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Original article

Changes in self-reported eating patterns after laparoscopic sleeve gastrectomy: a pre-post analysis and comparison with conservatively treated patients with obesity

Andrea Figura, Diplom^{a,*}, Matthias Rose, M.D., Ph.D.^{a,b}, Jürgen Ordemann, M.D., Ph.D.^c,
Burghard F. Klapp, M.D., Ph.D.^a, Anne Ahnis, Ph.D.^a

^aDepartment of Psychosomatic Medicine, Center for Internal Medicine and Dermatology, Charité—Universitätsmedizin Berlin, Charitéplatz 1, Berlin 10117, Germany

^bDepartment of Quantitative Health Sciences, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, Massachusetts 01655

^cCenter for Obesity and Metabolic Surgery, Charité—Universitätsmedizin Berlin, Charitéplatz 1, Berlin 10117, Germany

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Abstract

Background: Patients with severe obesity need to adapt to surgically induced changes in their eating behaviors to maintain treatment success.

Objectives: This study examined the effects of laparoscopic sleeve gastrectomy (LSG) on weight loss and on 3 dimensions of eating behavior, namely, cognitive restraint, disinhibition, and hunger. Outcomes of the LSG group were compared with a group of conservatively treated (CT) patients, who underwent a 1-year multimodal weight-reduction group program that included dietary advice, physical exercise, psychoeducation, cognitive-behavioral therapy, training in Jacobson's progressive muscle relaxation, and social group support.

Setting: The study setting was a multidisciplinary obesity center located in a university hospital.

Methods: A sample of 102 patients with obesity were investigated using the Three-Factor Eating Questionnaire before and, on average, 19 (± 5) months after weight loss intervention. Of the 102 patients, 62 (age 45.8 ± 10.8 years, 71% females) underwent LSG, and 40 patients (age 50.6 ± 11.3 years, 77.5% females) underwent the CT program. Patients were assigned to either the surgical or the nonsurgical intervention group following clinical guidelines and patient preference.

Results: In the LSG group, total weight loss was $25.9 \pm 11.0\%$, excess weight loss was $52.8 \pm 24.1\%$, and body mass index decreased from 51.4 ± 8.1 to 38.0 ± 7.8 kg/m². In the CT group, total weight loss was $5.4 \pm 10.6\%$, excess weight loss was $13.9 \pm 27.1\%$, and body mass index decreased from 40.3 ± 6.7 to 38.0 ± 7.2 kg/m². Significant improvements in self-reported eating behaviors were observed in both groups, that is, an increased cognitive restraint of eating, a decreased disinhibition of eating control, and a reduced degree of perceived hunger. In contrast, whereas Three-Factor Eating Questionnaire scores before weight loss intervention did not differ between groups, LSG patients reported significantly greater reductions in disinhibition and hunger than CT patients did after weight loss intervention. In both groups, greater weight loss was associated with decreased hunger sensations.

Conclusion: In the second follow-up year, LSG was associated with greater weight loss and greater improvements in self-reported eating behaviors compared with conservative treatment. (Surg Obes

*Correspondence: Dipl.-Psych. Andrea Figura, Charité—Universitätsmedizin Berlin, Department of Psychosomatic Medicine, Center for Internal Medicine and Dermatology, Charitéplatz 1, Berlin 10117, Germany.

E-mail: andrea.figura@charite.de

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Both physiologic and psychological factors may be important to treatment success with bariatric surgery and may also contribute to postoperative differences in weight-related outcomes. Potential underlying mechanisms include a combination of gastrointestinal effects (e.g., altered concentration and signaling of meal-stimulated gut hormones), metabolic-systemic effects (e.g., increased energy expenditure), and restrictive respective malabsorptive effects (e.g., reduced food intake and reduced absorption of calories and nutrients) as well as behavioral changes (e.g., altered eating behaviors) [1]. Specifically, the extent of pathologic pre- and postoperative eating patterns is thought to represent a predictive parameter for the course of weight after surgery [2–6].

To date, research on eating behaviors in patients with obesity has mainly focused on Roux-en-Y gastric bypass (RYGB) surgery, while research on the laparoscopic sleeve gastrectomy (LSG) is scarce. The LSG, a restrictive single-stage procedure, is relatively new in the field of bariatric surgery, but its efficacy in weight reduction and its low surgical and nutritional risks have already been confirmed [7]. Only a few studies have investigated the effects of LSG on the 3 dimensions of eating behavior, namely, cognitive restraint, disinhibition, and hunger, using the Three-Factor Eating Questionnaire (TFEQ). For example, Langer et al. [8] found an increased cognitive restraint of eating, a decreased disinhibition of eating control, and a decrease in hunger feelings in a sample of 15 patients 6 months after LSG as well as an excess weight loss of 51%. At 12 months after LSG, Rieber et al. [9] found that while patients' eating behaviors had changed, as patients experienced less hunger and decreased disinhibition, high levels of cognitive restraint did not change in their sample of 40 patients. Moreover, excess weight loss for this sample was 62.7%.

Far more studies have administered the TFEQ to patients who underwent RYGB surgery. Interestingly, the previously described marked improvements in self-reported eating patterns after LSG are similar to those observed after RYGB surgery. Previous studies have found that, in addition to substantial weight loss, RYGB surgery resulted in increased cognitive restraint, while disinhibition and perceived hunger were decreased at various follow-up time points, such as 4 to 6 months [10–12] and >12 months [13] after surgery, whereas greater weight loss was associated with greater reductions in disinhibition and hunger after gastric restriction surgery [14,15]. Moreover, de Zwaan et al. [16] explain that TFEQ scores reached normal ranges

18 to 35 months after RYGB surgery. It is suggested that the surgically modified anatomy of the gastrointestinal tract and subsequent hormonal alterations may play a role in these results. In a few previous studies [e.g., 14,17], the effects of bariatric surgeries, such as RYGB and gastric banding techniques, on weight and psychological variables were compared with conservative treatments, such as lifestyle modification, to identify underlying mechanisms and improve treatment options for obesity. However, though the number of LSG procedures that are performed is rising [18], reliable data on the longer-term beneficial effects of LSG on eating behavior and weight loss compared to the effects of nonsurgical treatment options are still lacking. Thus, further research is needed.

The aims of the present observational pre-post study were to investigate self-reported changes in eating behaviors after LSG using the TFEQ in a naturalistic clinical setting by assessing and comparing preoperative and, on average, 19-month follow-up postoperative data. The self-reported eating behaviors of LSG patients were compared with data from a conservatively treated (CT) control group for the same follow-up period of, on average, 19 months after completing a 1-year multimodal weight-reduction group program. We controlled for TFEQ pretest scores, age, and body mass index (BMI) measured before the interventions. Additionally, we evaluated the extent to which potential changes in eating behaviors after LSG or CT were associated with weight loss outcomes. We aimed to confirm the preliminary findings from Langer et al. [8] and Rieber et al. [9] using a controlled design as well as a larger sample size and a longer follow-up period (during which weight loss tends to cease) than previous studies.

Methods

Study design

As part of the routine comprehensive evaluation for bariatric surgery or conservative treatment at the multidisciplinary obesity center of the university hospital, an experienced clinical psychologist or physician specialized in psychosomatic medicine assessed patients who sought weight loss treatment. Additional medical consultations involved a surgeon and an endocrinologist, and tablet PCs were used to administer psychometric measurements (i.e., self-rating questionnaires). Treatment suggestions for bariatric surgery or a conservative 1-year multimodal weight-reduction group program and assignment to 1 of the 2

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