Journal of Plastic, Reconstructive & Aesthetic Surgery (2017) 70, 1181–1185

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

Body contouring procedures in three or more anatomical areas are associated with long-term body mass index decrease in massive weight loss patients: A retrospective cohort study

Itay Wiser [a,b,*], Lior Heller [a], Coral Spector [a], Ehud Fliss [a], Tali Friedman [a]

[a] *Department of Plastic Surgery, Assaf Harofeh Medical Center, Affiliated to Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel*
[b] *Department of Epidemiology and Preventive Medicine, Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel*

Received 21 March 2017; accepted 28 May 2017

KEYWORDS
Bariatric surgery;
Body contouring;
Plastic surgery;
Morbid obesity;
Massive weight loss

Summary *Background:* Massive weight loss (MWL) patients who undergo body contouring plastic surgery (BCPS) display superior long-term weight maintenance. The effect of the number of anatomical areas contoured on weight dynamics is undetermined.
Objectives: To determine whether body mass index (BMI) dynamics following BCPS are associated with the number of anatomical areas operated.
Methods: A retrospective cohort study was conducted. Study groups were defined by the number of anatomical areas operated (1, 2, and 3+). BMI velocity was defined as a ratio between BMI change following BCPS and follow-up time. Multinomial logistic regression was performed to assess the independent association with BMI velocity.
Results: A total of 222 patients undergoing 513 BCPSs between 2009 and 2014 were included in the study (mean age 36.8 ± 10.9 years, 77% females). Group 3+ ($n = 88$) had a negative mean BMI velocity compared with positive values in Groups 1 and 2 (−0.11 ± 1.0 vs. 0.44 ± 1.4 and 0.03 ± 1.2, respectively; $p = 0.03$). Independent risk factors for positive BMI velocity (>0.5 kg/m^2/year) included single anatomical area BCPS compared to three or more (OR = 3.37; CI 95% 1.24–9.14; $p = 0.017$) and psychiatric medication use (OR = 6.73; CI 95% 1.15–39.35; $p = 0.034$). Independent protective factors included diabetes mellitus (OR = 0.094; CI 95% 0.01–0.99; $p = 0.049$).

* Corresponding author. Department of Plastic Surgery, Assaf Harofeh Medical Center, Zerifin 70300, Israel. Fax: +972 8 9779427.
E-mail address: wiser125@gmail.com (I. Wiser).

http://dx.doi.org/10.1016/j.bjps.2017.05.055

Conclusions: BCPS in three or more anatomical areas following MWL is associated with a long-term weight loss following BCPS. As part of the health strategy to maintain normal BMI values and achieve overall quality of life improvement in MWL patients, clinicians and health policy makers should positively consider recommending BCPS in multiple anatomical areas.

Introduction

Background

Obesity is a growing phenomenon that carries severe medical and economic consequences for individuals and for the entire society.[1–4] Accordingly, bariatric surgery, an effective method for weight reduction and long-term body mass index (BMI) maintenance, is being increasingly performed.[4–6] Despite the numerous benefits of weight loss, patients after massive weight loss (MWL) suffer from redundant excess skin that may cause health, self-image, and quality-of-life disturbances.[6–8] Body contouring plastic surgery (BCPS) has emerged as an effective method for the removal of excess skin and is gaining prominence in the process of weight loss and maintenance of normal BMI in formerly obese patients.[9]

Rationale

It has been previously shown that BCPS may aid in the long-term maintenance of normal BMI in patients after MWL.[8,10] This is most probably due to improved satisfaction, quality of life, body image, and physical function reported by these patients.[9–13] Patients may undergo surgery in a variety of anatomical areas according to their pattern of weight loss and excess skin.[7] We hypothesize that treating more anatomical areas will have a positive effect on factors such as postoperative weight reduction, patient satisfaction, and motivation, which ultimately translate into improved ability to maintain and further decrease BMI over time.

Objectives

The primary objective of this study was to examine the association between the number of anatomical areas undergoing BCPS and BMI velocity ($\Delta kg/m^2$ per year) throughout the follow-up period. The information obtained in this study may aid in surgical decision-making when creating patient-specific body contouring surgical plan in patients following MWL.

Materials and methods

Study design and population

We performed a retrospective cohort study. A total of 273 patients underwent BCPS following MWL by a single plastic surgeon (T.F.) between 2009 and 2014. All patients were pre- and postoperatively followed at the clinic by the primary surgeon. The following patients were eligible to enter the study: those over 18 years of age, those who lost at least 50% of their excess weight, those who underwent at least one body contouring procedure, and those whose medical records were accessible. Following data acquisition, the study population was divided into three groups: patients who underwent BCPS in one anatomical area (Group 1), those who underwent BCPS in two anatomical areas (Group 2), and those who underwent BCPS in three or more anatomical areas (Group 3+). The study was approved by Assaf Harofeh Medical Center local Institutional Review Board (No. 246-14).

Data measurement

Demographic details, medical history, and operative data of all patients were extracted from patients' electronic medical records. In addition, a telephone interview was performed to validate information regarding current BMI, smoking status, and physical activity performance (June, 2016). Follow-up period was calculated depending on the last communication with the patient. BMI velocity ($\Delta kg/m^2$ per year) was calculated by dividing the difference between pre- and postoperative BMI (ΔBMI) by follow-up time in months. Weight loss, weight stability, and weight gain were defined as BMI velocity of ≤ -0.5 kg/m^2/year, between -0.5 and 0.5 kg/m^2/year, and ≥ 0.5 kg/m^2/year, respectively. Seven anatomical areas, namely the breast, abdomen, back, arms, thighs, buttock, and face, were investigated. The body lift procedure was considered two anatomical areas, i.e., abdomen and back. The number of operations performed was calculated separately.

Statistical methods

Statistical analysis was conducted using the SPSS software v.21 (SPSS technologies, IBM, USA). Continuous variables were presented as means and standard deviations and were compared using independent Student's *t*-test. Differences in categorical variables were compared using χ^2 test or Fisher's exact test. Multiple-group comparison of continuous variables was performed using analysis of variance, followed by a multiple comparison analysis using LSD test. To assess the risk of weight gain, we used a conditional logistic regression model (age and sex were forced into the model as controls). Multivariate analysis included age, gender, smoking status, physical activity, follow-up time, and whether the patient underwent bariatric surgery prior to BCPS. All statistical tests were two-sided, and results