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Problematic Eating Behaviors and Eating Disorders Associated with Bariatric Surgery

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INTRODUCTION

Obesity is increasing in prevalence worldwide and is frequently characterized as an epidemic.[1] Obesity is associated with several serious potentially life-threatening medical co-morbidities, including type 2 diabetes mellitus, hypertension, dyslipidemia, sleep apnea and cardiovascular disease.[2–5] The most effective treatment for severe obesity, and the only intervention that usually results in both substantial weight loss and resolution or improvement in most weight-related comorbidities, is bariatric surgery.[2] Two large, long-term prospective trials have clearly documented this. In the controlled non-randomized Swedish Obese Subjects (SOS) study, bariatric surgery has been found to yield significant and sustained benefits in health status and health-related quality of life (HRQoL).[6–8] In the United States, the Longitudinal Assessment of Bariatric Surgery (LABS) study has yielded similarly promising findings at seven-year follow-up.[9] Currently the most frequently performed bariatric surgeries are sleeve gastrectomy (SG), and Roux-en-Y gastric bypass (RYGB).[2] RYGB now accounts for the minority of bariatric surgeries performed in the U.S. and involves surgically partitioning the stomach to create a small gastric pouch, which is connected to the jejunum, bypassing the first part of the small intestine, the duodenum. SG involves surgically dividing the stomach vertically to reduce its size, creating a sleeve. SG is currently the most commonly performed bariatric surgery in the U.S.

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Traditionally, weight loss and remission of weight-related comorbidities were thought to be a result of the anatomical changes secondary to the surgery. However, a growing body of research suggests that the mechanisms by which the RYGB, and likely the SG, lead to weight loss, are through alterations in gastrointestinal (GI) physiology that include changes in the activity of certain gut hormones, bile acids, inflammatory factors and gut bacteria (the microbiome).[10–14] These alterations in physiology have also been shown to be involved in bidirectional communication with the central nervous system.[10] Further understanding of the mechanisms of weight loss and disease remission will likely continue to be an important focus of research, as evidence suggests that post-surgery outcomes are dependent on these physiological changes and the interactions among them.

EATING PROBLEMS IN OBESE INDIVIDUALS

Although obesity is not classified as an eating disorder, various eating problems, including overconsumption relative to energy expenditure, and problems with binge eating and night eating syndrome (NES), wherein people get up to eat during the night after having been asleep, and/or eat excessively late in the evening after the evening meal, have been described.[15]

EATING PROBLEMS IN BARIATRIC SURGERY CANDIDATES

Bariatric surgery candidates have higher rates of eating problems and eating disorders compared to individuals in the general population[16,17], as well as to those with lesser degrees of obesity who seek non-surgical treatments.[18] Bariatric surgery candidates also report substantial impairments in HRQoL[19], are more focused on their weight and shape[20,21], and report experiencing weight-related stigma from others[22], which can further exacerbate eating disorder symptoms[22], and increase weight via activation of stress-induced physiological processes.[23] For example, consuming high calorie foods such as sweets and fats can trigger physiological responses that can contribute to binge eating, resulting in decreased distress or positive emotions.[24] Thus, it is not surprising that patients in greater distress and with disordered eating behaviors such as binge eating, may present for bariatric surgery (rather than seeking more conservative weight loss methods) because patients want to achieve more rapid and sustainable weight loss to alleviate physical and psychosocial comorbidities.

This article will review pre- and post-surgical problematic and eating disordered behaviors that are common among bariatric surgery patients and will include the associations of these behaviors with HRQoL, psychopathology and weight loss outcomes, concluding with treatment recommendations.

PRE-SURGERY

BINGE EATING AND BINGE EATING DISORDER

According to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria[20], BED is defined as eating an unusually large amount of food in a short period of time (about 2 hours) and must be accompanied by a sense of loss of control (LOC) over

eating (i.e., feeling that one cannot stop eating or control the amount of food eaten). To meet the minimum diagnostic criteria for mild BED, a patient must engage in binge eating at least once per week for the past 3 months, and the binge eating must cause marked distress. Relevant to bariatric surgery candidates, recent studies have shown that the severity of BED is associated with the severity of obesity and psychopathology.[21] For example, higher perceived LOC over eating is related to greater distress and psychopathology[25], with depressive and anxiety disorders being among the most common psychiatric comorbidities.[26] Patients with BED are also more likely to have other problematic eating behaviors.[27]

BED is the most common eating disorder among bariatric surgery candidates. A recent LABS study found that 10% of patients met full criteria for the disorder, which is a conservative estimate based on structured diagnostic assessments and the more stringent diagnostic criteria utilized in the DSM-IV.[28] This well exceeds prevalence rates of BED in the general population (~1.2%)[17] and is also high considering that bariatric surgery candidates tend to underreport and minimize symptoms so that they are not excluded from having surgery.[29] Actually, most patients with BED seek treatment for their obesity rather than for an eating disorder or problematic eating behaviors.[21]

Rates of BED have varied considerably across studies[10,30] due to methodological differences, including over-reliance on self-report instruments and retrospective accounts versus structured clinical assessments.[31] In addition, there is currently no standardized approach to conducting the pre-surgical psychological interview, which can lead to biased estimates of BED and psychopathology. Ideally, clinicians and researchers would evaluate current eating and other forms of psychopathology using gold standard approaches, such as the Eating Disorders Examination (EDE)[32], a structured clinical interview that assesses dietary restraint, as well as eating, weight, and shape concerns, and has been adapted for use with bariatric surgery patients (The EDE-Bariatric Surgery Version; EDE-BSV) and the Structured Clinical Interview (SCID-5) for DSM-5 disorders[33], respectively. The EDE is lengthy to administer and requires training, and so it is not widely used[31] but does have a validated questionnaire form, the EDEQ[34], that can be used instead. Other validated eating disorder questionnaires, including the Eating Inventory[35] can be used to assess cognitive restraint over eating, LOC eating or disinhibited eating, and hunger.

Another area of interest in the past several years has been to determine whether pre-surgical binge eating or BED are related to suboptimal weight loss outcomes after bariatric surgery. Numerous studies have been conducted, but the majority do not support a relationship, and only a few support that BED is related to poorer weight loss outcomes.[31] For this reason, binge eating and BED is not considered to be a contraindication for bariatric surgery. However, patients with pre-surgical binge eating/BED should be closely monitored after surgery[31] because there is compelling evidence that disordered eating behaviors can re-emerge after surgery.[31,36–38]

PICKING AND NIBBLING/GRAZING

Picking and nibbling (P&N) is defined as unplanned and repetitious eating in between meals and snacks, where it is unknown how much food will be eaten at the outset[39]. The term is

often used interchangeably with grazing[36,40]. P&N/grazing are prevalent among patients with eating disorders[39], including anorexia nervosa (AN), bulimia nervosa (BN), and BED, and those pursuing bariatric surgery[40] but do not appear to be associated with other eating disordered behaviors or psychopathology.[39] This may be because LOC eating is not included in the definition of P&N. To date, it is unclear whether or not P&N is a normative, disordered, or maladaptive eating behavior, and this is even less clear among bariatric surgery candidates, who may engage in P&N to restrict eating in an attempt to lose weight.[39] However, there is evidence that those who engage in grazing pre-surgery may be more likely to continue this behavior after surgery[36], which we will later discuss, has a deleterious effect on weight loss. Thus, these individuals may benefit from interventions that focus on eating consistent, planned meals.[41]

NIGHT EATING SYNDROME

Night eating syndrome (NES) is characterized by a normal sleep-wake cycle but with recurrent episodes of night eating, in which the person awakens from sleep to eat (i.e., nocturnal ingestions) and by excessive food consumption (>25% of daily food intake) after the evening meal (i.e., evening hyperphagia) occurring at least twice per week[10,42], a pattern considered to be a delay in the circadian intake of food.[43] In the DSM-5, NES is classified as an “Other Specified Feeding or Eating Disorder”[20], which to be diagnosed, necessitates that individuals have:

1. an awareness of their eating (which differentiates NES from a parasomnia, in which there is limited or no recollection of eating);
2. significant distress associated with it; and
3. the behavior is not better explained by another disorder such as BED.

In fact, for those with NES, the amount of food eaten is typically less than what would be consumed during a binge eating episode.[44] However, about 15–20% of patients with obesity do meet full criteria for both NES and BED.[36,44]

Approximately 17% of bariatric surgery candidates have NES, according to recent estimates[27,31,44], although lower and higher rates have been reported.[30] The Night Eating Questionnaire (NEQ)[42], the most widely used, validated, self-report measure of night eating, can be used in conjunction with a diagnostic interview and a 24-hour food recall[42] to assess NES in bariatric patients.[10,27] However, it should be noted that the presence of pre-surgical NES is not a contraindication to surgery. Rather, the NEQ can be used to monitor candidates before and after surgery and to guide interventions because NES has been associated with higher rates of lifetime anxiety, substance use, and depressive disorders[44], and is more likely to occur under periods of high stress (see de Zwaan et al.[44], for a review of studies).

ASSOCIATIONS WITH PSYCHOPATHOLOGY AND QUALITY OF LIFE

Pre-surgical eating disordered behaviors, particularly binge eating, have been associated with significant psychopathology, including higher rates of depression[21], mood disorders[26], less perceived interpersonal support, alcohol use,[27] and lower HRQoL, defined as the impact

of health on an individual's functioning[45], including, but not limited to, physical and mental health domains. These are typically significantly impaired in bariatric surgery candidates.[46,47] These impairments appear to be even greater among those with the highest severity of obesity as well as those with current and/or lifetime psychiatric disorders.[18]

EATING PROBLEMS AFTER BARIATRIC SURGERY

In bariatric surgery research, weight loss has usually been utilized as the primary outcome, with resolution of medical comorbidities also emphasized; eating behaviors have received less attention.[31] However, several recent studies show that problematic eating contributes to suboptimal weight loss trajectories[48] and weight regain. A smaller percentage of patients may also develop post-surgical eating disorders such as AN. Therefore, assessment of eating behaviors after surgery requires that clinicians understand what motivates patients to engage in these behaviors[31], which are addressed in the next sections.

LOSS OF CONTROL EATING

While binge eating is physically not possible after bariatric surgery due to anatomic changes, and consequently, improves afterwards[49], patients may still struggle with LOC eating and subjective binge eating episodes.[49] It appears that those most at risk are patients who met criteria for BED prior to surgery.[37]

Conceição and colleagues[48] estimated that nearly 10% of patients developed LOC eating about two years after surgery, although it may re-emerge as early as 6 months post-surgery.[36,50] LOC eating is problematic because it is associated with more post-surgical complications[31,38] (e.g., vomiting), higher psychopathology (e.g., depression), low HRQoL,[37,50,36] eating disordered behaviors[50], less weight loss[37], including poor long-term weight loss,[51] and greater weight regain.[52,53] It has been suggested that since patients are no longer able to engage in binge eating after surgery, prior LOC eating might present as grazing/P&N.[40] Thus, suboptimal weight loss and weight regain may result not only from disinhibited eating but also because, over time, patients are able to consume larger amounts of food.[54]

Therefore, it is critical to identify postoperative patients at risk for LOC eating and to monitor their eating behaviors and weight loss progress[55] using the EDE-BSV[28], for example, which more accurately assesses eating disordered behaviors after bariatric surgery. Patients identified as having LOC eating and comorbid psychopathology may then benefit from a targeted intervention that addresses both. However, these patients may need additional support to remain engaged in treatment because there is evidence that patients with BED/LOC eating may be less adherent to postoperative dietary recommendations[54] and are less likely to attend postoperative appointments.[56]

PICKING AND NIBBLING/GRAZING

Picking and nibbling (P&N)/grazing is the most frequent problematic eating behavior after surgery[49,57], affecting about 30% of bariatric patients.[48] Some patients develop a new onset of P&N post-surgery; although, a risk factor is preoperative LOC eating.[48] The difficulty

with differentiating P&N from normative eating behavior[38] is that patients are required to eat several small meals throughout the day after surgery. However, P&N is done without planning and forethought, which often leads to the consumption of high calorie foods or drinks.[31] In turn, P&N has been associated with postoperative weight regain[48,49], although additional research is needed to better characterize this phenomenon and its relationship to weight outcomes.

NIGHT EATING SYNDROME

Currently, there is limited research on NES after bariatric surgery. However, a recent review[58] noted that it occurs less frequently post-surgery. One study found a decrease in night eating from pre- to post-surgery at one year follow-up (17.1% to 7.8%), but this study was limited to patients having laparoscopic adjustable gastric banding (LAGB)[36]. Another study suggested that postoperative night eating symptoms improved among patients who had preoperative depressed mood versus those without it, but the relationship between mood and NES is complex; other factors including sleep may also play a role.[59] For example, sleep problems and depressive symptoms typically improve for most patients in the short-term following surgery. Further, NES is currently defined based on the timing of eating rather than the size of eating episodes; therefore, investigators believe that patients may still engage in night eating after surgery but eat smaller amounts.[59] Therefore, future studies are needed that assess night eating prospectively across bariatric patients.[58]

ASSOCIATIONS WITH PSYCHOPATHOLOGY AND QUALITY OF LIFE

HRQoL generally improves in the early postoperative period, particularly for physical and mental domains.[45,46,58,60] However, there appears to be emerging evidence that these gains may be short-lived[58,61], and a subset of patients may be at risk for ongoing mood and eating problems after surgery.[27]

For example, in the studies that showed improvements in mental HRQoL for long-term follow-up, they also noted that these gains were related to weight loss but began to decline over time.[46,61,62] Further, for those with significant eating disorder symptoms after surgery, BED was associated with poor HRQoL after surgery and grazing two or more times per week[52], and this was also true in another study having long-term follow-up, in which binge eating negatively affected mental HRQoL nearly 14 years after surgery.[63]

Thus, while positive changes in HRQoL and eating are typically observed in the early postoperative period,[46] there appears to be more variability in outcomes in the later postoperative years, which in some studies, has been dependent on the type of surgery and related to the amount of weight lost.[45] A limitation of the literature on psychosocial outcomes after surgery is that, with the exception of a few studies[46,63], the data have been limited to studies with outcomes at 2–3 years post-surgery. Indeed, longer-term follow-up research is needed.[58]

ASSOCIATIONS WITH WEIGHT LOSS OUTCOMES

Recent studies indicate that while problematic and disordered eating behaviors generally improve after surgery, recurrence or development of these behaviors can contribute to suboptimal weight loss.[49] The most consistent evidence to date has shown that postoperative binge eating/BED/LOC, P&N, and significant psychopathology are negative predictors of weight loss outcomes[48,53,55], with different weight loss trajectories observed within 2 years postoperatively.[48] Specifically, about 65% of patients with weight regain report problematic eating behaviors,[48] and higher levels of impulsiveness are thought to play a role.[49] Thus, ongoing intervention and monitoring is needed in the postoperative period.[55] However, as noted in a review by Sheets et al.[55], positive predictors of weight loss outcomes were found among a sample of over 2,000 LABS participants (from baseline to 3-years post-surgery) who stopped eating when they felt full, stopped eating continuously throughout the day, and engaged in self-weighing; they had 14% greater weight loss than those who made no positive changes.

EATING DISORDERS AFTER BARIATRIC SURGERY

Although less common, it is being increasingly recognized that a small subset of patients are diagnosed with eating disorders post-bariatric surgery.[15,57] Indeed, research indicates that traditional eating disorders (EDs) such as AN and BN, can occur after bariatric surgery and in some cases patients present for treatment with low BMIs and significant medical comorbidities, although other patients may not have a critically low BMI but none-the-less have lost excessive weight, have medical evidence of starvation, and meet current criteria for AN, which do not stipulate the necessity of a low body weight if other criteria are met.[15,57] There are no prevalence or incidence data yet available on such outcomes.

TREATMENT FOR THESE EATING PROBLEMS

PRE-SURGERY

A critical component of the pre-surgical psychological evaluation is to identify patients with significant untreated psychopathology including BED. An appropriate intervention should be considered (i.e., referral for psychotherapy and/or psychotropic medication), but generally such interventions should be deferred until after surgery.[41] For example, non-bariatric patients meeting DSM-5 criteria for BED would typically be referred for cognitive-behavioral therapy (CBT), the first-line, evidence-based treatment for BED[64], which focuses on normalization of eating patterns, reduction of binge eating[21], and improvement in mood symptoms rather than addressing weight loss, which rarely results from such an intervention.[21] Some bariatric programs have developed brief, group CBT protocols to treat binge eating prior to surgery and found that patients with BED who completed the group, improved on binge eating scores such that they no longer met criteria for BED before surgery.[65] Antidepressants or stimulant medications can also be used in lieu of or as an adjunct to psychotherapy. However, BED should not be regarded as a contraindication to bariatric surgery, since some patients experience a remission of BED with surgery and progress normally. Also, most bariatric surgery candidates are significantly impaired psychologically, socially and medically, and delaying surgery for an extended time is rarely warranted.

POST-SURGERY

It has been well-documented that problematic eating behaviors pose the greatest threat to meaningful and sustained weight loss, and that a new onset or recurrence of such behaviors (i.e., LOC eating) can occur within 12 months or earlier after surgery[50], which can result in less weight loss at long term follow-up. This suggests the need to monitor problematic eating and intervene earlier[48,53], which aligns with researchers who suggest the best time to target behaviors like LOC eating and clinically significant depressive symptoms is as soon as possible once they manifest post-surgery when patient investment in treatment[38] is high, and they are motivated to succeed.[66]

Treatment for post-operative eating disorders is, again, usually CBT. However, inpatient or day treatment may be necessary for those who develop AN or BN. Medications are typically used for depression and adjunctive for BN and BED. The focus of CBT remains on normalizing eating patterns but topics may include issues pertaining to adjustments in foods eaten, vitamins taken, relationships, and body image, which may not have been thoroughly considered pre-surgery.[67]

Post-surgery treatments have utilized both individual and group-based CBT[66,67] and others have incorporated motivational enhancement strategies[68], which can result in a reduction in LOC or binge eating symptoms, increased self-efficacy, and enhance weight loss.

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KEY POINTS

- Obesity prevalence has reached epidemic proportions worldwide, and obesity results in a variety of potentially life-threatening illnesses.
- Bariatric surgery is the only effective treatment for severe obesity.
- Bariatric surgery candidates often report problematic eating symptoms.
- Loss of control eating and other problematic eating behaviors after bariatric surgery are associated with attenuated long-term weight loss and need to be identified and addressed.

SYNOPSIS

Bariatric surgery candidates often report problematic and/or eating disordered behaviors. For most patients, these eating behaviors improve after surgery. However, a subset experience a recurrence or new onset of problematic eating behaviors as early as 2 to 18 months after surgery, which can result in compromised weight loss/excessive weight regain. Those most at risk are individuals with comorbid psychopathology (i.e., loss of control eating, depression) after surgery. For some, such problems are present before surgery. Therefore, it is critical to monitor patients closely after surgery so that appropriate psychiatric treatments can be provided if indicated.