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# Laparoscopic Sleeve Gastrectomy is Associated with Reduced Depressive Symptoms: A One-Year Follow-Up Study

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## Abstract

Nowadays obesity is considered to be one of the most important health issues worldwide, and is associated not only with significant physical disorders but also with psychosocial morbidity. Many studies have shown that bariatric surgeries are a proven, effective therapeutic intervention in cases of severe obesity. However, because the surgery is considered to be an invasive method, some concerns rise about its potential negative effect on patient's psychological health. Therefore, the objective of the present study was to evaluate the possible positive effect of laparoscopic sleeve gastrectomy on reducing depression symptoms. The results showed that the point prevalence of depressive disorders decreased significantly after surgery ( $p < 0.01$ ). The score on the depression scale we used significantly decreased after the laparoscopic sleeve gastrectomy. In summary, our findings speak in favor of a considerable improvement in a psychological aspect such as depressive symptoms in the course of the 1st year after the laparoscopic sleeve gastrectomy.

*Keywords:* bariatric surgery, depression, social implications; psychological implications.

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## Introduction

Today, obesity is considered to be one of the most important health issues worldwide, and is associated not only with significant physical disorders but also with psychosocial morbidity (Dixon, Dixon, & O'Brien, 2001; Tiggermann *et al.*, 2005; van Hout, van Oudheusden, & van Heck, 2004). For this reason, several modern treatments have been developed, including dietary interventions, prescribed medications, intragastric devices and bariatric operations. Many studies have shown that bariatric surgeries are a proven, effective therapeutic intervention in cases of severe obesity (Buddeberg-Fischer *et al.*, 2006). However, because the surgery is considered to be an invasive method, some concerns rise about its potential negative effect on patients' psychological health (Dymek *et al.*, 2002). As a result, to address these concerns, many experiments were conducted. Interestingly, the results of these studies showed that bariatric procedures significantly reduce anxiety, depression scores and quality of life in general (Mathus-Vliegen & de Wit, 2007).

As before mentioned, obese individuals suffer from psychosocial impairments. Studies have shown that individuals who suffer from obesity are more likely to have to deal with social discrimination, lower education, lower income and higher rates of unemployment when compared to the normal-weight population (Willett, Dietz, & Colditz, 1999; Sullivan *et al.*, 1993). These individuals also report higher levels of anxiety and depressive symptoms, impairment of physical functioning, public distress and a low self-esteem (Wadden *et al.*, 2006; Moore *et al.*, 1962; Herpertz *et al.*, 2006; Wadden *et al.*, 2001; Kolotkin *et al.*, 2001).

Studies show that for individuals who suffer from obesity grade 3 bariatric surgery is the proven, most effective way of treatment (Monteforte & Turkelson, 2000). After the bariatric operation patients present considerable weight loss and improvement of somatic co-morbidities (Christou *et al.*, 2004). However, the weight loss present after the bariatric surgery also helps improving mental health and psychosocial functioning (Dixon, Dixon, & O'Brien, 2001; Herpertz *et al.*, 2003; de Zwaan *et al.*, 2002). That is the reason why the positive outcome of a bariatric procedure should be measured not only in terms of weight loss but also should include the psychological status benefits that this procedure has (Ballantyne *et al.*, 2003). Therefore, the objective of the present study was to evaluate the possible positive effect of laparoscopic sleeve gastrectomy on reducing depression symptoms.

## Methods

The sample of this study was formed from 7 patients (4 men and 3 women), all Romanians, who were hospitalized for laparoscopic sleeve gastrectomy surgery in the Surgery Service, "Sf. Spiridon" Clinical Emergency Hospital in Iasi (Romania).

Patients who participated in this study self-reported by telephone the patient-administered version of the Montgomery-Asberg Depression Rating Scale (MADRS-S). This scale consists of 9 items administered assessing patients' mood, feelings of unease, sleep, appetite, ability to concentrate, initiative, emotional involvement, pessimism and zest for life. Each item is scored between 0 and 3, with three intermediate levels (0.5, 1.5, and 2.5). The total score is calculated by summing the answers of the nine items, ranging between 0 and 27 (higher scores indicate increased impairment). This scale was self-administered before and 12 months after the laparoscopic sleeve gastrectomy.

All patients from this study were operated through the laparoscopic sleeve gastrectomy procedure. The surgery involved a longitudinal resection of the stomach on the greater curvature from the antrum starting opposite of the nerve of Latarjet up to the angle of His. In the first part of the procedure was to divide the vascular supply of the greater curvature of the stomach, which was achieved with the section of the gastro-colic and gastro-splenic ligaments close to the stomach. Then, the greater curvature was completely freed up to the left crus of the diaphragm to completely resect the gastric fundus that harbours the ghrelin secreting cells of the stomach. The second part of the operation was the longitudinal gastrectomy that "sleeved" the stomach to reduce it to a narrow tube. A naso-gastric tube was used to obtain a precise calibration and to avoid stenosis of the gastric plasty. All patients treated by surgical intervention were given the same kind of dietary advice and were recommended to take a daily oral supplement containing vitamins and minerals.

## Results

### *Baseline Data*

At baseline, before patients underwent laparoscopic sleeve gastrectomy surgery, the mean of the patients regarding the depression scale was 4.25, with SD of 1.94. From all participants 38.8% scored below the cut-off score of the scale and were considered to be clinically depressed.

### *After 12 months data*

12 months after the laparoscopic sleeve gastrectomy the score mean regarding the depression decreased to 2.73 (SD=1.82). Furthermore, the laparoscopic sleeve gastrectomy also influenced the number of patients who scored under the cut-off score: only 17.7% of the patients were diagnosed as being depressed 12 months after the laparoscopic sleeve gastrectomy. The paired sample t-test analysis showed

a significant difference ( $p < 0.01$ ) between the depression scores before and after laparoscopic sleeve gastrectomy.

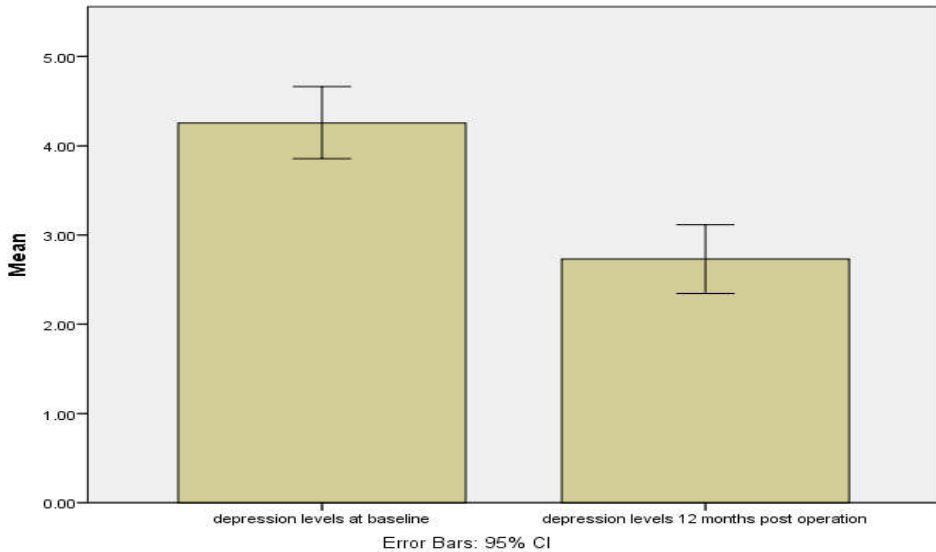


Figure 1. Changes in depression scores from baseline to 1-year follow-up in obese patients treated with laparoscopic sleeve gastrectomy

## Discussion

The aim of this study was to evaluate the course of depressive symptoms 1 year after bariatric surgery. This study investigated the course and the prognostic significance of preoperative and postoperative depressive disorders in extremely obese bariatric surgery patients in a prospective design with a self-reported depression scale administered prior to the surgery and 1 year postoperatively. The results showed that the point prevalence of depressive disorders decreased significantly after surgery ( $p < 0.01$ ). The score on the depression scale we used significantly decreased after the laparoscopic sleeve gastrectomy.

Furthermore, a significant change in mental health status could be observed with regard to depressive symptoms. Depression scores decreased in the 1st year after surgery. 38.8% of the bariatric patients had depression scores of clinical relevance before surgery. One year after surgery, only 17.7% still suffered from depressive symptoms. These findings are in concordance to other studies found in the literature regarding on the possible effect of bariatric surgery on depression (Ryden & Torgerson, 2006). In summary, our findings speak in favor of a considerable

improvement in a psychological aspect such as depressive symptoms in the course of the 1st year after the laparoscopic sleeve gastrectomy.

However, our results present some limitations. It should be taken into consideration that our investigation was limited to evaluating patients after a 12-month interval. The data in the literature is clearly showing that psychosocial improvement generally reaches a plateau at 1 year postoperatively and then gradually decline (Dymek *et al.*, 2002; Burgmer *et al.*, 2007). Further studies on our sample will concentrate on a follow up on these patients for a more extended time period to determine whether improvement in depression symptoms stops, continues or regresses.

Our results also raise the question of the nature of the association between obesity and depression. Studies show that a reciprocal link between depression and obesity exists. Specifically, the results of one meta-analysis obesity showed that obesity increases the risk of depression, and on the other hand depression was found to be an important predictive factor of developing obesity (Luppino *et al.*, 2010). The connection between depression and obesity may be explained involving both biological and psychological mechanisms. The most popular theory asserts that the inflammation as well as HPA-axis dysregulation typically found in obesity could mediate this relationship between obesity and depression.

Other factors to be taken into the consideration may be the diabetes mellitus and insulin resistance, which have been shown increase the risk of depression. Finally, the psychological explanation asserts that weight related stigmatization (Chen *et al.*, 2007), increased body dissatisfaction and decreased self-esteem might increase the risk of depression. To conclude, it is safe to assert that severe obesity might cause or aggravate depression. For this reason some authors suggested that depression should be considered another co-morbidity of obesity (Dixon *et al.*, 2003).

Although before a bariatric surgery it is recommended that the patients undergo some kind of psychological evaluation (Bauchowitz *et al.*, 2005), there is no clear consensus on how to determine suitability regarding psychological impairments of a patient seeking bariatric surgery. For example, only 53% of the bariatric programs agree that having depression symptoms prior to the operation may be a definite contraindication. However, 60% of the bariatric programs which were included in this analysis considered suicide attempt within in the past year as a definite contraindication.

Interestingly, being clinically depressed prior to the operation may be associated with a significant weight loss after the bariatric procedure. Some studies have been shown that depressed individuals lose more weight than their non-depressed counterparts after bariatric surgery (Averbukh *et al.*, 2003; Clark *et al.*, 2003). Beside the weight loss which is expected after bariatric surgeries, a number of studies have described an improvement in mental health during the first year after surgery; depression symptoms were one of the psychological aspects

which decreased at 1 year after the operation in this meta-analysis (Magallares & Schomerus, 2015). Another systematic review of 40 studies from 1982–2002 showed that patients which underwent bariatric procedures presented a consistent improvement of axis I psychiatric disorders of the DSM, particularly depression and anxiety (Herpertz *et al.*, 2003).

Although depression scores improve in the year first following bariatric surgery as before mentioned, some studies reported that these scores tend to decline after a longer period of time (Mitchell *et al.*, 2014). Unfortunately, we do not have information about depression scores after a prolonged period of time in our registries and can thus we cannot evaluate whether the depression symptoms reoccur significantly after 2 years or more.

However, it is of a real concern that 37.7% of the participants of our study met criteria for current depressive disorder (32.7%). This percentage is alarming when compared to the 4-week prevalence rates in obese in patients who showed that only 9.1% of the patients were depressed (Baumeister & Harter, 2007). Even though depressive symptoms improved after the laparoscopic sleeve gastrectomy, our data show that not all patients were free from depressive disorders after surgery and these patients still need medical attention. In addition, the rates of depressive disorders post-surgery still appear to be elevated (17.7% at 1 year post surgery) compared to the 4-week prevalence rates in the obese general population (7.6%) or, as before mentioned, in obese patients (9.1%) (Burgmer *et al.*, 2007). That is the reason why bariatric program should expand well beyond the operation itself, with a long period of careful follow up, education classes with nutrition and sport science advices and with psychological counseling

In this context, we could also mention the importance of exercising performing, with studies showing that it can reduce depression-related manifestations (Craft & Perna, 2007), in both animal models and human patients or in relation with other factors such as oxidative stress status modifications, as our group previously showed (Trofin *et al.*, 2014; 2017).

## Conclusions

Our findings highlight the positive impact of bariatric surgery on patients' psychological well-being, further strengthening its place as an effective treatment approach not only for weight reduction but also as an important tool to fight against depression.

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