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Effectiveness of Laparoscopic Sleeve Gastrectomy for Weight Loss and Associated Co-Morbities Follow up and Outcome, Baghdad / Iraq

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Abstract:

Objective:

Laparoscopic sleeve gastrectomy (LSG) is becoming a stand-alone bariatric surgery for obesity.

Aim

To evaluate the effectiveness of LSG for weight loss and associted comorbities on obese patients in medium term follow-up

Patients and Methods:

The study consisted of 47 patients (40 females and 7 males) underwent LSG the period from September 2012 to january 2018 at Medial city Baghdad teaching hospital 3rd floor single team results. The BMI ranged from 36 to 66, and aged from 18 to 66 years. Patients were grouped into three groups according to preop. BMI 3539.9 (11) 40-49.9 (18) >50 (18).Medium-term outcome measures were: total weight loss (%TWL), excess weight loss (%EWL) and associated co-morbidities.

Results

47 patients underwent LSG in our unit comprising 40 women and 7 men with a mean age of 33.7±7.2 years. preoperative mean body weight (BW) and BMI were 127±23.8, 47.2±7.6 respectively, After LSG, the mean BW significantly declined to 97.2±17.1 kg at 6 months, 88.3±14.4 kg at 1 year, 85.1±13.7 kg at 2 years,83.7±13.6 kg at 3 years and 82.2±11.1 at 4 years, Postoperative BMI was 36.1±5.3kg/m2 at 6 months,32.9±4.49 kg/m2 at 1 year, 31.7±4.3 kg/m2 at 2 years,30.8±4.09kg/m2 at 3 years and 30±3.3 at 4 years

Conclusion

LSG is effective in weight loss and is a resonable option for obese patients,especially for patients with a BMI >40 kg/m2

Key words: Laparoscopic sleeve gastrectomy, weight loss, comorbidities.

Introduction

Obesity is pandemic, increasing in prevelance (1).nearly tripled since 1975.

according to WHO in 2016 more than 650 million were obese (13%) of adults aged above 18 years(2).

Obesity in iraq is increasing, overall overweight and obesity affects 55.1% of the population (54.7% of women and 45.3 % of men) (3).

Co-morbidities associated with morbid obesity include type 2 diabetes (T2DM), ischemic heart diseases, musculo-skeletal disorders, sleep apnea and a higher mortality rate.

With income increasing and the changes in food structure, the incidence of obesity and associated comorbities had grown in recent years. More and more people accepted the view that morbid obesity is a disease, which greatly harms health and needs medical intervention.The medical treatment of obesity did not achieve sufficient success to balance the increase in the prevalence of obesity. the high failure rate (95%) of medical treatment in achieving weight loss in the long term contributes to the need for the emergence of bariatric surgery(4).

Bariatric surgery proved to be the most successful treatment as it achieves long-term weight loss and correction of metabolic abnormalities in patients suffering from obesity(5)

Laparoscopic sleeve gastrectomy has increasingly gained acceptance among bariatric surgeons during the past years. Even high-risk patients underwent a staged procedure with LSG serving as a primary stage before RYGB or biliopancreatic diversion/duodenaswitch(6)

Laparoscopic sleeve gastrectomy (LSG) is abariatric procedure that can induce weight loss mainly by reducing gastric capacity and changing hormone, (ghrelin and obestatin) secretion to limit food intake and appetite(7)

Data have shown that LSG is a highly efficient, technically easy and safe bariatric operation that can be used as a stand-alone procedure(8).

Laparoscopic sleeve gastrectomy(LSG) has become one of the most commonly used bariatric procedures worldwide(9)

The considerable popularity of this procedure may be due partly to its seeming technical ease and good results. The world wide popularity of LSG increased from 4.5% of all bariatric procedures in 2008 to 37% in 2013, and it became the most popularoperation in the USA in 2015 (10).

Aim of the study

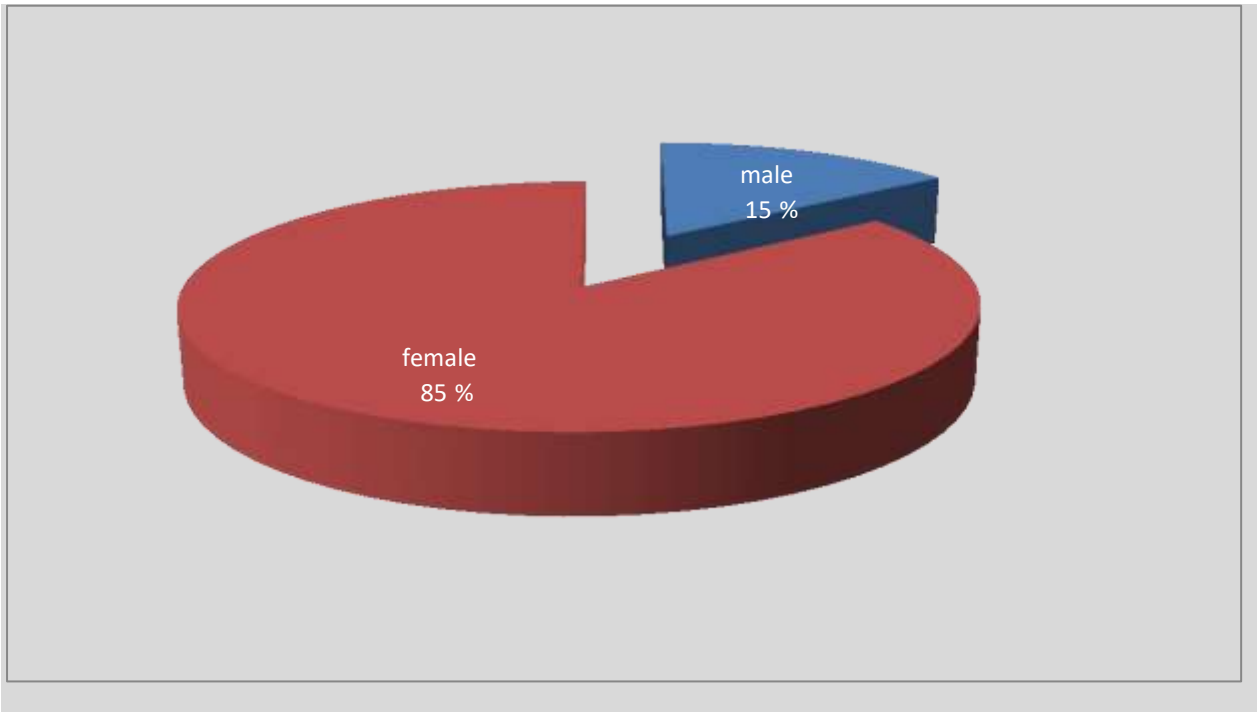
The goal of this study was to extended protrospectively evaluate the outcomes of patients who underwent LSG as a primary bariatric procedure in terms of weight loss, complica

Patients and methods:

Data collection:

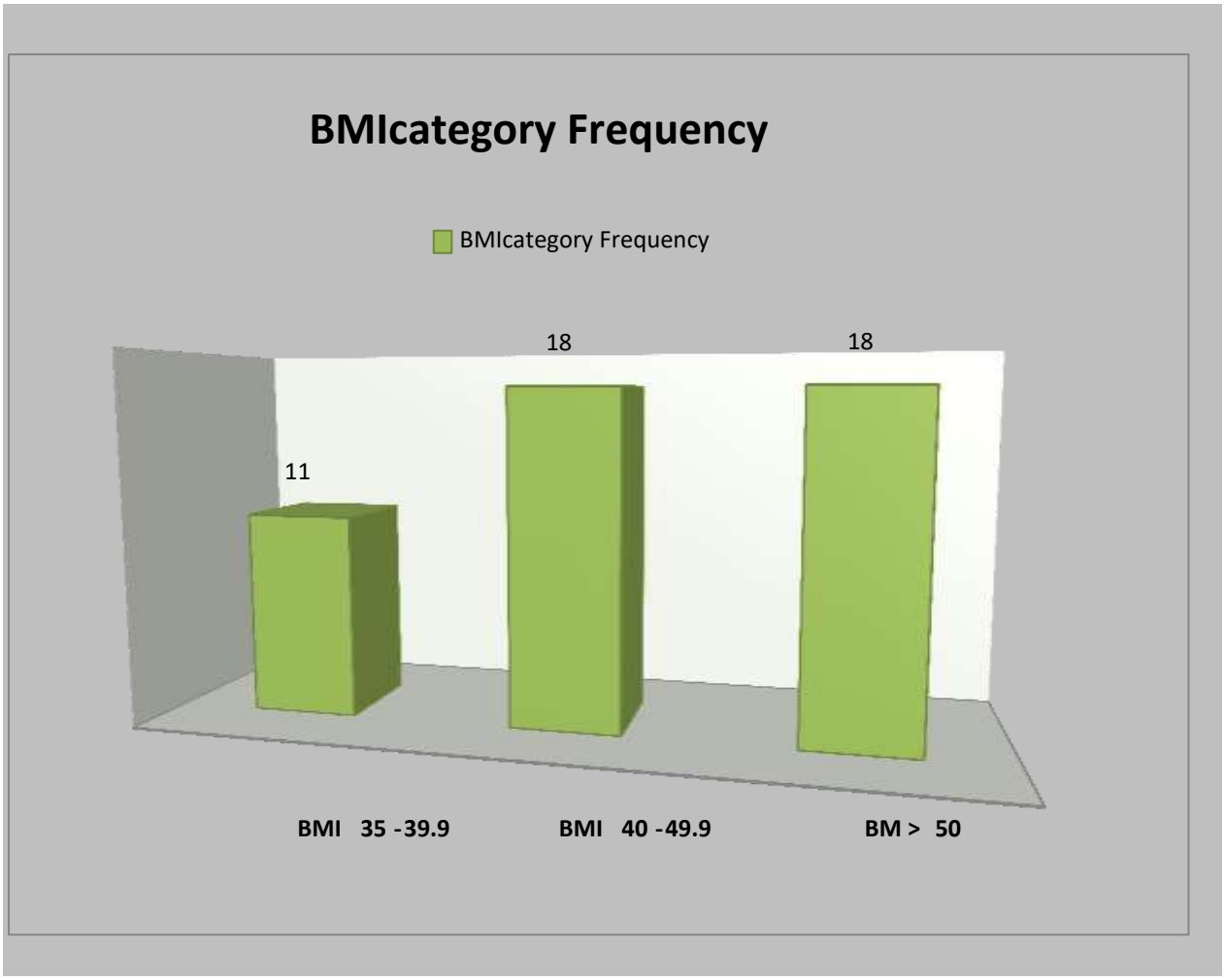
The sample consisted of 47 patients (40 females and 7 males), (fig.1) underwent LSG the period from septeber 2012 to january 2018 in Medical city Baghdad teaching hospital third floor single team results.

tions, and co-morbidity improvements, over >48 months of postoperative followup.



(Figure.1, gender frequency)

Participants ranged from 35 BMI to 66 and aged from 18 to 66 years. Patients were grouped into three groups according to preoperative BMI 35-39.9 (11) 40-49.9
(18) >50 (18), (fig. 2).



(figure.2; Body mass index categories)

After institutional review board approval and written informed consent obtained from all patients,a extended prospective review of all obese patients treated with LSG.

The data base includedpatients' preoperative demographic characteristics [age,sex,body weight(BW), BMI(kg/m2), and obesity-related comorbidities] as well as postoperative follow-up data including total weight loss(%TWL), excess weight loss (%EWL), complications. after 6, 12, 24, 36 and 48 months, respectively.The %TWL was calculated using the formula:(weight loss/the initial weight)*100.

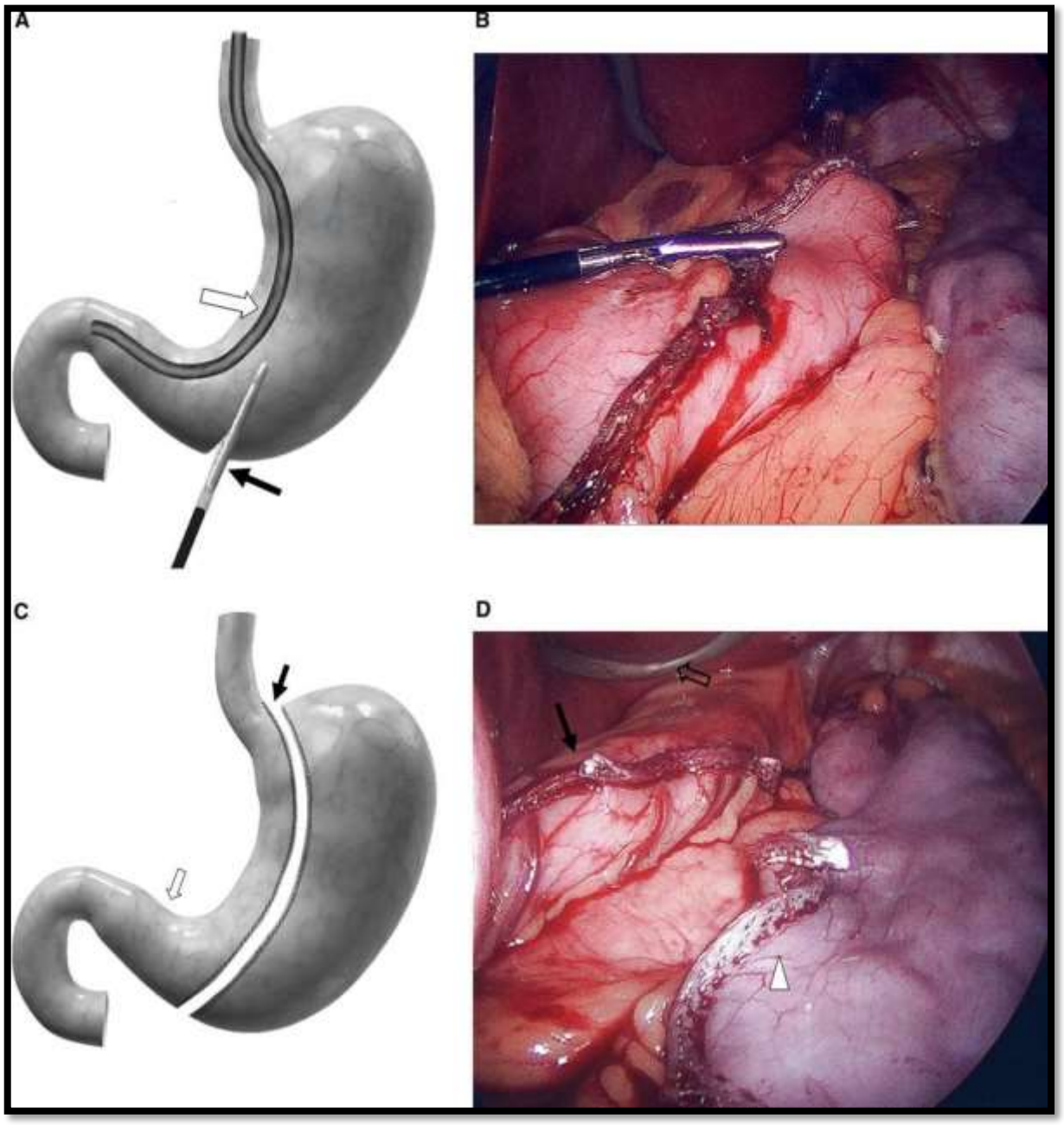
The %EWL was calculated using the formula:(weight loss/baseline excess weight)*100, where weight loss = preoperative weight _initial weight;baseline excess weight =initial weight_ideal weight.

Outcomes and follow-up

Weight was assessed using a standard physician scale,with patients in light clothing without shoes. Height (to calculate BMI) was assessed using astandard physician stadiometer. Percent excess weight loss (%EWL) and total weight loss(TWL) were the different weight loss outcomes tested. Failure was defined as
%EWL<50%, in analogy with Reinhold's criteria [10].

Surgical Procedure

LSG surgery was performed by single team at Medical ccity Baghdad teaching hospital third floor using a 4 trocar laparoscopic technique.The greater curvature of the stomach was divided using an Enseal scalpel (Ethicon Endo-surgery) from the distal antrum (4 cm proximal to the pylorus) to 1cm of the gastroesophageal junction, taking special care to expose the left crus and completely dissect the gastric fundus. A36-Fr bougie was inserted transorally along the lesser curvature to calibrate the sleeve. five to seven 60-mm endoscopic staples (Echelon Endopath™ stapler, Ethicon Endo-surgery) were fired to transect the excess stomach, first one, Green then gold, and last one were blue cartridges, depending on the thickness of the stomach. Leaking test done by insuflation of air 50-100 cc through the bogie. The transected gastric specimen was retrieved via a port site and the abdominal cavity drainage tube was placed (fig. 3)



(figure.3; laparoscopic sleeve gastrectomy procedure)

Patients start oral fluids in the 3rd day post-operatively,drain removed after 5 days, allowed to eat semi solid food after 10 days, start sport excercise after 2 weeks.

Out patient follow-up visits were performed at 1, 3, and then every 6 months after surgery. communication via outpatient visit ,telephone call,and e-mail.

Statistical Analysis

Data were analyzed using excel and Statistical Package for Social Science (SPSS v24) programe under Microsoft Windows. Data were included from patients who underwent surgery in the past 4 years, had 6 and 12 month follow-up data and had data from at least 3 other time points. This inclusion criterion was used to increase the rates of available data and reduce the amount of data that would need to be imputed at later time points (i.e.,24 and 36 and 48 month follow-up). Participants were grouped according to preoperative BMI, and between-group differences in postoperative weight loss were tested.

Results

From september 2012 to january 2018 47 patients underwent LSG in our unit comprising 40 women and 7 men with a mean age of 33.7±7.2 years.preoperative mean body weight(BW) and BMI were 127+_23.8, 47.2±7.6 respectively.the comorbid diseases were dyslipidemia 12.7%(n:6) Hypertention 10.6%(n:5), osteoarthritis 10.6%(n:5) obstructive sleep apnea 6.3%(n:3) and T2DM 4.2%(n:2).

All patients were completed the procedure laparoscopically, the mean operative time was 75 minutes, no mortality was reported during follow-up.

Weight loss

Median and mean follow-up times were 36 (range, 6-48) months and 28 -14 months, respectively. Follow-up done for 100%(47 patients) 6 months, 89.3% (42 patients) at 1 year, 72.3%% (35 patients) at 2 years, and 57.4% (27 patients) at 3 years and 46.8% (22 patients) at 4 years.

After LSG, the mean BW significantly declined to 97.2±17.1 kg at 6 months, 88.3±14.4 kg at 1 year, 85.1±13.7 kg at 2 years,83.7±13.6 kg at 3 years and 82.2±11.1 at 4 years (P <.05)

Postoperative BMI was 36.1±5.3kg/m2 at 6 months,32.9±4.49 kg/m2 at 1 year, 31.7±4.3 kg/m2 at 2 years,30.8±4.09kg/m2 at 3 years and 30±3.3 at 4 years which were all significantly lower than the preoperative value (P <.05, Fig. 4).

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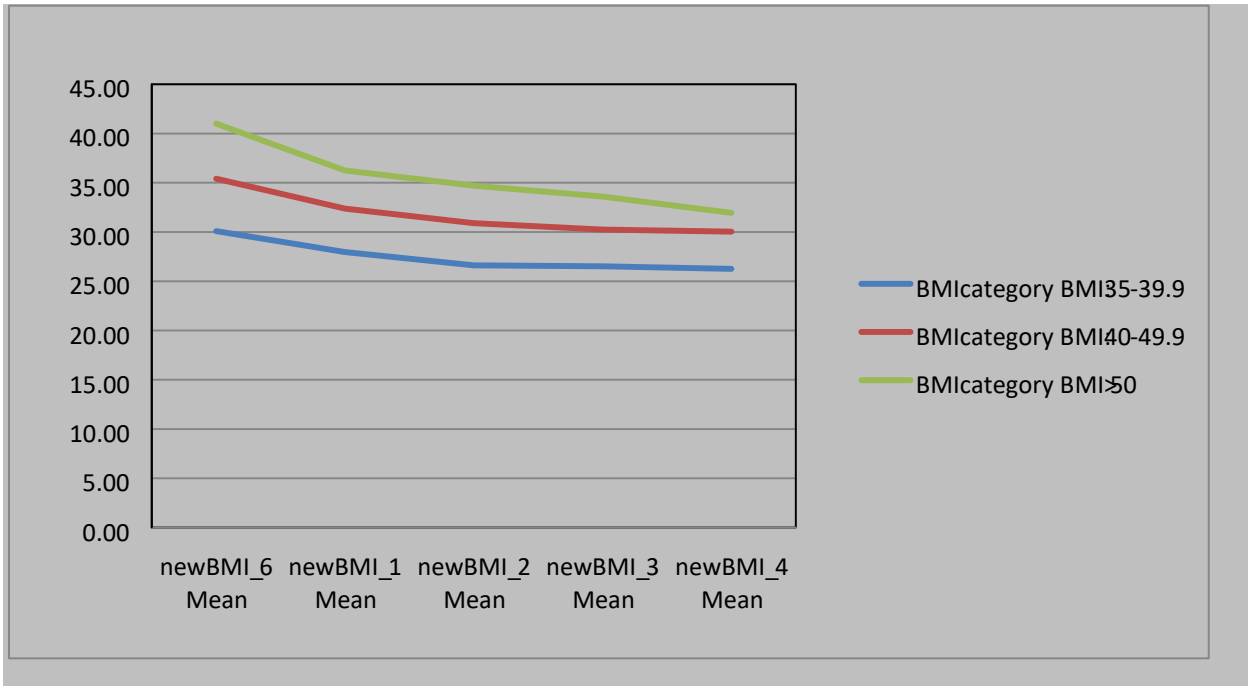
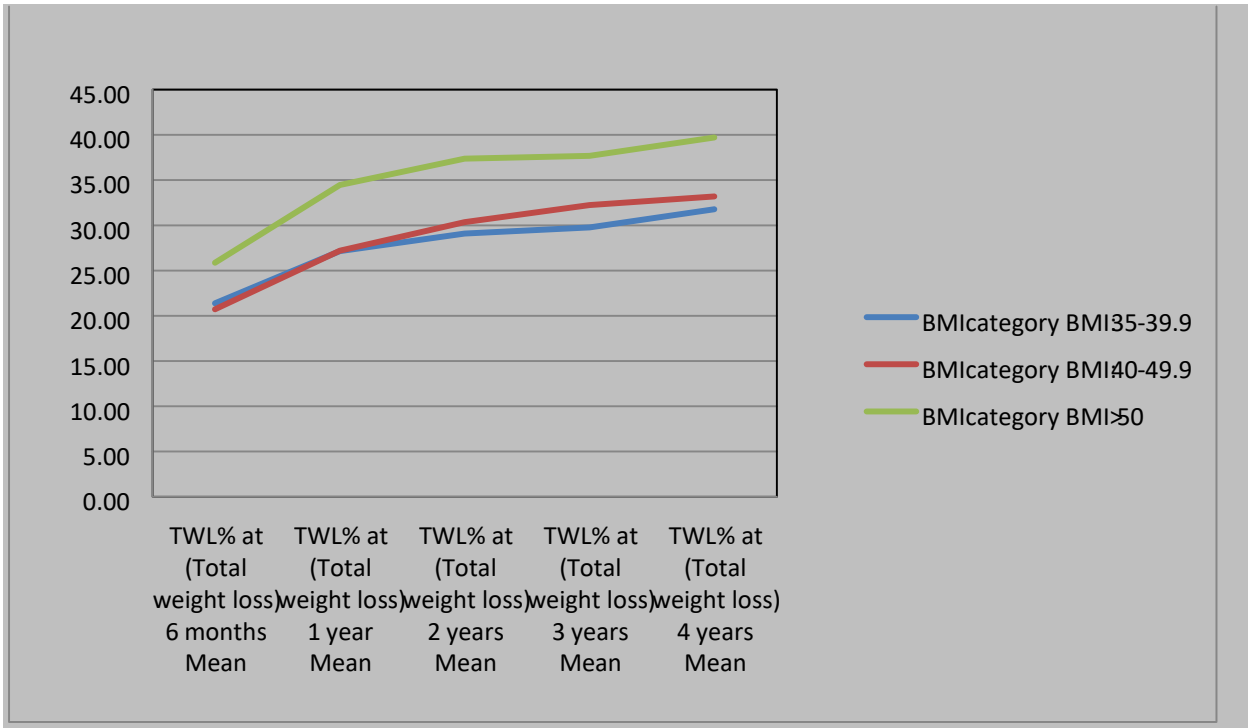


(figure.4; comparison of BMI loss in different categories)

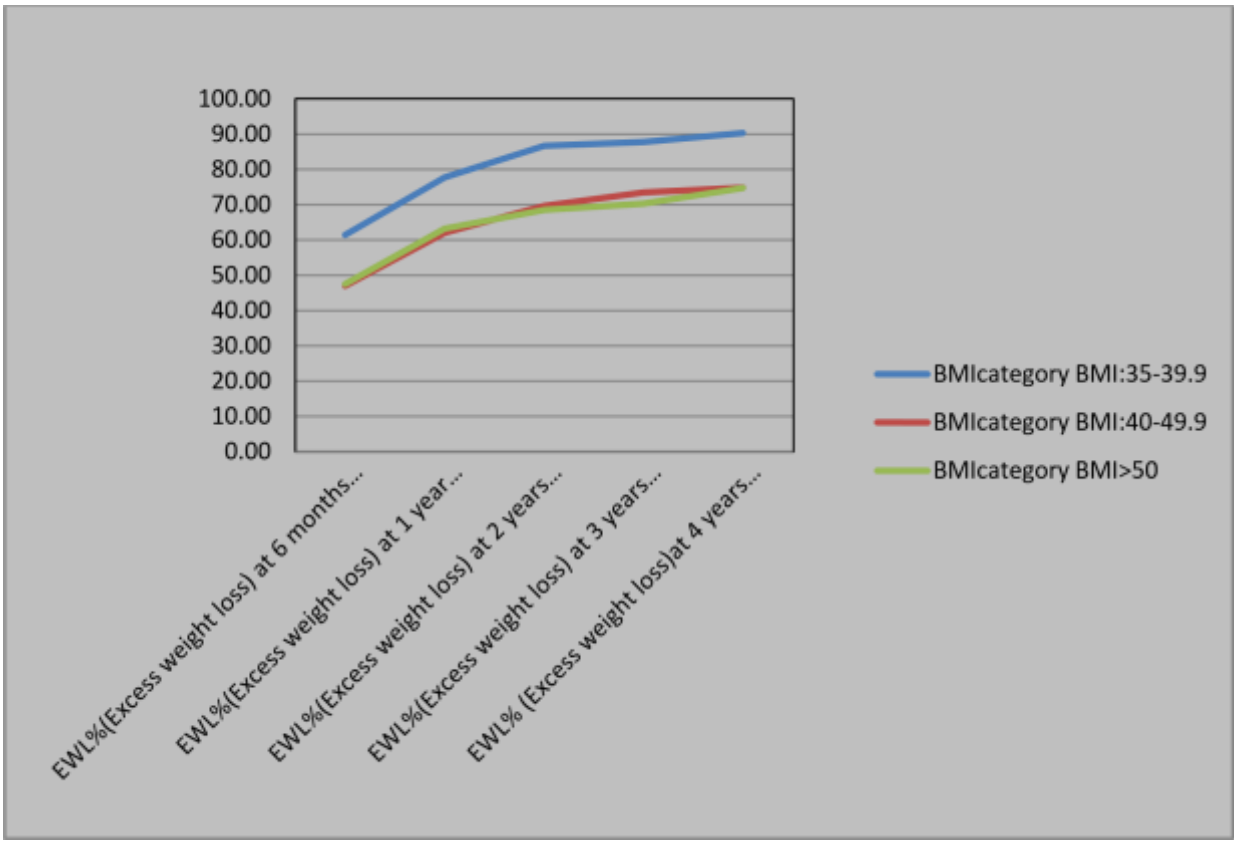
The mean %TWL achieved was 23.1±4.7 at 6 months, 30.4±6.1at 1 year, 33.5±5.8 at 2 years,34.7±5.89 at 3 years and 36.2±5.9 at 4 years.



(figure.5; comparison of total weight loss for different categories)

The proportions of patients having successful weight loss (%TWL >10%) were 100% from 6 months to 4 year(fig. 5)

The %EWL gradually increased from 51.1±11 at 6 months,66.49±13.8 at 1 year, 72.7±13.6 at 2 years,76.2±15.3 at 3 years and 78.8±14.7 at 4 years (Fig. 6).



(figur.6; comparison of excess weight loss for different categories)

The patients were divided into three (BMI 35-40),(40-50)and(>50 kg/m2) groups according to mean BMI. We also compared the therapeutic differences after LSG for these three subgroups. In line with the overall results, the BW and BMI were also significantly decreased, but the % TWL and %EWL were significantly increased for the high and low BMI groups.

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(Table 1) Weight loss in patients after laparoscopic sleeve gastrectomy

	6 Months	1 Year	2 Years	3 Years	4 Years
Bmicategory Ewl%	Bmi:35-39.9	61.44	77.74	86.69	87.82	90.32
	Bmi:40-49.9	47	62.05	69.69	73.48	74.87
	Bmi>50	47.49	63.24	68.55	70.3	74.76
Bmicategory Twl%	Bmi:35-39.9	21.38	27.14	29.08	29.76	31.78
	Bmi:40-49.9	20.72	27.2	30.35	32.25	33.2
	Bmi>50	25.87	34.46	37.38	37.69	39.7

Nevertheless, contrary results to compare the weight loss effect for the high and low BMI groups were achieved when using %EWL or %TWL. The weight loss effect of LSG was more significant in the low BMI group(<40 kg/m2) when using %EWL (61.4±5.45 versus 47±8.7 , 47.4±7.4at 6 months; 77.7±7.3 versus 62±11 , 63.2±9.6 at 1 year; 86.6±1.9 versus 69.6±6.9 , 68.5±10.5 at 2 years; 87.8±3.6 versus 73.4±7 , 70.3±11.4 at 3 years and 90.3±3.8 versus 74.8±5.7 and 74.7±10.1 at 4 years.

Otherwise, when using %TWL (21.3±2 versus 20.7±4.2, 25.8±3.8 at 6 months 27±2.6 versus 27.2±5.4, 34.4±4.9 at 1 year; 29±1.6 versus 30.3±3.6, 37.3±5.4 at 2 years; 29.7±1.5 versus 32.2±3.5, 37.6±6.2 at 3 years and 31.7±11 versus 33.2±3.2, 39.7±6.2).

Weight regain

Two patients developed weight regain, first one male his weight was

173 kg drop to 137 kg after 18 months regain weight 145 kg as he did not perform exercise and take high calorie diet (drinking one can of pepsi every day), second one female preoperative weight was 120 kg drop to 85 after 1 year regain weight to 95 as she does not attend regullar follow up and does not play sport.

Complications

One patient converted to open surgery due bleeding from meseteric vien injury during primary port insertion (visi port), bleeding controlled and the procedure completed laparoscopically, one case of port site infection about 500 cc pus collection from the port we extract the stomach, one case of chest infection (pneomonia), 3 cases of capsular injury to the spleen during dissection of short gastric vessels managed by packing.

Co-morbidity improvements

The co-morbid diseases were dyslipidemia 12.7%(n:6) results return to normal value after 12 months, Hypertention 10.6%(n:5) after 3 months return to normal plood pressure, osteoarthritis 10.6%(n:5)one was on wheel chair return to walking and another one was on crutch return walking without support , obstructive sleep apnea 6.3%(n:3) improved and T2DM 4.2%(n:2) was on treatment now return to normal level of their blood sugar after 6 months post surgery.

Discussion

In the present study, we conducted medium-term observational analysis over 48 months on our own patients recruited from Medical city Baghdad teaching hospital third floor single team results. Consistent with many previous studies[12,13], our results also suggested that LSG was effective in achievingsubstantial weight reduction over medium-term follow-up, with a meanpercent excess BW loss of 51.1±11 at 6 months, 66.4±13.8 at 1year ,72.7±13.6 at 2 years, 76±15.3 at 3years and 78.8±14.7 at 4 years respectively.

Apart from weight control, our results also showed the resolution of obesity associated co-morbidities, such as T2DM,dyslipidemia, osteoarthritis, sleep apnea and HTN at the medium-term assessment. Although, LSG has been suggested as aprimary and reliable bariatric procedure, several studies show the difference in therapeutic effects for different BMIs, For example, Mui et al. demonstrated that patients with a BMI <35 kg/m2 seemed to obtain more significant weight loss from LSG compared with patients with a BMI >35 kg/m2 (%EWL:73.0±44.8 versus
39.9±11.7 at 3 months; 99.4±44.1 versus 61.1±21.1 at 6 months; 88.3±15.8 versus 60.9±29.5 at 12months) [12]. Park et al. also reported that % EWL in the lower BMI(30-35kg/m2) group was significantly greater than in the higher BMI group (>35kg/m2) (86.1%versus 61.9%, P<.001) at mean follow-up of 24months [14]. Boza et al. found that the patients with apre operative BMI >40 kg/m2 achieved significant lower %EWL incomparison with the patients with BMI <40 kg/m2(50.2% versus 72.7%) at 5 years [15].

Considering the mean BMI of our patients was 47.2±7.6 kg/m2, we divided our patients into three BMI groups using 35kg/m2 as the threshold. As expected, we also found that patients with a BMI <40 kg/m2 could achieve significant weight lossfrom LSG compared with patients with a BMI 40-50 kg/m2 and >50 kg/m2 (EWL% 61.4±5.45 versus 47±8.7 , 47.4±7.4 at 6 months; 77.7±7.3 versus 62±11 , 63.2±9.6 at 1 year; 86.6±1.9 versus 69.6±6.9 , 68.5±10.5 at 2 years; 87.8±3.6 versus 73.4±715
70.3±11.4 at 3 years and 90.3±3.8 versus 74.8±5.7 and 74.7±10.1 at 4 years). In addition to %EWL, recent studies also used %TWL to assess weight loss after a bariatric procedure [16,17].It is reported that the %TWL gradually increased along with theincrease in BMI (24% for BMI of 30–35 kg/m2 and 28 % for BMI of 35– 40kg/m2 at 1 year after operation [18]; 38.77% for a BMI >60 and 36.64% for a BMI <60 at 2 years after operation [16]). In line with

these studies, we alsofound that the %TWL was higher in patients with BMI >40 kg/m2 after LSG treatment. Nevertheless, these findings from the %TWL seemed to be oppositethose from the %EWL. This may be explained by the following 2 reasons: (1) the high BMI group had a significant reduction in weight but did not get as close to their ideal weight as the low BMI patients [16]; and (2)the %EWL may be more affected by baseline weight than %TWL [18,19]. Thus,it is still controversial to evaluate the weight loss effect according to the %EWL and the %TWL may be more believable.

In line with these studies,we observed early complications in patients during follow-up in this study.Most complications were dealt with and relieved leading to no mortality.Taken together,our

Limitations There are several limitations to our study. The first limitation of this work is the small number of patients. The small number of patient s with a lower BMI (3035kg/m2) is attributed to the fact that the indication for operation was strictly controlled and most patients have not accepted surgical treatment of metabolic diseases. Consequently, we also cannot compare the difference between LSG and other treatments.Finally, we cannot rule out the influence on the effect of diet for weight loss because the differences in dietary habit are great between every region.16.

Conclusions and recommendations LSG is an effective and safe weight loss procedure for showing favorable outcomes in terms of %EWL,%TWL, and resolution of co-morbidities at 4 years follow-up. Better weight loss and resolution of associated co-mobidities may be seen in patients with a preoperative BMI >40 kg/m2. However, further prospective studies with larger sample sizes are needed to confirm our conclusions.

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