Bariatric Surgery Improves Sexual Function in Obese Patients

David Goitein MD, Alex Zendel MD, Lior Segev MD, Anya Feigin MD and Douglas Zippel MD

Department of Surgery C, Sheba Medical Center, Tel Hashomer, affiliated with Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

ABSTRACT: **Background:** Obesity causes specific sexual problems, including diminished sexual desire, poor performance and avoidance of sexual encounters.

Objectives: To systematically evaluate the effect of bariatric surgery on patients' sexual function as compared to their preoperative status.

Methods: Bariatric surgery candidates were given a validated sexual function questionnaire the day before surgery and again 6 months after surgery. Females were polled with the Female Sexual Function Index (FSFI) and males with the Brief Sexual Function Inventory (BSFI). Statistical analysis was performed to elucidate differences in response to the questionnaires.

Results: The study population included 34 females and 14 males. Mean age and body mass index (BMI) were 40.2 ± 10.2 years and 43.4 ± 5.3 kg/m^2, respectively. Postoperative BMI was 31.4 ± 4.9 kg/m^2 ($P < 0.001$). Laparoscopic sleeve gastrectomy was performed in 36 patients and laparoscopic Roux-Y gastric bypass in 12. In females, the FSFI index rose significantly from 24 to 30 ($P = 0.006$), indicating increased sexual performance and satisfaction. In males the BSFI increased from 40.2 to 43.9 but did not reach statistical significance ($P = 0.08$). However, general satisfaction, desire and erection were each significantly improved within the BSFI.

Conclusions: In addition to the well-documented medical and quality-of-life benefits of bariatric surgery, there is also clear improvement in patients' sexual function, both physical and psychosexual.

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KEY WORDS: sexual function, laparoscopic sleeve gastrectomy (LSG), laparoscopic Roux-Y gastric bypass (LYRGP), bariatric surgery, obesity

Obesity is a major health issue worldwide and is associated with significant medical and psychosocial morbidity, some beginning in adolescence [1-3]. Obesity is linked to specific sexual problems including lack of sexual desire, poor sexual performance, poor fertility and avoidance of sexual encounters, thus negatively affecting sexual life [4,5].

Bariatric surgery has become the mainstay of treatment for morbid obesity with many thousands of procedures performed annually. It has been shown to significantly help patients lose weight and improve obesity-related comorbidities, quality of life and survival [6,7]. Studies also reveal a significant positive effect of bariatric surgery on psychological status and sexual function [8-10], alongside some undesirable effects due to surgical and metabolic complications [11]. The greatest weight loss typically occurs within the first 6 months from surgery with the nadir at 1–1.5 years.

Obese women experience more sexual difficulties compared to men, the majority of female candidates for bariatric surgery complaining of sexual dysfunction [5]. Most studies concentrated on gastric banding and gastric bypass procedures, and only a few reported on both genders [9,12].

The Female Sexual Function Index (FSFI) is a well-validated and widely used tool for the assessment of female sexual function [13]; the Brief Male Sexual Function Inventory (BSFI) serves the same purpose in males [14].

We describe here the effect of laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) on the self-reported sexual function of men and women before and 6 months after weight loss surgery.

PATIENTS AND METHODS

Consenting morbidly obese patients fulfilling the accepted criteria for bariatric surgery were enrolled in the study. Participants were administered gender-relevant questionnaires assessing sexual function by a member of the research team before surgery (T1) and 6–7 months after (T2). Female and male sexual function was assessed by the 19-item Hebrew translation of the FSFI and by the 11-item Hebrew translation of the BSFI, respectively (ISBI = Israeli Sexual Behavior Inventory) [15]. A cutoff of 24.66 was used for female sexual dysfunction definition.

Surgical technique was standardized as previously reported. The patients chose the type of bariatric intervention after receiving detailed counseling by a multidisciplinary team consisting of a surgeon, a bariatric dietitian and a psychologist, regarding the two procedures and their respective merits and drawbacks. Demographic, anthropometric and clinical

data were prospectively collected in a database of all bariatric procedures performed.

STATISTICAL ANALYSIS

Analysis of data was performed using SPSS 11.0 statistical analysis software (SPSS Inc., Chicago, IL, USA). Distributions of continuous variables were assessed for normality using the Kolmogorov-Smirnov test (cutoff at $P = 0.01$). Normally distributed continuous variables were described as mean ± standard deviation, while continuous variables with distributions significantly deviating from normal were described using median (minimum-maximum). Continuous variables were compared by using Student's *t*-test for independent samples. Categorical variables were described using frequency distributions and are presented as frequency (%). Categorical variables were compared using the chi-square, or Fisher's exact test as necessary. All tests are two-tailed and considered significant at $P < 0.05$. This study was approved by the institutional review board at our center.

RESULTS

Between January 2012 and June 2012, 80 patients scheduled for bariatric surgery were invited to participate in this study. Fifty-one patients consented to fill in the initial questionnaire at T1 (63%). Of these, 48 (34 females and 14 males, 94%) completed the second questionnaire at 6–7 months postoperatively (T2). Mean age was 40.2 ± 10.2 years. Women were younger than the men at the time of surgery (mean age 38.4 ± 9.1 vs. 44.8 ± 13.9 years, respectively, $P < 0.01$). LSG was performed in 36 patients (75%) and LRYGB in 12 (25%). Twenty-three patients had dyslipidemia, 9 were diabetic, and 12 had hypertension prior to surgery. Comorbidity resolution occurred in 60%, 86% and 72% of dyslipidemia, diabetes and hypertension, respectively, all highly significant ($P < 0.01$). Mean preoperative body mass index (BMI) decreased from 43.4 ± 5.3 kg/m^2 to 31.4 ± 4.9 kg/m^2 at T2 ($P < 0.01$) [Table 1].

Table 1. Demographic, anthropometric and comorbidity data of the study cohort

	Women	Men	Both
No. of patients	34	14	48
Age, years (± SD)	38.4 (± 9.1)	44.8 (± 13.9)	40.2 (± 10.9)
Pre-op BMI, kg/m^2 (± SD)	44.4 (± 5.5)	40.9 (± 4.2)	43.4 (± 5.4)
Post-op BMI, kg/m^2 (± SD)	32.5 (± 5.1)	28.9 (± 3.6)	31.5 (± 4.9)
Diabetes mellitus, n (%)	5 (14%)	4 (29%)	9 (19%)
Cholesterol, n (%)	17 (50%)	6 (43%)	23 (48%)
Hypertension, n (%)	9 (26%)	3 (21%)	12 (25%)
LRYGB, n (%)	11 (30%)	1 (7%)	12 (25%)
LSG, n (%)	23 (70%)	13 (93%)	36 (75%)

BMI = body mass index, SD = standard deviation, DM = diabetes mellitus, Cholesterol = dyslipidemia, LRYGB = laparoscopic Roux-Y gastric bypass, LSG = laparoscopic sleeve gastrectomy

Table 2. Female sexual function inventory (FSFI) and male brief sexual function inventory (BSFI) scores shown as average scores ± standard deviation before and 6–7 months after bariatric surgery

Women			
Domain score	**Before surgery**	***P* value**	**After surgery**
Desire	3.6 ± 1.2	0.18	4.2 ± 1.1
Arousal	3.8 ± 1.8	0.025	4.9 ± 1.2
Lubrication	4.4 ± 2	0.011	5.5 ± 0.7
Orgasm	4.2 ± 2	0.046	5.2 ± 0.9
Satisfaction	4 ± 1.9	0.001	5.4 ± 1
Pain	3.8 ± 2.5	0.027	5.1 ± 1.4
Total	24 ± 9.6	0.006	30 ± 4.5
Men			
	Before surgery	***P* value**	**After surgery**
Desire	6.1 ± 1.6	0.018	7.8 ± 2.7
Erection	4.5 ± 0.8	0.043	12 ± 3.6
Ejaculation	9 ± 1.3	0.315	8.3 ± 2.6
Perception of sexual problems	11.3 ± 3.7	0.42	11.8 ± 4
General satisfaction	2.8 ± 0.8	0.0006	4.1 ± 1.1
Total	40.2 ± 9.2	0.064	43.9 ± 12

SEXUAL FUNCTION IN WOMEN: FSFI SCORES

Of 43 women 20 (59%) had a total FSFI score < 24.66 before surgery, indicating sexual dysfunction. Of these only 4 (12%) remained with dysfunction at T2, 3 of whom improved their scores, but not above the aforementioned threshold ($P < 0.001$). Average FSFI index rose significantly from 24 ± 9.6 to 30 ± 4.5 ($P = 0.006$), indicating increased sexual performance and function. An independent increase was found in all FSFI parameters, except for desire, which did not reach statistical significance ($P = 0.18$) [Table 2].

SEXUAL FUNCTION IN MALES: BSFI SCORES

BSFI increased from a baseline 40.2 to 43.9, but did not achieve statistical significance ($P = 0.064$). However, general satisfaction index, desire and erection were each significantly improved [Table 2]. Due to the small sample size, no stratification according to age groups was attempted.

DISCUSSION

Sexual dysfunction in obese patients is a common but complex condition that results in considerable personal distress and adversely affects health and quality of life [5,12]. The under-

lying mechanism of obesity-related sexual dysfunction is multifactorial. There are high comorbid rates in the morbidly obese (diabetes, hypertension, metabolic syndrome, etc.) which have been clearly associated with sexual dysfunction [16-18]. Psychological and social effects of obesity influence self-esteem and the behavioral aspects of avoidance and initiation of sexual encounters [2]. Studies have shown that weight loss positively influences sexual function in the obese population, probably due to amelioration of both medical and psychosocial impairments.

Bariatric surgery is a natural candidate for treatment of sexual dysfunction in morbidly obese individuals, as it is presently the treatment of choice for this condition. Camps and colleagues [19] retrospectively studied 28 patients (64% women) who had undergone vertical banded gastroplasty 1–11 years earlier. They found that 50% of patients and 64% of their partners reported better sexual performance, including improvements in frequency and enjoyment of sexual intercourse, orgasmic function, and body image [19]. Kolotkin et al. [20] evaluated changes in sexual quality of life over a 2 year period in 187 adults (161 women and 26 men) undergoing weight loss treatment. Weight loss greatly improved sexual quality of life [20]. Bond and team [9] reported on a cohort of 54 women who underwent bariatric surgery, 34 of whom suffered from sexual dysfunction. Similar to our study, they completed the FSFI preoperatively and 6 months postoperatively. Sexual dysfunction resolved in 68% of these 34 women [9]. Dallal and co-workers [12] reported on the prevalence of sexual dysfunction in men and its high rate of resolution after gastric bypass surgery. They found that morbidly obese males scored similarly to matched non-obese controls who were 20 years older. In those achieving a significant weight loss (> 67% excess weight loss) sexual function improved back to levels of their own age group [12].

In our study population, sexual dysfunction was prevalent, as reflected by the average test scores which were well below the established cutoff scores. The age and gender distribution is typical of the bariatric population seeking surgical treatment in Israel, the vast majority being women younger than their male counterparts. An expected, significant weight loss was recorded for the cohort and was similar to that reported in the literature. Most patients in our cohort underwent LSG (75%), though this study was neither designed nor powered to establish differences between LSG and LRYGB. In the female subgroup, improvement was observed for all FSFI domains, significantly for all except desire, which did not reach statistical significance. In the male subgroup, all BSFI domains were improved, significantly in three of five domains (all except ejaculation and perception of sexual problems) [Table 2].

Since the underlying mechanism of obesity-related sexual dysfunction is multifactorial, the extent to which different variables account for sexual function improvement may differ between genders. Thus, impaired hormonal regulation may contribute to sexual dysfunction to a greater extent in males [21]. Alagna et al. [22] found an improvement in sexual hormone levels in 20 men after bilio-pancreatic diversion. The influence of weight loss on hormonal activity has been shown in females as well, but its contribution to sexual function is less obvious. In contrast, the role of psychogenic factors, such as body image and depression, has been studied in woman more frequently but, unfortunately, its impact on sexual function is still not clear [19,23-25].

Limitations of our study include the rather low response rate by our bariatric candidates. We enrolled only 64% of those approached and this might introduce a selection bias to the study. Arguably, patients with a higher or lower rate and distribution of sexual function parameters might opt out of the survey, thus skewing our results. The small number of male patients precluded subdivision according to age, which greatly influences the BFSI. Also, the size sample and study design precluded a true comparison of LSG and LRYGB, which might have a different effect on sexual function due to the difference in absolute, and rate of, weight loss as well as hormonal and metabolic differences between the two procedures.

Although further studies are needed to answer these questions, we conclude that bariatric surgery has a significant positive effect on sexual function in both genders, adding yet another virtue to this treatment modality for morbid obesity.

Correspondence
Dr. D. Goitein
Head, Bariatric and Metabolic Surgery, Dept. of Surgery C, Sheba Medical Center, Tel Hashomer 52621, Israel
Phone: (972-3) 530-2714
Fax: (972-3) 542-1562
email: david.goitein@sheba.health.gov.il

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