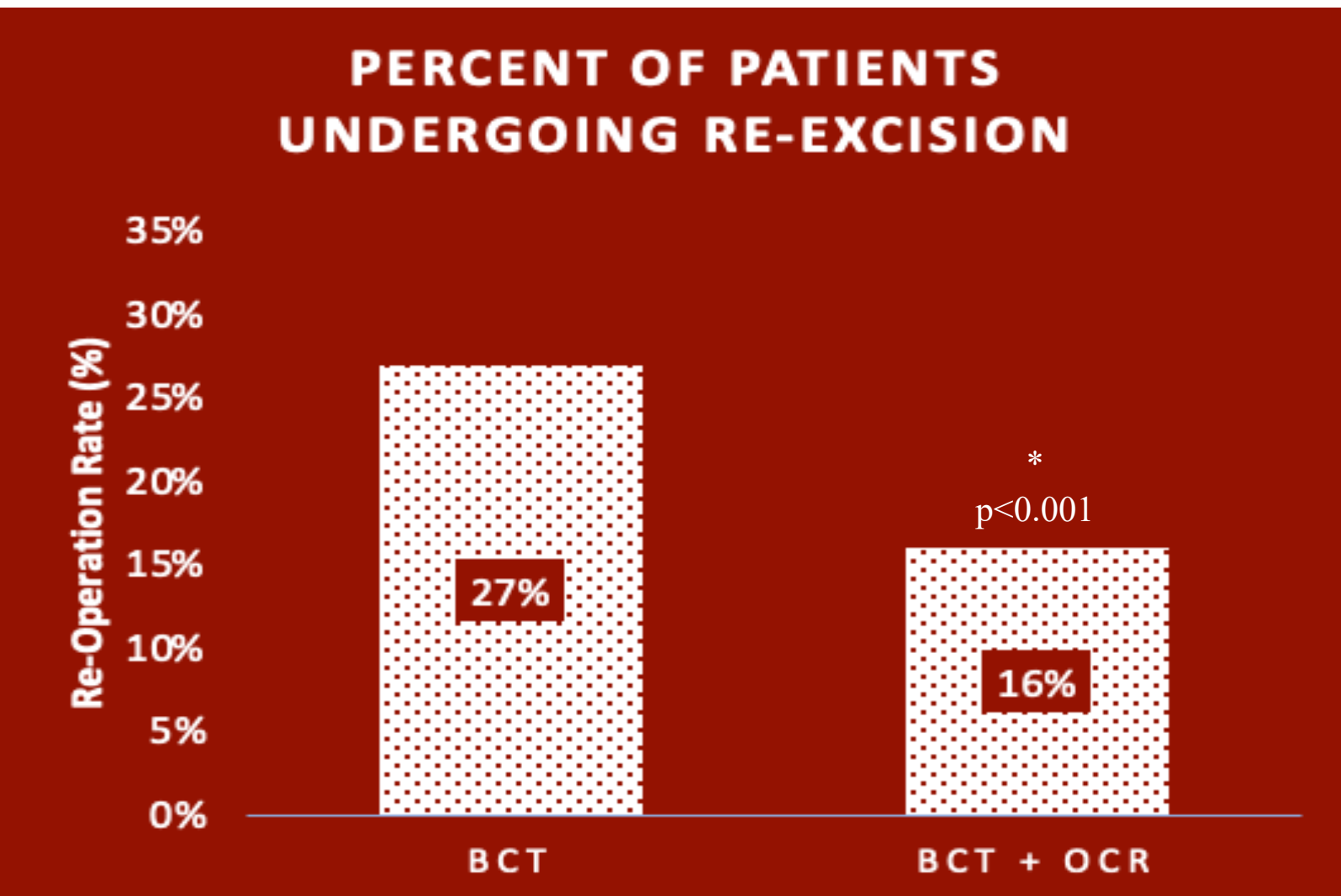
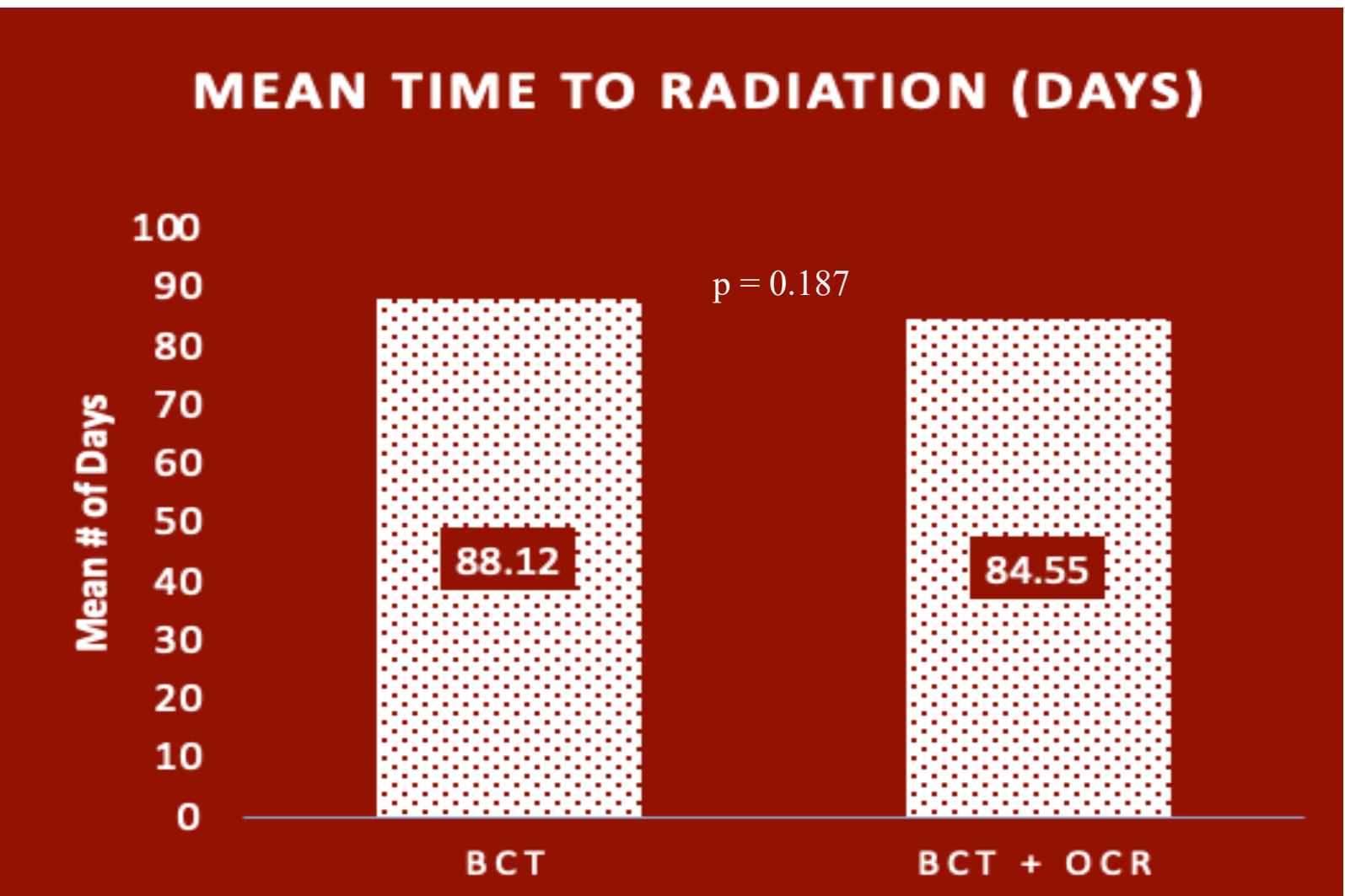


Figure 3: Time to Adjuvant Radiotherapy



Conclusions

In patients undergoing breast conservation therapy for the treatment of breast cancer, oncoplastic reduction decreases rates of positive margins requiring re-excision without impacting time to adjuvant radiation therapy, despite increased rates of complications relative to lumpectomy alone. Given the rise of BCT, this study’s results are increasingly relevant for both physician decision-making and patient counseling.

Future Directions

One drawback of this study design was the retrospective nature of the investigation, where the study groups were not temporally aligned with one another. Additionally, comorbidities were unevenly distributed between the study groups, obscuring the true effect size of oncoplastic reduction on post-operative complication rates. Ideally, future investigations will include matched cohort studies or RCTs that are able to control for these variables.

Future studies should also focus on collecting additional information, such as resection weight, aesthetic outcome, and patient satisfaction to provide a more complete characterization of oncoplastic reduction in the context of breast conservation therapy.

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