Is re-sleeve gastrectomy after sleeve gastrectomy failure feasible?

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Received 16 April 2017
Accepted 10 September 2017

The Egyptian Journal of Surgery
2018, 37:5–8

Background
There is an increasing incidence of inadequate loss of weight or weight regain after sleeve gastrectomy (SG) accounting for 5–10%, with the potential recurrence of obesity-linked diseases.
Aim
To determine the safety and outcome of redo-SG in patients with failed SG.
Patients and methods
A total of 21 patients with failed SG who received redo-laparoscopic sleeve gastrectomy were evaluated.
Results
Entire cases were accomplished laparoscopically, with a mean operative time of 96.9±10.3 min. The mean percentage excess weight loss, percentage excess;Deg;BM;Deg;l loss, and mean;Deg;BM;Deg;l were 12.4±4.1, 13.5±3.6%, and 49.5±8.0 kg/m^2, respectively, at 1 month; 40.5±6.8, 43.3±7.8%, and 41.5±6.6 kg/m^2, respectively, at 6 months; and 56.8±8.5, 60.3±8.9% and 36.5±4.8 kg/m^2, respectively, at 12 months. At a mean follow-up of 15±2.2 months, two patients were cured of hypertension, dyslipidemia resolved in two patients, diabetes disappeared in two patients, and all patients were cured of joint problems.
Conclusion
In a short period of follow-up, redo-laparoscopic SG after failed SG is a feasible option and has good results regarding weight loss and comorbidity improvement.

Keywords:
bariatric surgery, redo sleeve gastrectomy, weight regainers

Egyptian J Surgery 37:5–8

1110-1121

Introduction

Sleeve gastrectomy (SG) has become now a definitive surgery for all stages of obesity, because it is a simple operation and done without implantation of foreign body with no disruption of the gastrointestinal (GI) tract [1].

Weight regain was observed during long-term follow-up, whatever the type of bariatric surgery, to a little pit significant number of patients, and it is especially common in the restrictive operations.

Development of new reflux symptoms (21%) and regain of weight were noticed between the third and the sixth years postoperatively [1]. A trend of slight weight regain is observed annually after SG as reported by studies [1,2].

Percentage of failed SG patients requiring another operation for control of morbid obesity is somewhere between 5 and 10%. Recurrence of obesity-related morbidities like hypertension and type 2 diabetes mellitus is the most important consequence of weight recidivism [3,4].

The management armamentariums for weight recidivism after SG are redo-SG; conversion to a malabsorptive bariatric procedure like gastric bypass; or achieving more restriction by implantation of adjustable gastric band to the initial sleeve. In this study, we evaluated 21 patients who had undergone redo-laparoscopic sleeve gastrectomy (re-LSG) with a follow-up period of 1 year.

Patients and methods

Eligibility

The study was done in the Department of Clinical and Experimental Surgery, Medical Research Institute, University of Alexandria, Egypt, after approval from the Ethical Committee of our Institution.

A total of 21 patients experiencing weight recidivism or unsatisfactory weight loss after LSG who received re-LSG and completed a period of 1 year after the surgery were evaluated.

The inclusion criteria were the following:

(1) Patients who underwent LSG in our institution from the period of June 2010 to December 2014

 DOI: 10.4103/ejs.ejs_51_17

and experienced insufficient weight loss (defined as loss of <50% of excess weigh) or progressive weight regain over a period of at least 18 months were included.
(2) Persistence of obesity-related comorbidities was evaluated by the use or discontinuation of medications in case of joint disease. Diabetic state was evaluated by fasting blood glucose and glycosylated hemoglobin preoperatively and postoperatively. Hypertension was assessed by systolic and diastolic pressure before and after surgery, and dyslipidemia was evaluated by lipid profile chemistry tests.
(3) After multidisciplinary team assessments, patients with failed LSG were subjected to an upper GI series. If the upper GI series showed the presence of large antrum and/or body and/or gastric fundus which was because of either dilatation after the initial SG or technical failure of the initial SG, then this patient is a good candidate for re-LSG.

Informed consent was signed by all patients, and they understood the possibility of alteration of the procedure to another option, for example, gastric bypass.

Surgical technique

The patients were positioned in an anti-Trendelenburg with split leg position.

(1) Adhesolyis was done using Harmonic Scalpel (Ethicon Endo-Surgery, Cincinnati, Ohio, USA).
(2) Dissection of the sleeve pouch from the liver was done along with complete dissection of the fundus with left diaphragmatic crus exposure with dissection of retrogastric adhesions till complete mobilization of the gastric pouch.
(3) Gastrectomy was done guided by a 36-Fr orogastric tube (Ethicon Endo-Surgery), which was introduced and loosely pressed against the lesser curvature by the stapler.
(4) In case of presence of large gastric antrum, it was resected closure to the pylorus as much as we can.
(5) In case of only dilated gastric fundus, it was resected completely aided by its good dissection till exposure and resection of fundic pad of fat.
(6) Green and black cartridges were used using an endoscopic linear cutter with articulation (Echelon Flex60; Ethicon Endo-Surgery).
(7) Invagination of staple line was done by 2-0 V-loc (Covidien suture, Mansfield, MA, USA).
(8) Tube drain (18-Fr) was placed along the surgical bed.

The orogastric tube was removed after completing the procedure, and the trocar wounds were closed. No nasogastric tube was left.

Study design and sample selection

A total of 21 re-LSG procedures were done in the Department of Clinical and Experimental Surgery in Medical Research Institute, University of Alexandria. The follow-up period ranged from 12 to 19 months, with a mean of 15±2.2 months.

Postoperative management

(1) Patients were started on oral liquids after upper gastrograffin study on postoperative day 1.
(2) If the condition permitted, patients were discharge on postoperative day 2, and the drain was removed before discharge.
(3) Patients' visits were planned for follow-up after 1, 3, 6, and 12 months in the postoperative period for the assessment of postoperative complications and effect of operation on weight reduction.

Statistical analysis

IBM SPSS (SPSS Inc., Chicago, IL, USA), version 20 was used for statistical analysis. The normality of distribution of variables was verified by the Kolmogorov–Smirnov test, and analysis of variance with repeated measures was assessed for comparison between different periods for normally distributed quantitative variables. All statistical tests were judged at 0.05 significance level.

Results

Data after initial laparoscopic sleeve gastrectomy

Before LSG, the mean initial BMI was 57.8±8.7 kg/m^2, mean weight was 153.7±20.8 kg, and there were four comorbid conditions among the 21 patients as shown in Table 1.

First LSG has led to a mean BMI of 53.1±8.3 kg/m^2, a mean percentage excess weight loss (%EWL) of 15.7±8.6, and a mean weight of 139.8±21.6 kg at a mean interval of 26.5±7.8 (18–42) months, as shown in Tables 2 and 3.

Table 1 Distribution of comorbidities before laparoscopic sleeve gastrectomy

	Patients [*n* (%)]
Blood hypertension	3 (14.28)
Type 2 diabetes mellitus	3 (14.28)
Joint disease	10 (47.61)
Dyslipidemia	2 (9.52)

Table 2 Descriptive analysis of the studied cases according to weight, BMI, and excess weight (*n*=21)

	Initial	After 1 year	Before re-sleeve	After re-sleeve			*P*
				1 month	6 months	1 year	
Weight	153.7±20.8	127.0±17.9	139.9±21.6	131.5±21.6	110.2±17.2	97.2±12.4	<0.001*
Excess weight loss (%)	–	29.0±11.5	15.7±8.6	12.4±4.1	40.5±6.8	56.8±8.5	<0.001*
BMI	57.8±8.7	47.8±6.7	53.1±8.3	49.5±8.0	41.5±6.6	36.5±4.8	<0.001*
Excess BMI loss (%)	–	–	–	13.5±3.6	43.3±7.8	60.3±8.9	<0.001*

Table 3 Mean weight and BMI before primary surgery and before re-sleeve

	Before initial operation	Before re-sleeve
Weight (kg)	153.7±20.8	139.9±21.6
BMI	57.8±8.7	53.1±8.3

Regarding comorbidities related to obesity, one of the three patients showed improvement with hypertension, resolution of diabetes occurred in one of the three patients, dyslipidemia was improved in one of the two patients, and joint problems resolved in two and improved in one of the 10 patients.

Data after redo-laparoscopic sleeve gastrectomy

A total of 12 patients of the included cases experienced significant weight regain whereas nine cases experienced inadequate weight loss (<50% of EW).

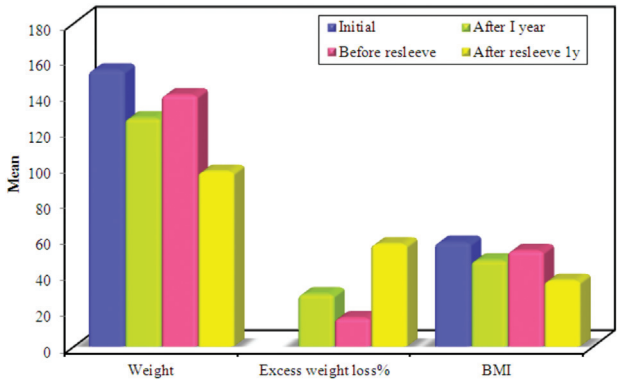
The study included two males and 19 female patients, with a mean age of 32.8±9.9 (20–54) years.

All cases of re-LSG were finalized by laparoscopy without intraoperative or postoperative complications, with a mean operative time of 96.9±10.3 min.

The mean %EWL, mean %EBL, and mean BMI were 12.4±4.1, 13.5±3.6%, and 49.5±8.0 kg/m^2, respectively, at 1 month; 40.5±6.8, 43.3±7.8%, and 41.5±6.6 kg/m^2, respectively, at 6 months; and 56.8 ±8.5, 60.3±8.9% and 36.5±4.8 kg/m^2, respectively, at 12 months, as shown in Fig. 1. The mean follow-up of patients was 15.0±2.2 months.

Regarding comorbidities, two patients were cured of hypertension and stopped taking antihypertensive drugs and one showed improvement, dyslipidemia resolved in two patients, diabetes disappeared in two patients and improved in one, and all patients were cured of joint problems.

Figure 1



Descriptive analysis of the studied cases according to weight, BMI, and excess weight (n=21).

Discussion

SG became the most frequently performed procedure worldwide and in the USA in 2013 and in our institute almost doubled every year. This growth can be attributed to its operational simplicity without interruption of the GI tract [5–8].

Patients who have undergone LSG but have experienced weight recidivism or have developed certain complications, such as new reflux symptoms, can be managed surgically by a second intervention, such re-LSG; conversion to biliopancreatic diversion with duodenal switch; or Roux-en-Y gastric bypass. Single anastomosis duodenoileal bypass with SG represents a new option, but data are limited in the literature and must be validated over time [9,10].

Best way of management of these patients is to take a full history at first and then to assess their weight, BMI, and their alimentary habits. All patients with maladaptive eating disorders because of their bariatric surgery should undergo further psychological assessment and should be treated before consideration for surgical revision.

The next step is to document evidence of primary or secondary dilation of the primary gastric sleeve by upper GI radiological studies. For nonconclusive results, a volumetric computed tomography scan to be done.

Mean gastric volume was studied by Braghetto and colleagues and they found that it had increased from 108 to 250 ml with computed tomography gastric

volumetry with a study conducted on 15 LSG patients on postoperative day 3, and repeated at 3 years after surgery. However, none of these patients regained weight, and they settled that even with tight sleeve, the gastric volume had increased [11].

At 1 year, upper GI radiological studies were performed by Langer *et al.* [12] for 14 LSG patients, and they found that only one patient had fit the criteria for gastric dilation. However, this patient still maintained good %EWL. Moreover, in another study by the same author, weight regain in patients was not correlated with sleeve dilation [13].

According to the literature, redo-SG can be considered when gastric volumetry study reveals a remnant gastric volume more than 250 ml in case of initially performed tight sleeve (i.e. dilatation after the initial SG) and/or when a large gastric fundus and/or antrum is present (i.e. technical failure of the initial SG) [14–16].

Conclusion

In a short period of follow-up, re-LSG for failed SG is a feasible option in presence of large fundus and has significant results regarding weight loss and comorbidity improvement.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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