

The Effect of Laparoscopic Sleeve Gastrectomy on Erectile and Sexual Function in Obese Adult Men

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ABSTRACT

Background: Obesity is often associated with multiple negative health-related comorbidities. There is an increased risk of sexual dysfunction in the obese population. Although multiple studies reported significant improvement of these complaints after different bariatric surgeries, there are few studies evaluating the role of laparoscopic sleeve gastrectomy (LSG) on this specific outcome. **Objective:** This study was conducted to evaluate the effect of LSG on sexual function in male patients with morbid obesity. **Patients and methods:** This prospective study included 114 morbid obese patients with erectile dysfunction (ED). All patients underwent the conventional LSG. Sexual function was evaluated using the International Index of Erectile Function (IIEF) score before surgery, then after six and 12 months after surgery. The severity of ED was evaluated according to the erectile function component of the same previous score.

Results: The one-year % of excess weight loss (EWL) had a mean value of 61.18%. At the same visit, there was a significant improvement in the total IIEF score from 49.04 to 67.88, erectile function from 18.25 to 25.94, orgasm function from 6.99 to 9.41, sexual desire from 7.06 to 9.35, intercourse satisfaction from 9.25 to 13.56, and overall satisfaction from 7.49 to 9.61. A significant positive association was noted between the % EWL and the total IIEF score and its components. **Conclusion:** LSG led to significant improvement of sexual and erectile dysfunction in obese male patients. Weight loss led to a significant decline in the prevalence of ED, and if the problem did not resolve, its severity would be markedly decreased.

Keywords: Sleeve gastrectomy; Erectile dysfunction; Sexual function.

INTRODUCTION

Sexual dysfunction in males entails a wide spectrum of problems, including erectile dysfunction (ED), orgasm problems, a decrease in sexual desire, and ejaculatory dysfunction. The incidence of this problem is linked to multiple medical diseases, including diabetes, hypertension, metabolic syndrome, atherosclerosis, and obesity (1-3). Obesity has been a major public health concern all over the world because of its increasing prevalence and its associated comorbidities that have a negative impact on an individual's quality of life (4,5). In Egypt, 39.8% of the adult Egyptian population suffers from obesity, according to the "100 million health" survey conducted in 2019 (6). Obese males are more likely to experience sexual problems (7). Normal sexual function is influenced by a number of elements, including vascular, neurological, hormonal, and psychological aspects. All of which can be negatively affected by obesity (8). Furthermore, being overweight or obese increases the risk of ED by 30–90% when compared to people of normal weight. Subjects with ED, on the other hand, are more likely to have a larger waist circumference, higher blood pressure, and elevated cholesterol level than those without ED (9).

Bariatric procedures have been widely used for durable management of obesity and its associated comorbidities like diabetes mellitus, obstructive sleep apnea, insulin resistance, and hypertension (10-12). One of the most popular bariatric operations in Egypt is laparoscopic sleeve gastrectomy (LSG) (13), which proved its efficacy in achieving durable weight loss and improving comorbidities associated with obesity (14, 15).

Although many studies have evaluated the effect of different bariatric procedures on male sexual and erectile function (16,17), there is a clear paucity of studies handling the effect of lsg on such outcomes. the purpose of this study was to see how lsg affected the sexual function in obese male patients (including the prevalence and severity of ed).

PATIENTS AND METHODS

The current prospective interventional study was performed at the General Surgery Department, Al-Azhar University Hospitals. The study was conducted during the period between July 2018 and August 2021 (three-year duration). We calculated the sample size via G*Power version 3.1.9.6 for windows (2020) using data published by Mora *et al.* (18) with IIEF total score change after a one-year follow-up period as the primary outcome. The absence of difference in the IIEF total score before and after LSG was considered as the null hypothesis. According to Mora *et al.* (18), IIEF's total score had a mean value of 54.85 ± 16.59 before the procedure and 61.21 ± 14.10 at one-year follow-up. In the proposed investigation, a sample size of 95 patients was required to obtain a 90% power using a two-sided, paired-samples t-test with a 5% significance level. With a 20% drop expected drop rate, a total of 114 patients were enrolled in the current study. We included married adult patients diagnosed with morbid obesity (body mass index BMI > 40 kg/m²) and diagnosed with ED. Contrarily, patients with obesity-related comorbidities, age less than 18 years, psychiatric problems, hypogonadism, or known sexual hormone imbalance



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were excluded from our study. In addition, unmarried patients or married personnel who lived away from their wives (traveling abroad) were also excluded.

After that, routine preoperative evaluation was done for all participants, including proper history taking, physical examination, routine preoperative laboratory investigations, pelviabdominal ultrasonography, and esophagogastroduodenoscopy. All patients were evaluated via the IIEF questionnaire, which is a validated tool for sexual function assessment. It is a 75-point questionnaire that includes 15 questions. Each question is answered on a 0 to 5 scale. The IIEF includes five components; erectile function (six questions - 30 points), orgasm function (two questions - 10 points), sexual desire (two questions - 10 points), intercourse function (three questions - 15 points), and overall satisfaction (two questions - 10 points). Better sexual function is indicated by higher scores⁽¹⁸⁻²⁰⁾. The presence of ED was established according to the results of the erectile function component of the previous scale. ED was diagnosed when this component had a value of 25 or less. The severity of ED was also classified as follows; severe (6 - 10), moderate (11 - 16), mild to moderate (17 - 21), and mild (22 - 25)⁽²¹⁾.

All cases were performed via laparoscopy under general anesthesia. After abdominal insufflation via the Veress needle, the classic five ports were inserted (one for telescope, two working, and two assistant ports). Devascularization was started 4 cm proximal to the pylorus, and the greater omentum was separated from the greater curve of the stomach using the ligasure hemostatic device. This was continued till reaching the left diaphragmatic crus. Over a 40-Fr bougie, the sleeve was created using endostaplers (Covidien, Norwalk, CT, USA). If any spurters were detected over the staple line, it was controlled via clips. After the operation, the patients were transferred to the recovery room then to the internal ward. Oral fluids were allowed on the 1st post-operative day after excluding leakage with an oral gastrograffin study. Most patients were discharged on the following day unless complications were encountered. Regular follow-up visits were scheduled up to one year following operation. Through these visits, anthropometric measures were evaluated (the percentage

of excess weight loss % EWL). Besides, the IIEF score with its five components was evaluated and recorded at six- and twelve-months' visits and then compared to the baseline values. Furthermore, in patients with residual ED, its severity was also graded according to the same preoperative classification.

Ethical approval:

This study was approved from The Local Ethical Committee of the same university. Every participant signed informed written consent after explaining the details, advantages, and possible complications of the laparoscopic procedure. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

SPSS version 27 for Windows® (Statistical Package for Social Sciences) was used to code, process, and analyse the data (IBM, SPSS Inc, Chicago, IL, USA). Qualitative data were expressed as number (frequency) and percent. Quantitative data were presented as mean ± SD, median and interquartile range. To compare categorical data at two different time points, McNamara's test was used. For comparing quantitative data at ≥ 3 time points, the repeated measures ANOVA test was used. Pearson's or Spearman correlation was used to correlate numeric data. P value ≤ 0.05 was considered significant in all tests.

RESULTS

The age of the included participants ranged between 22 and 42 years (mean = 31.94 years), while their BMI ranged between 40.17 and 56.81 kg/m², with a mean value of 48.95 kg/m². The duration of the laparoscopic operation had a mean value of 78.11 minutes (range, 60-95). Only one patient experienced post-operative complications in the form of intraperitoneal bleeding (0.9%), which was conservatively managed by IV fluids, hemostatics, and blood transfusion (2 units). At the one-year follow-up, the mean value of EWL was 61.18% (range, 30 - 91%) as shown in table (1).

Table (1): Demographic characteristics, operative time, postoperative complications, and % EWL in the study participants.

All patients (n= 114)	Mean & SD	Median	IQR
Age (years)	31.94 ± 5.593	31.00	27.00, 36.25
Weight (kg)	155.11 ± 17.748	152.50	143.00, 167.00
Height (cm)	177.96 ± 5.424	178.00	173.00, 183.00
BMI (kg/m ²)	48.95 ± 4.903	48.85	44.29, 53.30
EWL (%)	61.18 ± 17.366	62.00	47.00, 77.00
Operative time (minutes)	78.11 ± 11.059	80.00	70.00, 90.00
Postoperative complications	Absent	99.1% (113)	
	Bleeding	0.9% (1)	

As illustrated in table (2), although all of our patients had ED before operation (100%), its prevalence decreased down to 89.5% and 32.5% at six- and twelve-months follow-up visits, respectively. LSG was found to be linked to a considerable reduction in the prevalence of ED (p < 0.001).

Table (2): The prevalence of ED in the study participants at baseline and after the operation

Erectile dysfunction	All patients (n= 114)	p
Basal	100.0% (114)	-
Six months	89.5% (102)	< 0.001
One year	32.5% (37)	< 0.001

P was generated by comparing each reading to the respective basal value.

The total IIEF score with its five categories showed a significant statistical improvement at the scheduled follow-up visits ($p < 0.001$). The erectile function component showed a significant increase from 18.25 before operation up to 21.21 and 25.94 at six- and twelve-months visits. In addition, the total IIEF score increased from 49.04 before surgery up to 56.66 and 67.88 at the same follow-up visits, respectively. Other IIEF components are shown in table (3). When it comes to the percent of change, the largest change was noticed in the intercourse satisfaction and erectile function components (47.91% and 44.94%, respectively), while less values were noticed in the remaining three components.

Table (3): Sexual function of the study participants at baseline and at one-year follow-up as assessed by IIEF

	All patients (n= 114)	Mean & SD	Median	IQR	P
Erectile function (max 30)	Basal	18.25 ± 3.866	18.50	15.75, 22.00	-
	Six months	21.21 ± 3.852	22.00	19.00, 24.00	< 0.001
	One year	25.94 ± 3.886	27.00	25.00, 29.00	< 0.001
	Change (%)	44.94 ± 18.148	42.00	32.00, 60.25	-
Orgasmic function (max 10)	Basal	6.99 ± 1.060	7.00	7.00, 8.00	-
	Six months	8.09 ± 1.027	8.00	8.00, 9.00	< 0.001
	One year	9.41 ± 0.929	10.00	9.00, 10.00	< 0.001
	Change (%)	36.86 ± 16.435	41.50	25.00, 43.00	-
Sexual desire (max 10)	Basal	7.06 ± 1.162	7.00	6.00, 8.00	-
	Six months	8.11 ± 0.910	8.00	8.00, 9.00	< 0.001
	One year	9.35 ± 0.728	9.00	9.00, 10.00	< 0.001
	Change (%)	35.37 ± 19.694	29.00	25.00, 50.00	-
Intercourse satisfaction (max 15)	Basal	9.25 ± 1.216	9.00	8.75, 10.00	-
	Six months	10.85 ± 1.285	11.00	10.00, 12.00	< 0.001
	One year	13.56 ± 1.331	14.00	13.00, 15.00	< 0.001
	Change (%)	47.91 ± 14.673	47.00	36.00, 56.00	-
Overall satisfaction (max 10)	Basal	7.49 ± 0.962	8.00	7.00, 8.00	-
	Six months	8.39 ± 0.748	9.00	8.00, 9.00	< 0.001
	One year	9.61 ± 0.557	10.00	9.00, 10.00	< 0.001
	Change (%)	30.53 ± 18.058	25.00	13.00, 43.00	-
IIEF total (max 75)	Basal	49.04 ± 5.905	49.00	45.50, 54.00	-
	Six months	56.66 ± 5.594	58.00	53.00, 61.00	< 0.001
	One year	67.88 ± 5.513	70.00	66.00, 72.00	< 0.001
	Change (%)	39.44 ± 11.162	37.50	30.75, 48.25	-

As illustrated in table (4), a significant positive correlation was detected between the % EWL and the total IIEF score changes, including all of its components ($p < 0.05$). This confirms the positive impact of weight loss on sexual function in the study participants.

Table (4): Correlation between change in IIEF and EWL during one-year follow-up.

Erectile dysfunction	All patients (n= 114)	p
Erectile function change (%)	0.292	0.002
Orgasmic function change (%)	0.201	0.032
Sexual desire change (%)	0.219	0.019
Intercourse satisfaction change (%)	0.438	< 0.001
Overall satisfaction change (%)	0.218	0.020
IIEF total change (%)	0.389	< 0.001

As illustrated in figure (1), not only did the prevalence of ED decrease, but also its severity decreased in the remaining cases who had ED at one-year follow-up.

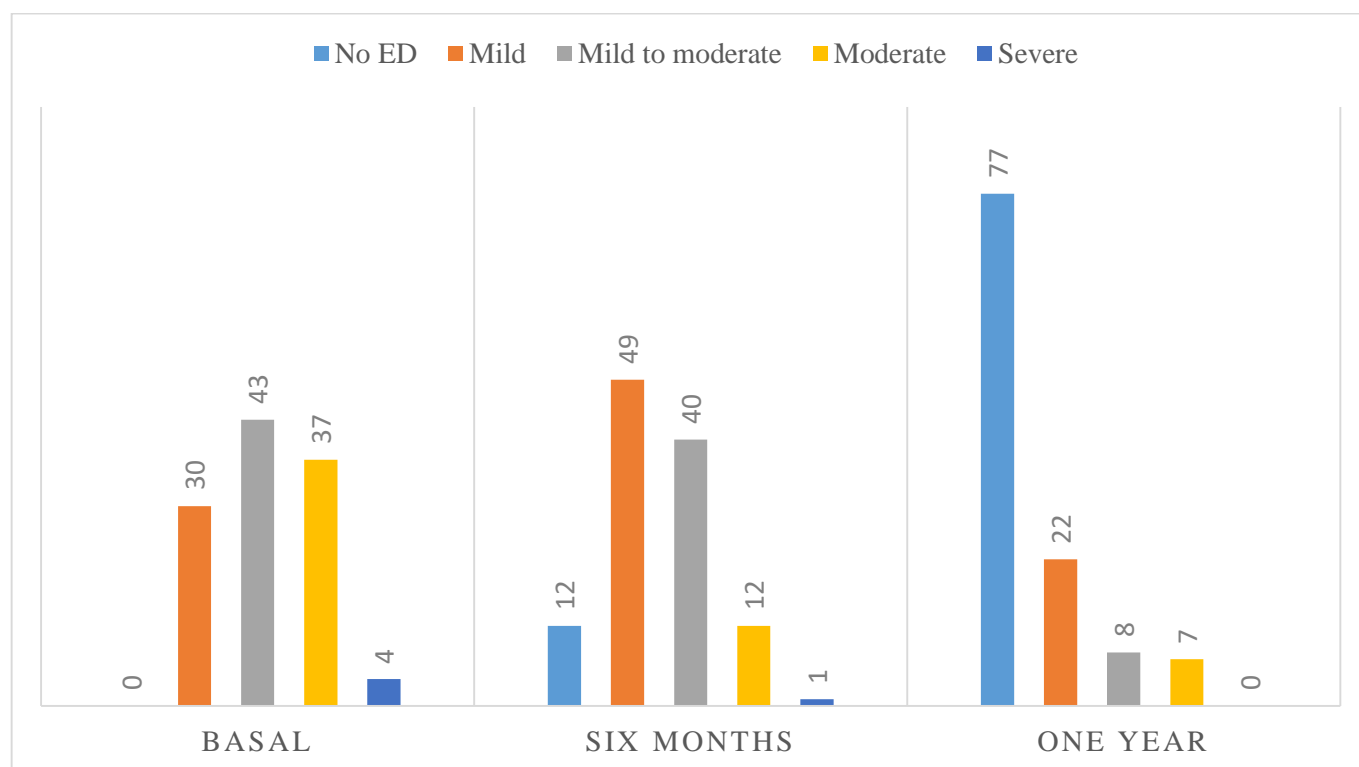


Figure (1): Changes in the severity of ED in the study participants.

DISCUSSION

We conducted this study to evaluate the effect of LSG on sexual function in male patients with morbid obesity and ED. Endothelial dysfunction, hormonal imbalance, insulin resistance, sedentary lifestyle, and psychological may all contribute to sexual and erectile dysfunction in morbidly obese patients, according to available research. With achieving effective weight loss, these associations should be improved or resolved, which in turn will lead to a marked improvement in the preexisting dysfunction⁽²²⁻²⁴⁾.

In the current study, LSG succeeded in achieving a mean EWL of 61.18% (range, 30 – 91). **Praveenraj et al.**⁽²⁵⁾ also reported that the EWL had a mean value of 60.19% one year after LSG (range, 33.83 – 104.65%). Other studies reported mean values of EWL comparable to ours at the same follow-up period. **Menenakos et al.**⁽²⁶⁾ reported EWL of 66%, and **Atkins et al.**⁽²⁷⁾ reported a value of 61% for the same parameter. All of these studies came in line with our findings regarding weight loss.

Our findings showed significant improvement of the total IIEF score with its components, including ED. In addition, the prevalence of ED decreased significantly at both six- and twelve-months follow up ($p < 0.001$). The largest change was noticed in the intercourse satisfaction and erectile function components, while less values were noticed in the remaining three components. We noticed that even in patients who had ED at the last follow-up visit, its severity was decreased compared to the baseline value. **Aleid et al.**⁽²⁸⁾ reported that bariatric surgery was associated with a significant rise in the total IIEF score

in obese patients with ED. It had median values of 35 and 66.5 before and six months after surgery ($p < 0.05$). Regarding the included domains, the erectile function component was the earliest one to show improvement, which was evident one month after surgery. Other domains achieved a statistical difference at three- and six-months follow-up visits⁽²⁸⁾. This comes in line with our findings. Another recent meta-analysis confirmed the beneficial impact of bariatric surgery on the IIEF score with all its components ($p < 0.05$), apart from orgasm function, which showed no significant change ($p = 0.2$)⁽¹⁷⁾. Although some studies have denied the significant impact of weight loss on orgasm function^(29, 30), we believe that improvement of other parameters would have a positive impact on that item. Better sexual experience after operation compared to the status prior to it could affect patient assessment using this subjective measuring scale. Another important item to be considered is the satisfaction of the other partner, which could also affect this outcome. However, it was not assessed in our study. **Mora et al.**⁽¹⁸⁾ confirmed the previous findings as the total IIEF score showed a significant increase one year after bariatric surgery (from 54.85 up to 61.21 – $p = 0.006$). Regarding the underlying components of the same scale, the erectile function component increased from 21.95 at baseline to 25.74 at the same follow-up visit ($p = 0.002$). Additionally, sexual desire and overall satisfaction were significantly improved after surgery ($p < 0.05$). Nevertheless, the same authors reported no significant improvement in the orgasm function and intercourse satisfaction components ($p = 0.843$ and 0.083 respectively). **Groutz et al.**⁽³¹⁾ evaluated changes in the

same score three months after bariatric surgery in 39 participants. The authors reported a significant increase in the erectile function score from 22.7 before the operation to 26.1 after it ($p = 0.02$). Moreover, both intercourse and overall satisfaction also showed a significant improvement ($p = 0.01$ and 0.02 respectively). Although orgasmic function and sexual desire increased after the operation (from 8.5 to 9.2 for the former and from 7.8 to 8.4 for the latter), these changes were not significant in statistical analysis ($p > 0.05$)⁽³¹⁾.

Dallal et al.⁽¹⁾ used another scale (Brief Male Sexual Function Inventory or BFSI) in patients undergoing the gastric bypass procedure. The authors reported a significant improvement in all domains of that scale, including sex drive, erection, ejaculation, problem assessment, and sexual satisfaction ($p < 0.05$). The erection domain increased from 6.4 before surgery up to 8.9 during follow-up assessment after a mean follow-up period of 19 months.

On the other hand, **Ranasinghe and his colleagues**⁽³²⁾ reported no significant improvement of IIEF after the bypass procedure. The total IIEF score had mean values of 51.36 and 48.17 before and after operation, respectively ($p = 0.7012$). In addition, both erectile and orgasmic components showed worsening after surgery when adjusted for time. Authors attributed their findings to micronutrient malabsorption following this procedure, especially zinc element⁽³³⁾. Of course, the application of purely restrictive procedures, like LSG, with strict follow-up and patient monitoring should decrease the risk for such deficiencies compared to malabsorptive procedures^(34,35).

Our findings showed that a significant positive correlation was detected between the % EWL and the total IIEF score changes, including all of its components. In the same context, **Mora and his associates**⁽¹⁸⁾ reported a significant negative correlation between total IIEF score and different anthropometric measures, including weight ($p = 0.001$), BMI ($p = 0.01$), and excess weight ($p = 0.002$). Furthermore, according to **Dallal et al.**⁽¹⁾ the amount of weight loss was a significant predictor for the degree of improvement in all BFSI domains. Patient weight had a significant negative correlation with all BFSI components ($p < 0.05$). This indicates that the more weight loss experienced, the more improvement sexual function is expected.

Our study has a few flaws, initially it is a single-center study. Also, it lacks data on the included participants' intermediate and long-term follow-up. These cons should be well evaluated in future studies.

CONCLUSION

According to the previous results, LSG improved sexual and erectile dysfunction in obese male patients. The associated weight loss led to a significant decline in the prevalence of ED, and if the problem did

not resolve, its severity would be markedly decreased. Therefore, LSG could be considered an effective option for improving this problem in obese individuals.

Conflict of interest

The authors of this paper have declared that they have no conflicts of interest.

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