



## Research Article

# The Effects of Laparoscopic Adjustable Gastric Band Procedure on the Sexual Functioning

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### Abstract

**Objectives:** We aimed to investigate the effects of bariatric surgery on the sexual functions in both genders by comparing Female Sexual Function Indexes (FSFI) and International Index of Erectile Function (IIEF) scores with the physical, hormonal and biochemical findings after the Laparoscopic Adjustable Gastric Band (LAGB) procedure of morbidly obese male and female patients.

**Methods:** Obese patients between 18 and 65 years of age who underwent bariatric surgery and continued their follow-up visits were included in the study. At the postoperative 6<sup>th</sup> month, FSFI and IIEF surveys were performed to the LAGB patients. Biochemical and hormonal tests were evaluated.

**Results:** At the postoperative period, a significant decrease was detected in the BMI levels of both male and female groups in comparison to the preoperative period ( $p < 0.01$ ). There was no significant difference in the FSFI, IIEF, IIEF-5 and IIEF-6 scores ( $p > 0.05$ ); however, there was a quantitative increase at the score levels. A negative correlation was detected between BMI and FSFI, IIEF, IIEF-5 and IIEF-6 scores.

**Conclusion:** Although there was no significant difference in the sexual functions of the patients who underwent LAGB operation in the early period, the long-term follow-up of the patients was become more of an issue.

**Keywords:** Female sexual function indexes, erectile dysfunction, international index of erectile function, laparoscopic adjustable band, obesity, obesity surgery

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Obesity is a major public health issue with worldwide increasing incidence <sup>[1]</sup> Various comorbid conditions affecting secondary vital functions appear by means of the increasing incidence of obesity. These conditions involve diseases-associated metabolic syndrome, and it has an effect on the respiratory, musculoskeletal and sexual functions.<sup>[2]</sup> In the previous clinical studies, the relationship of obesity with various clinical conditions have been investigated in detail, except sexual functioning.<sup>[3]</sup> However, there are limited number of studies investigating the effect of obesity on the sexual functions.

As mentioned above, obesity leads to erectile dysfunction as it causes metabolic syndrome, and affects respiratory system and other vital functions.<sup>[4]</sup>

This condition shows the multifactorial nature of the erectile dysfunction in obese patients. Therefore, the main problem should be eliminated, instead of treating comorbid conditions separately, in the treatment of erectile dysfunction in obese patients. Thus, the weight loss after Laparoscopic Adjustable Gastric Band (LAGB), which is one of the surgical options in the obesity therapy, might positively affect erectile dysfunction.

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For this purpose, we aimed to investigate the effects of bariatric surgery on the sexual functioning in both genders by comparing Female Sexual Function Indexes (FSFI) and International Index of Erectile Function (IIEF) scores with the physical, hormonal and biochemical findings after the Laparoscopic Adjustable Gastric Band (LAGB) procedure of morbidly obese male and female patients.

## Methods

This study was conducted by Ankara Numune Training and Research Hospital in September 2008- September 2010. Obese patients aged 18-65 years who underwent bariatric surgery and did not skip the control appointments were included in the study. Patients included in the study have signed a voluntary consent form.

The decision of surgical therapy was given with respect to The International Federation for The Surgery of Obesity (IFSO) criteria (Body Mass Index (BMI) $>40$  kg/m<sup>2</sup>) or at least two comorbid diseases (BMI $>35$  kg/m<sup>2</sup>). Patients did not continue postoperative controls, patients receiving statins, antihypertensive therapy and phosphodiesterase type-5 inhibitors, single patients and patients without a sexual life were excluded from the study. At the postoperative 6th month, FSFI and IIEF surveys were performed to the patients who underwent LAGB. Biochemical and hormonal tests were evaluated. The BMI values of the patients were recorded.

FSFI survey was applied to the female patients. The FSFI composed of 19 items divided into subscales; desire, arousal, lubrication, orgasm, satisfaction and pain (scoring 1-5 x coefficient). FSFI 2-36 was accepted as normal. FSFI score was obtained by adding scores of each subscale.<sup>[5]</sup> The survey for male patients was the Turkish version of IIEF form that was published in Urology Journal by Raymond Rosen et al. in 1997. It contains 15 questions.<sup>[6]</sup> The sensitivity and reliability of the questions were evaluated in the same article.

Biochemical measurements were performed by using an enzymatic calorimetric method for the blood samples obtained after a minimum 12-hour fasting and Hitachi Modular P800 (Roche Diagnostics Corp. Indiana, Indianapolis, USA) autoanalyzer device.

Very low-density lipoprotein (VLDL)-cholesterol and Low-Density Lipoprotein (LDL)-cholesterol was determined according to the Friedewald's equation.<sup>[7]</sup> According to this equation, VLDL-cholesterol=Triglyceride/5, LDL-cholesterol=Total cholesterol – High Density Lipoprotein (HDL)+VLDL-cholesterol. This equation was performed on the patients with triglyceride levels  $<450$  mg/dl. In conditions  $>450$  mg/dl, VLDL and LDL were evaluated incom-

pletely. BMI was used to evaluate obesity.

Prior to the study, the letter of conformity was obtained from Ankara Numune Training and Research Hospital Scientific Researches Assessment Commission, in terms of the convenience to the method and principles of the study, on 1 January 2010 with decision number of 060\2010.

## Statistical Analysis

Statistical analysis was performed by Statistical Program for Social Sciences (SPSS) version 18.0 for Windows. Descriptive statistics were used to evaluate study data; mean and standard deviation (SD). Spearman's correlation test was performed to describe the correlation between BMI and other data. p values less than 0.05 were considered significant.

## Results

Bariatric surgery was performed on 84 patients within the study period. Twenty-six patients, who continued to follow-up visits regularly, were included in the study (Female: 16 patients, male: 10 patients). The demographic and clinical findings of the patients included in the study were presented in Table 1. The preoperative mean age ( $39.6\pm 8.8$  vs.  $35.4\pm 5.4$  years;  $p>0.05$ ) and BMI ( $41.5\pm 4.1$  vs.  $41.8\pm 3.8$  kg/m<sup>2</sup>;  $p>0.05$ ) of the patients were found to be similar. In male group, the ratio of alcohol consumption was higher than the female group [4 (40%) vs, 1 (6.3%);  $p<0.001$ ]. There was no significant difference between the groups in terms of smoking. In terms of chronic diseases, a significant difference was detected only in terms of hypertension between the groups [8 (80%) vs. 3 (18.8%);  $p<0.001$ ]. No significant

**Table 1.** Demographic and clinical characteristics of study population

Variables	♀	♂	p
Age (years)	39.6±8.8	35.4±5.4	N
BMI (kg/m <sup>2</sup> )	41.5±4.1	41.8±3.8	N
Smoking n (%)	5 (20%)	6 (60%)	N
Alcohol n (%)	1 (6.3%)	4 (40%)	<0.001
Chronic diseases n (%)			
Hypertension	3 (18.8%)	8 (80%)	<0.001
Diabetes	3 (18.8%)	-	-
Hypothyroidi	2 (12.5%)	-	-
Depression	2 (12.5)	-	-
Osteoporosis	2 (12.5%)	-	-
Marital status n (%)			
Married	13 (81.3%)	4 (40%)	N
Single	2 (12.5%)	2 (20%)	N
Divorced	1 (6.3%)	4 (40%)	N

N: Not significant; BMI: Body mass index.

difference was detected between the groups in terms of marital status (married, single, divorced;  $p>0.05$ ). The fact that type 2 diabetes mellitus, which is especially considered to be among the chronic diseases associated with obesity and sexual dysfunction, is seen in only 18.8% of our patients is related with the low age average of the patient population incorporated to the study and that type 2 DM is a diseases that becomes more severe by increasing age.

The comparison of preoperative and postoperative BMI, FSFI and IIEF score of the groups was presented in Table 2. At the postoperative period, a significant decrease was detected in the BMI levels of both male and female groups in comparison to the preoperative period ( $p<0.01$ ). There was no significant difference in the FSFI, IIEF, IIEF-5 and IIEF-6 scores ( $p>0.05$ ); however, there was a quantitative increase at the score levels. A negative correlation was detected between BMI and FSFI, IIEF, IIEF-5 and IIEF-6 scores. There was no significant correlation between other variables.

The comparison of preoperative and postoperative laboratory findings of the groups was presented in Table 3. The laboratory findings showed a significant variation in the female group in terms of HDL cholesterol ( $43.4\pm 15.4$

vs.  $48.3\pm 18.0$ ;  $p=0.02$ ) and progesterone levels ( $2.6\pm 3.3$  vs.  $3.1\pm 3.1$ ;  $p=0.021$ ). There was no significant difference in terms of other parameters. After a follow-up period, no significant difference was detected in FSFI and IIEF scores. However, a negative correlation was detected between BMI values and FSFI and IIEF scores.

Unfortunately, the response to the appointments that we have established in order to better monitor our patients in the long term after bariatric surgery is not proper and most of the patients cannot be reached in the future periods. For this reason, we have decided to intensify our work on early data which has definite control results and publish it as a paper.

## Discussion

In the study of Aleid et al.<sup>[8]</sup> it was reported that bariatric surgery improved erectile dysfunction and urinary symptoms in the 3 to 12-month postoperative follow up of the patients. Of 30 patients included in the study, 18 had IIEF score  $<25$  and 14 reported moderate or severe lower urinary tract symptoms before the operation. Twelve patients

**Table 2.** Changes in body mass index, FSFI and IIEF scores of the study population

Variables	♀			♂		
	Pre-op.	Post-op.	p	Pre-op.	Post-op.	p
BMI	41.5±4.1	35.0±4.7	0.001*	41.8±3.8	35.6±5.1	0.001*
FSFI	21.6±4.7	27.7±5.8	0.170	-	-	-
IIEF5	-	-	-	18.6±0.8	24.3±3.2	0.086
IIEF6	-	-	-	22.4±1.0	28.6±4.7	0.222
IIEF	-	-	-	53.0±3.77	67.4±8.4	0.426

\* $p<0.05$  is considered significant for statistical analyses.

BMI: Body mass index; FSFI: Female Sexual Function Indexes; IIEF: International Index of Erectile Function.

**Table 3.** Comparison of preoperative and postoperative laboratory findings of study population

Variables	♀			♂		
	Pre-op	Post-op.	p	Pre-op.	Post-op.	p
T. Kol. (mg/dL)	170.9±33.0	153.8±30.7	0.604	154.4±23.4	150.0±32.1	0.245
LDL (mg/dL)	103.3±27.6	100.8±28.1	0.983	89.7±24.0	83.6±22.3	0.786
HDL (mg/dL)	43.4±15.4	48.3±18.0	0.02*	35.5±10.3	43.6±14.2	0.406
Triglycerid (mg/dL)	120.0±65.9	111.1±48.9	0.225	103.8±16.1	43.6±14.7	0.071
LH (mIU/mL)	3.3±3.9	3.8±1.4	0.158	-	-	-
FSH (mIU/mL)	3.5±2.5	4.6±2.0	0.096	-	-	-
Estradiol	142.8±86.9	154.3±84.7	0.621	-	-	-
Progesterone	2.6±3.3	3.1±3.1	0.021*	-	-	-
Prolaktin (ng/mL)	12.0±4.9	11.6±3.1	0.649	-	-	-

\* $p<0.05$  is considered significant for statistical analyses.

T. Kol: Total cholesterol; LDL: Low density lipoprotein; HDL: High density lipoprotein; LH: luteinizing hormone; FSH: Follicle stimulating hormone.

had both erectly dysfunction and moderate or severe lower urinary tract symptoms. This is the first study reporting improvement in the erectile and urinary function within 1 month following bariatric surgery.

Mora et al.<sup>[9]</sup> performed a study on 39 male patients who underwent bariatric surgery, the baseline and postoperative 1-year scores of IIEF were found statistically significant (54.85+16.59 and 61.21+14.10, respectively). In our study, it is not possible to make an evaluation because there is no 1 year old patient results.

In the study of Rosenblatt et al.<sup>[10]</sup> including 51 patients, early postoperative IIEF scores revealed no difference; however, erectile dysfunction and overall satisfaction were better than those in the obese group, although still lower than those in the lean group.

In the present study, although we detected positive variations in the certain biochemical parameters of LAGB patients, the improvement was not significant in the sexual functioning. In the male patient group, there was an advanced significant difference between postoperative ALT and postoperative BMI levels ( $p < 0.01$ ). In the female patient group, there was an advanced significant difference between postoperative BMI values and postoperative HDL and progesterone levels ( $p < 0.01$ ). The absence of a significant improvement in the sexual functioning of the patients might be related to the inadequate number of patients included in the study and inadequate duration of postoperative follow-up period. Another important issue was the deficiency of zinc and certain minerals after weigh loss might affect sexuality of the patients.

There are studies showing the side effect of weight loss with bariatric surgery on the fertility. Spermatogenesis was completely terminated after spermiogram and testicular biopsies.<sup>[11]</sup> This condition might be related to the malabsorption of essential nutrients, such as zinc, after bariatric surgery. Zinc deficiency was detected in 68% of the patients after bariatric surgery.<sup>[12]</sup> Zinc deficiency might cause insufficient synthesis of testosterone, and thus, it results in hypogonadism and impotence.<sup>[13]</sup> In uremic patients with zinc deficiency, sexual functions are treated with zinc supplementation. While a decrease is observed in the total testosterone and sex-hormone binding globulin levels in the obese individuals, estradiol level is increased. The increase in the level of estrogen is considered due to the aromatization of androgen to estrogen in the fat tissue. In our study, zinc levels were not observed in the postoperative follow-up period, and zinc deficiency assessment could be performed if long-term follow-up could be achieved.

Another comorbidity is depression in obese individuals. Depression has a negative impact on the erectile dysfunction.

General social activities are decreased with communication and sexual desire in depressive patients. Camp et al. reported significant improvements in the body image and sexuality of patients who lost weight with bariatric surgery.<sup>[14]</sup>

In the prospective study of Reis et al.<sup>[15]</sup> including 1.220 obese males, life style modifications were applied to a group for 4 months and they followed up the patients after gastric bypass surgery; other group was followed-up without a surgery. IIEF-5, TT and FT scores were increased in the gastric bypass group.

Band et al.<sup>[16]</sup> performed a study according to the FSFI on 102 morbidly obese women who underwent bariatric surgery, 61 patients (59.8%) who were scored over the cut-off score  $\leq 26.55$  were detected, and their finding was higher than the control group. The prevalence of female sexual dysfunction (FSD) is in the range of 32.6% - 4%. This ratio is between 42% and 56% in patients who will undergo bariatric surgery.<sup>[17-19]</sup>

Sarwer et al.<sup>[20]</sup> demonstrated significant differences in the desire and satisfaction of the 106 women in the first year of bariatric surgery when women were evaluated at the postoperative 1<sup>st</sup> and 2<sup>nd</sup> years. At the postoperative 2<sup>nd</sup> year, significant differences were reported in the lubrication and arousal scores of the women. However, there was no statistically significant difference in the orgasm score. As a result of this study, patients lost their one third of their body weight within 2 years after bariatric surgery and positive results were observed in sexual arousal, adiposity, desire, satisfaction and sexual hormones. Kolotkin et al.<sup>[21]</sup> compared the sexual conditions of the obese males with obese control group at the postoperative 2<sup>nd</sup> year, the quality of sexual life was improved in the bypass group. The effect of obesity on the sexuality has multiple phenomes, such as social, psychological and biological. Obesity and insulin resistance lead to peripheral vascular diseases resulted in endothelial dysfunction and atherosclerosis.<sup>[22]</sup> Endothelial dysfunction and atherosclerosis are the risk factors for erectile function.<sup>[23]</sup> Sexual functions are improved by non-surgical weight loss. This condition is related to the improvement in the symptoms of hypertension, hypogonadism and insulin resistance. Although improvement is obtained in the comorbidities after bariatric surgery, erectile function is not improved at the same ratio. In the survey study of Ranasinghe et al.<sup>[24]</sup> with 145 LAGB morbidly obese patients, preoperative IIEF score was 51.36 and it decreased to 48.17 at the postoperative 32-month, and 5 patients received phosphodiesterase type 5 inhibitors. De Araujo et al.<sup>[25]</sup> reported that the total IIFS score increased in 76.19% at the preoperative and postoperative 6-month in 21 obese males who underwent gastroplasty. The total prevalence of



erectile dysfunction was reported as 7% in Massachusetts Male Aging Study, and this ratio was increased to 45% when BMI is over 30 kg/m<sup>2</sup>. In obese individuals, the anomalies in the hormone regulations and production might cause sexual disorders in comparison to the comorbidities, such as Type 2 DM, HT and CVD.

In the study of Kinz et al.<sup>[26]</sup> the sexual performance of the 82 obese women was investigated, and the sexual performance of 63% patients was increased and 12% patients was decreased. Fifteen questions with 5 different answers were asked to the patients (one question; score of 1–5), and the total IIEF score was obtained by adding the scores of each question.

In the present study, there was no significant improvement in the sexual functions of male and female group after bariatric surgery. However, it is required to perform new randomized controlled studies with larger study groups and longer postoperative follow-up periods. In conclusion, there is no significant difference in the sexual activity of patients in the early period after LAGB operation, and it is important to follow-up the patients for longer time periods.

#### Disclosures

**Ethics Committee Approval:** Ankara Numune Training and Research Hospital 060\2010.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship Contributions:** Concept – G.C., I.S.; Design – G.C., I.S., A.O.; Supervision – I.A.; Materials – G.C., I.S.; Data collection &/ or processing – G.C., I.S.; Analysis and/or interpretation – G.C., I.S., I.A., A.O.; Literature search – G.C., I.S., I.A., A.O.; Writing – G.C.; Critical review – G.C., I.S., I.A., A.O.

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