

## Research Article

# Does Preoperative Weight Change Predict Postoperative Weight Loss after Laparoscopic Roux-en-Y Gastric Bypass in the Short Term?

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*Background.* Many institutions mandate preoperative weight loss prior to bariatric surgery. This study examines the correlation between preoperative weight change and postoperative success following laparoscopic Roux-en-Y gastric bypass. *Methods.* We retrospectively studied the correlation between change in BMI before surgery and change in BMI postoperatively, using linear regression analyses and one-way ANOVA, in 256 consecutive gastric bypass patients with 1-year followup. *Results.* Of 256 patients, 125 lost weight preoperatively (mean  $-1.7\%$  BMI), while 131 maintained or gained weight (mean  $+1.2\%$  BMI). Postoperatively, there was no significant difference in percent BMI loss between the two groups (34.6% and 34.5%). The percent change in BMI preoperatively did not predict postoperative BMI change after 1 year ( $P = \text{n.s.}$ ). *Conclusions.* Our study did not show any correlation between preoperative weight change and postoperative weight loss after Roux-en-Y gastric bypass. Therefore, we do not believe that potential patients should be denied bariatric surgery on the basis of their inability to lose weight preoperatively.

## 1. Introduction

Obesity is a continuing and worsening health problem in the United States. The problem has reached epidemic proportions with nearly 20% of the American population affected, and representing a significant proportion of the total health care costs [1, 2]. In addition, the number of morbidly obese individuals with a body mass index (BMI) greater than  $40 \text{ kg/m}^2$  has also risen dramatically over the past decade [3]. Dietary changes, exercise, and pharmacotherapy are the mainstay of the initial approach to the obese patient. These modalities, separately or in combination, typically produce only a modest weight loss in the range of 2-10% excess weight loss in 1 year [4]. Weight regain is common in these patients, emphasizing the need for a more durable method of weight loss.

The surgical treatment of obesity for appropriate candidates [5] has emerged as the most effective and durable

approach for clinically significant weight loss. The number of bariatric operations performed annually in the United States has dramatically increased over the past 15 years [6]. The Roux-en-Y gastric bypass, a mixed restrictive and malabsorptive procedure, is considered the gold standard for bariatric surgery and is currently the procedure of choice in the United States [7]. The beneficial effects of bariatric surgery on weight loss and comorbid conditions result in a significant savings in total health-care costs studied over a 5-year period [8].

Not all gastric bypass patients enjoy dramatic weight loss, however. In fact, a proportion of patients regain much of their lost weight. It is well accepted that patient motivation is a key factor for successful outcome following laparoscopic Roux-en-Y gastric bypass (LRYGB). Lifestyle changes, including modification of dietary habits and increasing physical activity, are common to patients who

TABLE 1: Demographic data.

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Female (%)	82
Age (years)	17–64 (mean 41.7)
Preoperative BMI (Kg/m <sup>2</sup> )	36.1–90.5 (mean 51.3)
Mean % postoperative BMI loss	34.5

have significant weight loss. Consequently, good outcomes hinge upon appropriate patient selection.

The search for predictors of success is ongoing. It is clear that behavioral modification is paramount to successful outcome. To that end, it is suggested that intrinsic motivational factors would predict greater weight loss after LRYGB [9]. In many practices, preoperative weight loss is an implied surrogate for intrinsic motivation, and thus a predictor of postoperative success [10, 11]. In fact, in some centers preoperative weight loss is a prerequisite for bariatric surgery to assess patient compliance, although there is no evidence to support preoperative weight loss as an indicator of “intrinsic motivation.” Yet in some institutions it is still used to deny morbidly obese patients bariatric surgery. It is unknown how many patients are denied surgery due to an inability to demonstrate weight loss preoperatively. In our study we sought to determine whether any preoperative weight change, gained or lost, was predictive of postoperative weight loss, and whether it is justified to use preoperative weight loss to assess postoperative patient compliance, and consequently operative success.

## 2. Materials and Methods

At a single institution, 354 laparoscopic Roux-en-Y gastric bypass operations were performed over a 3-year period. Patient data was gathered and recorded in a longitudinal prospective database. Initial patient weight was measured and BMI was calculated 8 weeks prior to the anticipated surgical date. All the patients included in the study were eligible for bariatric surgery as determined by the 1991 NIH consensus guidelines [5]. These include preoperative psychological screening, education by a trained dietician, and appropriate preoperative medical clearance. None of the patients in this study had prior bariatric surgery. All patients were weighed again, using the same scale, within 2 weeks of surgery. Using these data, we could determine whether each patient had lost or gained weight preoperatively. None of the patients was mandated to lose weight as a programmatic policy in our institution. Patients who had no preoperative weight change were also included in the study.

All procedures were performed by a single surgeon at a single institution, assisted by a surgical fellow or chief resident. All patients received the same postoperative dietary instructions. For the first 2 weeks after surgery they were instructed to drink 6 ounces of caloric fluids per day in addition to unlimited calorie-free liquids. A high protein very low calorie diet was gradually introduced thereafter. Patients were followed at 2 weeks, 2 months, 6 months, and

TABLE 2: Preoperative percent change in body mass index.

% preoperative BMI change	Number of patients (%)
< -5%	2 (0.7)
-2.1 to -5.0%	31 (12.1)
-0.1 to -2.0%	94 (36.7)
0%	27 (10.5)
0.1 to 2.0%	83 (32.4)
2.1 to 5.0%	25 (9.8)
>5%	2 (0.7)

12 months postoperatively. Patients were weighed at each of the follow-up office visits.

Patient data were entered into a longitudinal prospective database. A linear regression analysis and one-way ANOVA were performed comparing percent body mass index change before surgery to percent BMI loss at 1-year followup.

## 3. Results

Of the 354 patients who underwent LRYGB, 256 patients were available for 1-year followup. Age ranged from 17 to 64 years and 82% were female. Preoperative BMI ranged from 36.1 to 90.5 kg/m<sup>2</sup> (mean 51.3). Postoperatively, the mean percent of excess weight lost was 62%, corresponding to a mean percent BMI loss of 34.5% (Table 1).

Of the 256 patients, 125 lost weight prior to surgery. Among them, 94 reduced their BMI by 0.1–2.0% preoperatively. Thirty-one patients reduced their BMI by 2.1–5.0% and 2 patients reduced their BMI by >5% preoperatively. Of the 256 patients, 104 gained weight prior to surgery. Of these, 83 patients increased their BMI by 0.1–2.0% preoperatively. Twenty-five patients increased their BMI by 2.1–5.0%, and 2 patients increased their BMI by >5% preoperatively. Twenty-seven patients had no change in their weight prior to surgery (Table 2). Of the patients who lost weight preoperatively, a mean of 1.7% of body mass index was lost (SD = 2.8). Of the patients who did not lose weight prior to surgery, a mean of 1.2% of body mass index was gained (SD = 1.2).

Preoperative BMI change was compared to postoperative BMI change at 1-year followup (Figure 1). The percentage of BMI reduction among patients who lost weight preoperatively (mean 34.6% ± 8) was compared to the percentage of BMI reduction among patients who did not lose weight (34.5% ± 7.6). An analysis of variance (ANOVA) showed little correlation between the expected and found variation between these two groups ( $P = .79$ ). A linear regression analysis showed that percent change in BMI from initial visit to surgery did not significantly correlate with change in BMI at 1-year postoperatively ( $P = .09$ ).

## 4. Discussion

Bariatric surgery has proven to be the most effective and durable method of weight loss for the morbidly obese population. Many surgical practices have a policy mandating that candidate patients for bariatric surgery lose weight

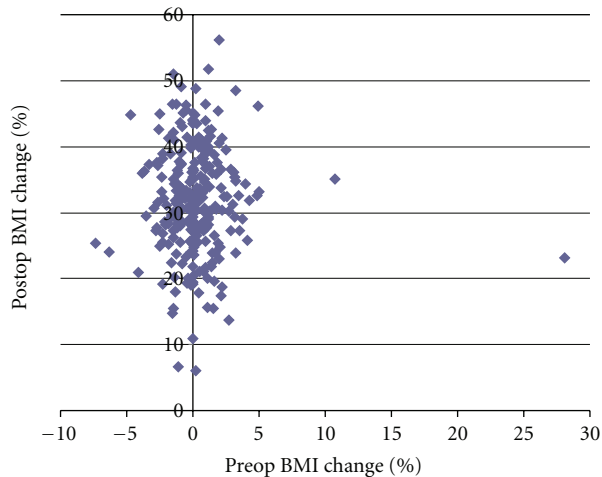


FIGURE 1: Change in postoperative percent BMI change ( $y$ -axis) as a function of preoperative percent BMI change ( $x$ -axis). There is no significant correlation.

prior to the operation. This requirement is based on the assumption that successful preoperative weight loss can serve to effectively select patients who will have good postoperative outcomes. Conversely, however, the inability to lose weight preoperatively is perceived by some centers as a marker for poor postoperative outcomes. Neither the NIH Consensus Development Conference Statement of 1991 nor the American Society of Metabolic and Bariatric Surgery mandates weight loss prior to bariatric surgery, yet this remains a controversial issue, with different centers arguing for and against mandatory preoperative weight loss [10–13].

In our institution there is no preoperative weight loss requirement placed on candidate patients. Nonetheless, patients are followed for several weeks before surgery, allowing us to prospectively follow weight trends. We noticed that without prompting, a significant portion of the patients will lose some weight. With this information we were able to study the effect of preoperative weight change, whether gained or lost, on postoperative weight loss. Our findings suggest that in the short-term postoperative period, there is no correlation between the two. Neither weight loss, nor weight gain, in the preoperative period is predictive of postoperative change in BMI after 1 year. Thus, preoperative weight loss is not an effective predictor of postoperative success in the short term.

We recognize that this conclusion is limited, since it is based on a relatively short-term followup after gastric bypass. It is possible that the significance of our findings will diminish with longer followup. However, it does bring the policy of mandatory preoperative weight loss into question. This is important, since a stigma can be associated with an inability to lose weight prior to surgery, and an effective treatment may be denied to these patients, which even in the short-term period of 12 months, may have significant health consequences. In addition, this finding is in general agreement with some previous data that were generated from open gastric bypass and vertical banded gastroplasty [12, 14],

and a more recent retrospective analysis of 203 patients undergoing laparoscopic gastric bypass [13]. Harnisch et al. found that neither preoperative weight loss nor weight gain correlated with short-term postoperative weight change, and neither correlated with postoperative resolution of comorbidities.

Other studies, however, have shown a difference in postoperative weight loss between the preoperative weight loss and no-weight-loss groups [10, 11, 15]. The differences demonstrated, however, are small. A possible explanation for the discrepancy between these studies and the findings described here is that our study also includes those patients who gained weight preoperatively. In addition, the overall differences in BMI change are small between the two patient populations. It is possible that selection of patients with more extreme preoperative BMI changes would identify a significant difference in postoperative outcome.

Even though we argue that preoperative weight loss is not a surrogate marker for postoperative weight loss, the results presented here are not meant to encourage weight gain prior to bariatric surgery. On the contrary, preoperative weight loss may indeed present a healthier patient to the operating room and make the operation easier to perform by shrinking the liver [16] and may therefore also make results more reproducible.

Preoperative weight in general has been shown to influence the operative time in bariatric surgery [11, 17, 18]. Indeed, Alami et al. showed that preoperative weight loss significantly decreases operative time in LRYGB [11]. The ease of performing the operation may change the postoperative morbidity profile as well and thus also have an effect on short-term postoperative surgical outcomes and weight loss [11, 18]. In a large prospective study, Still et al. found that in high-risk patients undergoing gastric bypass, preoperative weight loss correlated with a shorter postoperative length of stay and a more rapid early postoperative weight loss [19].

Nonetheless, from the results of this study, we do not predict a correlative relationship between pre- and postoperative weight loss, and on that basis we do not advocate a mandatory weight loss prior to laparoscopic Roux-en-Y gastric bypass. A larger prospectively designed study with longer followup is needed to conclusively answer this controversial issue.

## 5. Conclusions

Our study did not show any correlation between preoperative weight change and short-term postoperative success after Roux-en-Y gastric bypass. Therefore, we do not believe that potential patients should be denied bariatric surgery on the basis of their inability to lose weight preoperatively.

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