



Psychiatric aspects of bariatric surgery

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Purpose of review

Bariatric surgery has been consistently shown to be effective in long-term marked weight loss and in bringing significant improvement to medical comorbidities such as metabolic syndrome. Empirical data suggest a high prevalence of psychiatric disorders among bariatric surgery candidates. In this review, we focus on the studies published recently with a high impact on our understanding of the role of psychiatry in bariatric surgery.

Recent findings

This article reviews the specific psychopathologies before surgery, changes in psychopathologies after surgery, suicide risk related to bariatric surgery, factors associated with weight loss, and recommendations for presurgical and postsurgical assessment and management. Research indicates a decrease in certain psychiatric symptoms after weight loss with bariatric surgery. However, the risk of suicide and unsuccessful weight loss in some bariatric surgery patients make monitoring following surgery as important as careful assessment and management before surgery. Specific considerations for youth and older populations and future potential research foci are discussed.

Summary

Recent publications suggest new directions for psychiatric evaluation and interventions for bariatric surgery patients. Future research on outcomes of specific populations, effectiveness of psychopharmacotherapy, and underlying pathophysiology are warranted for the advancement of treating bariatric surgery patients.

Keywords

bariatric surgery, bioenterics intragastric balloon, cognition, psychiatric disorder, suicide

INTRODUCTION

Obesity has become the most serious and quickly spreading disease in developed countries this century. It has a multifactorial cause that includes genetic, environmental, dietary as well as cultural and psychosocial factors. When obesity achieves the level of 'morbid obesity', it is associated with adverse effects on almost all the organ systems and can dramatically decrease the life expectancy and quality of life of its victims [1]. Treatment results have been disappointing in this category of obesity, even when intensive medical treatment is applied, and till now bariatric surgery is considered the only effective and long-lasting therapy. In 1991, the National Institute of Health (NIH) Consensus established the guidelines for bariatric surgery for patients with BMI greater than 35 kg/m² with severe obesity-related comorbidity and for those with BMI greater than 40 kg/m² with or without comorbidity [2]. Jejunio-ileal bypass was the first reported bariatric procedure and involved bypassing most of the small intestine. This operation was associated with high morbidity and a significant mortality rate, and most of the patients eventually had to undergo

reversal of the procedure, so it was finally abandoned [3]. At present, adjustable gastric banding, sleeve gastrectomy, and Roux-en-Y gastric bypass are the most commonly adopted bariatric procedures in the world [4].

The bioenterics intragastric balloon (BIB) is a reversible and nonsurgical method for weight loss and has been considered an effective treatment for obesity in both Western and Eastern populations [5,6]. The BIB is a spherical balloon of silicone that

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KEY POINTS

- Psychiatric disorders such as depressive disorders, anxiety disorders, and binge eating disorders are prevalent among bariatric surgery candidates.
- Presurgical psychopathology may imply poor postsurgical outcomes and hence warrant thorough evaluation and aggressive treatment.
- Postsurgical weight loss is likely to improve cognitive function and psychiatric symptoms like depression, but not anxiety.
- As suicide risk is both high before and after the surgery, long-term supervision and timely intervention are suggested.

can be filled with 400–700 ml of isotonic saline. It is placed in the stomach under endoscopic control and should be removed after 6 months to avoid spontaneous balloon deflation. It treats obesity by reducing the volume of the stomach and provides a continuous sensation of satiety, which will result in decreasing food intake and facilitating maintenance of a low-calorie diet. Imaz *et al.* [5] pooled 3608 patients and reported that weight loss at the time of balloon removal was 12.2% of initial weight, 5.7 kg/m², and 32.1% excess weight loss (EWL). Although the majority of the obese progressively regain some weight, Kotzampassi *et al.* [7] reported that BIB was effective in bringing about significant weight loss and maintenance for a long period in 500 obese individuals followed up for up to 5 years. In addition to the treatment of obese patients, BIB is also effective in treating overweight patients. Genco *et al.* [8] reported that BIB treatment had a good effect on 261 overweight patients from 3 European centers with mean percentage EWL of 55.6 and 29.1% at the time of BIB removal and 3 years after BIB removal, respectively. Mental health providers are asked to assist in the preoperative evaluation and postoperative monitoring more often than before. Though most reviewed reports are related to bariatric surgery, findings may well be applicable to BIB.

PRESURGICAL FINDINGS AND MANAGEMENT

Bariatric surgery and BIB should both be carried out by a team composed of multidisciplinary members. The ideal clinical practice guideline includes nutritional, metabolic, and nonsurgical support before and after bariatric surgery [9]. The presurgical assessment performed by the psychiatrists involves the candidates' ability to understand the surgical procedure, make a responsible decision, and adhere

to postsurgical management. As a result, bariatric surgery candidates with psychiatric symptoms or a psychiatric diagnosis may have a higher risk of dropout prior to surgery [10]. The decision to turn down a bariatric surgery candidate remains controversial. Psychopathology of the candidate as a contra-indication to bariatric surgery can be absolute or relative, depending on the adhesiveness of the multidisciplinary team. More devoted involvement from mental health providers may improve the care quality and safety of bariatric surgery patients.

The high prevalence of psychiatric disorders in surgery candidates is gaining more attention than before. Studies from several countries show that around 40% of all bariatric surgery patients have at least one psychiatric diagnosis. Depressive disorders (dysthymic disorder and major depressive disorder), anxiety disorders (e.g., generalized anxiety disorder), and eating disorders (i.e., binge eating disorder) are the three commonest psychiatric diagnoses [11,12[■],13,14,15[■]]. Identification of these disorders improves the quality of perioperative management and helps predict the weight loss outcome after bariatric surgery. For example, a lifetime history of mood disorder implies poor weight loss [16]. In a follow-up study, patients with two or more psychiatric diagnoses were significantly more likely to experience weight loss cessation or weight regain after 1 year compared with those with less than two psychiatric diagnoses [17]. Eating pattern is also important in presurgical assessment. An absence of binge-eating behavior is associated with a favorable weight loss result after surgery [18]. Bariatric surgery candidates may be especially prone to eating-related disorders, internalized weight bias, and body shame [19]. Substance use disorder like alcohol abuse is another critical issue, as bariatric surgery candidates may have a greater lifetime risk of alcohol use disorders and a greater propensity to alcohol intoxication after bariatric surgery [20].

Apart from axis I disorders, personality factors also are associated with mood symptoms and eating behaviors among bariatric surgery candidates. Neurotic personality traits are associated with more concerns about body figure, binge-eating driven by stress, more depression and anxiety, and more negative coping reactions [21]. The presence of neuroticism deserves further evaluation and management. Bariatric surgery candidates are also likely to have had previous suicide attempts. Patients with a positive suicide history may have a greater BMI [22]. One of the possible explanations for the high suicide risk among bariatric surgery candidates is stigma. Overweight-related stigma may make an individual more vulnerable to social isolation,

and hence is associated with suicidal ideation and behavior [23]. Sexual abuse history is associated with poorer weight loss outcomes following bariatric treatment. Alcohol addiction, psychiatric comorbidities, and low-income status are highly associated with sexual abuse [24]. A physical abuse history, suicidal ideation, and psychiatric symptoms also are associated with sexual abuse or physical attack status in bariatric surgery patients [25].

Presurgical pharmaceutical and nonpharmaceutical management is suggested for bariatric surgery candidates in need of stabilizing the mental status. Cognitive-behavioral therapy (CBT) is effective in treating psychopathology regardless of the presence of binge eating disorder or degree of obesity. In a study of 3-month CBT program with twelve 2-h sessions before bariatric surgery, candidates' self-esteem, depression, and eating disorders were much improved especially in those with binge eating disorder [26[■]]. Though one study of presurgical group counseling had shown that group counseling failed to improve postsurgical adherence to weight loss management [27], it is still strongly suggested that presurgical counseling and psychoeducation be delivered to bariatric surgery candidates in various forms. In addition to the above management, physical activity may have a beneficial effect on psychopathology. Bariatric surgery candidates with physical activity of moderate-to-vigorous intensity for approximately 1 h per week are less likely to have depression or anxiety [28].

POSTSURGICAL OUTCOMES AND INTERVENTION

After bariatric surgery, mental health professionals need to regularly monitor the progress of weight loss and the occurrence or worsening of psychiatric symptoms. Postsurgical assessment and systematic follow-up are necessary to guarantee optimal weight loss and weight regain prevention [29]. The presence of depressive disorders after bariatric surgery may predict attenuated weight loss after treatment [30]. Several studies have implied improvement in psychopathology after bariatric surgery [30–33,34[■]]. In the meanwhile, pharmaceutical utilization and costs related to psychiatric treatment decrease after surgery [35], as the prevalence of depressive symptoms significantly decreases after bariatric surgery [30,32,33,34[■]]. Anxiety symptoms are not improved after surgery [30,32], but the psychiatric course of stable bipolar disorder is not altered after surgery, either [36]. The frequency of axis I disorders in bariatric surgery patients decreases significantly after surgery, and the improvement seems independent of the degree of weight loss [13].

More recent studies point out the tendency of improved cognitive function after bariatric surgery. Memory improvement in bariatric surgery patients is noted after 12 months [37]. In a 36-month follow-up study, attention improved up to 24 months; executive function improvement peaked at 36 months; and memory improvement was short term and maintained at 36 months [38[■]]. Postsurgery cognitive function is important because it may predict future weight loss [39,40]. Better cognition helps weight loss as cognitive function is associated with adherence to the postsurgical guidelines dealing with diet, exercise, and other lifestyle changes [41,42].

Suicide attempts and risk of completed suicide among bariatric surgery patients deserve much attention in the follow-up period. In a 10-year follow-up study, bariatric surgery patients as a group had excessive suicides compared with their age and sex-matched counterparts [43]. A later meta-analysis demonstrated that the suicide rate after surgery was lower, but provided more substantial evidence that bariatric surgery patients have higher suicide rates than the general population [44[■]]. There seems to be a positive association between obesity and suicide, but some studies do not favor this association [45]. Unlike other psychopathologies that improve after bariatric surgery, suicide risk remains high and warrants long-term supervision.

Psychotherapy such as behavioral-motivational nutritional education or behavioural psychotherapy may improve depressive symptoms after bariatric surgery. This improvement in depression can then lead to more ideal weight loss [46[■],47]. Obese patients receiving weight management services can achieve better psychosocial health [48]. It is reasonable to expect a better quality of life for bariatric surgery patients if more weight loss is achieved.

CONSIDERATIONS FOR SPECIFIC POPULATIONS

Like the adult population, obese adolescents also have high rates of psychopathology. However, the youth population may have different causes. Childhood experience of parental loss is associated with metabolic syndrome [49]. Early parental loss may also play a role in the development of obesity in bipolar II individuals [50]. After bariatric surgery, adolescents may experience marked improvement in depressive symptoms, binge eating, and quality of life. Intrafamilial conflict, on the other hand, may hamper weight loss after surgery among youth [51]. Around 30% of adolescent bariatric candidates are reported to have axis I disorders. Comprehensive presurgical evaluation and postsurgical monitoring

of psychosocial issues are needed [52^{*}]. School problems and cognitive impairment are found to be associated with increased BMI among younger bariatric candidates. Therefore, improving academic support and deficiencies in educational systems for obese students is necessary to make the assessment and intervention complete [53].

As of now, no specific guideline has been proposed for the older obese population. A framework with a person-centered approach that emphasizes individual needs as well as psychosocial and cognitive concerns has been suggested [54]. Most presurgical and postsurgical principles recommended for the general population seem applicable to older obese patients, as well. Older bariatric patients have not presented a higher psychological risk after bariatric surgery [55]. Whether older age is associated with a worse prognosis in body weight loss is not known. More research is needed to provide valid recommendations for the presurgical evaluation and postsurgical follow-up of older patients [56].

The role of sex in obesity and bariatric surgery is another unsolved issue. One study found no significant difference in weight loss between men and women after bariatric surgery [57]. Another study indicated that men and women differ significantly in terms of suspected psychosurgical risk factors like depression and anxiety. Assessments of bariatric surgery candidates should recognize that men and women have different baseline risk factors, and the reported results should be separated by sex [58]. For example, female bariatric surgery candidates with infertility may be more psychiatrically vulnerable than other bariatric surgery patients. These candidates receive less psychiatric treatment than their counterparts [59].

UNSOLVED PROBLEMS

Studies related to the effectiveness and adverse effects of pharmacotherapy for the psychiatric comorbidities of bariatric surgery patients are still needed. At the same time, the mechanism of obesity and food addiction needs further exploration to provide a robust basis for development beyond the present knowledge of dopamine and food addiction. In previous studies, the mesolimbic and nigrostriatal dopamine systems were thought of as mechanisms that contribute to food addiction. Though it is often stated that mesolimbic dopamine mediates reward, there is no standard technical meaning of this term. Moreover, dopamine transmission is consistently linked to pleasure or hedonia, instead of motivation or learning. Furthermore, compulsive food intake and binge eating will be considered from an evolutionary perspective

involving adaptive patterns of food consumption and seeking behaviors [60,61^{*}].

Genetic susceptibility to obesity and the possible neurogenetic linkage between obesity and psychopathology are in need of clarification. The term 'Reward Deficiency Syndrome' (RDS) is used to describe behaviors associated with gene-based hypodopaminergic function and may be useful to help expand understanding of broad obsessive, compulsive, and impulsive behaviors. The newly developed concept of natural dopamine D2 receptor agonist therapy with testing of a panel of reward genes, the Genetic Addiction Risk Score, may serve as a springboard for novel approaches to the prevention and treatment of RDS [62].

And last, obesity is independently associated with cognitive impairment, increased risk of dementia, and regional alterations in brain structure. Bariatric surgery is effective in combating obesity and findings suggest that it may improve cognitive function in obese patients. Whether it is possible for bariatric surgery to reduce the risk of Alzheimer's disease is becoming a popular issue and deserves further study [63].

CONCLUSION

Bariatric surgery has been consistently shown to be effective in long-term marked weight loss and in bringing significant improvement to medical comorbidities. We have found a substantially high prevalence of psychiatric disorders among bariatric surgery candidates. Depressive disorders, anxiety disorders, and binge eating disorder are the most common diagnoses. Part of the psychopathologies before surgery may be attenuated after surgery, though the mechanism is not clarified. In the presurgical evaluation, suicide risk and factors associated with weight loss should be included. If available, pharmacotherapy and psychotherapy are recommended to improve the adherence to treatment guideline and surgical outcome. However, the risk of suicide and unsuccessful weight loss in some bariatric surgery patients make monitoring following surgery as important as careful assessment and management before surgery. Future research may need to deal with specific considerations for youth and older populations in bariatric surgery, effectiveness of psychopharmacotherapy in bariatric surgery patients, and the underlying pathophysiology pinning mental disorders and obesity.

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Conflicts of interest

The authors report no conflicts of interest.

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