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Exploring Complication Rates: A Comparative Study of Breast Reduction and Combined Breast Reduction with Abdominoplasty

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Abstract

Background Despite a trend towards combining abdominoplasty with breast reduction surgery, so called "mommy makeovers", the safety of this combined approach has been the subject of debate, with previous research yielding conflicting results. We evaluated the risk for complications and revision associated with adding abdominoplasty to bilateral breast reduction surgery.

Methods We conducted a 10-year single-center retrospective chart review of bilateral breast reduction patients in Nova Scotia. Univariate and multivariate analyses were performed to compare the risk for complication and revision in patients with bilateral breast reduction to those with a concomitant abdominoplasty.

Results Of the 1871 patients initially screened, 738 were included. 44 underwent a concomitant abdominoplasty procedure. Compared to the breast reduction alone group, patients with concomitant abdominoplasty were significantly older (47.5±9.9 vs. 42.8±13.2, p=0.004), had a higher BMI (28.1±4.4 vs. 25.8±3.1, p<0.001), and experienced longer operating room times (226±6 vs. 115±3 mins, p<0.001). In multivariate analysis, concomitant abdominoplasty did not increase the risk for breast-related (OR: 0.86 95%CI 0.43–1.7, p=0.668) or total complications (OR: 1.63, 95%CI 0.83–3.19, p=0.154). However, there was a trend towards an increased risk of breast revision (OR: 2.684, 95%CI 0.95–7.6, p=0.062) and a significantly increased risk of total revision (OR: 6.624, 95%CI 2.7–16.1, p<0.001). Moreover, patients with concomitant abdominoplasty experienced more follow-up visits (median: 4 vs. 3 visits, p=0.042).

Conclusion In our single-center retrospective analysis, combining abdominoplasty with bilateral breast reduction did not increase the risk for breast, or total complications; however, it did increase the risk for total revisions.

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Keywords Breast reduction · Abdominoplasty · Safety · Complications · Mommy-makeover

Introduction

Abdominoplasty is a commonly sought-after operation ranking as the sixth most frequently performed cosmetic procedure in the United States [1, 2]. Notably, abdominoplasty carries inherent risks due to the extensive nature of the surgery, alterations in intrabdominal pressure, and the post-operative flexed trunk position, which can affect lung capacity [3, 4]. As such, studies published from 2007 to 2014 have reported the complication rate for abdominoplasty to be as high as 51.8%, which is amongst the highest complication rates for aesthetic surgeries [1]. Complications may vary in severity, and while there can be some variability in how they are defined, major complications are typically characterized by the necessity for surgical intervention or hospitalization [5]. This includes life-

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threatening conditions such as deep vein thrombosis, and pulmonary embolism, among others [6].

Combining abdominoplasty and breast reduction has gained popularity particularly among patients who have undergone physical changes and are seeking 'mommy-makeovers' [7, 8]. In general, performing multiple surgeries is desirable due to the advantages of reducing operating time, financial burden, and recovery time [2, 6]. The concept of combining abdominoplasty with additional local procedures, such as suction lipectomy, hernia repair, and others, is well-established [9]. Indeed, in a database of 25,478 patients who underwent an abdominoplasty, more than half of patients had an abdominoplasty combined with another procedure [1]. However, concerns exist regarding the safety of combining anatomically distinct procedures. For example, increasing the number of anatomical sites can extend operative time, and therein increase the risk of systemic complications, including venous thromboembolism [10].

Currently, there is limited data regarding the risk of complications, revisions, and follow-up times in procedures where abdominoplasty is combined with breast reduction. Most studies addressing this question have primarily investigated the risks associated with adding breast reduction to patients originally scheduled for an abdominoplasty. Some previous works have treated this question as a secondary analysis [4, 11, 12]. Nevertheless, these studies provide mixed findings on the risks associated with combining abdominoplasty and breast reduction, and as such, no consensus has been reached.

Therefore, in this study, we aimed to determine whether the addition of abdominoplasty in patients seeking elective breast reduction surgery increased the rates of complications and need for revision surgery.

Materials and Methods

Patient Selection

Billing codes were used to identify all patients who had bilateral breast reduction surgery at a single center between April 1, 2008, and March 31, 2018. Inclusion criteria included: patients who underwent a routine bilateral breast reduction surgery or a bilateral breast reduction with a combined abdominoplasty. These surgeries are generally covered through public funding as medically necessary procedures. Exclusion criteria consisted of the following: previous breast surgery, congenital breast asymmetry, male gender, unilateral breast reduction, previously diagnosed or existing breast cancer, less than 200 g of breast tissue removed from each breast, missing BMI information, or no recorded postoperative follow-up. Standard follow-up was 1-week, 2-weeks, and 1-month post-operation. However, patients were followed up longer if deemed necessary by the attending physician.

The indications for breast reduction included physical symptoms (e.g., back, neck, shoulder or chest pain, headaches, postural issues, bra strap grooving, difficulty with sleep or exercise) and psychological symptoms including self-confidence issues concerning their clothing and involvement in physical activities.

Evaluated minor complications included seromas, hematomas, infections, erythema, asymmetry, loss of nipple sensation, unsightly and painful scars, skin loss, nipple loss, wound dehiscence, fat necrosis. Major complications, including revision surgery, pulmonary embolism, and death were also analyzed. There were no established criteria for undergoing revision surgery, but decisions were broadly guided by clinical examination, patient satisfaction and feedback, and surgeon input. Common indications included addressing issues such as dog ears, scar revision, and fat necrosis, among others.

Statistical Analysis

We compared patients who underwent a breast reduction alone with those patients who underwent both a breast reduction and abdominoplasty in the same operative setting. In univariate analysis, continuous dependent variables were evaluated using T-tests. Categorical variables were assessed via a chi-square analysis.

Multivariate analysis was conducted using binary logistic regression. In total we tested four separate models to assess the following: 1) the risk for all breast complications (including revision), 2) breast revision alone, 3) total complications (i.e., breast and abdominoplasty complications) and 4) total revision (i.e., breast and abdominoplasty revision). Independent predictors, including age, BMI, active smoker, pedicle type (inferior, superior medial, superior, lateral, medial, central, and superiorlateral), technique (Wise vs. vertical), total liposuction, total breast resected, bleeding disorders (previous DVT/PE, clotting disorders, B12 deficiency, anemia, von Willebrand disease, thrombocytopenia, hemochromatosis, previous stroke, and any hematological disease), and cardiovascular disorders (coronary artery disease, Raynaud syndrome, peripheral vascular disease, atrial fibrillation, rheumatic fever, heart murmur, long QT syndrome, arrythmias, congenital heart disease, and any cardiovascular disorder excluding hypertension) were selected a priori in a hypothesis-generated manner based on previous literature and clinical experience. All analyses were performed in IBM SPSS (version 28) and statistical significance was evaluated at $P < 0.05$.

Results

Billing codes were used to identify a cohort of 1871 patients who had undergone elective bilateral breast reduction surgery. Of these, 738 patients fulfilled the inclusion criteria and were analyzed. In total, 44 patients (6.0%) received a combined abdominoplasty and reduction. Patients who received a combined abdominoplasty and reduction were older (47.5 ± 9.9 vs. 42.8 ± 13.2, p=0.004) and had a higher BMI (28.1 ± 4.4 vs. 25.8 ± 3.1, p<0.001) in comparison to those who solely underwent reduction (Table 1). Moreover, 66 patients (8.9%) were active smokers.

The Wise pattern technique was the most common surgical method for breast reduction, used in both the reduction-only group (65.3%) and the combined group (64.3%) (Table 1). The mean operative time was 121 ± 5 minutes for the total study population. However, patients who underwent both bilateral breast reduction and abdominoplasty had a significantly longer operative time of 226 ± 6 minutes, in contrast to those who solely underwent bilateral breast reduction, with a mean operative time of 115 ± 3 minutes (p <0.001).

Overall, 290 patients (39.3%) experienced a breast complication, of which wound dehiscence (78; 10.6%), painful scars (65; 8.8%), and asymmetry (65; 8.8%) were the most common issues (Table 2). Additionally, 51 patients (6.9%) required revision surgery (Table 2). Of the 44 patients who underwent an abdominoplasty combined with breast reduction surgery, 16 (36.4%) had experienced complications (Table 2). Of these, revisions (6; 13.6%) and painful scars (5, 11.4%) were most frequently reported.

We were interested in whether abdominoplasty increased the risk of breast complications or breast revision surgery. In univariate analysis, patients in the combined group did not exhibit a significant difference from those in the reduction-only group regarding the prevalence of breast complications (p=0.681) (Table 2). However, there was a trending association with an increased number of breast revisions (13.6% vs. 6.5%, p=0.070). When also considering the incidence of abdominal complications, patients who underwent the combined surgery experienced a greater number of total complications (54.5% vs. 39.5%, p =0.048) and total revisions (25.0% vs. 6.5%, p<0.0001). Accordingly, the combined group experienced a greater number of follow-up days compared to the breast-only group (4 days vs. 3 days; p=0.042, Table 1). In multivariate analysis, we found that abdominoplasty did not elevate the risk of breast complications (p=0.668), or total complications (p=0.154, Table 3). However, abdominoplasty

Table 1 Clinical and demographics variables of patients who underwent breast reduction surgery alone compared to breast reduction with abdominoplasty

Variables	Breast reduction alone	Breast reduction and abdominoplasty	*P* values
Number of patients	694	44	–
Smoking (Active)	63 (9.1%)	3 (6.8%)	0.611
Presence of cardiovascular disorders	41 (5.9%)	3 (6.8%)	0.805
Presence of diabetes	13 (1.9%)	2 (4.5%)	0.223
Presence of hypertension	91 (13.1%)	8 (18.2%)	0.339
Presence of dyslipidemia	50 (7.2%)	7 (15.9%)	0.036
Presence of bleeding disorder	34 (4.9%)	3 (6.8%)	0.572
Mean age (±SD) at surgery (years)	42.8 ± 13.2	47.5 ± 9.9	0.004
Mean BMI (±SD) (kg/m^2)	25.8 ± 3.1	28.1 ± 4.4	<0.001
Wise technique (%)[1]	449 (65.3%)	27 (64.3%)	0.897
Pedicle type	415 (60.3%)	25 (59.5%)	0.916
Inferior	231 (33.6%)	15 (34.1%)	
Superior medial	42 (6.1%)	2 (6.4%)	
Other[2]			
Total liposuction (mean ±SD)	191.3 ± 253.8	174.8 ± 313.9	0.739
Total number resected (g) (mean ± SD)	1193.7 ± 628.6	1104.4 ± 712.0	0.426
Operative time (minutes)	121 ± 5	226 ± 6	<0.001
Number of follow-up visits (median, [interquartile range])	4 [2–6]	3 [2–4]	0.042
Follow-up duration (median, [interquartile range])	80 [25–286]	204 [33–368]	0.087

[1]Otherwise vertical technique was used.

[2]Includes the superior, lateral, medial, central, and superiorlateral pedicles.

Table 2 Description of complications observed in both the breast reduction alone and breast reduction with abdominoplasty groups

Variables	Breast reduction alone	Breast reduction and abdominoplasty	*P* values
Breast complications			
Hematoma	56 (8.1%)	3 (6.8%)	0.767
Seroma	8 (1.2%)	1 (2.3%)	0.512
Fat necrosis	37 (5.3%)	4 (9.1%)	0.291
Skin loss	28 (4%)	2 (4.5%)	0.868
Nipple loss	14 (2%)	1 (2.3%)	0.907
Unsightly, painful scars	62 (8.9%)	3 (6.8%)	0.631
Wound dehiscence	73 (10.5%)	5 (11.4%)	0.86
Infection	46 (6.6%)	3 (6.8%)	0.961
Erythema	55 (7.9%)	5 (11.4%)	0.418
Asymmetry	61 (8.8%)	4 (9.1%)	0.945
Loss of nipple sensation	38 (5.5%)	2 (4.5%)	0.792
Revision	45 (6.5%)	6 (13.6%)	0.07
Total breast complications	274 (39.5%)	16 (36.4%)	0.681
Abdominal complications			
Hematoma	–	0	–
Wound dehiscence	–	3 (6.8%)	–
Seroma	–	3 (6.8%)	–
Infection	–	1 (2.3%)	–
Revision	–	6 (13.6%)	–
Painful scars	–	5 (11.4%)	–
Pulmonary embolism	–	1 (2.3%)	–
Total	–	16 (36.4%)	–
Combined complications			
Total combined complications	274 (39.5%)	24 (54.5%)	0.048
Total combined revisions	45 (6.5%)	11 (25%)	0.000007

Table 3 Binary logistic regression analysis to predict breast complications or total complications

Variables	Breast complications		Total complications	
	OR (95%CI)	*P*-values	OR (95%CI)	*P*-values
BMI	1.048 (0.986, 1.112)	0.13	1.044 (0.983, 1.109)	0.158
Active smoker	1.148 (1.148, 1.956)	0.612	1.208 (0.711, 2.052)	0.485
Increasing age	1.006 (0.993, 1.018)	0.366	1.004 (0.992, 1.016)	0.525
Vertical technique vs. Wise technique	0.902 (0.274, 2.969)	0.865	0.921 (0.28, 3.027)	0.893
Bleeding disorders	0.959 (0.477, 1.93)	0.908	0.931 (0.462, 1.876)	0.842
Presence of CVD	2.429 (1.273,4.634)	0.007	2.336 (1.225, 4.456)	0.01
Presence of abdominoplasty	0.86 (0.431, 1.714)	0.668	1.629 (0.832, 3.189)	0.154
Total liposuction	0.999 (0.998, 0.999)	<0.001	0.999 (0.998, 0.999)	<0.001
Total breast resection	1 (1, 1.001)	0.118	1 (1, 1.001)	0.145
Pedicle type				
Superior medial versus inferior	0.498 (0.247, 1.004)	0.051	0.513 (0.255, 1.032)	0.061
Other versus inferior	0.772 (0.255, 2.34)	0.648	0.798 (0.264, 2.412)	0.689

exhibited a trending increase in the odds of breast revision (OR: 2.684, 95%CI [0.95, 7.6], p=0.062), and increase in the odds of total revision by 6-fold (p<0.001, OR: 6.624, 95%CI [2.723, 16.114], Table 4).

Furthermore, through multivariate analysis we assessed other prognostic indications for surgical complications and revision (Tables 3 and 4). Notably, higher quantities of breast associated liposuction reduced the odds of breast complications (OR: 0.999; 95%CI [0.998, 0.999]; p<0.001) (Table 3), and breast revision (OR: 0.997; 95%CI [0.996, 0.999]; p<0.001). As well, when compared to the inferior pedicle, the superomedial technique was associated with a reduced odds for breast revision (OR: 0.18; 95%CI [0.067, 0.483]; p<0.001) and a trending reduction in the odds for breast complications (OR: 0.498, 95%CI [0.247, 1.004]; p=0.051). By contrast, increased breast resection volume was associated with an increased odds for breast revision (OR: 1.001; 95%CI [1, 1.001]; p=0.032). Finally, cardiovascular comorbidity increased the risk for any breast surgery related complication (OR: 2.429; 95%CI [1.273, 4.634]); p=0.007), but not breast revision (p=0.77). These associations persisted when looking at total complications and total revisions as well.

Discussion

This study aimed to evaluate the risks associated with combining abdominoplasty and breast reduction compared to breast reduction surgery alone. Importantly, the addition of abdominoplasty did not appear to complicate breast surgical outcomes, and, after correcting for confounding factors, did not appear to significantly increase the risk of total complications. Nevertheless, we found that the addition of abdominoplasty increased the odds for total revision surgery nearly 6-fold and showed a trending association for increased breast revision surgery. Moreover, patients undergoing combined surgery had, on average, one more additional follow-up visit.

It is essential that we do not over-interpret these results. We cannot differentiate whether the addition of an abdominoplasty adds greater risks than if a patient were to undergo these two surgeries separately. Numerous previous studies have examined the risks associated with combined elective breast surgeries (i.e., breast augmentation, mastopexy, and reduction) with abdominoplasty when compared to abdominoplasty alone. A single systematic review of four studies found that concurrent abdominoplasty with any breast surgery significantly increased the risk of major complications, defined as a pulmonary embolus, operative site infection, or blood transfusion, compared to abdominoplasty alone [6]. However, other studies, similar to ours, have found no statistical significant difference when assessing overall complication rates [4, 11–13]. Moreover, an evaluation of combining abdominoplasty with any aesthetic breast procedure found no greater than additive risks for venous thromboembolism, and mortality [14].

Collectively, while previous work might suggest that adding concomitant breast reduction to a planned abdominoplasty may not incur substantial added risk for complications, the converse is not necessarily true. Khavanin and colleagues (2015), using a large aesthetic surgery database, found a 4-fold increase in complication rates when abdominoplasty combined with breast augmentation/mastopexy to breast augmentation/mastopexy alone.

Table 4 Binary logistic regression analysis to predict breast revision or total revision surgery

Variables	Breast revision		Total revisions	
	OR (95%CI)	*P*-values	OR (95%CI)	*P*-values
BMI	0.926 (0.817, 1.049)	0.228	0.922 (0.818, 1.04)	0.185
Active smoker	0.914 (0.305, 2.737)	0.872	1.102 (0.399,3.045)	0.852
Increasing age	1.016 (0.992, 1.04)	0.196	1.01 (0.987, 1.033)	0.39
Vertical technique versus Wise technique	1.596 (0.338, 7.54)	0.555	1.591 (0.333, 7.591)	0.56
Bleeding disorders	2.245 (0.803, 6.273)	0.123	2.037 (0.72 , 5.76)	0.18
Presence of CVD	1.206 (0.344, 4.23)	0.77	1.508 (0.484, 4.697)	0.478
Presence of abdominoplasty	2.684 (0.953, 7.556)	0.062	6.624 (2.723,16.114)	<0.001
Total liposuction	0.997 (0.996, 0.999)	<0.001	0.997 (0.996, 0.999)	<0.001
Total breast resection	1.001 (1, 1.001)	0.032	1.001 (1,1.001)	0.003
Pedicle type				
Superior medial versus inferior	0.180 (0.067, 0.483)	<0.001	0.185 (0.069, 0.496)	<0.001
Other versus inferior	0.476 (0.111, 2.042)	0.318	0.487 (0.113, 2.088)	0.332

Furthermore, Stevens and colleagues (2009), observed that combining breast reduction and abdominoplasty most commonly increased the need for revision surgery—a result which is consistent with our cohort. Most recently Schafer and colleagues (2023) found that combining various plastic surgery procedures into a single surgery increase the odds for complications [15]. Thus, we speculate that adding the generally higher-risk abdominoplasty surgery to the planned breast surgery is driving the increased risk for total revisions. Unfortunately, we cannot evaluate whether this risk is additive, or synergistic. However, it is notable that abdominoplasty had a trending association for increasing the risk of breast revision. Thus, future studies will need to further explore this.

To our knowledge, few studies have considered a broader spectrum of comorbidities, such as bleeding disorders and cardiovascular disorders, as prognostic factors. In line with previous work [16], we found that a positive history of cardiovascular disease increased the risk for complication in our population, although not revision. This suggests a previous cardiovascular history should considered in pre-operative screening for candidate patients. Additionally, we found that a larger total breast tissue resection correlated with an increased risk of future revision, which is aligned with other studies [17, 18]. Mechanistically, previous work has specifically correlated time to healing with breast resection weight. Interestingly, we identified that the addition of liposuction was a protective factor, reducing the risks for both breast complications and breast revision. Little data have estimated the impact of liposuction on complication rates; however, a large database study has found that liposuction does not increase the risk for complication [19].

We also found that the superior medial pedicle reduced the risk for breast revision by over 5-fold compared to the inferior type. While both the inferior and superior medial technique are commonly used procedures for breast reduction surgery [20], it remains an outstanding question as to which approach is superior. While a previous literature review suggested a lower complication rate for the superior medial technique (16.9% superior medial vs. 29.7% inferior) [21], this analysis was not statistically tested. Other studies directly comparing the two techniques have shown no statistically significant differences in their complication rates [20, 22]. Our data supports a preference for the superior medial pedicle approach; however, more research is needed to address this question.

We note that our cohort generally reports a higher rate of complications than others, although it still remains within the reported range. In part, this could be attributable to the small number of abdominoplasty cases. Alternatively, it is possible that given our patient population is receiving care for physiological indications, and not primarily for aesthetic reasons, they could represent a higher risk population in general.

Our study carries inherent limitations. Given that we were unable to include an abdominoplasty only control group, we cannot evaluate whether combined surgery carries more risks that abdominoplasty alone. Moreover, we cannot assess whether combined abdominoplasty with reduction augments the risk compared to seperate abdominoplasty with breast reduction surgeries. As with any retrospective analysis, there is a risk of incomplete patient data, and biased sampling. The limited number of abdominoplasty cases may under- or over-estimate the risks associated with combined surgery. Furthermore, our single-centre design adds bias, as surgeon experience, skill, and preference for certain surgical techniques, among other factors, may have a more pronounced effect on outcomes. As a retrospective chart review, there may be unrealized confounds in our patient population which may contribute to the complication risk that may not generalize to other populations. As well, the decision for revision surgery is, in part, derived from patient and physician preference, and thus may not be standardized across all patients. Nevertheless, among patients seeking symptomatic breast reduction surgery, we have demonstrated that adding abdominoplasty increased the risk for revision surgery. This context is crucial for informing decision-making for both patients and practitioners. Given the scarcity of literature focused on combination surgery, our study underscores the need for higher level evidence to interrogate the risks associated with combination breast reduction and abdominoplasty.

Conclusion

In conclusion, our study demonstrates that combining abdominoplasty with breast reduction, compared to reduction alone, does not appreciably increase the risk for overall complications. However, the addition of abdominoplasty should not necessarily be considered as a benign procedure of opportunity, as patients and healthcare professionals should be aware of the added potential risks associated with extended general anesthetic times, the longer recovery time required for abdominoplasty, and also the higher chance of requiring revisional surgery.

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Declarations

Conflict of interest None of the authors have any conflicts of interest to disclose.

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Informed Consent For this type of study, informed consent is not required.

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