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Correlation between the Beck Depression Inventory and bariatric surgical procedures

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Abstract

Background: The Beck Depression Inventory (BDI) is a psychosocial screen for depression in obese patients seeking bariatric surgery. Gastric bypass improves postsurgical BDI scores due to weight loss, which predicts future weight loss. The effect of different bariatric procedures with differences in weight loss on BDI scores is unknown. Objective: To evaluate the relationship between different bariatric procedures and changes in the BDI scores, adjusting for the initial BDI score, and to consider the impact of psychosocial variables. The secondary objective was to assess the relationship between changes in BDI scores and weight loss at 6 to 12 months. Setting: University Hospital, United States.

Methods: Bariatric surgical patients were prospectively enrolled and retrospectively reviewed. We assessed changes in BDI after adjusting for the presurgical BDI and analyzed the relationship between patient demographic characteristics/psychological disorders and changes in BDI.

Results: We enrolled 137 patients who underwent a gastric band procedure, sleeve gastrectomy, or gastric bypass. We found a significant decrease in BMI and BDI scores across the full sample. Unlike BDI, change in BMI varied with procedure. Normalizing for baseline BDI, change in BDI did not significantly correlate with change in BMI. Patients who were employed and those without psychiatric history experienced even greater improvement in BDI scores. No statistically significant correlation was found between the change in BDI and weight loss at 6–12 months.

Conclusions: BDI scores were independent of the type of bariatric procedure and the amount of weight loss. Advantageous psychosocial parameters were associated with greater improvement in BDI scores. (Surg Obes Relat Dis 2015;11:637–642.)

Keywords: Beck Depression Inventory; Psychosocial; Weight loss; Depression; Bariatric surgery

Depression is a highly prevalent co-morbidity occurring in patients with severe obesity [1]. Several studies have reported an association between obesity and mild to moderate depressive symptoms compared with nondepressed controls [2–4]. Depression in bariatric patients is of specific interest, because the presence of depressive symptoms before surgery has been associated with poorer outcomes after surgery, including regaining of lost weight [5,6].

A prerequisite for bariatric surgery includes a presurgical evaluation of the patient's psychosocial status, most often by a mental health professional. Most programs use symptom inventories such as the Beck Depression Inventory (BDI) as the most common assessment tool [7]. These assessments also serve as an indicator for further thorough psychological consultation and for comparison of mood

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changes in the postsurgical period, including either an improvement in or an increased likelihood of feelings of depression.

Previous studies have shown a trend toward improvement in symptoms of depression after bariatric surgery that may be correlated with weight loss [8–10]. The objective of this study was to analyze the effect of bariatric surgery, patient demographic characteristics, and clinical characteristics on postoperative BDI scores in urban, severely obese patients who underwent bariatric surgery at a tertiary center. Patients were further stratified by the type of bariatric surgery, including gastric banding, sleeve gastrectomy, and Roux-en-Y gastric bypass, to determine if a correlation was present between the type of procedure and weight loss and the BDI scores.

Methods

BDI is a multiple-choice questionnaire composed of 21 items. The questions assess symptoms of irritability, feelings of guilt, suicidal ideation, fatigue, and weight loss. Scores of 0–9 are considered to indicate minimal depression, 10–19 mild depression, 19–29 moderate depression, and ≥ 30 severe depression.

Sample and procedures

A total of 318 patients with available presurgical BDI scores who underwent bariatric surgery between January 2006 and December 2012 were retrospectively reviewed for inclusion in the study. All surgeries were performed by a single surgeon at a university-based tertiary care center that offered Roux-en-Y gastric bypass, sleeve gastrectomy, and gastric banding. Only patients who completed postsurgical follow-up and who completed a postsurgical BDI were included in the study. Of the 318 patients, 137 met these requirements.

After Institutional Review Board approval, the charts for the 137 patients were reviewed for age, gender, height, weight, presurgical body mass index (BMI), BDI scores, and postsurgical BMI and BDI scores. Presurgical or baseline data was collected about 4.6 months before surgery. About one half of the sample had their psychiatric assessment performed between 3–6 months before surgery. Postsurgical collection of data are classified into 2 groups: 1 week to 6 months follow-up after surgery as "up to 6 months," and >6 months until the end of study period (i.e., 12 months from the bariatric procedure) as "6–12 months," with an assumption that significant weight changes from bariatric procedures usually take about 6 months. The timeline for the collection of data was categorized into 0–3 months, 3–6 months and 6–12 months. Ideal measure for BMI in up to 6 month group was taken between 3–6 months postsurgery. If that measure was not available, the 0–3 months measure was used. For nearly three quarters of the sample, the BMI was measured from 3–6 months. Additionally, the type and number of co-morbidities and the psychiatric history, including a history of psychotropic drug use, were noted. Finally, charts were reviewed for social factors including the level of education completed, self-reported perception of family support, marital status, history of physical, mental, or sexual abuse, and employment status. Patients were then stratified by the type of surgery, which included Roux-en-Y gastric bypass, sleeve gastrectomy, and adjustable gastric banding.

Statistical analysis

Summary and descriptive statistics were generated for each patient's baseline clinical characteristics. The Wald test and analysis of variance (ANOVA) were used to assess baseline imbalances between patients in the 3 surgical groups. The primary outcome, the change in BDI score from pre- to postsurgery, was analyzed using the paired t test. Analysis of covariance (ANCOVA) was used to assess the absolute change in BDI among the surgical groups after adjusting for the baseline BDI score. The least square mean differences with standard errors (SE) are reported. The relationship between marital status, employment, history of abuse, and psychiatric diagnosis and the change in the BDI score was investigated with exploratory analysis using ANCOVA. Sensitivity analysis was conducted using non-parametric rank order ANCOVA models. The Pearson correlation coefficient was calculated to assess the relationship between the change in BDI score and the change in BMI up to 6 months. Sensitivity analysis was performed carrying forward the BMI measurement up to 6 months for patients with missing data and the BMI measurement at 6–12 months. A 2-sided P value of less than .05 was considered statistically significant. Statistical analysis was performed with SAS statistical software version 9.3 (SAS Institute, Cary, NC).

Results

Patient demographic characteristics

The patient population in this study included 115 women and 22 men with a mean ($\pm$ SD) age of 41.7 $\pm$ 10.4 years, height of 165.7 $\pm$ 10.3 cm, weight of 132.0 $\pm$ 24.8 kg, presurgical BMI of 47.7 $\pm$ 7.7 kg/m^2, and postsurgical BMI of 42.2 $\pm$ 7.7 kg/m^2. Seventy-eight (57%) patients were African American, 44 (32%) patients were married, 64 (47%) patients were employed, and 55 (40%) patients had completed high school or the equivalent at the time of surgery.

Patient demographic characteristics were stratified by the type of bariatric surgery and are presented in Table 1. Of the 137 patients, 58 patients underwent gastric banding, 51 underwent sleeve gastrectomy, and 28 underwent gastric bypass. The Wald test and ANOVA were used to assess the