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Original article

Weight loss is higher among patients who undergo body contouring procedures after bariatric surgery

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Abstract

Background: As the number of patients who have undergone bariatric surgery increases, it is expected that more patients will present for body contouring procedures after weight loss. It has been reported that abdominoplasty can improve mobility, reduce skin fold complications, and improve psychosocial functioning. No previous studies have evaluated weight loss in patients who pursue plastic surgery after bariatric surgery.

Objectives: The aim of this study is to evaluate weight loss outcomes in patients who choose to undergo body contouring procedures after bariatric surgery.

Setting: Academic center, United States.

Methods: Patients who underwent body contouring procedures after bariatric surgery between 2002 and 2014 were included. A comparison was made to a matched cohort based on age, gender, type of bariatric procedure, preoperative body mass index (BMI), and length of follow-up.

Results: In total, 186 patients had documentation of a body contouring procedure after bariatric surgery. There were 158 (84.9%) female participants in the body countering group. Mean age was 48.5 ± 12.7 years and mean BMI was 49.8 ± 10.4 kg/m^2. Roux-en-Y gastric bypass, sleeve gastrectomy, and adjustable gastric banding were performed in 157 (84.4%), 17 (9.1%), and 11 (5.9%) patients, respectively. After a matched follow-up period of 61 months, total weight loss was 43.0 ± 22.6 kg in the body contouring group versus 33.5 ± 21.7 kg in the control group ($P < .001$), percentage of total weight loss was 30.8 ± 11.4% versus 24.0 ± 13.2% ($P < .001$), percentage excess weight loss was 66.4 ± 25% versus 52.5 ± 30.5% ($P < .001$), and BMI dropped by 15.7 ± 7.8 kg/m^2 versus 12.1 ± 7.3 kg/m^2 ($P < .001$) in the body contouring group compared with the bariatric surgery–only group, respectively. Multivariate analysis indicated that body contouring after bariatric surgery is significantly associated with increase and durable weight loss (odds ratio 3.59, 95% confidence interval 2.04–5.14, $P < .001$).

Conclusion: Patients who underwent body contouring procedures after bariatric surgery had significantly better long-term weight loss than a matched cohort of patients. This finding likely has many contributing factors, and the association between long-term weight loss and body contouring procedures after bariatric surgery requires more detailed study. (Surg Obes Relat Dis 2015;▮:00–00.)

Keywords: Body contouring; Obesity; Bariatric surgery; Weight loss; Abdominoplasty

Bariatric surgery is currently the most effective and durable treatment for weight loss in the morbidly obese [1]. After bariatric surgery, significant resolution or

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improvement of obesity-related co-morbidities such as type 2 diabetes mellitus, hypertension, hyperlipidemia, and obstructive sleep apnea is observed [2,3]. Bariatric surgery also reduces the risk of major complications of obesity-related co-morbidities (including nephropathy, retinopathy, and cardiovascular disease) and mortality [4,5]. However, after significant weight loss, some patients develop excessive skin folds, which can cause intertrigo, skin infections, mobility problems, negative perception of body image, psychosocial dysfunction, and depression [6–10]. Because of this, many post–bariatric surgery patients seek surgical management of this burdensome problem through body contouring procedures [11]. Classically, body contouring procedures include resection of redundant skin and subcutaneous fat in various areas, including the abdomen, breast, back, thighs, arms, genital areas, and face. The most prevalent body contouring procedures after bariatric surgery are panniculectomy or abdominoplasty (36%) followed by breast lift (mastopexy) (32%), upper arm lift (12%), lower body lift (10%), and thigh lift (9%) [12]. Operative approaches can include single-site lifts or multisite resections at the same setting.

Abdominoplasty includes the removal of excess skin and fat and in most cases can reestablish weakened or separated muscle defects. Abdominal panniculectomy, which can be performed alone or in combination with abdominoplasty, includes resection of excessive skin and subcutaneous fat from below the umbilicus. A lower body lift procedure (circumferential abdominoplasty) is a more extensive version of abdominoplasty that also includes folds from the back and hips. All of these procedures have been associated with improvements in patient quality-of life-measures and functional status after bariatric surgery [13–15]. Some studies report increased risk of postoperative complications after body contouring procedure in bariatric patients compared with body contouring procedure without a prior weight loss procedure, but studies addressing this are relatively sparse [16–18]. Furthermore, the data thus far focus mostly on the plastic surgery outcomes after body contouring procedures in patients who have undergone bariatric surgery and not the effect of body contouring procedures on bariatric outcomes. We aim to evaluate a group of bariatric surgery patients who chose to undergo body contouring procedures after their weight loss procedure and to compare their weight loss parameters to those who did not seek plastic surgery.

Materials and Methods

Institutional Review Board approval was obtained for this retrospective matched cohort study. We analyzed all patients who had bariatric surgery with a subsequent body contouring procedure at our institution between 2002 and 2014. For the purpose of this analysis, the primary body contouring procedures analyzed included panniculectomy, abdominoplasty, and lower body lift. Brachioplasty, mastopexy with breast reduction or augmentation, arm and thigh lift, liposuction, facelift, and pubic/genital plasty procedures were identified and considered as "other procedures." Weight of the resected tissue was recorded if available. Patient demographic characteristics included age, gender, and body mass index (BMI) both before and at the last available follow-up visit after bariatric surgery. Thorough patient co-morbidity assessments were performed. This cohort of patients was then matched and compared with a 1:1 control group of patients who had only undergone bariatric surgery. Matching was based on age, gender, BMI at the time of bariatric surgery, type of bariatric surgery procedure, and length of follow-up. Data were presented as mean ± standard deviation. Comparisons between paired and unpaired parameters were subjected to Student's t test for continuous variables and to χ^2 test for categorical variables. Regression analysis was utilized for correlation between weight loss and different clinical factors. Statistical significance was set at $P < .05$.

Results

Between 2002 and 2014, we identified 194 (3.7% of 5184 total bariatric procedures) patients who underwent body contouring procedure after bariatric surgery. Eight patients who underwent duodenal switch were excluded because no matched control patients could be found. Study cohort patients had an average BMI loss of 15.7 ± 7.8 kg/m^2 after 43.8 ± 22.2 months of follow-up. Demographic data for the remaining 186 patients and their controls are presented in Table 1. Sex, age, BMI, and type of procedure were matched between the groups. Although no matching

Table 1
Patients' demographic characteristics

	Body contouring after bariatric surgery group N = 186	Bariatric surgery only group N = 186	P
Sex (female)	158 (84.9%)	161 (86.5%)	.65
Age (y)	48.5 ± 12.7	47.1 ± 12.9	.29
Weight (kg)	136.6 ± 32.9	137.7 ± 32.0	.74
BMI (kg/m^2)	49.8 ± 10.4	49.7 ± 9.8	.94
Race (Caucasian)	157 (84.4%)	142 (76.3%)	.05
Co-morbidities			
Diabetes mellitus	64 (34.4%)	76 (40.8%)	.19
Hypertension	130 (69.8%)	133 (71.5%)	.73
Hyperlipidemia	112 (60.2%)	120 (64.5%)	.39
Procedure type			
RYGB	157 (84.4%)	157 (84.4%)	1.0
SG	17 (9.1%)	17 (9.1%)	1.0
AGB	11 (5.9%)	11 (5.9%)	1.0

AGB = adjustable gastric banding; BMI = body mass index; RYGB = Roux-en-Y gastric bypass; SG =sleeve gastrectomy.