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/m\textsuperscript{2} with severe obesity-related comorbidity and for those with BMI greater than 40 kg/m\textsuperscript{2} with or without comorbidity [2]. Jejuno-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.

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 adheriveness 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,
Several studies have implied improvement in psychiatric symptoms after 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 nonpharmacological 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
be considered from an evolutionary perspective. More, compulsive food intake and binge eating will be considered instead of motivation or learning. Further, 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.

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.

**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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Psychiatry, medicine and the behavioral sciences

Conflicts of interest
The authors report no conflicts of interest.

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