Effects of Bariatric Surgery on Quality of Life

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ABSTRACT

Data assessing quality of life (QOL) after commonly performed bariatric surgery is inconclusive. The aim of this study is to evaluate the impact of different procedures on postoperative QOL, weight loss and surgical technique.60 patients who underwent laparoscopic sleeve gastrectomy (LSG;n=30) and One-Line Anastomotic Gastric Bypass (LOAGB; n=30)) were included. Body mass index, body weight loss, excess body weight loss, QOL index and sexual functions (using GIQLI, FSFI and EDF questionnaires) were prospectively collected preoperatively, 1, 3 and 6 months postoperatively. Mean preoperative body weight(kg), BMI (kg/m2) and excess weight loss (kg) at 6 months postoperatively were 117.3 (93-144) kg, 43.3 (35.8-56) kg/m2, 31.9 (25.8-33.8) kg in the LSG group and 133.2(102-193) kg, 49 (40.6-66.9) kg/m2, 36.5 (27.8-51.9) kg in the LOAGB group. Body weight loss was higher in the LOAGB group. QOL had improved in both groups during the 1st, 3rd and 6th month. LOAGB was found to be more effective than LSG in total scores at 1 and 3 months. FSFI-EDF scores

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improved in both groups, but LOAGB was found to be more effective. Both techniques are effective in controlling body weight and QOL and sexual functions in the early period in morbidly obese patients. Body weight loss was significantly higher in the LOAGB group.

Keywords: *morbid obesity, laparoscopic sleeve gastrectomy, laparoscopic one-line anastomotic gastric bypass, gastrointestinal quality of life index.*

Bariatrik Cerrahinin Yaşam Kalitesi Üzerine Etkileri

ÖZET

Sıklıkla uygulanan bariatrik cerrahi işlemlerden sonra yaşam kalitesini (QOL) ölçen veriler sınırlıdır. Çalışmamızın amacı farklı obezite ameliyatlarının kilo kaybı ve yaşam kalitesi üzerine etkinliklerini değerlendirmektir. Laparoskopik sleeve gastrektomi (LSG; n=30) ve tek-anastomozlu gastrik bypass (LOAGB; n=30) ameliyatı geçiren 60 hasta dahil edildi. Beden kitle indeksleri, kilo kayıpları, fazla kiloların kayıp oranları, QOL skorları ve cinsel fonksiyonları (GIQLI, FSFI ve EDF anketleriyle) prospektif olarak preoperatif, postoperatif birinci, üçüncü ve altıncı aylarda değerlendirildi ve karşılaştırıldı.Ortalama vücut ağırlığı (kg), BKİ (kg/m^2) ve 6.aydaki fazla kilo kayıpları, LSG grubunda sırasıyla 117.3 (93-144)kg, 43.3 (35,8-56)kg/m^2, 31.9 (25.8-33.8)kg, LOAGB grubunda sırasıyla 133.2 (102-193)kg, 49 (40.6-66.9) kg/m^2 ve 36.5 (27.8-51.9) kg olarak bulundu. LOAGB grubunda kilo kayıpları daha fazlaydı. GIQLI skorlarının 1., 3. ve 6. ayda her grupta anlamlı olarak düzeldiği görüldü. LOAGB'ın genel skor açısından LSG'den 1. ve 3. ayda daha etkin olduğu gözlendi. FSFI-EDF skorlarında her yöntemle düzelmeler görüldü, ancak LOAGB'nin etkisi daha belirgindi. Her iki teknik, erken dönemde kilo kaybı, QOL ve cinsel fonksiyonlarda üzerinde son derece etkilidir ama kilo verme oranları LOAGB ile anlamlı oranda yüksektir.

Anahtar Kelimeler: *morbid obezite, laparoskopik sleeve gastrektomi, laparoskopik tek anastomozlu gastrik bypass, gastrointestinal yaşam kalitesi indeksi.*

INTRODUCTION

The word "obesity" originates from the Latin words "ob," meaning "due to," and "esum," meaning "to have eaten," which together signify "due to eating." Obesity has become an increasingly prevalent global health issue, adversely impacting quality of life and reducing life expectancy. Loss of working capacity, development of physical and mental problems, impact on national economies and isolation of individuals from society are the common negative consequences of this endemic disease. The prevalence of obesity has increased since 1980. According to World Health Organization (WHO) data from 2008, 1.4 billion adults are overweight, including more than 200 million men and 300 million women (more than 10% of the world's adult population). In addition, according to more recent data from 2011, more than 40 million children under the age of 5 are overweight (Semin,2014). The Turkish Obesity Prevalence Study (TURDEP I) found that the prevalence of obesity was 22.3% in 1998 (Satman et al., 2002). In addition, the TURDEP II study conducted in 2010 found that the obesity rate in Türkiye had increased to 32%. This remarkably rapid increase is important because it carries the risk of serious health problems (Satman et al., 2013). Obesity has been found to be more prevalent in societies with lower income and education levels (Harvey et al., 2010).

The Body Mass Index (BMI) is used to define and classify obesity and can be calculated using the following formula: kg (body weight)/m² (height). In 1997, the WHO established a classification for overweight and obesity as follows: those with a BMI $\geq$ 30.0 kg/m^2 are considered obese; those with a BMI of 30-34.9 kg/m^2 are classified as grade I; those with a BMI of 35- 39.9 kg/m^2 are classified as grade II; those with a BMI > 40 kg/m^2 are classified as grade III (extremely obese). In recent years, people with a BMI over 45 kg/m^2 have been classified as super-obese. According to this classification, surgery is indicated in patients with a BMI greater than 40 and in patients with a BMI greater than 35 who have obesity-related medical conditions (Scherrer et al., 1996). In addition, anthropometric measurements such as waist-to-hip ratio, waist and hip circumference, and skinfold measurements can be used as diagnostic tools. Less commonly, imaging techniques such as isotope and chemical dilution (magnetic resonance, computed tomography, ultrasound, dual-energy X-ray absorptiometry) may also be used (Bouchard, 1991).

Obesity itself causes significant health problems, including type 2 diabetes mellitus (T2DM), hypertension (HT), cardiovascular disease (CVD), respiratory disease, polycystic ovary disease (PCOS) and pseudotumour cerebri, shortness of breath, snoring, inability to walk, sleep apnoea, knee and low back pain. It also causes sexual, psychological and various sociological dysfunctions. As a result of excessive calorie intake, the human body stores energy in the form of

triglycerides. Although white adipose tissue is an important endocrine organ due to the many hormones and adipokines it secretes, it has been shown to be associated with both obesity and obesity-related comorbidities (Bouchard, 1991; Yamauchi et al., 2001).

Because fat mass is excessive in obese patients, total oxygen consumption increases, cardiac output is higher and peripheral vascular resistance is lower. As a result of adipose dysfunction, there is an increase in heart rate, cardiac output and cardiac muscle mass due to pathogenic mediators and lipotoxicity, which leads to an increase in systemic arterial pressure above 140/90 mm Hg and this pathological condition progresses over time. As atherosclerosis is more common in obese people, the risk of coronary heart disease also increases.

The main factors in the aetiology of obesity are an intake of calories far in excess of the body's needs, and physical inactivity for reasons such as sedentary lifestyles, old age, post-operative recovery and the use of medication. The hypothalamus controls metabolism and food-seeking behaviour by stimulating or suppressing the appetite centre. There are neural and hormonal communication networks between the central nervous system (CNS) (hypothalamus and associated brain stem components) and the organs of the digestive system (pancreas, intestines, liver, adipose tissue, etc.). Hormones and peptides such as leptin, ghrelin, glucagon-like peptide-1, incretin, tyrosine peptide, insulin, orexin A and B, adiponectin, apelin, resistin generate peripheral feedback signals.

The main goal of obesity treatment is to reduce the amount of calories consumed and reverse the impaired energy balance. Treatment of obesity includes these six interventions: medical treatment, surgical treatment, exercise, diet, behavioural therapy and acupuncture.

Worldwide, no surgical procedure has yet been found that can be accepted as the gold standard. Although Roux-en-Y gastric bypass (RYGBP) is widely used, especially in recent years, laparoscopic sleeve gastrectomy (LSG), previously used as a staged procedure, has come to the forefront as the preferred surgical method due to its ease of use and excellent early good results. Laparoscopic minigastric bypass/laparoscopic single anastomosis gastric bypass (LMGB/LOAGB) is also rapidly increasing in use today because, unlike Roux-en-Y, it involves a single anastomosis, is easy to perform and has much better early results. All of these procedures tend to reduce the patient's dietary intake and prevent caloric intake.
The concept of "quality of life" was first discovered and used in the 1960s, and first appeared in the medical literature in the 1970s. Nowadays, many researchers believe that "quality of life" should be given greater importance due to the longer human lifespan and therefore more patients with chronic diseases. Over time,

many indices have been developed to measure quality of life, such as health-related quality of life (HRQOL). But then it was realised that there was a need to find organ-specific indices.

Erectile dysfunction is defined as the inability to achieve or maintain an erection sufficient for successful sexual intercourse. Although erectile dysfunction is not life-threatening, it has a profound impact on physical and psychosocial health and negatively affects the patient's quality of life. Sexual dysfunction was defined at the National Institutes of Health (NIH) meeting in 1992 as the inability to achieve or maintain an adequate erection for at least 6 months. Erectile dysfunction can be caused by many systemic, neurological, endocrine and psychiatric diseases. Smoking and morbid obesity have also been shown to cause erectile dysfunction, and our study aimed to clarify this relationship in patients without known penile factors.

The aim of this study is to examine changes in weight loss rates, quality of life and sexual function in patients who have undergone sleeve gastrectomy and single anastomosis gastric bypass surgery and to compare these two different procedures.

PATIENTS AND METHODS

Patient selection

Patients who were diagnosed with morbid obesity and evaluated by the multidisciplinary team and found suitable for bariatric surgery, who were admitted to Department of General Surgery between March 2015 and September 2015, who read the informed consent form and agreed to participate in the study, and who were scheduled for primary surgery were included. Patients who did not give consent, underwent revision surgery, or did not comply with the controls and provided incomplete information were not included in the study. The study was divided into two groups.

Laparoscopic sleeve gastrectomy group (LSG group; n=30): 30 patients who met the criteria and were diagnosed with morbid obesity and underwent laparoscopic sleeve gastrectomy were included in the study. All patients were informed about the study and their written consent was obtained. A detailed preoperative medical history was taken, and height and weight were recorded during a detailed physical examination. After surgery, the patients were called again at the first, third and sixth months, and their physical examinations were carried out and the study parameters were recorded by means of relevant questionnaires.

Laparoscopic one anastomosis gastric bypass group (LOAGB group n=30): It consisted of 30 patients who underwent laparoscopic one anastomosis gastric

bypass surgery with a diagnosis of morbid obesity. All patients were informed about the study and their written consent was obtained. A detailed preoperative medical history was taken, and height and weight were recorded during a detailed physical examination. After surgery, the patients were called again at the first, third and sixth month for a physical examination and to record the study parameters by completing the relevant questionnaires.

Patient follow-up and data collection

The questionnaires used for both groups included 36 questions from the Gastrointestinal Quality of Life Index (GIQLI) and 3 additional questions to assess satisfaction with surgery. In addition, seven questions each from the Female Sexual Function Index (FSFI) for female patients and the Erectile Dysfunction Test for male patients were asked. These questionnaires were administered to patients on an outpatient basis when they were admitted to hospital in the preoperative period and when they returned for follow-up at 1, 3 and 6 months postoperatively.

Statistical analysis

SPSS 21.0 for Windows (USA) was used for all statistical analyses. Descriptive statistics were used to evaluate the data: mean ± standard deviation for numerical measurements, and numbers and percentages for qualitative measurements. The Shapiro-Wilk test was used to test whether the numerical measurements in the surgical groups were normally distributed. The test showed that the data did not have a normal distribution. Therefore, comparisons of numerical characteristics in the two groups were made using the Mann-Whitney U test. Cross-tab analyses and chi-squared analyses were used to compare qualitative measures such as gender and diabetes status in the surgery groups. Changes over time in the surgery groups were evaluated using the Friedman test. Time points with differences as a result of the Friedman test were determined using the Conover-Dunn pairwise comparison test. Difference values were calculated for the scale scores and subscores used in the study (baseline - 1st month; baseline - 3rd month; baseline - 6th month, etc.). The Mann-Whitney U test was used to determine whether these differences were different between the two groups. For statistical significance, $p<0.05$ was considered significant.

RESULTS

In this study, questionnaires were administered to patients in the outpatient clinic and personal contact was made with participants during the data collection phase.

Preoperative demographics of patients in both groups

70 patients were invited to participate in the study, but 10 patients who missed their appointments were excluded from the study, leaving a total of 60 patients. Thirty

of these patients (n=30; 28 Female) underwent laparoscopic sleeve gastrectomy (LSG) and the other thirty (n=30; 23 Female) underwent laparoscopic one anastomosis gastric bypass (LOAGB). A total of 16 patients (26.7%) had T2DM (6 patients in the LSG group, 10 patients in the LOAGB group). The demographic data of the patients are summarised in Table I.

The mean excess body weight in the preoperative period was 49.4±9.8 (28.2-67) kg in the LSG group and 64.4±16.8 (35.7-114.6) kg in the LOAGB group. It was also observed that the obesity scores of the patients were higher in the LOAGB group ($p<0.001$).

Table I. Pre-operative demographics of patients in both groups

Variables	LSG (n=30)	LOAGB (n=30)	*p* value
Age (Years)	36.8(20-60)	39.2 (21-61)	0.428
Gender (Female/Male)	28/2	23/7	0.071
Body weight(kg)	117.3 (93-144)	133.2 (102-193)	<0.001
BMI (kg/m^2)	43 (35.8-56)	49 (40.6-66.9)	<0.001
Excess body weight (kg)	49.4 (28,2-67)	64.4 (35.7-114.6)	<0.001

Comparison of demographics of patients in both groups at month 1, 3 and 6
Mean body weight in the first month was 106.5±13.4 (84.4-130) kg in the LSG group and 121.9±17 (96-182) kg in the LOAGB group. The mean excess weight loss in the first month was 26.7±9.8 (12.6-30.7) kg in the LSG group and 31.6±16.6 (21.2-41.6) kg in the LOAGB group. The percentage of excess weight loss was 21.8±7.3% (10-37.6) on average in the first group and 17.7±6% (6.9-22.1) in the second group. The excess weight loss was statistically significant between the two groups and was higher in the LOAGB group ($p=0.022$ and $p<0.001$, respectively). Nonetheless, if we look at the weight loss as a percentage (%), the reason why it appears to be greater in the LSG group is that the initial BMI of these patients is also lower. Therefore, the actual weight loss (kg) is taken into account when assessing efficacy.

At month 3, the average body weight was 95.8±11.8 (75-115) kg in the LSG group and 109.2±16.7 (84-163) kg in the LOAGB group. In both groups, this value was statistically lower in the LSG group ($p<0.001$). The average excess weight loss at month 3 was 28±9.2 (10.8-44) kg in the first group and 37.2±12.6 (19.2-47.6) kg in the second group. The mean percentage of excess weight loss was 44.8±10.8% (28.5-67.1) in the first group and 37.7±10.8% (18-58.3) in the second group. Although the percentage losses (%) in the LSG group appeared to be high, the actual weight losses (kg) were statistically significant in favour of LOAGB.

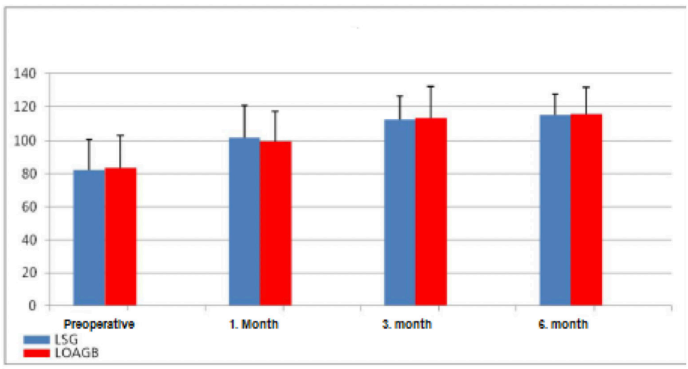
The mean body weight after 6 months was 86.4±12.9 (66-108) kg in the LSG group and 99.6±16.2 (79.5-145) kg in the LOAGB group. The mean excess weight loss was 31.9±3.9 (25.8-33.8) kg in the LSG group and 36.5±6 (27.8-51.9) kg in the second group. The average percentage of excess weight loss was 63.8±16.4% (37.2-88.7) in the first group and 54.3±14.6% (29.7-81.9) in the second group, and actual weight loss was losses (kg) were statistically significant in favour of LOAGB.

In both groups, weight values, body mass indexes, numerical and percentage excess weight loss values at 0, 1, 3 and 6 months showed statistically significant improvement over time ($p<0.001$ for each).

Change in GIQLI scores over time in both groups

When comparing according to the sum of the GIQLI scores, the average score in the sleeve gastrectomy group was 82.1±18.9 (32-123) in the preoperative period, 102±18.6 (62-142) in the first postoperative month, 111.8±14.4 (91-140) in the third month, and the average in the sixth month was 114.6±12.9 (84-139). (91-140), and the average at month 6 was 114.6±12.9 (84-139). When these values were compared on a monthly basis, a statistically significant difference was found between the preoperative period and the 1st, 3rd and 6th month ($p=0.002$, $p<0.001$, $p<0.001$, respectively). No statistical difference was found between the first and third month ($p=0.273$) and between the third and sixth month ($p=1.000$) (Figure I). Looking at the change in GIQLI score over time in the LOAGB group, the mean score was 83.8±19.6 (45-127) in the preoperative period, 99.5±17.7 (56-131) in the first postoperative month, 112.8±19 in the third month, 2 (46-137) and 115.2±16.5 (57-134) in the sixth month. In the internal comparison, there was no difference between the preoperative period and the first month in the bypass group ($p=0.56$), while a significant improvement was found between the preoperative period and the third and sixth months ($p<0.001$ for both). No significant difference was found between the first and third month and between the third and sixth month ($p=0.56$ and $p=1.00$ respectively), and a difference in improvement was found between the first and sixth month ($p=0.008$). (Graphic I)

Graphic 1. Total GIQLI scores



When total GIQLI scores were compared at preoperative, first, third and sixth month, no significant difference was seen between the two groups ($p = 0.842$; $p = 0.767$; $p = 0.391$; $p = 0.386$). In addition, when the differences were compared each month, there was no significant difference between the two groups.

As mentioned above, the GIQLI score is divided into subscales. For each group, comparisons were made over time and between the two groups. The comparisons are shown in Table II.

Table II. Evaluation of GIQLI scores

Variables	*LSG* *Pre-op (1)* Median (Min.-Max)	*LOAGB* *Pre-op (1)* Median (Min.-Max)	p	*LSG* *1.month (2)* Median (Min.-Max)	*LOAGB* *1.month (2)* Median (Min.-Max)	p	*LSG* *3.month (3)* Median (Min.-Max)	*LOAGB* *3.month (3)* Median (Min.-Max)	p	*LSG* *6.month (4)* Median (Min.-Max)	*LOAGB* *6.month (4)* Median (Min.-Max)	p	*Differences within the LSG group across months*	*Differences within the LOAGB group across months*
General score (0-144)	82.1 (32-123)	83.8 (45-127)	p=0,842	102 (62-142)	99.5 (56-131)	p=0,767	111.8 (91-140)	112.8 (46-137)	p=0,391	114.6 (84-139)	115.2 (57-134)	p=0,368	1-2: **p=0,002** 1-3: **p<0,001** 1-4: **p<0,001** 2-3: p=0,273 3-4: p=1,000	1-2: p=0,560 1-3: **p<0,001** 1-4: **p<0,001** 2-3: p=0,560 3-4: p=1,000
Gastrointestinal Symptoms (0-76)	51.9 (22-69)	53.1 (30-71)	**p=0,02**	55.8 (34-74)	53.7 (29-65)	p=0,25	58 (40-78)	58 (24-71)	**p=0,001**	57.5 (45-72)	57 (34-69)	**p=0,009**	1-2: p>0,5 1-3: p>0,5 1-4: **p=0,012**	1-2: p>0,1 1-3:p>0,1 1-4: p>0,1
Emotional (0-20)	8.6 (2-20)	8.9 (1-19)	p=0,51	13.6 (7-20)	14.8 (7-20)	p=0,77	15.7 (9-20)	16.1 (6-20)	p=0,32	17.3 (10-20)	17.4 (8-20)	**p=0,01**	1-2: **p=0,026** 1-3: **p<0,001** 1-4: **p<0,001**	1-2: **p=0,003** 1-3: **p>0,001** 1-4: **p<0,001**
Physical competence (0-28)	9.6 (1-22)	10.1 (0-26)	p=0,52	18.3 (8-28)	17.9 (1-27)	**p=0,003**	20.9 (10-28)	22.1 (7-28)	p=0,56	22.4 (14-28)	23.5 (9-28)	p=0,94	1-2: **p=0,004** 1-3: **p<0,001** 1-4: **p<0,001**	1-2: p>0,5 1-3: **p<0,001** 1-4:**p<0,001**
Social competence (0-16)	9.3 (2-15)	9.1 (0-16)	p=0,58	11 (6-16)	10.1 (4-15)	p=0,196	13.6 (9-16)	13 (7-16)	p=0,066	13.7 (7-16)	13.7 (6-16)	p=0,24	1-2: p>0,5 1-3: **p<0,001** 1-4: **p<0,001**	1-2: p>0,5 1-3: **p<0,001** 1-4: **p<0,001**
Medical treatment (0-4)	2.6 (1-4)	2.4 (0-4)	**p=0,006**	3.2 (1-4)	2.8 (1-4)	p=0,45	3.4 (2-4)	3.5 (0-4)	**p<0,001**	3.7 (3-4)	3.5 (0-4)	**p<0,001**	1-2: p>0,5 1-3: **p=0,005** 1-4: **p<0,001**	1-2: p>0,5 1-3: **p<0,001** 1-4: **p<0,001**

GIQLI: Gastrointestinal System Quality of Life Index; LSG: Laparoscopic Sleeve Gastrectomy; LOAGB: Laparoscopic Minigastric By-pass or Laparoscopic One-anastomosis Gastric By-pass

In the laparoscopic sleeve gastrectomy group, a statistical difference was found only between the preoperative period and month 6 for the sub-dimension 'gastrointestinal symptoms' ($p = 0.012$). No difference was found between the preoperative period and the first and third months, or between the first and third months.

In the same group, there were statistically significant differences in the sub-dimension "emotional symptoms" between the preoperative period and the first month ($p=0.026$), between the preoperative period and the third month ($p<0.001$), between the preoperative period and the sixth month ($p<0.001$), and between the first month and the sixth month ($p<0.001$). 0.001) statistically significant improvements were observed.

Again in the same group, in the physical competence sub-dimension, there were statistically significant improvements between the preoperative period and month 1 ($p=0.004$), between the preoperative period and month 3 ($p<0.001$), between the preoperative period and month 6 ($p<0.001$) and between month 1 and month 6 ($p<0.001$). There was a difference between month one and month six ($p<0.006$). No difference was found between months one to three and months three to six.
While there was no significant difference between the preoperative period and the first month, the third month and the sixth month for "social competence", the improvements were statistically significant between the preoperative period and the third month, the preoperative period and the sixth month, the first month and the third month, and the first month and the sixth month ($p<0.001$, $p<0.001$, $p=0.002$ and $p<0.001$ respectively).

In the LSG group, there was a significant difference between the preoperative month and the third and sixth months ($p=0.005$, $p<0.001$).

In the LOAGB group, no difference was found between any months for the gastrointestinal symptoms sub-dimension ($p>0.1$ for all comparisons). In the same group, statistically significant improvements in the "emotional symptoms" sub-dimension were observed between the preoperative period and month 1 ($p=0.003$), the preoperative period and month 3 ($p<0.001$), and the preoperative period and month 6 ($p<0.001$). Again, in the physical competence sub-dimension, a difference was found between the preoperative period and the third month ($p<0.001$), the preoperative period and the sixth month ($p<0.001$), and the first month and the sixth month ($p=0.005$). Regarding the sub-dimension "social competence", it was found to be significant between the preoperative period and the third month, between the preoperative period and the sixth month, between the first month and the third month, and between the first month and the sixth month ($p<0.001$, $p<0.001$, $p=0.012$ and $p=0.001$; respectively).

In the LOAGB group, there was a significant improvement in distress due to medical treatment between preoperative and third month, preoperative and sixth month, first and third month, and first and sixth month ($p<0.001$, $p<0.001$, $p=0.026$ and $p=0.014$, respectively), but no difference was found when comparing other months.

Comparison of patient satisfaction questions over time in both groups after surgery

The distribution of both LSG and LOAGB groups within the preoperative, 1st, 3rd and 6th month was not statistically significant ($p=0.07$, $p=0.177$; respectively) (Table III).

Table III. Assessment of patient satisfaction after surgery

Variable		*LSG*	*LOAGB*	*p*
		Median (Min.-Max)	**Median (Min.-Max)**	
Pateint satisfactory from surgery (3 Questions) (0-12)	***1.month*** [(2)]	10,4 (6-12)	11,2 (7-12)	*p=0,673*
	3.month [(3)]	11 (7-12)	11,4 (7-12)	*p=0,252*
	6.month [(4)]	11 (7-12)	11,6 (7-12)	*p=0,07*

LSG: Laparoscopic Sleeve Gastrectomy; LOAGB: Laparoscopic Single-Anastomosis Gastric By-pass

Comparison of changes in FSFI-EDF scores over time in both groups

Considering the FSFI-EDF, a significant improvement was observed in the LSG group only between the preoperative period and the sixth month ($p<0.006$), and no difference was observed between the other months.

In the LOAGB group, a significant difference in this index was observed between the preoperative period and the sixth month, and between the first month and the sixth month ($p=0.001$ and $p<0.001$, respectively) (Table IV).

Table IV. Comparison of changes in FSFI-EDF scores

Variables		*LSG*	*LOAGB*	*p*
		Median (Min.-Max)	**Median (Min.-Max)**	
FSFI (F) – EDF (M) (0-35)	***Pre-op*** [(1)]	15,9 (0-32)	18,2 (0-31)	p=0,42
	1.month [(2)]	18,5 (0-35)	16 (0-32)	p=0,20

	3.month [3]	18,6 (0-34)	21,7 (0-34)	p=0,91
	6.month [4]	20,6 (0-35)	26,5 (0-35)	p=0,14
Differences within the group across months		**[1-4] p<0,006**	**[1-4] p=0,001**	

FSFI: Female Sexual Function Index; EDF: Erectyl Dysfunction Index; LSG: Laparoscopic Sleeve Gastrectomy; LOAGB: Laparoscopic One-Anastomosis Gastric By-pass; F: Female, M: Male

The difference between the two groups in terms of the total score of the GIQLI and the subscales "gastrointestinal symptoms", "emotional symptoms", "physical competence", "social competence" and "medical treatment" was not significant between the preoperative, first, third and sixth months. Regarding the questions aimed at understanding patient satisfaction after surgery, the LOAGB group gave statistically better results than the LSG group in the first, third and sixth months postoperatively (p=0.012, p=0.044 and p=0.039; respectively). While there was no difference between the two groups in terms of FSFI and EDF preoperatively, in the first and third months, more positive results were obtained in the LOAGB group in the sixth month (p=0.047).

DISCUSSION

The GIQLI is a well-designed and valid 36-question survey. In this study, it was administered to patients in the preoperative period and in the first, third and sixth months postoperatively. The GIQLI questionnaire ranges from 0 to 144 points, with an average score of 122.6 in healthy subjects. The GIQLI is divided into 5 subcategories; gastrointestinal symptoms (0-76 points; 19 questions), emotional state (0-20 points; 5 questions), physical symptoms (0-28 points; 7 questions), social competence (0-16 points; 4 questions) and 1 medical treatment question. In this study, 3 more questions were added to measure satisfaction with surgery, but these 3 questions were not added to the total score to avoid errors in the calculation of results.

The Female Sexual Function Index (FSFI) is a short questionnaire used to assess women's sexual function. It focuses on measuring sexual desire, orgasm, satisfaction and pain, rather than learning and seeking sexual experience, knowledge or behaviour in women. The initial questions, including panel selection, were preadministered verbally and conceptually to healthy individuals under the supervision of expert counsellors. A study by Rosen et al. in 2000 compared a control group of 131 individuals with two groups of 128 patients of similar age in five different centres. The FSFI is divided into six subscales: desire, arousal, orgasm, satisfaction, sensuality and pain. A significant difference was

found between the two groups and it was stated that further studies were needed with the quality of life index (Renehan et al., 2008). Sexual function in women is known to be impaired by a number of conditions, and the effect of morbid obesity on this situation was investigated and studies conducted in our country have shown that the prevalence of erectile dysfunction is 69.2% for each grade (Singh et al., 2013).

The mean preoperative body weight of the patients included in the study was 117.3±13.8 (93-144) kg in the sleeve gastrectomy group and 133.2±17.7 (102-193) kg in the single anastomosis gastric bypass group. The only significant difference in preoperative demographics was in body weight.

When the study groups were examined in terms of postoperative weight loss, in the sleeve gastrectomy group, body weights at 1, 3 and 6 months were 106.5±13.4 (84.4-130) kg, 95.8±11.8 (75-115) kg and 86.4±8 kg, respectively. In the single anastomosis gastric bypass group, postoperative body weights at 1, 3 and 6 months were 121.9±17 (96-182), 109.2±16.7 (84-163) and 99.6±16.2 (79.5-145) kg, respectively. Considering the excess weight loss rates, in the sleeve gastrectomy group, 21.8±7.3% (10-37.6%), 44.8±10.8% (28.5-67%) and 63.8±16.4% (37.2-88.7) were achieved in the 1st, 3rd and 6th month, respectively. In patients who underwent single anastomosis gastric bypass, the excess weight loss rates observed in the 1st, 3rd and 6th months were 17.7±6% (6.9-32.1%), 37.7±10.8% (18-58.3%) and 54.3±14.6% (29.7-81.9), respectively. When these results were evaluated, it was observed that patients who underwent single anastomosis gastric bypass lost weight more slowly in the early period.

There is no any study that compares laparoscopic sleeve gastrectomy and single anastomosis gastric bypass as in our study. Although there are no long-term data in our study, the results of sleeve gastrectomy were found to be more successful than laparoscopic mini-gastric bypass due to the strict rules in our selection criteria and probably due to preoperative weight differences. Long-term follow-up of changes in body weight is needed to make a definitive decision on this issue. Nevertheless, successful results were achieved in both groups, with more than 50% of excess weight lost in the first 6 months.

The GIQLI (Gastrointestinal Quality of Life Index) score is assessed under 5 main headings: gastrointestinal symptoms, physical functions, mood, social functions and treatment effects (Emerging Risk Factors Collaboration, 2011). Looking at the total score in our study, it was 82.1 (32-123) and 83.8 (45-127) in the LSG and LOAGB groups, respectively, and no statistically significant difference was found between the two groups. When the changes at 1, 3 and 6 months after

surgery were examined, they were 102 (62-142), 111.8 (91-140) and 114.6 (84-139) in the LSG group, respectively. In the LOAGB group, the changes at 1, 3 and 6 months after surgery were 99.5 (56-131), 112.8 (46-137) and 115.2 (57-134), respectively.

Although a significant increase in GIQLI scores compared with the preoperative period was observed in both groups when cross-checked, no significant difference in GIQLI scores was observed in the LSG and LOAGB groups in the time periods determined in the cross-sectional analyses. These results support that LOAGB is a safe and effective procedure. The reason for this is that although it is a technically more complex procedure with a malabsorption component, it is believed that the quality of life is not affected by side effects such as dumping, diarrhoea and malnutrition that may be observed in patients. It has therefore been concluded that it has comparable safety to LSG. In the quality of life study conducted by Bruzzi et al. in 126 patients with LOAGB, the overall GIQLI score increased from 92.5±15.9 to 110.3±17.4. This finding supports our study (Bruzzi et al., 2015).

When the sexual dysfunction of our patients was evaluated with FSFI-EDF scores, a significant improvement was observed in both groups (LSG and LOAGB) at 6 months after surgery compared to the preoperative period. Similarly, in their study of 80 patients, Groutz et al. reported an improvement in erectile function at 3 months after surgery (Groutz et al., 2017).

In a recent study by Vitish Singla et al in 2022, GIQLI scores of patients undergoing single anastomosis gastric bypass were improved and they invented a mini-GIQLI questionnaire with 5 questions and the results were similar to our study (Singla et al., 2022). Therefore, although LOAGB is a more complex procedure, it appears to be a method that can be safely applied and provide effective weight loss. In the study conducted by Kaseja et al. in 74 patients (33 LSG, 41 LRYGB), no statistically significant difference was found when the general GIQLI scores of the LSG and LRYGB groups were compared (110.6 vs 108.7) at 5-year follow-up (Kaseja et al., 2014). In the study conducted by Lee et al. in 154 patients, it was reported that no significant difference was found between the LOAGB, adjustable gastric band and LSG groups in terms of 1st year GIQLI scores (Yu et al., 2014). All these studies report similar results to our study. On the other hand, in the study by Vers et al. comparing the LSG and LRYGB groups, LSG was found to be superior to LRYGB in terms of GIQLI scores in the 4-year follow-up, and this was found to be associated with food intolerance scores (Overs et al., 2012). In another study, the sexual functions of 48 patients (34 women, 14 men) were examined at the 6th month after LRYGB,

and while a significant improvement was found in women, the improvement in sexual function in men was not statistically significant (Goitein et al., 2015). In a meta-analysis Yu Lei conducted last year; that 5 years after surgery, LRYGB resulted in greater weight loss and achieved better remission rate of T2D and dyslipidemia than LSG. Nonetheless, LSG has a lower morbidity rate than that of LRYGB (Lei et al., 2024).

CONCLUSIONS

The main feature of our study is to investigate the effect of a relatively newly developed method, such as laparoscopic single anastomosis gastric bypass, on quality of life and sexual function. According to the results of our study, when comparing the laparoscopic sleeve gastrectomy and single anastomosis gastric bypass groups, early weight loss rates were found to be better for sleeve gastrectomy but there was no significant difference between the two surgery groups in quality of life index studies.

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Data collection: S.Ö., T.T.Ş., C.Ç., investigation: S.Ö., T.T.Ş., M.M.Ö., planning: M.M.Ö, T.T.Ş, literature review: S.Ö, T.T.Ş, C.Ç., and manuscript writing: SÖ., TTŞ., MMÖ., conceptualization and critical review: S.Ö., T.T.Ş., M.M.Ö.

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