

Effect of gender on outcomes of laparoscopic sleeve gastrectomy: A prospective comparative study

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Abstract: Introduction and aim of work: Bariatric surgery is becoming the standard of care for morbid obesity. Several operations are utilized to treat these cases with differences in response between males and females. In this study we explored the difference in early response to laparoscopic sleeve gastrectomy (LSG) according to patients' gender. **Patients and Methods:** Thirty patients (15 females and 15 males) with morbid obesity were subjected to LSG and followed up for a period of 6 months (at 1, 3, and 6 months). Weight loss and BMI loss were calculated. **Results:** The mean weight loss in males was 13.00, 22.47 and 34.33 at 1, 3 and 6 months respectively while females lost 10.00, 16.93 and 23.80 at the same time points. The mean male BMI loss was 4.39 ± 1.43 , 7.56 ± 2.17 and 11.56 ± 3.20 at 1, 3 and 6 months respectively, while female BMI loss at the same time points was 3.88 ± 1.47 , 6.55 ± 2.06 and 9.17 ± 2.66 . **Conclusion:** LSG is an effective procedure for weight loss, however there is difference in response according to gender, where men perform favorably in short term. Longer periods of follow up are needed to confirm the stability of these results.

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1. Introduction

Obesity is considered a pandemic, which affects nearly every country in the world. It affects both males and females at different age groups.(1) Morbid obesity usually fails conservative treatments and surgical interference is needed to attain successful reduction in weight and body mass index (BMI) as well as improvement of associated co-morbidities.(2)

Bariatric surgery involves several procedures that have been employed with different results regarding success rates and complications.(3) Laparoscopic sleeve gastrectomy (LSG) is one of the most effective and less technically demanding bariatric operations, hence gaining popularity as a treatment for morbid obesity (4)

In literature, there is a controversy regarding the gender influence on the results of different techniques of bariatric surgeries(5-7). The objective of this study is to evaluate the effect of gender on short term outcomes of LSG.

2. Patients and Methods

This study had been conducted in Kasr-Alaini New Teaching Hospital in the period between September 2013 and May 2014. The institutional review board approved the study. The first 30 patients with morbid obesity attending the outpatient clinic matching the inclusion criteria and consenting to participate in the study were included. They underwent LSG. The study included patients with BMI > 40 or BMI > 35 with co-morbidities, age

between 18-60 years, previous failed attempts of medical management approaches such as lifestyle modification through proper nutrition and increased exercise, behavioral modification and medication. Patients with endocrinal disorder leading to obesity, psychological disorders, addiction or had previous bariatric surgeries were excluded.

All patients were subjected to full clinical and routine laboratory evaluation. Clinical evaluation aimed at assessment of degree of obesity, preoperative evaluation and detection of different complications of morbid obesity like hypertension, diabetes, sleep apnea and skeletal problems.

LSG was performed using five ports including one port for liver retractor and a 36 French bougie, starting the resection 3-6 cm proximal to the pylorus. All patients were instructed to take oral fluids for 2 weeks followed by semisolid and pureed diet for another 2 weeks then start normal feeding in the form of small frequent well chewed meals. Follow up by assessment of weight, improvement in co-morbidities and diagnosing complications at 1, 3 and 6 months postoperatively were done.

Statistical analysis was done using SPSS software version 16. Mean and standard deviation were used to describe continuous data; chi square test was used with $p \leq 0.05$ is considered significant.

3. Results:

The age of the patients ranged between 20 years and 60 years (mean= 32.53 years), 15 patients were

females, their mean age was 31.20 years, while males mean age was 33.87 years. The BMI of all patients ranged from 35.6 - 81.3 kg/m² with a median of 46.4 kg/m². Mean BMI for females was 47.04 kg/m² (range= 35.6 – 52.4) and for males was 55.31 kg/m² (range= 41.0 – 81.3). There was no significant difference between females and males as regards operative duration and hospital stay. Although there was a trend to increased complications in male patients however there was no statistically significant difference between females and males in intra-operative or post-operative complications. One serious complication in the form of postoperative bleeding

happened with a 25 years old male patient that required blood transfusion and re-exploration by laparoscopy, but no definite source of bleeding was found just drainage of hematoma and lavage were done. Other complications in the form of vomiting, atelectasis, gastroesophageal reflux, fever and wound infection were managed conservatively.

Males had lost more weight than females at 1, 3 and 6 months, these differences were statistically significant at all three time points as shown in (Table 2).

Table (1) Patient characteristics

	Male (n= 15)	Female (n= 15)	P-value
Age	33.87 ± 11.56	31.20 ± 10.35	0.511
BMI	55.31 ± 9.20	47.04 ± 4.96	0.005*
Intraoperative duration (min)	95.67 ± 19.17	94.33 ± 24.78	0.870
Hospital stay (days)	1.53 ± 1.25	1.07 ± 0.26	0.167
Complications	8 (53.3%)	5 (33.3%)	0.269
- Bleeding	1	0	
- Vomiting	3	2	
- Atelectasis	1	0	
- GERD	0	1	
- Wound infection	2	0	
- Fever	1	1	

Table (2): Weight loss according to sex

Time Points	Weight loss (Kg)		p-value
	Male	Female	
	Mean ± SD	Mean ± SD	
At 1 month	13.00 ± 3.48	10.00 ± 3.61	0.035
At 3 months	22.47 ± 5.24	16.93 ± 5.02	0.013
At 6 months	34.33 ± 7.97	23.80 ± 6.85	0.002

The mean male BMI loss was 4.39 ± 1.43, 7.56 ± 2.17 and 11.56 ± 3.20 at 1, 3 and 6 months respectively, while female BMI loss at the same time points was 3.88 ± 1.47, 6.55 ± 2.06 and 9.17 ± 2.66 (Figure 1). There

was no significant difference at 1 and 3 months between females and males, yet, at 6 months the difference in BMI loss reached statistical significance (*p*-value= 0.036) (Table 3).

Table (3): BMI loss according to sex

Time Points	BMI loss		p-value
	Male	Female	
	Mean ± SD	Mean ± SD	
At 1 month	4.39 ± 1.43	3.88 ± 1.47	0.290
At 3 months	7.56 ± 2.17	6.55 ± 2.06	0.206
At 6 months	11.56 ± 3.20	9.17 ± 2.66	0.036*

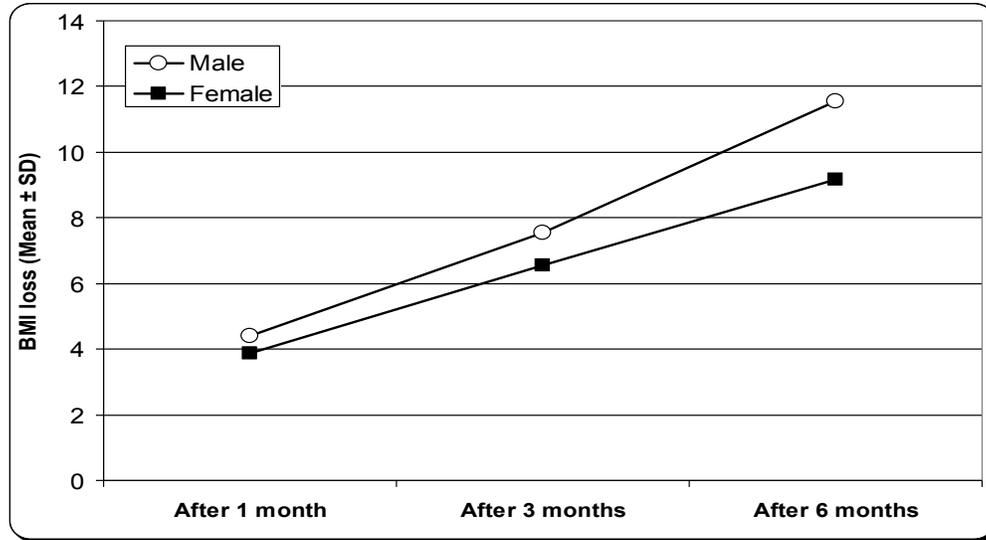


Figure (1): BMI loss at 1, 3 and 6 months.

4. Discussion:

LSG as a stand-alone procedure is considered now one of the most popular and successful bariatric surgeries(8). The response to several procedures according to gender has been reported(6). Unfortunately, there is no standard method for measuring the effect of weight loss after bariatric surgery; hence several measures appear in the literature, such as absolute weight loss, BMI loss, percentage of excess weight loss and excess BMI loss(9).

In this study we report on the short term difference in response to LSG between females and males. Males lost more absolute weight at all time points. They also lost more BMI but with no statistical significant difference except at 6 months.

Some studies didn't find a difference between females and males as regards the response to different procedures(10-12), while others reported a better male response in the form of absolute weight loss (13-16) contradicting fewer studies reporting more absolute weight loss in females (17, 18). Some studies had mixed data in the form of more absolute weight loss in males, while females lost more BMI(19).

The importance of reporting the influence of gender on the results of different procedures may help customizing the choice of the available procedures to suite the patients better. Our results support the notion that LSG is a more fruitful procedure for males; they have lost more absolute weight and BMI in a short period of time.

Few studies targeted the effect of gender on response to LSG. Perrone*et al.*, reported results similar to ours, where in a study comparing LSG (162 patients) and laparoscopic Roux en Y gastric bypass (LRYGP) (142 patients). LSG was more effective in

men, while there was no statistical significant difference in LRYGP(7). Similarly, Anderson *et al.*, in a study o 160 patients stated that female gender was a predictor for lower percentage of excess BMI loss after LSG(20).

The reason why a certain gender should perform better after a certain procedure is yet to be discovered. However, on daily practice basis one should make the best decision for his patient, and it seems that gender should play a role in the decision making.

In conclusion:

LSG is an effective procedures for weight loss, however there is difference in response according to gender, where men perform favorably in short term. Longer periods of follow up are needed to confirm the stability of these results.

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