

# Does bracketing reduce positive margin rates in patients undergoing partial mastectomy?

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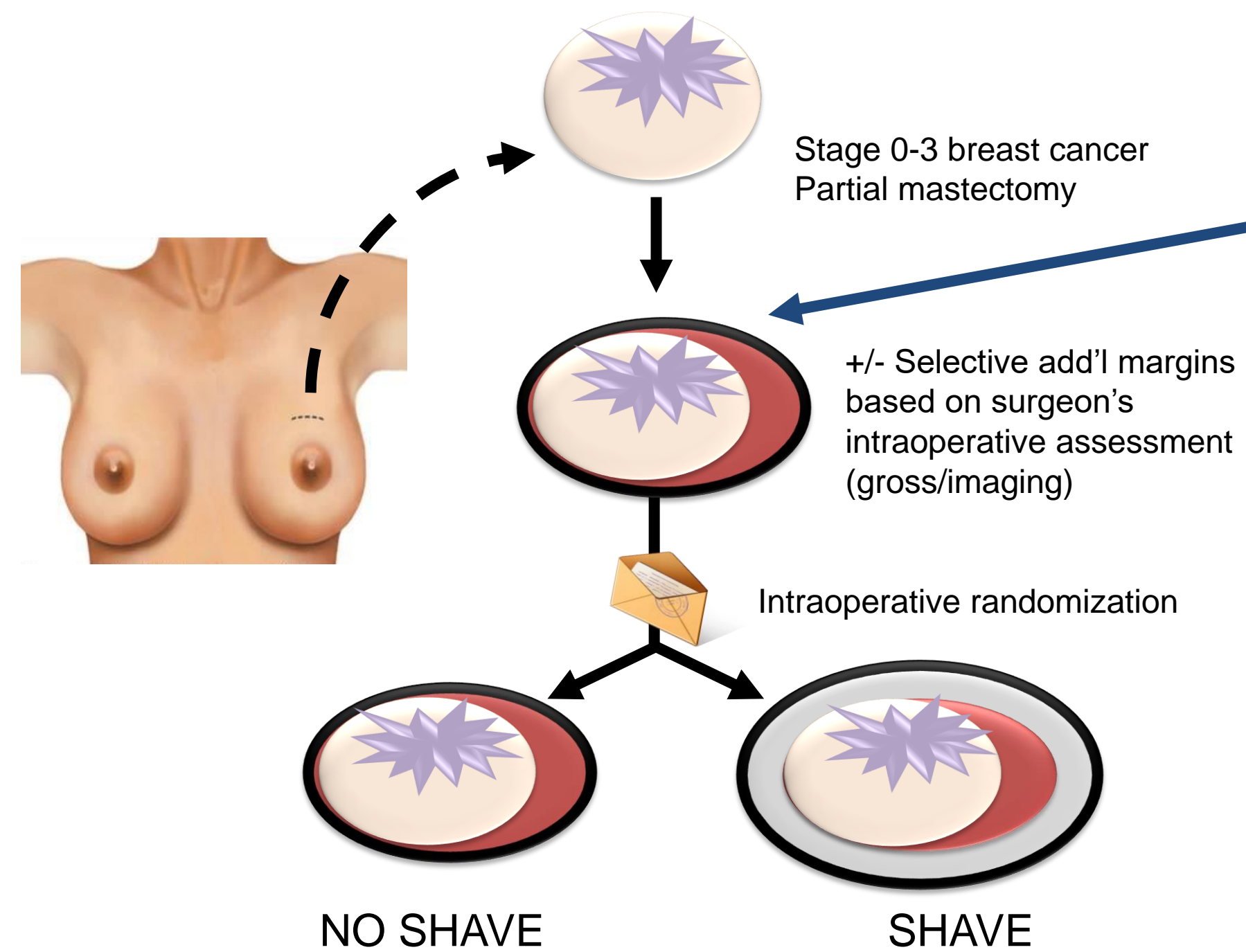
## Background

- With the advent of localization for non-palpable tumors, some have advocated bracketing with two or more devices to more accurately define the tumor extent and reduce positive margins.
- We sought to determine factors associated with the use of bracketing and its impact on margin positivity.

## Methods

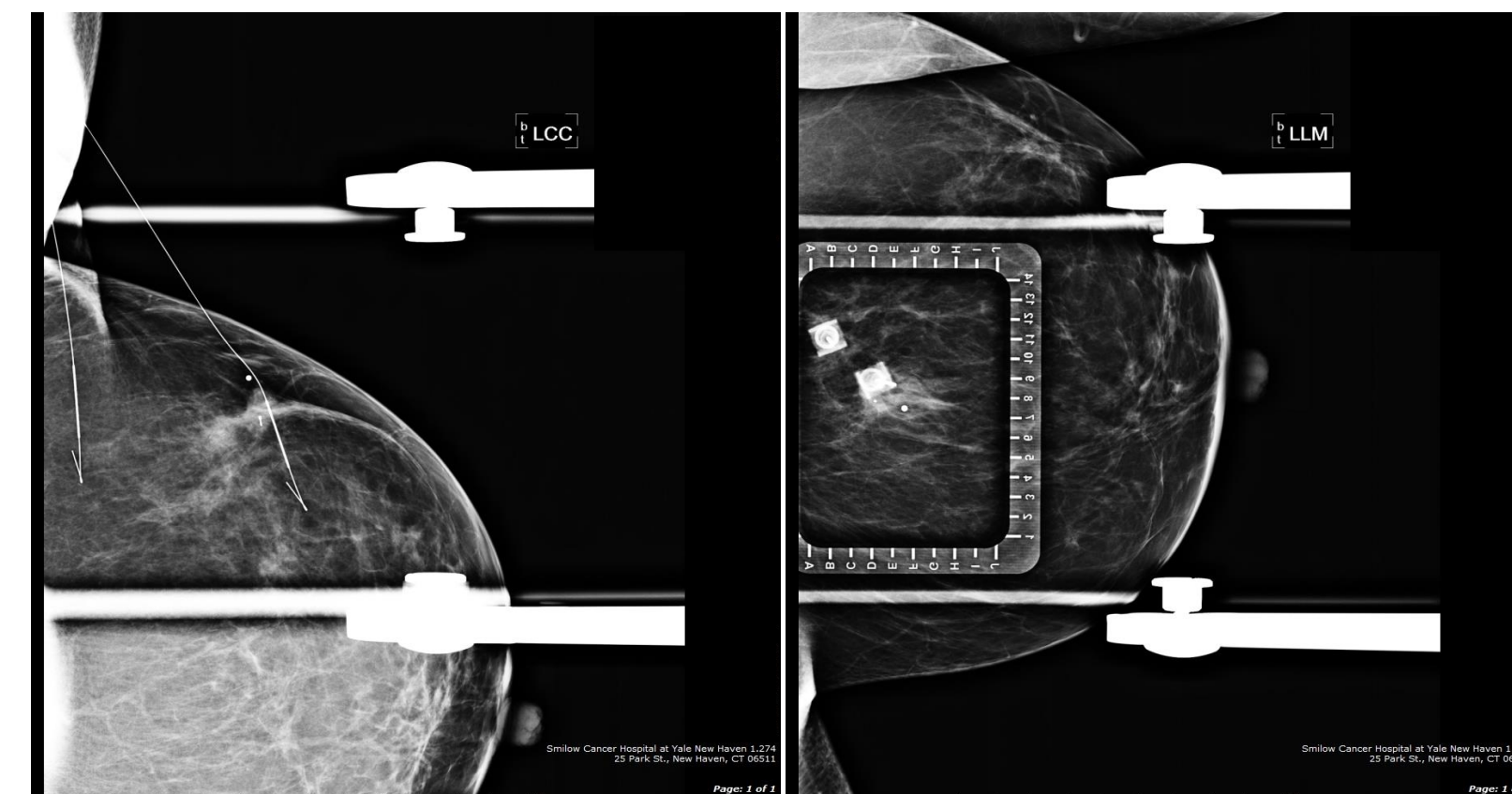
- Data from a randomized controlled trial of patients undergoing partial mastectomy were used to determine the effect of bracketing and the number of wires used to localize non-palpable tumors on positive margin rate after partial mastectomy.
- Margins for this analysis were assessed based on the initial partial mastectomy (inclusive of any selective margins that were taken as a result of specimen radiography or surgeon gross assessment).
- A positive margin was defined as either invasive tumor at ink or DCIS within 2 mm. Non-parametric statistical analyses were performed using SPSS Version 24.

## Trial Schema



NB: For the purposes of this analysis of bracketing, we evaluated margins prior to randomization to cavity shave margins not; ie. After the surgeon had performed their "best" partial mastectomy

Intraoperative specimen radiography was done in all cases, with selective margins being taken at the surgeon's discretion



Clinical Trials.gov (NCT01452399)

- A total of 216 patients underwent partial mastectomy with wire localization in this study
  - 31 (14.4%) had bracketing with 2 wires, and 5 (2.3%) had bracketing with 3 wires
  - Positive margin rates were 32.8%, 45.2% and 40.0% in the 1-, 2- and 3- wire group, respectively (p=0.407).
- Factors associated with bracketing are shown in Table 1. Patients who underwent bracketing tended to have larger tumors on imaging (p=0.042) and on final pathology (p=0.029)
  - tumor size tended to be underestimated on imaging
- Those who were bracketed were also more likely to present with calcifications (p=0.009).
- Bracketing with more wires resulted in a larger volume of tissue resected (p<0.001).

## Results

Table 1: Factors associated with bracketing

Factor	Number of wires (n; %)			p-value
	1	2	3	
Median patient age; yrs	61	60	74	0.357
Race:				0.686
White	147 (81.7)	22 (71.0)	4 (80.0)	
Black	17 (9.4)	5 (16.1)	0 (0)	
Asian	2 (1.1)	1 (3.2)	0 (0)	
Other	14 (7.8)	3 (9.7)	1 (20.0)	
Hispanic Ethnicity	4 (2.8)	2 (7.4)	0 (0)	0.467
Palpable	29 (16.1)	6 (19.4)	1 (20.0)	0.890
Mammographic mass	113 (62.8)	16 (51.6)	1 (20.0)	0.090
Calcifications	77 (42.8)	17 (54.8)	5 (100)	0.009
Presence of DCIS	131 (72.8)	23 (74.2)	4 (80.0)	0.924
Extensive intraductal component	113 (68.5)	22 (75.9)	4 (80.0)	0.629
Invasive tumor histology				0.247
Ductal	123 (87.9)	13 (72.2)	2 (66.7)	
Lobular	11 (7.9)	2 (11.1)	1 (33.3)	
Other	6 (4.3)	3 (16.7)	0 (0)	
Neoadjuvant chemotherapy	3 (1.7)	3 (9.7)	0 (0)	0.100
Lymphovascular invasion	15 (8.3)	3 (9.7)	0 (0)	0.492
Median tumor size by imaging, cm	1.0	1.5	1.5	0.042
Median pathologic tumor size, cm	1.5	2.0	3.5	0.029
Median volume of tissue resected; cm <sup>3</sup>	65.2	113.4	136.5	<0.001
Positive margins (%)	32.8	45.2	40.0	0.407
Median # of positive margins	1	2.5	2	0.057
Re-excision (%)	18.3	25.8	60.0	0.094
Median total operative time (min)	71	75	69	0.570

- Controlling for pathologic tumor size and presence of calcifications, the number of wires used to localize the tumor did not affect positive margin rate (p=0.600; OR for 2 wires vs. 1: 1.144; 95% CI: 0.469-2.791, p=0.768; OR for 3 wires vs. 1: 0.371; 95% CI: 0.046-2.994, p=0.352).

Factor	OR (95% CI)	P-value
Median pathologic tumor size, cm	2.094 (1.604-2.734)	<0.001
Presence of calcifications (vs. none)	1.228 (0.648-2.327)	0.529
Number of wires		0.600
1	Referent	
2	1.144 (0.469-2.791)	
3	0.371 (0.046-2.994)	

- The median number of positive margins did not vary significantly depending on the number of wires placed for bracketing (p=0.057), although there was a trend towards having more positive margins in patients who had bracketing
  - Controlling for pathologic tumor size and presence of calcifications, bracketing did not affect the likelihood of having more than one positive margin

Factor	OR (95% CI)	P-value
Median pathologic tumor size, cm	1.560 (1.117-2.179)	0.009
Presence of calcifications (vs. none)	1.433 (0.535-3.843)	0.474
Number of wires		0.826
1	Referent	
2	1.410 (0.412-4.826)	
3	0.709 (0.038-13.325)	

- Re-excision rate did not vary by number of wires used to localize or bracket the lesion (p=0.094)
  - Controlling for pathologic tumor size and presence of calcifications, bracketing did not affect re-excision rate

Factor	OR (95% CI)	P-value
Median pathologic tumor size, cm	1.889 (1.459-2.445)	<0.001
Presence of calcifications (vs. none)	3.771 (1.692-8.404)	0.001
Number of wires		0.840
1	Referent	
2	0.911 (0.328-2.533)	
3	1.768 (0.222-14.057)	

## Conclusions

- While bracketing tends to be used for larger tumors and those presenting with calcifications, the number of wires used to localize a tumor does not affect positive margin rates independent of these factors.

