HHS Public Access

Author manuscript

Obes Surg. Author manuscript; available in PMC 2017 November 04.

Published in final edited form as:

Obes Surg. 2009 September ; 19(9): 1240–1242. doi:10.1007/s11695-008-9724-3.

Body Mass Index as a Predictor of 1-year Outcome in Gastric Bypass Surgery

Eunice Y. Chen,
Eating and Weight Disorders Program, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S Maryland Ave, MC 3077, Chicago, IL 60637, USA

Michael S. McCloskey,
Self and Other Directed Aggression Laboratory, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, Chicago, IL, USA

Peter Doyle,
Eating and Weight Disorders Program, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S Maryland Ave, MC 3077, Chicago, IL 60637, USA. Department of Psychiatry and Behavioral Sciences, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA

James Roehrig,
Eating and Weight Disorders Program, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S Maryland Ave, MC 3077, Chicago, IL 60637, USA

Johnny Berona,
Eating and Weight Disorders Program, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S Maryland Ave, MC 3077, Chicago, IL 60637, USA

John Alverdy, and
Center of the Surgical Treatment of Obesity, University of Chicago Medical Center, University of Chicago, Chicago, IL, USA

Daniel le Grange
Eating and Weight Disorders Program, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S Maryland Ave, MC 3077, Chicago, IL 60637, USA

Abstract

Background—The aim of this study was to determine if presurgery (T1), post-surgery (T2), or the change in body mass index (BMI) between these time points are useful predictors for predicting longer-term (T3) outcome in gastric bypass surgery.

Methods—The sample consisted of 72 gastric bypass surgery patients with an average age of 40.5. The mean presurgery BMI was 54.7 (SD=8.6). T2 assessments (BMI, depressed mood, binge eating status) occurred on average 21 weeks (SD=19) after surgery and T3 assessments occurred on average 63 weeks (SD=34) after surgery.

Correspondence to: Eunice Y. Chen.

Results—Three separate hierarchical linear regressions were performed to assess the predictive value of (1) BMI at T1, (2) BMI at T2, and (3) change in BMI from T1 to T2 on the dependent variable, BMI at T3, when age, sex, ethnicity, education status, age of overweight, binge eating status, depressed mood, and number of weeks after surgery were controlled for. When these demographic and psychological variables were controlled for, lower BMI at T1 and lower BMI at T2 predicted lower BMI at T3. However, change in BMI from T1 to T2, did not significantly predict BMI at T3 (p<.001).

Conclusions—Higher presurgery BMI and post-surgery BMI predict poorer 1-year follow-up BMI in gastric bypass surgery, and these measures can be used as easy "rules of thumb" for predicting longer term outcome.

Keywords

Gastric bypass; Outcome; Predictor; Body mass index

Introduction

Roux-en-Y gastric bypass (GB) results in a loss of approximately 65% of excess body weight in severely obese patients [1]. However, up to 30% of GB patients regain weight after surgery and consistent presurgery predictors of long-term outcome have not been established [2].

While studies [3–5] have found that presurgery BMI predicts later outcome, they have not examined post-surgery BMI or change in pre- to post-surgery BMI as predictors. This study aims to examine whether presurgery BMI, post-surgery BMI, and change from pre- to post-surgery BMI predict 1-year Post-GB weight-loss outcome.

Materials and Methods

Participants

This study included 72 patients who underwent RYGBP surgery between October 1998 and September 2001 at The University of Chicago Hospitals. Patients were consecutively selected from an existing database of 275 RYGB patients and were included in the study if they had relevant data at all assessment time points. This study was approved by the University of Chicago IRB.

Procedures

To be considered a candidate for surgery, all patients must have a presurgery BMI>40 or a BMI>35 with significant obesity-related medical comorbidities. As standard practice, all patients completed questionnaires, received a thorough multidisciplinary assessment, and were then collaboratively deemed suitable to undergo surgery.

Measures

The heights and weights of all participants were assessed pre-, post-surgery, and follow-up. These values were used to calculate BMI.

The Beck depression inventory (BDI) [6] is a widely used, 21-item self-report questionnaire that measures symptoms of depression and has well-documented reliability and validity. The scale reliability (Cronbach's alpha) for the present study participants was .87, indicating high internal consistency of the items.

Binge eating was assessed using the Questionnaire of Eating and Weight Patterns (QEWP) or QEWP-Revised (QEWP-R) Spitzer [7, 8]. The QEWP or QEWP-R are self-report questionnaires that assess the components of a "binge" as defined by the Diagnostic and Statistical Manual of Mental Disorders IV-TR [9] and measure the frequency of binge eating. Meeting criteria for binge eating in this study equals to reporting at least one objective binge episode per week for 6 months.

Statistical Analyses

For the primary analyses, three hierarchical linear regressions were performed to assess the predictive value of (1) BMI at T1, (2) BMI at T2, and (3) change in BMI from T1 to T2, on the dependent variable, BMI at T3, controlling for demographic variables (i.e. age, ethnicity, education level, and age of obesity onset), psychological variables (binge eating status and BDI score), and number of weeks after GB surgery. In Eqs. 2 and 3, we chose not to control BMI at T1 as we were interested in the independent predictive value of BMI at each time point and because this variable was highly correlated with other predictors.

Results

Participant Characteristics

The sample consisted of 72 primarily female (80.6%), Caucasian (80.6%) GB surgery patients. Of the sample, 11.1% were Black, 6.9% Hispanic, and 1.4% Asian. Average age was 40.5 years (SD=9.5). Most (43.2%) completed some college or an Associates degree. Average age of onset of overweight status was 11.5 years (SD=8.3). At the presurgery assessment, BDI scores were an average of 15.7 (SD=8.8), indicating mild to moderate depressive symptoms, and 36.1% reported binge eating at least once or more each week.

Presurgery assessments (T1) occurred, on average, 19 weeks before GB surgery (SD=14), when average BMI for the sample was 54.7 (SD=8.6). Post-surgery assessments (T2) occurred on average 21 weeks (SD=19) after surgery (average BMI=44.6; SD=10.3). Longer term follow-up (T3) occurred 63 weeks (SD=34) after surgery (BMI M=36.9; SD=8.3). The mean change in BMI from T1 to T2 was 10.3 (SD=6.7).

Primary Analyses

Results for the three hierarchical linear regressions conducted are detailed in Table 1.

Number of follow-up weeks significantly predicted follow-up BMI for all three regression models. In the first regression, presurgery BMI predicted follow-up BMI, with presurgery BMI explaining 35% of the variance. For the second regression, post-surgery BMI predicted follow-up BMI, explaining 38% of the variance. In the final regression, BMI change from pre- to post-surgery was not a significant predictor of BMI at follow-up.

Discussion

Presurgery and post-surgery BMI are good predictors of outcome 1 year after surgery when controlling for other demographic and psychological variables.

These findings have clinical significance in being easy “rules of thumb” for identifying which GB candidates would benefit from additional intervention such as lifestyle weight management and/or pharmacotherapy. Surgery programs may target individuals who have a high presurgery BMI for initial weight management or alternatively, given that these individuals may not be able to prolong the wait for GB, individuals who have not lost a substantial amount of weight post-surgery.

This study needs replication in a larger sample, using immediate post-surgery outcome (e.g., 4 weeks rather than 20 weeks) as a predictor and to assess follow up over a longer period of time (2 to 5 years post-surgery rather than 1 year). Presurgery BMI assessments closer to the surgery date are also needed. Less variability is also needed in these BMI time-point assessments. Future studies could include other assessments of outcome such as comorbid medical conditions. This would lead to a more specific benchmark BMI that surgery teams can use to decide when to offer further intervention.

Acknowledgments

Dr. Chen acknowledges the support of NARSAD, the Mental Health Foundation, and the American Foundation of Suicide Prevention on Young Investigator grants and the National Institutes of Health (1K23MH081030-01A1). Dr. McCloskey acknowledges the support of the National Institutes of Health (5K23MH073721-02, 1R03MH069764-01A1, 1R03MH067193-01A2), Dr. Alverdy acknowledges the support of the National Institutes of Health (5R01GM062344-08), and Dr. le Grange acknowledges the support of the National Institutes of Health (5R01MH070620-05).

References

1. Buchwald H. Bariatric surgery for morbid obesity: health implications for patients, health professionals, and third-party payers. J Am Coll Surg. 2005 Apr; 200(4):593–604. [PubMed: 15804474]
2. Herpertz S, Kielmann R, Wolf AM, et al. Do psychosocial variables predict weight loss or mental health after obesity surgery? A systematic review. Obes Res. 2004 Oct; 12(10):1554–69. [PubMed: 15536219]
3. Averbukh Y, Heshka S, El-Shoreya H, et al. Depression score predicts weight loss following Roux-en-Y gastric bypass. Obes Surg. 2003 Dec; 13(6):833–6. [PubMed: 14738665]
4. Lutfi R, Torquati A, Sekhar N, et al. Predictors of success after laparoscopic gastric bypass: a multivariate analysis of socioeconomic factors. Surg Endosc. 2006 Jun; 20(6):864–7. [PubMed: 16738971]
5. Czupryniak L, Pawlowski M, Kumor A, et al. Predicting maximum Roux-en-Y gastric bypass-induced weight reduction–preoperative plasma leptin or body weight? Obes Surg. 2007 Feb; 17(2): 162–7. [PubMed: 17476866]
6. Beck AT, Ward CH, Mendelson M, et al. An inventory for measuring depression. Arch Gen Psychiatry. 1961; 4:561–71. [PubMed: 13688369]
7. Spitzer, R., Yanovski, S., Marcus, M. The questionnaire of eating and weight patterns-revised. New York: New York State Psychiatric Institute; 1993.
8. Johnson WG, Schlundt DG, Barclay DR, et al. A naturalistic functional analysis of binge eating. Behavior Therapy. 1995 Win;26(1):101–18.

9. APA. Diagnostic and statistical manual of mental disorders DSM-IV-TR. 4. Washington, D.C: American Psychiatric; 2000.

Table 1

Hierarchical linear regressions: BMI at T1, T2 and T1–T2 as predictors of follow-up BMI (T3)

Presurgery BMI (T1; *N*=72)			**Post-surgery BMI (T2; *N*=71)**			**BMI change (T1–T2; *N*=71)**		
Variable	**ΔR^2**	**β**	**Variable**	**ΔR^2**	**β**	**Variable**	**ΔR^2**	**β**
Block 1	0.073		Block 1	0.075		Block 1	0.075	
Sex		−0.091	Sex		−0.057	Sex		−0.067
Age		0.008	Age		0.076	Age		0.085
Ethnicity		−0.147	Ethnicity		−0.118	Ethnicity		−0.186
Education		−0.015	Education		−0.070	Education		−0.185
Age overweight		0.023	Age overweight		−0.045	Age overweight		−0.130
Block 2	0.090		Block 2	0.090		Block 2	0.090	
BDI total		0.057	BDI total		0.000	BDI total		0.084
Binge eating		0.005	Binge eating		0.024	Binge eating		0.030
Block 3	0.351***		Block 3	0.352***		Block 3	0.352***	
Post-surgery weeks		−0.395***	Post-surgery weeks		−0.119	Post-surgery weeks		−0.470**
Block 4	0.696***		Block 4	0.732***		Block 4	0.360	
T1 BMI		0.628***	T1 BMI		0.628***	T1–T2 BMI change		−0.119

R^2 amount of variance accounted for by each additional step in the hierarchical linear regression, β estimates for the final hierarchica l linear regression model generated are presented as an estimate of effect size

* $p<.05$,

** $p<.01$,

*** $p<.001$

Obes Surg. Author manuscript; available in PMC 2017 November 04.