Effect of Laparoscopic Sleeve Gastrectomy on Quality of Life in Morbid Obese Patients: a Systematic Review and Meta-Analysis

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Abstract
Purpose:determine the effect of sleeve gastrectomy on the quality of life of obese patients.
Method: The initial search was based on relevant keywords in the electronic databases PubMed, Scopus, Web of Science, EBSCO and Embase between 2013 to September 2021. The mean difference was calculated with 95% confidence interval (CI) by fixed effect model and inverse variance method. Meta-analysis was performed using Stata / MP v.16 software.
Result: Three RCT studies, two Prospective studies and one Retrospective study have been included in present article. Mean of Weight and BMI were 126.16±22.9 kg and 45.45±.21 kg/m^2. Mean differences of quality of life after laparoscopic sleeve gastrectomy in Morbid Obese patients was 21.75 (MD, 95% CI 20.54, 22.96).
Conclusion:result indicate an improvement in patients' quality of life after one year of laparoscopic sleeve gastrectomy (p=0.00) and improvement in quality of life is observed in all questionnaires.

Key words: laparoscopic sleeve gastrectomy, quality of life, Morbid Obese Patients

Introduction

The obesity epidemic is a serious public health problem worldwide(1-3). This problem is caused by the lack of long-term imbalance in energy balance and can be adjusted by factors such as body fuel, appetite, diet and physical activity(2, 45-47). Although these factors are influenced by genetic characteristics, they are often associated with environmental changes that are associated with increased food absorption and lack of physical activity. At present, the incidence of morbid obesity seems to be increasing worldwide(3, 42-44). Numerous diseases including hypertension, type 2 diabetes, hyperlipidemia, coronary artery disease, sleep apnea, depression and cancers of the breast, uterus, prostate and colon are among the diseases associated with obesity(4). The risk of developing these disorders and their severity increase linearly with some degree of obesity and it is expected that these disorders will improve as obesity resolves(2). Common methods for controlling obesity, namely diet, exercise, behavior modification, and medication, have a limited and weak maintenance effect on weight loss(5, 6). Conservative treatment, based on a combination of lifestyle and behavior changes, diets, and physical activity, has in many cases been ineffective or associated with relapse. Thus, bariatric surgeries including laparoscopic Roux-en-Y gastric bypass (LRYGB), sleeve gastrectomy (SG), laparoscopic adjustable gastric banding (LAGB) compared to conservative treatment with better long-term outcomes in most patients were associated with severe obesity, were introduced(7-9). At present, these surgeries are highly regarded and increasing all over the world. In 2013 alone, for example, 468,000 cases of bariatric

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surgery were reported worldwide(10). Laparoscopic sleeve gastrectomy is a relatively new bariatric surgery that was introduced in 1988(10, 39-41). sleeve gastrectomy is a restrictive procedure performed by vertical gastrectomy of the entire larger arch of the stomach(2, 11). The main advantages of this surgery are low complications, no malabsorption and continuity of the digestive system(12, 13). Although this surgery was initially performed as part of the main procedure, in recent years it has been performed as an independent bariatric surgery due to its good results, low complications, and simple technique (14-16). In addition to increasing the risk of morbidity and mortality, obesity has been shown to be associated with psychosocial problems and decreased quality of life even in young people(16, 17).Today, the study and evaluation of Quality of life has received much attention from medical researchers, and it is accepted that a thorough examination of the results of bariatric surgery should include, in addition to measuring the amount of weight loss, improvement of comorbidities and complications, examination of Quality of lifechanges(18). Sleeve gastrectomy has been shown to reduce the incidence of obesity-related diseases such as diabetes, hypertension, hyperlipidemia, and sleep apnea. In fact, the goal of this surgery is to lose weight and reduce the risk of obesity-related diseases to improve Quality of life(19, 36-38). Depending on the scope of Quality of life, there are different interpretations of it. These domains include mental health, physical health, self-confidence, happiness and life satisfaction. Perhaps a set of physical, mental, and social well-being perceived by an individual or a group of individuals is an appropriate definition of quality of life(20). So far, various studies have shown that bariatric surgery can improve Quality of life(2, 21, 22). Due to the importance of the subject, the present study aimed to determine the effect of sleeve gastrectomy on the quality of life of obese patients.

Method

The initial search was based on relevant keywords in the electronic databases PubMed, Scopus, Web of Science, EBSCO and Embase between 2013 to September 2021. All studies were selected according to inclusion criteria. The present study was a systematic review and meta-analysis based on the key considerations of the PRISMA statement(23).

Inclusion and exclusion criteria

Body mass index between 35 and 40, Accompanied by an underlying disease, randomized clinical trial studies, randomized controlled trials studies, controlled clinical trials; Prospective and retrospective cohort studies, observational study, in human. Severe GERD and Large hiatal hernia, case control studies, in vitro studies, animal studies, case reports and reviews were excluded from the study.

Data Extraction and **analysis method**

Author's name, year of publication, age, sex, body mass index before surgery, height, weight, incidence of complications after surgery and weight loss and Quality of life were reported. Newcastle-Ottawa Scale (NOS) (24, 35) used to assessed quality of the cohort studies and case-control studies, This scale measures three dimensions (selection, comparability of cohorts and outcome) with a total of 9 items. In the analysis, any studies with NOS scores of 1-3, 4-6 and 7-9 were defined as low, medium and high quality, respectively.

The quality of randomized studies included was assessed using Collaboration's tool(25). The scale scores for low risk were 1 and for High and unclear risk was 0. Scale scores range from 0 to 6. A higher score means higher quality.

Two blind browsers extracted the data independently from the full text of the selected studies, and the third browser then examined the data. Prior to screening, kappa statistics were performed to confirm the level of agreement between the reviewers. Kappa values was 0.80 estimated that this value is appropriate and high.

The mean difference was calculated with 95% confidence interval (CI) by fixed effect model and inverse variance method. Effect size was used using the fixed effect model method. Random effects were also examined to address potential heterogeneity, with a coefficient of I^2 indicating heterogeneity, a coefficient above 50% indicating moderate to high heterogeneity. Meta-analysis was performed using Stata / MP v.16 software.

Result

First, the search was performed using primary keywords and 185 studies were found in the database. After removing 25 duplicate studies, the abstract of 160 studies was reviewed. At this stage, 128 studies that did not meet the inclusion criteria were excluded from the study and the full text of 32 studies was reviewed independently by two blind authors. Then 26 studies were deleted at this stage and only six studies were selected to enter the meta-analysis (Figure1).

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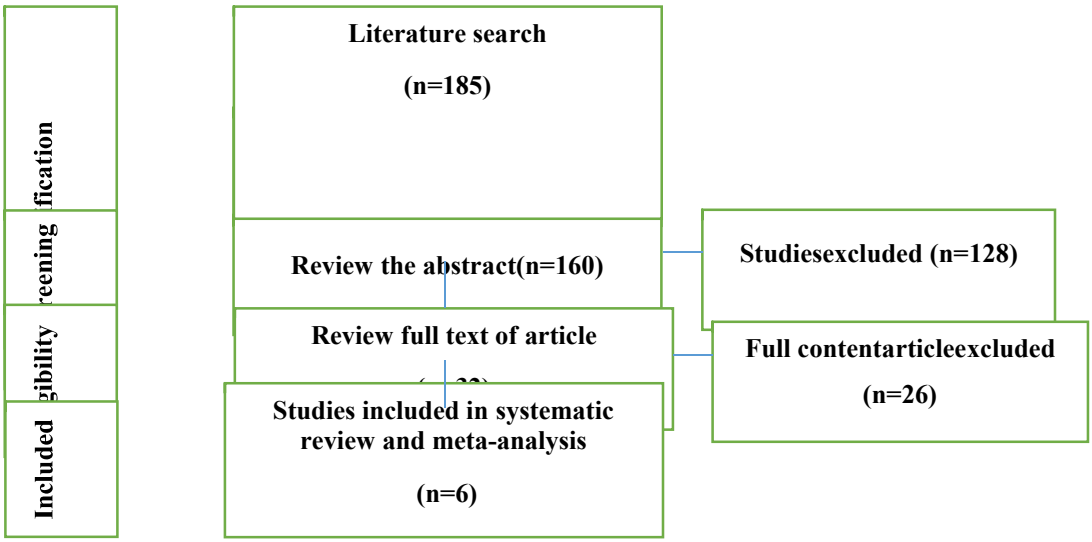

Figure 1. PRISMA flowcharts

Characteristics

Three RCT studies, two Prospective studies and one Retrospective study have been included in present article. The number of patients a total was1076 (male: 339; female: 737) with mean age of 41.63±9.75 years. Mean of Weight and BMI were 126.16±22.9 kg and 45.45±.21 kg/m^2 (Table1).

Assessing risk of bias

According to Collaboration's tool and NOS tool, all studies have a low risk of bias and Overall quality of studies were high.

Table1. Demographic information of Morbid Obese patients

Study. Years	Study design	Number of patients		Mean of age	Mean of BMI (kg/m2)	mean preoperative weight (kg)	QUALITY OF LIFE assessment tools	Follow-up period (month)
		male	female					
Mocian et al.,2021 (26)	prospective	12	26	37.9 ± 11.2	45.5± 8.2	129.4 ± 29.2	BQL, Quality of life	0,12
Malekpoor et al.,2019(2)	RCT	49	51	37.6±7.5	52.5±6.5	NR	WHO- Quality of life-100	0,6,12
Versteegden et al., 2018 (27)	Retrospective	186	480	42.8±11.2	44.5±6.0	128.±22.4	SF-36	0,12
Murphy et al., 2018 (28)	RCT	32	26	45.5±6.4	43.0±6.0	126.4±24.5	SF-36	12
Peterli et al., 2017 (29)	Prospective	30	77	43.0±11.1	43.6±5.3	123.5±19.4	Food tolerance questionnaire	6,12,24
Peterli et al., 2013 (30)	RCT	30	77	43.0±11.1	43.6±5.3	123.5±19.4	GIQLI BAROS score	12,24

NR: not reported; BQL: Bariatric Quality of Life index; Quality of life: quality of life; WHO: World Health Organization

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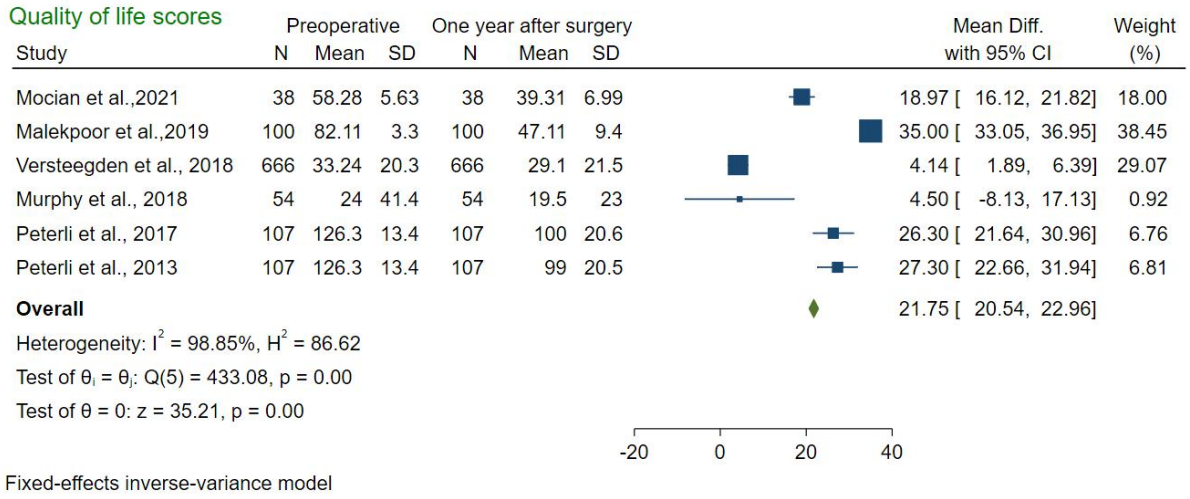

Figure2. Forest plot showedquality of life

Quality of life

Mean differences of quality of life after laparoscopic sleeve gastrectomy in Morbid Obese patients was 21.75 (MD, 95% CI 20.54, 22.96) with high heterogeneity (I^2 = 98.85%; P =0.00) (Figure2). These findings indicate an improvement in patients' quality of life after one year of laparoscopic sleeve gastrectomy (p=0.00); although the difference in studies is in the type of questionnaire use, however improvement in quality of life is observed in all questionnaires.

Discussion

The most important finding of the present systematic review and meta-analysis study was that sleeve gastrectomy surgery could be associated with optimal Quality of life improvement one year after surgery in addition to a significant reduction in BMI. Obesity is a pervasive epidemic in the world (31)and numerous studies have shown that it is associated with many physical, psychological and social problems(32). Thus, paying attention to the ways of diagnosing the cause of obesity and its treatment methods seems very desirable and necessary. In most overweight and obesity guidelines, surgical interventions are considered when non-surgical methods are unsuccessful.Bariatric surgeries are a type of surgery that is recommended for patients with a body mass index of 40 kg/m^2 or more, or patients with a body mass index between 35-40 kg/m^2 with related diseases such as type 2 diabetes, heart disease and sleep apnea. The positive effects of surgical treatments have led researchers to look for newer weight loss procedures that are less likely to have morbidity and recurrence(19). Sleeve gastrectomy surgery was first introduced by D. W. Hess, D. S. Hess, and P. Marceauin in 1988 as part of the biliopancreatic diversion procedure (DS / BPD) switch duodena(33, 34). Due to the high morbidity and mortality during and after surgery in high risk and obese-super patients, it was suggested that this surgery be performed in two stages so that sleeve gastrectomy is in the first stage(35). But the results showed that due to optimal weight loss and significant improvement in comorbidities, a second procedure is needed in only 25% of these patients(36). At present, according to the favorable results that have been reported in the treatment of obese patients with sleeve gastrectomy, this surgery is performed as an independent and very significant surgery all over the world. Compared to other bariatric surgeries, the sleeve gastrectomy procedure is simpler and requires a shorter learning curve(37). Sleeve gastrectomy does not require anastomosis or anatomical bypass and malabsorption does not occur (37-39).So sleeve gastrectomy appears to affect normal body physiology less than other surgeries such as LRYGB and BPD / DS (11). One of the major aspects of obesity is the Quality of life of patients.Obesity and its associated diseases can be associated with decreased activity levels of patients. It is also possible that a person's inappropriate appearance will cause him / her many psychological problems and will have a severe effect on his / her behavior, emotions and social conditions. As a result, one of the most important factors in evaluating obesity treatment methods is examining their effect on the patient's Quality of life. It should be noted, however, that because sleeve gastrectomy is a new surgery, not much is known about its long-term results(11).Assessing the concept of Quality of life related to health has expanded in the last 25 years and many questionnaires have been designed for this purpose(40). The overall purpose of Quality of life assessment is to assess the mental nature of Quality of life, to achieve one's own feelings about one's current state of life and health(41). In the present study, overall score of Quality of life after surgery increased significantly compared to before surgery. The findings of present study confirm the findings of some previous studies that have shown with various tools that sleeve gastrectomy can be associated with

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improved Quality of life. for example; In a study by Fezzi et al., 2011 effect of sleeve gastrectomy on Quality of life improvement, it was found that one year after surgery, all dimensions of the QOL-HR and 36-SF questionnaires improved significantly(42). Brunault et al., 2015 reported on Quality of life changes one year after bariatric surgery using the QOLOD questionnaire found that improvements in physical, mental, and sexual health were evident(43).Recently, Charalampakis et al., 2015 in a cohort study compared Quality of life before and after sleeve gastrectomy with two questionnaires, MAII and VAS. All obesity-related comorbidities improved after surgery. The MALL score increased from 0.4 to 1.75, 2.18 and 1.95, respectively.The median VAS before surgery was 3, which increased to 9, 10, and 9 after surgery(44). There was no significant difference in the improvement of Quality of life after LRYGB with sleeve gastrectomy in some studies, and in each of these studies, some factors such as physical activity or emotional changes in one of the two methods had more improvement(27, 45). The present study had some limitations, including: The results were not compared with other bariatric Quality of life was evaluated only one year after surgery, while to achieve reliable results, patients need to be followed longer.

Conclusion

The results of the present study showed that one year after laparoscopic sleeve gastrectomy surgery in Morbid Obese Patients, all parameters related to quality of life including physical health, mental health, level of endurance, social communication, environmental satisfaction and spiritual health as well as the overall quality of life score can be improved.

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