Are There Psychiatric Diagnoses That Preclude Safe Bariatric Surgery?

10

Emily R. Fink and Leslie J. Heinberg

10.1 Introduction

Bariatric surgery candidates demonstrate a greater lifetime prevalence of psychiatric diagnoses as compared to the general population and non-treatment seeking patients with severe obesity [1]. Although there is evidence that some mental health conditions (e.g., depression, binge-eating disorder) initially attenuate following surgery [2–4], a growing consensus warns of the risk for long-term psychiatric complications primarily in the realms of suicide/self-harm and alcohol/substance use disorders [5–7]. Given that psychological factors may affect the safety and outcomes of bariatric procedures by impacting adjustment, adherence, and medical comorbidities, clinical practice guidelines recommend psychological evaluation of surgical candidates before and after surgery [8]. This chapter examines psychological diagnoses and factors demonstrated to increase risk for postoperative complications.

10.2 Search Strategy

A systematic internet search of three bibliographic databases (Academic Search Complete, Medline, and Psychological and Behavioral Sciences Collection) was used to identify English language primary research published electronically or in

E. R. Fink
Cleveland Clinic Bariatric & Metabolic Institute, Cleveland, OH, USA
e-mail: finke3@ccf.org

L. J. Heinberg (✉)
Cleveland Clinic Bariatric & Metabolic Institute, Cleveland, OH, USA

Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, USA
e-mail: heinbel@ccf.org

J. Alverdy, Y. Vigneswaran (eds.), *Difficult Decisions in Bariatric Surgery*, Difficult Decisions in Surgery: An Evidence-Based Approach,
https://doi.org/10.1007/978-3-030-55329-6_10

Table 10.1 PICO

Patients	Patients with a history of Major Depressive Disorder, Anxiety Disorder, Schizophrenia Spectrum Disorder, Bipolar Disorder, Alcohol Use Disorder, Substance Use Disorder
Intervention	Bariatric surgery
Comparator	Patients without a psychiatric history
Outcomes	Post-surgical readmission, medical complication or mortality; Post-surgical suicidal ideation/self-harm, ED visit for suicidal ideation/self-harm, psychiatric hospitalization or completed suicide; Post-surgical substance abuse or opioid use

print from 2014 to 2019 (Table 10.1). Terms used in the search were "depression," "bipolar," "anxiety," "PTSD," "post-traumatic stress disorder," "schizophrenia," "psychosis," "personality disorder," "axis II," "suicide," "suicidality," "cognitive impairment," "intellectual disability," "ADHD," "attention-deficit/hyperactivity disorder," "anorexia," "bulimia," "alcohol," "smoking," "tobacco," "substance abuse," "drug use" AND "bariatric surgery," "obesity surgery," "gastric bypass," "sleeve gastrectomy," "vertical banded gastroplasty" AND "complications," "adverse events," "mortality." For inclusion, we required that studies report associations between preoperative psychiatric diagnoses/self-harm events/substance use behaviors and bariatric surgery complications (i.e., mortality, morbidity, readmission, ED visit, psychiatric hospitalization, suicidality/self-harm, substance use) in the main aims or abstract of the article. Additional exclusionary criteria included dissertations, master's theses, qualitative studies, animal studies, pilot studies, case reports, research specific to body contouring or plastic surgery, and studies with less than 150 participants. Given the limited research meeting our criteria addressing Attention-Deficit/Hyperactivity Disorder (ADHD), Post-Traumatic Stress Disorder (PSTD), Intellectual Disability/Mild or Moderate Cognitive Impairment, Anorexia Nervosa, Bulimia Nervosa, and Personality Disorders, these diagnoses were not included in our analysis. Research involving smoking was identified by our search given relevance to substance use behaviors. However, Tobacco Use Disorder was exluded from our analysis as it is addressed in another chapter. A total of 28 studies meeting our criteria were classified according to the GRADE system.

10.3 Major Depressive Disorder (MDD)

Eight identified studies examined relationships between preoperative depression symptoms (including suicidality) and postoperative psychological complications. A 2018 prospective study of 284 bariatric patients from the Toronto Bari-Psych Cohort [9], identified lifetime suicidal ideation as the strongest predictor of post-surgical suicidal ideation in both univariate (ß = −2.47; 95%CI [0.03–0.25]; $p < 0.01$) and multivariate analyses (ß = −1.92; SE = 1.33; $p < 0.01$). This same study found that a past diagnosis of MDD significantly predicted post-surgical suicidal ideation in univariate analyses (ß = −1.34; 95%CI [0.09–0.74]; $p = 0.01$), but this relationship was not maintained in multivariate analyses. Similar results were obtained by a

second study identifying history of self-harm as predicting post-surgical suicidality in both univariate and multivariate models [10] and a third study demonstrating antidepressant use as a risk factor for post-surgical suicide attempt (AHR 2.41; 95%CI [1.89–3.06]) [11]. Though a fourth study [12] indicated that lifetime and recent history of suicidality and pre-surgery antidepressant use increased risk for post-surgical self-harm or suicidal ideation, this research retrospectively assessed pre-surgical suicidal ideation and reported missing data specific to suicidality. In a fifth study involving gastric bypass (GB) patients, those who received an ICD code for depression from inpatient or outpatient services within 2 years of surgery had over a 50-fold higher risk for post-surgical hospitalization for depression compared to those without a history of mood disorders [13]. Hazard ratio for psychiatric hospitalization for self-harm following surgery was likewise greater in those with a self-harm history. A pair of retrospective cohort studies utilizing data from the Western Australian Department of Health Data Linkage Unit records identified pre-surgical psychiatric hospitalization due to mood disorders as a risk factor for post-surgical hospitalization due to deliberate self-harm [14] and pre-surgical emergency room visit for suicidality, psychiatric hospitalization for deliberate self-harm, and psychiatric hospitalization for mood disorders as risk factors for postoperative ED visit for self-harm or suicidal ideation [15]. Lastly, a study found that a majority of self-harm events were committed by patients with depression diagnoses [16]. Given the relative consistency of findings across studies, there is evidence to suggest that preoperative depression involving self-harm or psychopharmacological treatment increases risk for post-surgical depression involving suicidality.

Interestingly, the relationship between depression and postoperative morbidity was mixed. One study identified preoperative depression as a significant risk factor for all-cause hospital readmission [17], while a second demonstrated associations between depression and early readmission that trended towards but did not reach statistical significance [18]. A third and fourth identified increased odds of readmission/post-surgical hospital days in those diagnosed with Major Depression or Bipolar Disorder [19] and severe depression or anxiety [20] respectively, but did not identify unique risks conferred by specific diagnoses. A fifth found no difference in pre-surgical depression between cohorts experiencing vs. not experiencing surgical complications, but excluded patients with a history of significant psychiatric concerns [21]. This is likely to be a limitation throughout the literature as those with severe psychiatric illness are less likely to progress to surgery. Though no significant relationship between baseline depression score and 30-day adverse events was identified in a sixth study [22], increased risk for short-term adverse events was found in those prescribed antidepressant medication (AOR = 1.76; 95%CI [1.02–3.04]; $p = .04$); mild to severe depression scores on a common screener also increased risk (AOR = 1.77; 95%CI [1.03–3.05]; $p = .04$), as compared to minimal depression scores, suggesting that severity of psychopathology should be considered in addition to presence of negative affect. Relationships between pre-surgical depression and post-surgical substance use were inconsistent [23–25]. As there was inconsistent evidence regarding depression-related risk for post-surgical mortality

or the link between depression and postoperative opioid use [26–29] conclusions cannot be made regarding these relationships.

10.4 Anxiety Disorder

Three studies published data regarding potential relationships between anxiety and post-surgical suicidality. A nationwide study of 8966 bariatric patients matched with non-surgical controls with obesity [11] identified pre-surgical anxiolytic treatment as a significant risk factor for post-surgical suicide attempt (AHR 3.37; 95%CI [2.62–4.31]), while a second identified history of hospitalization for neurotic disorder as a risk factor for postoperative psychiatric hospitalization for mood or neurotic disorder, but not self-harm [14]. A third study identified high prevalence of anxiety disorders in patients exhibiting pre-and postoperative self-harm events [16]. Given risks for bias related to assessment of anxiety, no evidence-based recommendations regarding these associations can be made.

Seven studies examining relationships between anxiety and post-surgical complications were likewise inconclusive. A retrospective study of 354 patients undergoing bariatric surgery demonstrated increased prevalence of 30-day readmission in those diagnosed with anxiety, as compared to controls (10.1% vs 3.7%, $p < .05$) [18]. A second study found that those with severe depression or anxiety were less likely to have zero hospital days at all post-surgical time points or ED visits at 1 and 2 year follow-ups [20], but did not identify risk specific to anxiety. Though 2 other studies found little evidence of pre-surgical anxiety-related risk for adverse events or readmission [19, 21], methodological limitations may account for absence of findings in one of these studies [21]. Findings regarding relationships between anxiety and post-surgical alcohol abuse/opioid use were inconsistent [23, 28, 29].

10.5 Bipolar Disorder and Schizophrenia Spectrum Disorder

Four studies in our analysis examined associations between serious mental illness (SMI) and post-surgical readmission. History of psychosis was identified as a risk factor for readmission following surgery (OR = 1.7; 95%CI [1.4–2.2]; $p < .001$) in a database of 22,139 bariatric patients [17]. A retrospective study of 354 patients similarly demonstrated increased prevalence of 30-day readmission in those diagnosed with bipolar disorder, as compared to those without a psychiatric history (45.5% vs 3.7%, $p < .05$) [18]. Two other studies identified groups of psychiatric diagnoses including SMI as contributing to risk for readmission, but did not document influences unique to specific diagnoses; the first identified that patients diagnosed with either Major Depressive Disorder or Bipolar Disorder had 46% greater odds of 30 day readmission ($p < .005$) as compared to those without these disorders [19]. In a similar fashion, a 2017 multi-site study [20] identified that those diagnosed with Bipolar Disorder, Schizophrenia or psychosis were less likely to have zero hospital days or ED visits at 1 and 2 year follow-up. Taken together, Bipolar

Disorder and Schizophrenia Spectrum Disorders are likely to be risk factors for readmission, potentially due to the negative impact on adherence behaviors. However, given the assessment of psychopathology in the current research, there are limited conclusions that can be drawn regarding the post-surgical impact of specific disorders.

One study, limited by poor follow-up, identified new persistent opioid users to be more likely to be diagnosed with Bipolar Disorder [29], while another demonstrated risk for anastomotic ulceration in those with a history of psychosis [30]. In the absence of corroborating evidence, no recommendations can be made regarding these specific associations.

10.6 Alcohol Use

Although previous literature has documented elevated rates of alcohol misuse in bariatric populations [6], few published studies meeting our criteria examined psychiatric characteristics that increase risk for postoperative substance abuse. In a multisite prospective study (LABS-2) [24], pre-surgical consumption of alcohol was found to increase risk for post-surgical AUD as compared to no alcohol consumption; hazard ratios were greater in those reporting alcohol consumption ≥2×/week (AHR 12.68; 95% [8.34–19.26]) rather than drinking <2×/week (AHR 2.96; 95% [2.17–4.03]), suggesting that risk for AUD increases with greater preoperative frequency of use. Pre-surgical AUD also increased risk for post-surgical substance abuse treatment. However, this study did not assess lifetime history of AUD; given this limitation, it is unclear the extent to which post-surgical AUD in this study reflected development of new abuse behaviors or AUD relapse. This finding was supported by another study indicating decreased odds for postoperative AUD in patients without baseline AUD or alcohol consumption [25]. Current guidelines recommend elimination of alcohol consumption following surgery in high risk groups [8]. In light of evidence suggesting high rates of new onset alcohol abuse in post-surgical bariatric populations [6], accurate prediction of surgical candidates at risk for post-surgical AUD remains a domain requiring further research.

Two other studies identified high prevalence of preoperative alcohol misuse in bariatric surgery patients who later developed AUD [23, 31]; however, as one of these studies also utilized the LABS-2 cohort, similarities in findings may be attributable to overlap in participants. Inconsistent findings with regard to the potential impact of alcohol misuse on mortality [26, 32, 33], precludes conclusions regarding these relationships.

10.7 Drug Abuse and Opioid Use

Few identified studies examined associations between pre-surgical substance use and post-surgical complications. One study of 22,139 patients followed by the New York State Planning and Research Cooperative System, identified nonspecific

substance abuse history as increasing risk for post-surgical readmission (OR = 2.0; 95%CI [1.1–3.5]; $p = .022$) [17]. A second study identified drug abuse as increasing likelihood for perforated ulceration (OR = 5.05; 95%CI [1.85–11.19]; $p = .0003$) [34], while a third, fourth and fifth provided preliminary evidence with regard to relationships between substance abuse and postoperative self-harm/suicidality [10, 15, 35]. In an examination of 157,559 GB patients, substance abuse was not significantly related to 30-day mortality [26]. Although several of these studies controlled for potential confounds, the majority failed to specify the type of substance abused prior to surgery or the manner by which this abuse was assessed. Given the imprecision of assessment of substance use, limited conclusions can be made regarding such associations.

With regard to post-surgical substance use, one study identified pre-surgical opioid use as a risk factor for new persistent opioid use, such that increasing days' supply magnified this risk (1–29 days OR = 1.89; 95%CI [1.24–2.88]; 30–59 days OR = 6.91; 95 %CI [4.16–11.47]; 60–89 days OR = 13.23; 95%CI [7.03–24.91]; 90–119 days OR = 14.29; 95%CI [6.94–29.42]) as compared with no use [28]. In other studies, no evidence of relationships were found between pre-surgical illicit drug use/abuse and post-surgical opioid use [29, 36], AUD [24] or substance abuse treatment [24].

10.8 Unspecified Psychiatric History

Two studies identified increased risk for postoperative self-harm associated with history of unspecified psychiatric diagnosis or service utilization [10, 12]. A third examining 2 Swedish cohorts with matched controls, [35] found evidence for increased risk for suicidality in surgery patients with and without a psychiatric history in one cohort, as compared to non-surgical controls; in the other cohort, patients without a psychiatric history experienced increased risk. Though this suggests that selection bias or the surgical procedure itself contributes to risk for postoperative self-harm, this study was limited by exclusion criteria involving certain psychiatric disorders and inconsistent assessment of psychiatric history across cohorts. Another study evaluated impact of multiple psychiatric diagnoses on likelihood of readmission [19], demonstrating that odds for post-surgical hospital care rose as the number of mental health diagnoses increased. Patients diagnosed with 1 psychiatric disorder possessed 31% greater odds for readmission (OR = 1.31; 95%CI [1.13–1.51]) compared to those without comorbidities, while patients diagnosed with 3 or more conditions possessed 59% greater odds (OR = 1.59; 95%CI [1.19–2.13]).

10.9 Conclusions and Recommendations

Pre-surgical depression involving self-harm, psychiatric hospitalization or antidepressant use increases risk for post-surgical suicidality; individuals reporting such a history should be monitored following surgery and may benefit from ongoing

Table 10.2 Evidence and recommendations regarding associations between preoperative psychiatric diagnoses and postoperative outcomes

Preoperative diagnosis	Association	Grade of evidence	Recommendation	Strength of recommendation
Major Depressive Disorder	Postoperative self-harm/ suicidality/ hospitalization for depression	Low	Monitor patients with a lifetime history of depression involving suicidality, psychiatric hospitalization, or antidepressant use for psychological complications during postoperative recovery.	Weak
SMI	Readmission	Very Low	Monitor patients with a lifetime history of Bipolar Disorder or Schizophrenia Spectrum Disorder following surgery.	Weak
Alcohol Use Disorder	Postoperative substance use	Very Low	Patients with a history of AUD should be provided psychoeducation on risk for post-surgical alcohol abuse and be monitored for relapse following surgery.	Weak

SMI Serious mental illness, *AUD* Alcohol use disorder

treatment to reduce risk of psychiatric complications (Table 10.2). Though limited, preliminary evidence suggests relationships between SMI and post-surgical service utilization. Individuals diagnosed with Bipolar Disorder or Schizophrenia Spectrum Disorders should be monitored for psychological complications that may negatively impact adherence after surgery. Patients with a history of alcohol use disorder should be provided psychoeducation on risk for relapse following surgery and may benefit from ongoing post-surgical monitoring. There is currently inadequate evidence for post-surgical risk associated with anxiety and substance use disorders although best practice would suggest the importance of stability prior to surgery and ongoing assessment and treatment.

10.10 Personal View of the Data

Bariatric surgery patients are more psychiatrically vulnerable than non-treatment seeking patients with severe obesity or the general population and psychiatric complications of suicide, self-harm and substance use disorders are of great concern. Our knowledge of outcomes is based on patients who were deemed psychiatrically stable and appropriate for surgery. The strength of the preceding associations may be greater if psychological evaluation and treatment were not a standard component of pre-surgical preparation. In making determinations about psychological candidacy for surgery, the risks of psychiatric complications must be balanced with the

myriad of health and quality of life benefits resulting from bariatric procedures. However, the preceding summary highlights the importance of ongoing monitoring and treatment of patients at higher risk rather than only utilizing psychological services preoperatively.

Recommendation Summary

1. Patients with a lifetime history of depression involving suicidality, psychiatric hospitalization, or antidepressant use should be monitored for psychological complications during postoperative recovery (Evidence quality low; weak recommendation).
2. Those diagnosed with Bipolar Disorder or Schizophrenia Spectrum Disorder should be monitored following surgery, with attention to psychological complications that might negatively impact adherence (Evidence quality very low; weak recommendation).
3. Patients with a history of alcohol use disorder should be monitored for alcohol misuse following surgery and may benefit from psychoeducation and/or relapse prevention treatment (Evidence quality very low; weak recommendation).

References

1. Mitchell JE, Selzer F, Kalarchian MA, Devlin MJ, Strain GW, Elder KA, et al. Psychopathology before surgery in the longitudinal assessment of bariatric surgery-3 (LABS-3) psychosocial study. Surg Obes Relat Dis. 2012;8(5):533–41. https://doi.org/10.1016/j.soard.2012.07.001.
2. de Zwaan M, Enderle J, Wagner S, Mühlhans B, Ditzen B, Gefeller O, et al. Anxiety and depression in bariatric surgery patients: a prospective, follow-up study using structured clinical interviews. J Affect Disord. 2011;133(1-2):61–8. https://doi.org/10.1016/j.jad.2011.03.025.
3. Karlsson J, Taft C, Rydén A, Sjöström L, Sullivan M. Ten-year trends in health-related quality of life after surgical and conventional treatment for severe obesity: the SOS intervention study. Int J Obes. 2007;31(8):1248–61. https://doi.org/10.1038/sj.ijo.0803573.
4. Nasirzadeh Y, Kantarovich K, Wnuk S, Okrainec A, Cassin SE, Hawa R, et al. Binge eating, loss of control over eating, emotional eating, and night eating after bariatric surgery: results from the Toronto Bari-PSYCH Cohort Study. Obes Surg. 2018;28(7):2032–9. https://doi.org/10.1007/s11695-018-3137-8.
5. Tindle HA, Omalu B, Courcoulas A, Marcus M, Hammers J, Kuller LH. Risk of suicide after long-term follow-up from bariatric surgery. Am J Med. 2010a;123(11):1036–42. https://doi.org/10.1016/j.amjmed.2010.06.016.
6. King WC, Chen JY, Mitchell JE, Kalarchian MA, Steffen KJ, Engel SG, et al. Prevalence of alcohol use disorders before and after bariatric surgery. JAMA. 2012;307(23):2516–25. https://doi.org/10.1001/jama.2012.6147.
7. Conason A, Teixeira J, Hsu CH, Puma L, Knafo D, Geliebter A. Substance use following bariatric weight loss surgery. JAMA Surg. 2013;148(2):145–50. https://doi.org/10.1001/2013.jamasurg.265.
8. Mechanick JI, Apovian C, Brethauer S, Garvey WT, Joffe AM, Kim J, et al. Clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergoing bariatric procedures–2019 update: cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology, The Obesity Society, American Society for Metabolic & Bariatric Surgery, Obesity Medicine Association, and American Society

of Anesthesiologists. Surg Obes Relat Dis. 2019 Nov 4 [cited 2019 Dec 30]. https://doi.org/10.1016/j.soard.2019.10.025. [Epub ahead of print].
9. Wnuk S, Parvez N, Hawa R, Sockalingam S. Predictors of suicidal ideation one-year post-bariatric surgery: results from the Toronto Bari-Psych Cohort Study. Gen Hosp Psychiatry. 2018 Nov 26 [cited 2019 Dec 30]. https://doi.org/10.1016/j.genhosppsych.2018.11.007. [Epub ahead of print].
10. Konttinen H, Sjöholm K, Jacobson P, Svensson PA, Carlsson LMS, Peltonen M. Prediction of suicide and nonfatal self-harm after bariatric surgery: a risk score based on sociodemographic factors, lifestyle behavior, and mental health: a nonrandomized controlled trial. Ann Surg. 2019 Dec 10 [cited 2019 Dec 30]. https://doi.org/10.1097/SLA.0000000000003742. [Epub ahead of print].
11. Thereaux J, Lesuffleur T, Czernichow S, Basdevant A, Msika S, Nocca D, et al. Long-term adverse events after sleeve gastrectomy or gastric bypass: a 7-year nationwide, observational, population-based, cohort study. Lancet Diabetes Endocrinol. 2019;7(10):786–95. https://doi.org/10.1016/S2213-8587(19)30191-3.
12. Gordon KH, King WC, White GE, Belle SH, Courcoulas AP, Ebel FE, et al. A longitudinal examination of suicide-related thoughts and behaviors among bariatric surgery patients. Surg Obes Relat Dis. 2019;15(2):269–78. https://doi.org/10.1016/j.soard.2018.12.001.
13. Lagerros YT, Brandt L, Hedberg J, Sundbom M, Bodén R. Suicide, self-harm, and depression after gastric bypass surgery: a nationwide cohort study. Ann Surg. 2017;265(2):235–43. https://doi.org/10.1097/SLA.0000000000001884.
14. Morgan DJ, Ho KM. Incidence and risk factors for deliberate self-harm, mental illness, and suicide following bariatric surgery: a state-wide population-based linked-data cohort study. Ann Surg. 2017;265(2):244–52. https://doi.org/10.1097/SLA.0000000000001891.
15. Morgan DJ, Ho KM, Platell C. Incidence and determinants of mental health service use after bariatric surgery. JAMA Psychiat. 2019 Sept 25 [cited 2019 Dec 30]. https://doi.org/10.1001/jamapsychiatry.2019.2741. [Epub ahead of print].
16. Bhatti JA, Nathens AB, Thiruchelvam D, Grantcharov T, Goldstein BI, Redelmeier DA. Self-harm emergencies after bariatric surgery: a population-based cohort study. JAMA Surg. 2016;151(3):226–32. https://doi.org/10.1001/jamasurg.2015.3414.
17. Telem DA, Talamini M, Gesten F, Patterson W, Peoples B, Gracia G, et al. Hospital admissions greater than 30 days following bariatric surgery: patient and procedure matter. Surg Endosc. 2015;29(6):1310–5. https://doi.org/10.1007/s00464-014-3834-x.
18. Jalilvand A, Dewire J, Detty A, Needleman B, Noria S. Baseline psychiatric diagnoses are associated with early readmissions and long hospital length of stay after bariatric surgery. Surg Endosc. 2019;33(5):1661–6. https://doi.org/10.1007/s00464-018-6459-7.
19. Litz M, Rigby A, Rogers AM, Leslie DL, Hollenbeak CS. The impact of mental health disorders on 30-day readmission after bariatric surgery. Surg Obes Relat Dis. 2018;14(3):325–31. https://doi.org/10.1016/j.soard.2017.11.030.
20. Fisher D, Coleman KJ, Arterburn DE, Fischer H, Yamamoto A, Young DR, et al. Mental illness in bariatric surgery: a cohort study from the PORTAL network. Obesity (Silver Spring). 2017;25(5):850–6. https://doi.org/10.1002/oby.21814.
21. Ho K, Hawa R, Wnuk S, Okrainec A, Jackson T, Sockalingam S. The psychosocial effects of perioperative complications after bariatric surgery. Psychosomatics. 2018;59(5):452–63. https://doi.org/10.1016/j.psym.2018.03.005.
22. Mitchell JE, King WC, Chen JY, Devlin MJ, Flum D, Garcia L, et al. Course of depressive symptoms and treatment in the longitudinal assessment of bariatric surgery (LABS-2) study. Obesity (Silver Spring). 2014;22(8):1799–806. https://doi.org/10.1002/oby.20738.
23. Mitchell JE, Steffen K, Engel S, King WC, Chen JY, Winters K, et al. Addictive disorders after Roux-en-Y gastric bypass. Surg Obes Relat Dis. 2015;11(4):897–905. https://doi.org/10.1016/j.soard.2014.10.026.
24. King WC, Chen JY, Courcoulas AP, Dakin GF, Engel SG, Flum DR, et al. Alcohol and other substance use after bariatric surgery: prospective evidence from a U.S. multicenter cohort study. Surg Obes Relat Dis. 2017;13(8):1392–402. https://doi.org/10.1016/j.soard.2017.03.021.

25. Ibrahim N, Alameddine M, Brennan J, Sessine M, Holliday C, Ghaferi, AA. New onset alcohol use disorder following bariatric surgery. Surg Endosc. 2019;33(8):2521–30. https://doi.org/10.1007/s00464-018-6545-x.
26. Benotti P, Wood GC, Winegar DA, Petrick AT, Still CD, Argyropoulos G, Gerhard GS. Risk factors associated with mortality after Roux-en-Y gastric bypass surgery. Ann Surg. 2014;259(1):123–30. https://doi.org/10.1097/SLA.0b013e31828a0ee4.
27. Sakran N, Sherf-Dagan S, Blumenfeld O, Romano-Zelekha O, Raziel A, Keren D, et al. Incidence and risk factors for mortality following bariatric surgery: a nationwide registry study. Obes Surg. 2018;28(9):2661–9. https://doi.org/10.1007/s11695-018-3212-1.
28. Raebel MA, Newcomer SR, Bayliss EA, Boudreau D, DeBar L, Elliott TE, et al. Chronic opioid use emerging after bariatric surgery. Pharmacoepidemiol Drug Saf. 2014;23(12):1247–57. https://doi.org/10.1002/pds.3625.
29. Smith ME, Lee JS, Bonham A, Varban OA, Finks JF, Carlin AM, et al. Effect of new persistent opioid use on physiologic and psychologic outcomes following bariatric surgery. Surg Endosc. 2019;33(8):2649–56. https://doi.org/10.1007/s00464-018-6542-0.
30. Spaniolas K, Yang J, Crowley S, Yin D, Docimo S, Bates AT, et al. Association of long-term anastomotic ulceration after Roux-en-Y gastric bypass with tobacco smoking. JAMA Surg. 2018;153(9):862–4. https://doi.org/10.1001/jamasurg.2018.1616.
31. Cuellar-Barboza AB, Frye MA, Grothe K, Prieto ML, Schneekloth TD, Loukianova LL, et al. Change in consumption patterns for treatment-seeking patients with alcohol use disorder post-bariatric surgery. J Psychosom Res. 2015;78(3):199–204. https://doi.org/10.1016/j.jpsychores.2014.06.019.
32. Weiss AC, Parina R, Horgan S, Talamini M, Chang DC, Sandler B. Quality and safety in obesity surgery-15 years of Roux-en-Y gastric bypass outcomes from a longitudinal database. Surg Obes Relat Dis. 2016;12(1):33–40. https://doi.org/10.1016/j.soard.2015.04.018.
33. Gribsholt SB, Thomsen RW, Svensson E, Richelsen B. Overall and cause-specific mortality after Roux-en-Y gastric bypass surgery: a nationwide cohort study. Surg Obes Relat Dis. 2017;13(4):581–7. https://doi.org/10.1016/j.soard.2016.10.007.
34. Altieri MS, Pryor A, Yang J, Yin D, Docimo S, Bates A, et al. The natural history of perforated marginal ulcers after gastric bypass surgery. Surg Endosc. 2018;32(3):1215–22. https://doi.org/10.1007/s00464-017-5794-4.
35. Neovius M, Bruze G, Jacobson P, Sjöholm K, Johansson K, Granath F, et al. Risk of suicide and non-fatal self-harm after bariatric surgery: results from two matched cohort studies. Lancet Diabetes Endocrinol. 2018;6(3):197–207. https://doi.org/10.1016/S2213-8587(17)30437-0.
36. King WC, Chen JY, Belle SH, Courcoulas AP, Dakin GF, Flum DR, et al. Use of prescribed opioids before and after bariatric surgery: prospective evidence from a U.S. multicenter cohort study. Surg Obes Relat Dis. 2017;13(8):1337–46. https://doi.org/10.1016/j.soard.2017.04.003.