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REVIEW

What Happens to Patients with Bipolar Disorder after Bariatric Surgery? A Review

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Abstract

Bipolar disorder (BD) patients are at high risk of obesity, which affects their quality of life (QOL). Since there is a high comorbidity between BD and obesity, most BD patients seek surgical intervention for obesity. Nowadays, bariatric surgery (BS) is considered appropriate for carefully selected patients with BD. Evaluations before performing BS and careful follow-up of patients with the bipolar spectrum are highly recommended. This study reviews the effects of BS on the course of BD and, at the same time, assesses the effect of BD on the consequences of the surgery. Our results showed that the number of studies approving the promising impact of surgery on BD was more than those disapproving it. However, more accurate results require more than 3-year follow-ups.

Keywords Bariatric surgery · Bipolar disorder · Outcome

Introduction

Bipolar disorder (BD) is a severe and chronic mood disorder characterized by a change between depressive episodes, mania, hypomania, and mixed state with a prevalence of 2.4% in the general population [1].

It is well established that approximately 68% of people with BD are obese, and most of them suffer from cardiovascular diseases, type 2 diabetes mellitus, and dyslipidemia [2–4]. Several factors affect the weight of BD patients, including the use of mood-stabilizing medications and atypical antipsychotics, a higher rate of eating disorders comorbidity, increased appetite, and inactivity associated with depressive episodes [2, 5, 6].

Obesity is referred to body mass index (BMI) above 30; overweight, to BMI = 25–29.9; and morbid obesity is referred to BMI above 40 [3]. The treatments of obesity include primary prevention, dietary and behavioral modification, medication, and bariatric surgery (BS) [7, 8]. Generally, BS is proposed for patients with BMI > 35 kg/m^2 who suffer from at least one or more obesity-related co-morbidities and patients with BMI ≥ 40 with or without comorbidity [9].

Obesity in psychiatric patients, including those with BD, has been associated with a decrease in the quality of life (QOL) and satisfaction; therefore, treatment of obesity in these patients must be taken into account [10]. There is some evidence that offers BS as the most effective method of treatment for morbid obesity. About 1.5–3.4% of candidates for BS are diagnosed with BD (BD1, BD2, and cyclothymic disorder) [11]. Some studies have shown that BS plays an important role in the course and outcome of BD in addition to its effect on weight and improving physical conditions [12].

Bipolar spectrum disorders are not an absolute contraindication to BS, but little is known about the outcome of patients with bipolar spectrum after surgery, and data on the consequences of surgery are limited [11]. As there are some scattered evidence on the interaction between BD and BS, we intended to collect and compare data on each and obtain more focalized results.

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Definition and Prevalence of BD

BD is a severe and chronic affective disorder, characterized by alternating episodes of depression, mania, hypomania, and mixed states [1]. The lifetime prevalence of BD ranged from 0.1 to 7.5%, whereas lifetime prevalence of bipolar spectrum disorders (BD1, BD2, cyclothymic disorder, and BD not otherwise specified) ranged from 2.4 to 15.1%. Differences in the rates of BD and bipolar spectrum disorders may be related to the sub-threshold criteria upon diagnosis [13].

Definition and Prevalence of Obesity and Selective Treatments

Abdominal obesity in the USA is described as a waist circumference of more than 88 cm in women and more than 102 cm in men [3]. Recent results published in 2015 showed a global obesity prevalence of 12% in adults, which amounts to 604 million individuals with obesity in the world [14].

Overweight and obesity prevalence has been increased among all ages and both sexes of the Iranian population (the country in which this study was conducted) consistent with the worldwide growing reports. The range of obesity prevalence among Iranian adults was 12.6–25.9% [15]. Obesity has been considered as a public health problem worldwide, as in Asia. Moreover, it is well demonstrated that Asian populations have an elevated risk of type 2 diabetes, hypertension, and hyperlipidemia at relatively low levels of BMI, compared with Europeans [16].

The etiology of obesity is multifactorial and several factors, including genetic, environmental, behavioral, cultural, and psychosocial, are involved in its onset and development [9]. Obesity is associated with premature death and increased risk of common medical conditions including type 2 diabetes, cardiovascular diseases, dyslipidemia, hypertension, cognitive impairment, and dementia, as well as many cancers [3, 16].

As mentioned before, surgery is one of the treatments for obesity. According to the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) annual report of all submitted bariatric surgeries, the most usual methods of metabolic surgery are sleeve gastrectomy operations (46.0%), Roux-en-Y gastric bypass operations (38.2%), one anastomosis gastric bypass procedures (7.6%), and gastric banding operations (5.0%) [17].

BS causes weight loss via a combination of restrictive (LSG and LAGB), malabsorptive (biliopancreatic diversion), and mixed (Roux-en-Y gastric bypass—RYGB) procedures [18].

Obesity and BD Correlation

Among obese patients seeking BS, lifetime affective disorders were the most frequent condition (total = 64.9%; BDs = 35.6%; and depressive disorders = 29.3%) [19]. A bipolar spectrum disorder was found in 89% of severely obese patients, with the highest prevalence rates reported in BD2 patients [6]. A study in 2011 confirmed the correlation between obesity and BD and found that losing parents at an early age plays an important role in causing obesity in people with BD2 [20]. Some factors involved in obesity development in these patients include comorbid binge-eating disorder (BED), some depressive episodes, treatment with medications causing weight gain (such as atypical antipsychotics and mood stabilizer agents) excessive carbohydrate consumption, and low rates of exercise [21], although weight abnormalities occur in medication-naive patients [3]. In addition, depressive episode, which is more prevalent in individuals with BD, is associated with weight gain, possibly due to increased emotional eating, decreased behavioral self-management, and decreased motivation to change behavior [11].

Giahia et al. concluded that obesity in patients with a major depressive episode may indicate a sign of BD. This relationship is particularly more significant in severe forms of obesity and is likely to indicate an association between the bipolar spectrum, addictive behaviors, and severe obesity [22].

Obese BD patients also report more impairment in health-related quality of life (HRQOL) than similar patients who are not obese [10]. Furthermore, in BD patients, higher BMI is associated with poorer prognosis, polypharmacy, longer duration of illness, and greater disability [2]. The challenge of treating obesity may be greater for people who are consuming psychotropic drugs [10]. It is a great issue for patients with severe and chronic mental disorders taking antipsychotics to eat less and exercise more, while their medications increase appetite, fatigue, and lethargy, and the disease itself decreases motivation, limits interaction and social activities, and puts them in an impaired cycle [10]. Regarding the high correlation between BD and obesity, it is not surprising that patients with BD look for the surgical option to treat obesity [1]. The prevalence of BD in patients seeking BS ranges from 0.4 to 1.7% for recent BD to 3.5% for lifetime BD [2, 23, 24]. According to the study carried out by Semanscin et al., mood disorders are more common in patients treated with LSG. In the assessments, 43.1% of patients had current mood disorders, and 62.5% had a lifetime conditions of mood disorders. Among patients with mood disorders, 5.9% had current BD and a lifetime history of BD [25]. Obesity is correlated with a poorer outcome in patients with BD1. Preventing/treating obesity in BD patients could decrease mortality associated with physical illness in the field of obesity, enhance psychological well-being, and possibly improve the course of bipolar illness [26].

Psychiatric Evaluations in Patients before BS

A successful outcome for BS is largely dependent on patients' ability to compromise with postoperative behavior

fluctuations. In addition to a standard psychiatric interview, it is better to design assessment of specific behavioral components to this surgery [27]. There is a general consensus that a psychiatric disorder per se should not be an exclusion criterion for BS. Nevertheless, there may be psychiatric reasons to delay or deny surgery [28].

Although BD was previously considered as a contraindication to BS, further experience suggests that it may be a viable option for carefully selected patients [3]. Compared with behavioral and pharmacological weight-loss interventions, BS leads to more permanent weight loss. Recent guidelines suggest that preoperative psychosocial assessments are crucial for all patients, especially for those recognized or suspected for psychiatric disorders [1, 3, 16]. The high prevalence of psychiatric disorders in surgical candidates requires more attention than given before [7]. For patients with BD, this evaluation may include an assessment of the severity of symptoms, adherence to treatment, knowledge about surgery, potential issues with drug absorption, and switching the patient's medication to an agent with less weight gain liability [1, 3]. The evaluating clinician plays a significant role in the multidisciplinary treatment of BS [29, 30]. Moreover, psychosocial factors play a significant role in the long-term consequences of BS, including emotional adaptation, adherence to the recommended postoperative lifestyle regimen, weight loss outcomes, and improvement in comorbidities [29].

It seems that non-adherence to treatment is the main issue after surgery. In one study, researchers reported non-adherence to behavioral recommendations, including snacking (37%), drinking soda (2%), not taking vitamins (11%), and not exercising (41%) [31].

Since adherence to treatment and care after surgery is very important in the outcome of surgery and the rate of adherence to treatment in bipolar patients is usually low, it is necessary to strengthen the adherence of these patients before surgery. Psychotherapeutic approaches to improve adherence before BS in these patients including psycho-education, cognitive-behavioral therapy, family interventions, and group therapy [32] are recommended.

The most common reasons for delaying or rejecting BS are prominent psychopathology (psychosis or BD), untreated or ongoing depression, lack of understanding of postoperative risks and requirements, active eating disorder, and active substance abuse disorder [27, 30]. Accordingly, it seems that psychiatrists' decision in recommending BS for patients with the bipolar spectrum is highly variable, and there is no clearly defined guideline for defining suitable or unsuitable patients with the bipolar spectrum for surgery [11].

However, the main goal in the psychiatric evaluation of all patients is to determine if they would be able to manage postoperative challenges [33].

Psychiatric Outcomes after BS in BD Patients

In addition to its effect on improving physical symptoms, BS plays a crucial role in the course and outcome of BD [12]. In a qualitative descriptive study in 2020, patients with a history of BS and concurrent severe depressive disorder, BD, or schizoaffective disorder were asked about their experiences of BS and its outcomes using semi-structured interview schedules. Participants benefited from BS and felt it should be offered to others with mental illness, but with additional care and support [34].

In recent decades, HRQOL and psychological function have been considered as the indicators of BS consequence. Burgmer et al. found a significant improvement in depressive symptoms with the peak of weight reduction within the first year after surgery. There was a significant association between weight loss and remission of depression symptoms. Although, along with weight gain, psychological improvement slows down, there will be no significant reduction over time [35]. If it seems that weight loss is associated with a decrease in psychological scores, it is very difficult to conclude that psychological parameters before BS predict weight loss [36]. It is well documented that improvement in psychopathology after BS has been achieved [9, 37]. Unlike anxiety disorders, the point prevalence of post-BS depression is significantly reduced. Hence, the presence of post-BS depression also predicts poor postoperative outcomes and might be a warning because it requires clinical attention [38]. Some studies reported that the psychiatric course of stable BD did not change after surgery [9, 39]. For instance, two studies examined the psychiatric consequences of patients undergoing BS and reported that the psychiatric status after surgery did not show a significant decline in symptoms in the first year after surgery [40, 41]. Obesity surgery studies in patients with severe psychiatric disorders have mainly concentrated on BD. In one comprehensive study, 144 severely obese patients with BD who were exposed to bariatric surgery and the 1440 matched unexposed patients with BD were compared and monitored for 2 years. Surgical interventions were not significantly associated with the risk of psychiatric hospitalization or changes in outpatient visits for psychiatric services [40]. In one study, BS caused an increase in symptoms of depression or mania due to vomiting or impaired absorption of the drug after surgery [42]. Nepal et al. reported a case with the onset of primary mania within 2 months after BS [43]. In a non-controlled study by Shelby et al., out of the 7 patients with BD after surgery, 6 patients suffered from symptom relapse and needed medication. In just one patient, the exacerbation of the disease was directly related to drug malabsorption, and 6 patients required psychiatric hospitalization [41]. It should be noted that patients with BD require precise monitoring after surgery to find early signs of symptoms in favor of the recurrence of depression or mania. On the other hand, psychotropic drugs impose metabolism

Table 1 Bipolar disorder course after bariatric surgery

Reference	Study features	Effects of BS on BD course	Recommendation(s)
Yen YC et al. 2014 [9]	Reviews changes in psychopathologies after surgery.	Several studies have implied improvement in psychopathology after BS.	-
Hayden MJ et al. 2014 [39]	Prospective observational study explored psychiatric co-morbidities and weight loss outcomes in 204 gastric banding surgery candidates.	Bipolar patients remained stable over the 2 years.	Those with current axis 1 disorders should not be excluded from bariatric surgery.
Ahmed AT et al. 2013 [40]	A matched cohort study of 144 severely obese patients with BD who underwent BS and 1,440 matched control patients with BD.	BS did not affect psychiatric course among stable patients with BD.	Patients with BD who have been evaluated as stable can be considered for BS.
Shelby SR et al. 2015 [41]	Medical record review ($N = 1{,}500$) information was gathered on changes in psychiatric status post-surgery.	Exacerbation of BD occurred after BS.	It should not be assumed; exacerbations in symptoms are negative outcomes due to the BS itself. May be because of fluctuations of BD.
Nepal H et al. 2015 [43]	Case report of primary mania following BS.	Diagnosis of primary mania was made after considering several differential possibilities.	-

BD bipolar disorder, *BS* bariatric surgery

changes for patients with BD after BS, and a reduced absorption of mood stabilizers or antipsychotics can lead to relapses (maniac or depressive phases); therefore, alteration in dosing may be required [44]. Preliminary evidence published to date suggests that psychiatric medications do not have a negative impact on short-term weight loss or health-related quality of life outcomes among postoperative bariatric patients. There are insufficient data on specific psychiatric medications and long-term impact on weight loss and psychosocial outcome [45]. Auranj et al. suggested that BS drops down the prevalence, frequency, and severity of depressive symptoms, for several reasons: first, weight loss improves body image and self-confidence and interpersonal communication; second, changes in digestion and intestinal absorption after surgery may alter brain biochemical signals; and third, patients in the depressive phase may recover spontaneously without association with surgery [8].

Bipolar disorder course after bariatric surgery of the mentioned studies is summarized in Table 1.

Surgery Outcomes in BD Patients

Studies that have investigated the effect of preoperative psychiatric diagnoses on BS consequences have controversial findings; they often suggest a worse consequence for obese patients with psychiatric comorbidities [7, 25]. The roles of psychological factors in the consequences of BS seem contradictory. While some studies have found that people with psychiatric disorders have less weight loss, some others have reported that there is no link between two or even more psychiatric comorbidities and weight loss [7, 16].

Some studies have shown no significant difference in postoperative outcomes among the bipolar group compared with the control. For instance, Fuchs et al. found that patients with psychiatric comorbidities lost their weight similar to patients without any psychiatric history. Even patients with severe disorders such as BD and schizophrenia did not differ in weight loss during the 12 months after surgery [7].

Similarly, Hayden et al. reported that psychopathology before BS did not have a negative effect on weight loss consequences. However, rates of BD and schizophrenia were low within the study population, remained stable for more than 2 years, and did not influence post-surgical follow-up attendance [39].

In a study by Friedman et al., patients with BD participated in the follow-up care (medical and behavioral) at a similar frequency of those without psychiatric disorder during the first year after surgery, but from the second year onwards, the frequency of their visits to the doctor decreased [11]. In addition, there were very few patients with BD who did not carry out follow-up, and there was no significant difference between this group and the control group [40]. Out of patients undergoing Roux-en-Y gastric bypass surgery, BD patients had successful weight loss, which was not different from patients with other psychiatric or non-psychiatric disorders. Despite the high clinical contradictions, morbidly obese patients with BD, who are controlled and treated appropriately, should be considered appropriate candidates for BS using proven criteria to assess risks [46]. Laurne Thomson et al. indicated that

patients with a history of complex psychiatric disorders did not differ significantly from their counterparts with other psychiatric disorders or without psychiatric disorders in total weight loss within 1 year after BS, and while psychiatric illness does not have an impact on physical HRQOL, severe psychiatric illness such as bipolar disorder may contribute to declining mental HRQOL following surgery [47].

Moreover, several studies showed a poorer surgical consequence in BD patients. Some studies showed that both pre- and postoperative depressive disorders were negatively associated with postoperative weight loss during 24–36 months of follow-up [38].

Similarly, Kalarchian et al. reported that poorer outcomes of surgery were observed among patients with at least one axis 1 psychiatric disorder, especially preoperative anxiety and mood disorders [48]. The weight loss difference among patients with and without a history of lifetime mood disorders at the first, ninth, and 12th months of follow-up was significant. However, when patients with BD were excluded from the analyses, the difference was not statistically significant. Patients with current mood disorders (depression and BD) at the time of assessment had lower excessive weight loss (EWL%) than patients without psychiatric diagnosis in the first, third, sixth, and ninth months, wherever this difference was significant even after exclusion of patients with a diagnosis of BD. Patients with current depressive disorder also had lower weight loss at the first, third, ninth, and ninth months during follow-up in comparison with patients without psychiatric disorders [25].

The possible explanation for why patients with BD had less weight loss is impulsivity, a key feature of BD, which may have disallowed them from accepting post-surgery treatment according to the guidelines [25, 44]. In addition, lithium, a common drug in the treatment of BD, has negative effects on memory and cognitive processing [49]. Cognitive complications in patients with BD due to medications can cause problems in receiving postoperative diets according to the guidelines [25]. After BS, mental health professionals should regularly monitor the progress of weight loss and the occurrence, recurrence, or worsening of psychiatric symptoms [50]. Also, in post-bariatric patients depending on the type of procedure, some pharmacokinetic changes occur. Therefore, psychotropic drugs dose adjusting is essential, but literatures regarding psychotropic pharmacokinetic changes in post-BS patients are scant. One way to monitor is checking the plasma level to determine the effects of the procedure on the agent [51]. Postoperative evaluation and systematic follow-up are necessary to ensure optimum weight loss and to prevent weight gain [50].

Studies related to bariatric surgery outcome in bipolar disorder patients are represented in more details in Table 2.

Conclusion

Although bipolar spectrum disorders are not the absolute contraindication for BS, there is little knowledge about the specific consequences for patients with BD after surgery. Moreover, there is little empirical data on the results of psychological assessments of BD patients. There seems to be even little information about the characteristics of patients with BD who are approved by mental health care providers for BS and those who do not. Among patients with bipolar spectrum, who were approved for and obtained BS, the data on the consequence of surgery are limited [11]. On the other hand, patients with severe mental disorders, including BD, are screened before being referred for BS and are excluded from published studies [8]. However, lower attendance of patients with bipolar spectrum disorders at follow-up visits and relatively small sample size reduce the ability to interpret weight loss outcomes in this group and need further studies in the future [11]. Also, most studies have limited their results to weight loss outcome and have not paid much attention to effects of obesity surgery on QOL, medical comorbidities, life satisfaction, psychological well-being, and psychiatric symptoms [52]. Hence, while collecting data in this regard, we also looked at the consequences of BD after BS.

Due to the high prevalence of obesity among people with BD and the tendency of this group to use BS as an effective treatment option for weight loss, recent studies have shown that BS in this group of patients is not considered as an absolute contraindication, and health systems need to ensure equitable access to bariatric surgery for these patients, while monitoring for psychosocial issues after surgery. Yet, according to the present review study, it is recommended that

1. Psychiatric evaluations should be done in this group before BS, especially in terms of compliance and appropriate cooperation to follow the recommended diets according to guidelines after surgery. Also, regular post-surgery monitoring to ensure successful results is necessary both in the short and long terms after surgery. Also, the patients need additional care and support from multidisciplinary postoperative teams and their families to achieve better HRQOL similar to non-psychiatric patients. To follow up this group better, especially after the first year of surgery, regular phone calls can be made with the patient or his family to remind and encourage patient to continue follow-up.
2. In general, despite ambiguous findings on the consequences of BD after surgery, most studies maintain improvement or no change in the course of BD after BS, especially in the first year after surgery; only in two studies depressive symptoms relapsed or recurrence of mania were reported after surgery.

Table 2 Bariatric surgery outcome in bipolar disorder patients

Reference	Study features	Effects of BD on BS	Recommendation(s)
Semanscin-Doerr DA et al. 2010 [25]	Patients with and without lifetime and current mood disorders were prospectively followed up after LSG ($N = 104$).	Patients with current mood disorders (i.e., depressive and bipolar disorders) had lower %EWL after LSG.	Patients with a history of mood disorders might need additional pre- and postoperative care to improve their outcomes.
Hayden MJ et al. 2014 [39]	Prospective observational study explored psychiatric co-morbidities and weight loss outcomes in 204 gastric banding surgery candidates.	Weight loss in BD patients was found to be similar to those with no psychopathology.	Psychological evaluations should be utilized to prepare patients for upcoming challenges post-surgery and maximize weight loss outcomes.
Friedman KE et al. 2017 [11]	A retrospective record review (42 patients with BD who were approved for surgery were compared with 31 patients with BD who were not approved and to matched 29 control surgical patients without BD on a variety of characteristics and surgical outcomes).	BD patients were less likely to attend follow-up care appointments 2 or more years post-surgery but had similar weight loss at 12 months and at 2 or more years.	Carefully screened patients with BD who engage in long-term follow-up care may benefit from BS.
Ahmed AT et al.2013 [40]	A matched cohort study 144 severely obese patients with BD who underwent BS and 1440 matched control patients with BD.	BD patients had very low rates of loss to post-surgery follow-up.	-
Steinmann WC et al. 2011 [46]	A retrospective survey of RYGBP patient clinical records to assess weight loss outcomes.	In BD patients whot underwent RYGBP and had successful weight loss outcomes at 12 months similar to other groups.	Well-managed morbidly obese bipolar patients should be considered as suitable candidates for BS.
Thomson L et al. 2016 [47]	Prospective cohort study; 341 patients (CPH, NPD, OPD) were compared 1 year post-surgery in regard to %TWL.	No difference in %TWL or physical HRQOL across 3 groups, but CPH group had a decrease in mental HRQOL[10].	Reevaluate exclusion criteria to ensure equitable access to care, while continuing to monitor for psychiatric illness following surgery.
Kalarchian MA et al. 2008 [48]	Linear regression models to examine the relationship of psychiatric disorders to postoperative weight-related outcomes ($N = 207$).	Lifetime mood disorder was associated with a smaller decrease in BMI at 6 months post-surgery.	A greater duration of follow-up is needed to identify predictors of longer-term weight control.
Fuchs HF et al. 2016 [7]	Compare %EWL in patients with and without psychiatric comorbidities who underwent LSG or LAGB.	No significant difference in %EWL between the groups was found during follow-up.	%EWL can be achieved in patients undergoing LSG or LAGB despite the presence of well-controlled psychiatric comorbidity.

BD bipolar disorder, *BMI* body mass index, *BS* bariatric surgery, *CPH* complex psychiatric histories, *EWL* excess weight loss, *HRQOL* health-related quality of life, *LAGB* laparoscopic adjustable gastric banding, *LSG* laparoscopic sleeve gastrectomy, *NPD* no psychiatric disorder, *OPD* other psychiatric disorder, *RYGBP* Roux-en-Y gastric bypass, *TWL* total weight loss

3. Two comprehensive studies reported the poorer outcome of surgery in association with psychiatric diseases. In the case of BD specifically, the documents provided by five studies showed that BD does not have any effect on the outcome of BS and postoperative weight loss, mainly in the first year of follow-up. However, the rate of BD patient's adherence to follow-up visits decreased from the second year compared with that of controls. One study reported a minor outcome for BD patients (both lifetime and current), as well as other mood disorders after BS.

In a nutshell, the number of studies approving the poor consequence of surgery in BD patients and negative impact of BS on the course of BD is less than those disapproving this issue. However, due to the lower approval of patients with BD by mental health care providers for referral to surgery, more original studies are required in the future to investigate the effect and outcome of BS in patients with bipolar mood disorder.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval Statement This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Statement Informed consent does not apply.

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