


COMMENTARY

Increased asymmetry with larger breast size following the oncoplastic parallelogram mastopexy lumpectomy for cancer

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The parallelogram mastopexy lumpectomy (PML) was named from its rounded parallelogram skin incision.¹ This procedure was conceptualized based on Veronesi's "quadrantectomy" with its radially oriented, full-thickness glandular excision.² Subsequent undermining of the breast gland with reapproximation of the tissues at the chest wall, that is, mastopexy closure, reduces the extent of post-operative skin retraction and cavitation, but may lead to asymmetry requiring a contralateral breast lift and/or reduction for symmetry restoration.^{1,3} The Breast Retraction Assessment (BRA) test quantifies the degree of cosmetic asymmetry by measuring the distance of nipple-areolar complex deviation of the treated breast compared with the normal breast (Figure 1).⁴

Among 123 women with breast cancer who underwent PML resections between 2009 and 2015, 86 had formal breast cosmetic assessment including the Breast Retraction Assessment (BRA) test at least 6 months following the completion of radiation therapy. In the original study, Pezner and colleagues found that BRA values ranged from 0 to 3.1 cm among normal (control) subjects and ranged from 0 to 8.5 cm in patients who had undergone surgical resection.⁴ We therefore defined a favorable BRA measurement to be <3 cm (Figure 1).

The ages of patients were 30–80 years with a mean of 55 years; 91% of women had stage 0, 1, or 2 breast cancers. After surgery, 3 of 123 patients (2.4%) had positive or 1 mm margins; of these, two women underwent mastectomy and one woman had a re-excision lumpectomy. Most patients (111/123, 90%) had margins greater than 10 mm. Median follow-up time was 6.5 years (range: 0.4–11.4 years).

There were 4 women who developed in-breast local recurrences and one of axillary lymph node recurrence, yielding a Kaplan-Meier 5-year local recurrence-free survival rate of 97% (95% confidence interval = 91% to 99%). All cases of in-breast local recurrence, each of whom had >10 mm margins at the first resection, underwent subsequent mastectomy. The 5-year overall survival rate was 95% (95% confidence interval = 89% to 98%).

Of the 123 patients, 86 consented to receive formal cosmetic evaluation. The results of BRA were compared to multiple factors including

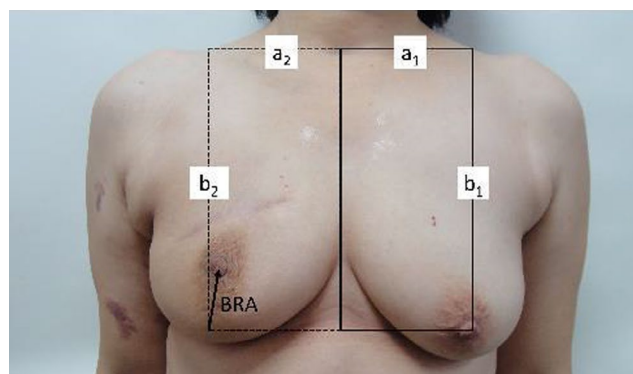


FIGURE 1 Breast retraction assessment (BRA) for the PML.⁴ From the sternal notch and median line of chest, the nipple of normal breast was localized by x-axis and y-axis at a_1 and b_1 . The expected neutral position (a_2 , b_2) of the operated breast would be the opposite side of a_1 and b_1 . BRA was the distance (cm) of retraction

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TABLE 1 Cosmetic outcomes by breast retraction assessment ($n = 86$)

Patient characteristics	BRA > 3 cm ($n = 36$)	95% CI or percentage	BRA ≤ 3 cm ($n = 50$)	95% CI or percentage	p values
Mean age (year)	58	54–62	54	51–57	0.093
Breast volume (cm^3)	902	791–1012	619	543–695	0.000
Body mass index	25	24–27	24	23–25	0.076
Tumor size					0.956
≤1 cm	12	33%	19	38%	
1–2 cm	18	50%	23	46%	
2–5 cm >5 cm	6	17%	8	16%	
Tumor location					0.464
Upper outer	20	56%	28	56%	
Upper inner	7	19%	14	28%	
Lower	9	25%	8	16%	
Stage					0.014
0	1	3%	13	26%	
I	17	47%	19	38%	
II	13	36%	16	32%	
III	4	11%	1	2%	
IV	1	3%	1	2%	

Abbreviation: 95% CI, 95% confidence interval.

age, BMI, estimated breast volume, clinical tumor size, tumor location, and stage (Table 1). The women with significant breast retraction (BRA > 3 cm, $n = 36$) had a larger breast volume (mean = 902 cm^3 , 95% confidence interval = 791–1012 cm^3) compared with those of women without significant asymmetry (BRA ≤ 3 cm, $n = 50$, mean breast volume = 619 cm^3 , 95% confidence interval = 543–695 cm^3 , $p < 0.001$). Women with significant asymmetry (BRA > 3 cm) were more likely to have stage III cancers (11% to 2%), while fewer had stage 0 cancer (3% to 26%, $p = 0.014$). Multivariate analyses (including parameters of age, tumor size, breast volume, BMI, location, and stage) revealed that breast volume was an independent parameter predicting breast asymmetry of BRA > 3 cm ($p < 0.001$). In the linear regression analysis, there was a moderate positive correlation between breast volume and BRA, $r(95) = 0.394$, $p < 0.001$. When two outliers of large BRA (>13 cm) were deleted, the positive correlation persisted with $r(95) = 0.377$ ($p < 0.001$).

Chagpar and colleagues showed in a prospective randomized trial that cavity shaving reduces the rate of positive margins (19% vs. 34%, $p = 0.01$) and need for surgical re-excision (10% vs. 21%, $p = 0.02$).⁵ By contrast, our PML series shows a positive margin and re-excision rate of 2.4%, which compares quite favorably to routine margin shaving. After oncoplastic breast-conserving surgery, local recurrences have been reported to occur in 0% to 7% of patients.⁶ Our 5-year local recurrence-free survival rate was 97% and was comparable to those of previous reports.

Asymmetry is a practical cosmetic feature to measure, because it can be surgically repaired (if so desired by the patient) using a contralateral breast lift and/or reduction. Boost irradiation had been reported to have adverse effect on the cosmetic result with breast conservation therapy.⁷ All of our patients with invasive breast

cancer underwent whole breast radiotherapy with a boost dose to the lumpectomy site. The slightly better outcome for women of non-invasive stage 0 cancer may have resulted from not receiving boost radiation to the lumpectomy site.

Mastopexy was originally a cosmetic glandular reshaping surgery in treating breast ptosis. Among the patients of larger breast volume, which was frequently associated with ptosis, mastopexy might bring about lifting effects on their nipple-areolar complex, which was demonstrated in our analyses of BRA. The potential need for surgical correction by reducing the opposite breast should be discussed with patients for whom asymmetry is a predictable or likely postoperative outcome.

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