

## Lifestyle, Depression and Metabolic/ Bariatric Surgery

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### ABSTRACT

Obesity alters brain structure and disturbs mood and cognition. Increase in BMI was associated with changes in white matter structures which may accelerate cognitive decline among obese individuals. Metabolic/bariatric surgery may be the last chance for good long-term weight-loss when conservative therapy did not produce results. Weight loss after metabolic surgery causes changes in self-perception and possible in inter-personal relationships. These changes may be mediators of different mental health outcomes such as depression. Different mental problems, mild, moderate or severe depressive symptoms and increase in self-harm are more prevalent in patients undergoing metabolic surgery in comparison with the general population. Some studies indicated that bariatric surgery is associated with long-term reductions in depression and anxiety, while the other studies have found elevated risk of major depression disorders. Increased risk for suicide after metabolic surgery may be explained by insufficient weight loss, weight regain, recurrence of obesity-related comorbidities or non-achieved life-changing effects after weight loss. Another issue is the five times higher risk of alcohol abuse after some types of the metabolic surgery.

**Keywords:** Anxiety; Depression; Obesity; Cognition; Metabolic/ bariatric surgery

### INTRODUCTION

Metabolic surgery as the most effective treatment for obesity is associated with decrease in prevalence of common psychiatric disorders, although modest or severe depression, suicide attempt or addiction could be worsened. Providing adequate information to patient about possibility of appearance or deterioration of depression after metabolic surgery, is required. Current guidelines suggested involvement of a psychologist or psychiatrist in bariatric team in order to recognize pre-surgical psychiatric disorders or post-surgical, new appeared mental disease.

Higher incidence of anxiety and depression was established among obese and individuals with eating disorders. It was postulated that obesity alters brain structure and disturbs mood and cognition due to metabolic problems, which may induce changes in nerve fibers. Rewarding processes by dopaminergic pathways play an important role in mechanisms that regulate human eating behavior. Sensitivity to natural rewards become weaker in conditions which decrease in dopamine receptors. Accumulation of fat in the body in obese persons may also has

an additional effect on brain function and on optimal body fat-to-muscle ratio. In a study among obese subjects where diffusion tensor imaging (DTI) were used, a lower number of fibers, alterations in integrity of connections and a reduced network clustering strength among the striatum nuclei and orbitofrontal cortex was found. Increase in BMI was followed by changes in white matter structures such as reduced myelin and increased water which may accelerate cognitive decline among obese individuals [1]. Metabolic treatments, including metabolic/bariatric surgery may be a viable therapeutic approach for mood disorders and may be the last chance for good long-term weight-loss when conservative therapy did not produce results [2,3].

Bariatric or metabolic surgery is “the operative manipulation of a normal organ or organ system to achieve a biologic result for a potential health gain” [4]. The first idea was that restriction of stomach volume could be useful for weight loss. Further evolution of bariatric surgery shown that it always had a beneficial metabolic effect probably due to a change in gastrointestinal anatomy and motility, gut hormones such as ghrelin, GLP-1, PYY, bile acid recirculation, changes in gut flora

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and in diet and behavior after the operation [5]. Surgeons have noticed a resolution of diabetes type 2, hypertension and hyperlipidemia, during follow-up period after the bariatric surgery. For that reason, the term “bariatric surgery” was often replaced with “metabolic surgery” [4,6]. From the beginning there were a few different procedures: restrictive, such as laparoscopic gastric banding (LGB) and laparoscopic sleeve gastrectomy (LSG), and on the other hand, restrictive-malabsorptive, such as Roux-en-Y gastric bypass (RYGB), mini gastric bypass (MGB), biliopancreatic diversion (BPD) and biliopancreatic diversion with duodenal switch (BPD/DS). All types of metabolic operation required well compliance of the patients regarding dietary habits and physical activity [4]. Protein deficiency with clinical manifestations such as hair loss, loss of lean body mass and peripheral oedema, may occur in the first few months after malabsorptive operations and requires protein intake from 60 to 120g/d. Ingestion of simple carbohydrates produces the dumping syndrome, very unpleasant feeling with nausea, weakness, sweating and fever. Recommendation for fat intake are similar as to a general population. Approximately 40% of patients undergoing RYGB or BPD/DS could have diarrhea and flatulence as well as steatorrhea followed by deficiencies in fat-soluble vitamins, copper, magnesium and zinc. Slowly swallowing and avoidance of gas-producing foods such as legumes and cauliflower may be good strategy in order to prevent this adverse event [5]. Some of malabsorptive procedures require lifelong mineral and vitamin supplementation besides lifestyle changes, and that may be too complicated and stressful for patients [7].

## DISCUSSION

Metabolic surgery has a significant impact on the mental state and is rightly considered that “metabolic surgery is cognitive surgery” [4]. Different mental problems, mild, moderate or severe depressive symptoms and increase in self-harm are more prevalent in patients undergoing metabolic surgery in comparison with the general population [8-10]. Positive correlation was established between depression and emotional eating habits, and negative correlation between severity of depression and restrictive eating regime [9]. In one study that include patients undergoing bariatric surgery five variables were investigated (severity of depression, diagnosis of major depressive disorder, history of suicide attempts, suicide ideation and severity of suicidality), while BMI was independent variable. Results indicated that self-esteem could explain the relationship between obesity and depression or suicidality. In addition, interventions including self-esteem may improve psychological outcomes among patients prepared for bariatric surgery [11]. Some studies indicated that bariatric surgery is associated with long-term reductions in depression and anxiety. The association between different types of bariatric surgery and mental health is still not clear [8]. One nationwide cohort study demonstrated that bariatric surgery improved depressive mood in a few postoperative years, but this improvement was not maintained. An elevated risk of major depression disorder (MDD), mainly after malabsorptive procedures, was found more than four years after surgery and authors speculated that long-term malabsorption and nutritional deficiency might be related to

MDD after bariatric surgery [12]. Pre-surgical history of common mental disorders such as anxiety, mood or eating disorders is unrelated to weight loss after bariatric/metabolic surgery. Exception is binge eating disorder which is associated with modestly weight loss after operation [13].

Another issue regarding bariatric surgery and mental health is suicide. One study evaluated suicide attempts one year after bariatric surgery and no suicide attempts were reported among 284 participants, while other investigations have demonstrated that a previous history of suicidal ideations was the most potent predictor of suicidal ideation one year after surgery [14,15]. Underlying mechanisms for increased risk for suicide are insufficient weight loss, weight regain, recurrence of obesity-related comorbidities or non-achieved life-changing effects after weight loss [8].

Suicide is rare, and there are no observational comparative studies on suicide in post-bariatric patients and non-surgical treated obese individuals [8]. Increased risk of self-harm and depression after surgery is also more often in patients who have a diagnosis of depression or self-harm before surgery [16].

Patients following malabsorptive bariatric procedures such as RYGB are in increased risk for alcohol and substance abuse besides depression and suicide attempting [17]. Alcohol intake resulted in higher blood alcohol level after RYGB, than before surgery. Those patients more easily could be intoxicated by other substance abuse. SOS (Swedish Observational Study) demonstrated that the risk of alcohol abuse was five times higher after RYGB than after sleeve gastrectomy [8].

Weight loss after metabolic/bariatric surgery causes changes in self-perception and possible in inter-personal relationships. These changes may be mediators of different mental health outcomes such as depression. Some of the patients reported differences between their objective post-surgical weight and their body image and they maintain persistent dissatisfaction with their body. Also, some patients experienced negatively judgement for their decision to have weight loss surgery by family or friends. Some of the operated patients were saddened by lack of recognition after excessive weight loss and they felt that they are no longer visible [18].

Although suicide and self-harm are relatively rare after metabolic surgery, change in mood and depression require that behavioral health clinicians with experience in pre and post-bariatric follow-up be involved in long-term postoperative evaluation. Psychosocial evaluation of bariatric patients may provide optimal surgical outcome [19-21].

## CONCLUSION

Metabolic surgery as the most effective treatment for obesity is associated with decrease in prevalence of common psychiatric disorders such as mild depression or anxiety, although modest or severe depression, suicide attempt or addiction could be worsened. Careful selection of patients for surgical treatment of obesity is very important for the desired outcome of therapy. Providing adequate information to patient about possibility of self-harm, appearance or deterioration of depression after metabolic surgery, is required. Current guidelines suggested

involvement of a psychologist or psychiatrist as a compulsory bariatric team member in order to recognize pre-surgical psychiatric disorder or post-surgical, new appeared mental problem.

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