

Laparoscopic Sleeve Gastrectomy: Comparing Two Techniques

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Sleeve gastrectomy is the fastest growing bariatric surgery nowadays. This is a prospective randomized study comparing two techniques in performing laparoscopic sleeve gastrectomy.

Methods: This is a prospective randomized study of 50 patients divided into 2 groups each of 25, for whom laparoscopic sleeve gastrectomy was done between July 2016 and December 2016, with a follow-up period of 1 year.

Regarding the surgical technique in group (A) dissection of the greater omentum was done till reaching the left crus of the diaphragm then stapling was done after. While in group (B) stapling was done after a small opening was made in the greater omentum then dissection of the greater omentum from the stomach was done.

Results: The mean operative time was 63 (± 16 min) for group A and 55 (± 18 min) for group (B). Regarding major perioperative complications there was a case of significant intraoperative bleeding and a case of portal vein thrombosis in group (A), also there was a case of stricture near the incisura in group (B). There was no mortalities in this study. Mean total blood loss was 70 \pm 11 mL (group A) and 51 \pm 9 mL (group B). Preoperative BMI was 45 \pm 7 in group (A) which decreased to 30 \pm 6 after 12 months, while in group (B), preoperative BMI was 46 \pm 5 decreased to 32 \pm 1, after 12 months.

Conclusion: In this study we compared results of LSG done by two different techniques either to start by stomach full mobilisation then stapling (A) or stapling then mobilisation of the stomach (B). No major differences were observed between the 2 techniques, however patients in group (B) had a shorter operative time and less blood loss.

Keywords: Morbid obesity, bariatric surgery, sleeve gastrectomy, weight loss.

Introduction

Obesity is a major worldwide health problem. Surgery is considered superior to medical treatment regarding weight loss in morbidly obese patients.^{1,2}

Sleeve gastrectomy is a restrictive weight loss surgery in which 85% of the stomach is removed leaving a long narrow tube which is the new stomach. The operation started as a part of duodenal switch surgery in 1988. In 2001 sleeve gastrectomy was done as a first stage, followed by gastric bypass in high risk patients.

Today sleeve gastrectomy is the fastest growing weight loss surgery worldwide.³⁻⁵

In this prospective randomised study we compared two methods for performing laparoscopic sleeve gastrectomy. Devascularisation of the greater curvature is done prior to stapling of the stomach in group (A), while in group (B) stapling of the stomach is done before full mobilisation.

Patients and methods

This prospective randomised study was conducted in Ain Shams University hospitals from July 2016 to December 2016 after approval of the ethical committee. The study included 50 patients divided randomly using closed envelope into 2 equal groups, each of 25 patients. Patients with previous operations in the stomach and patients with hiatus hernia were excluded from the study. All the patients had BMI >35, their age ranged from 19 to 58 years. Detailed history was taken from all patients then physical examination was performed.

Full laboratory tests, pelviabdominal ultrasound, chest X ray, ECG, ECHO cardiography and pulmonary function tests were performed for all patients, while upper GI endoscopy was done only in selected patients, according to the history taken. All patients were informed regarding surgical technique and likely complications, and informed consent was obtained from each patient. Prophylactic antibiotics and deep venous thrombosis prophylaxis were given. The patients

were followed up after one week then 3, 6, 9 and 12 months after surgery.

Surgical Technique

Under general anaesthesia, patients were positioned with legs apart in anti-Trendelenburg position. Prophylactic dose of Clexane 40 was received on induction along with a 1gm ceftriaxone dose. Abdominal insufflation pressure was set at 15 mmHg. Five trocars were used and placed as follows: 10-mm camera trocar 2 hand breadth below the xyphoid process, a 5-mm trocar on the left anterior axillary line, a 12-mm trocar on the left midclavicular line between the first and the second trocars, a 12-mm trocar on the right midclavicular line and 5 mm trocar placed 2 centimeters below xiphisternum for liver retraction.

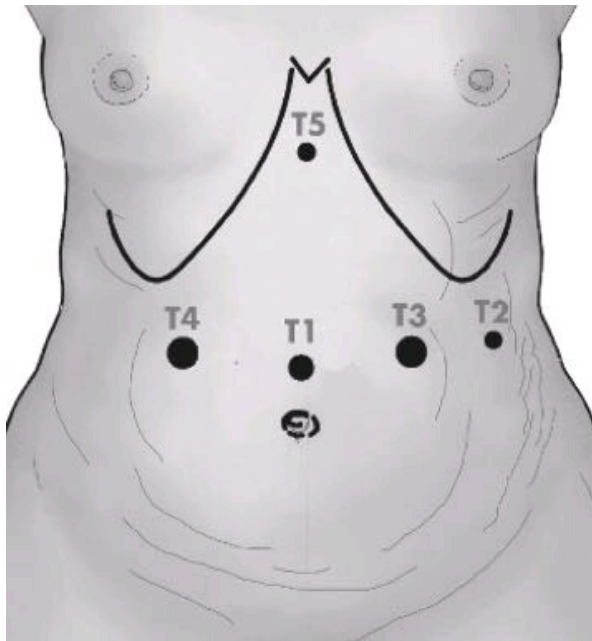


Fig 1: Positioning of trocars for sleeve gastrectomy.

Pylorus is identified then a window is opened in the greater omentum 3cm from the pylorus.

Group (A)

Dissection of the greater omentum was done till reaching left crus of the diaphragm, then stapling was started using a green load (Johnson & Johnson®) from the right 12 mm port, 3 cm from the pylorus over 40 Fr bougie, then stapling was continued using blue loads from the left 12mm port till the stomach is separated, taking care that the last staple is 1.5 cm away from gastroesophageal junction in order to avoid ischaemia.

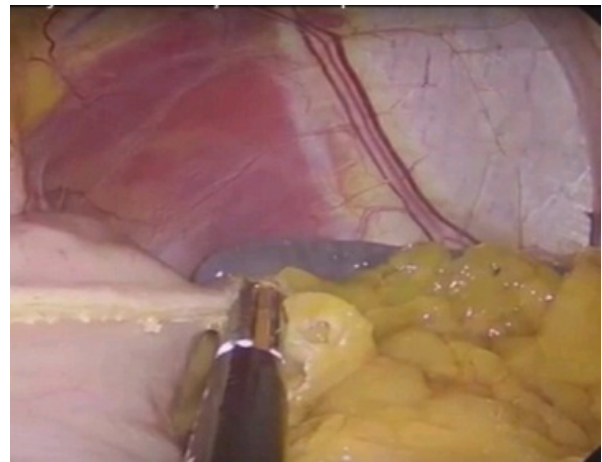


Fig 2: Dissection of greater omentum.

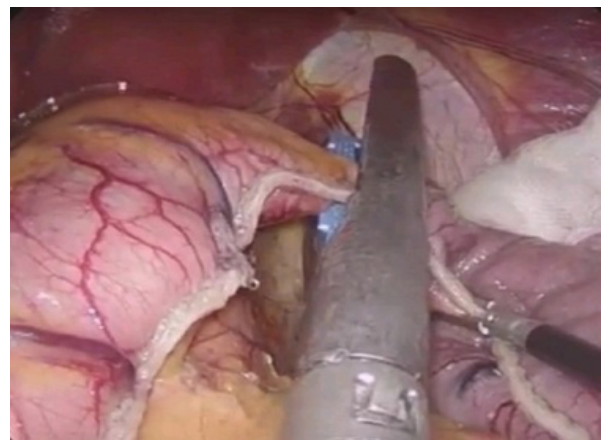


Fig 3: Stapling till stomach is separated.

Group (B)

40 Fr bougie was introduced by anaesthesiologist, then stapling was started from the right 12 mm port using a green load (Johnson & Johnson®) and stapling was continued using blue loads from the left 12mm port, before the last load, the angle of His was freed in a way similar to that done in gastric bypass surgery using blunt dissection, then the last staple was applied leaving at least 1.5 cm from the gastroesophageal junction, then securing the last short gastric vessels from the window in the retro-gastric space was done without division using ligasure®. After that full dissection of the greater omentum from the resected stomach was done.

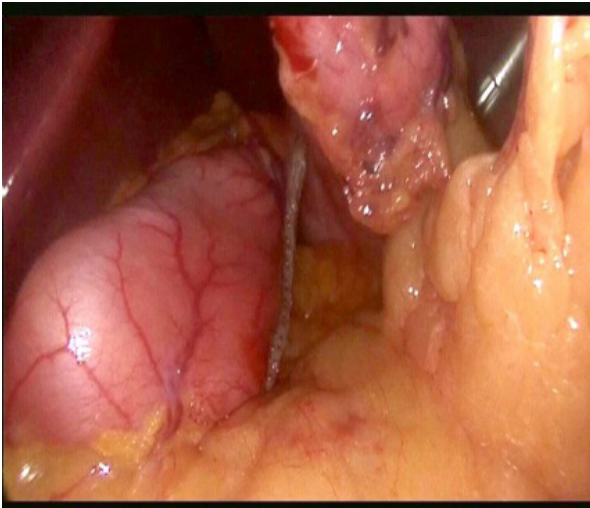


Fig 4: Opening of window in greater omentum and stapling.

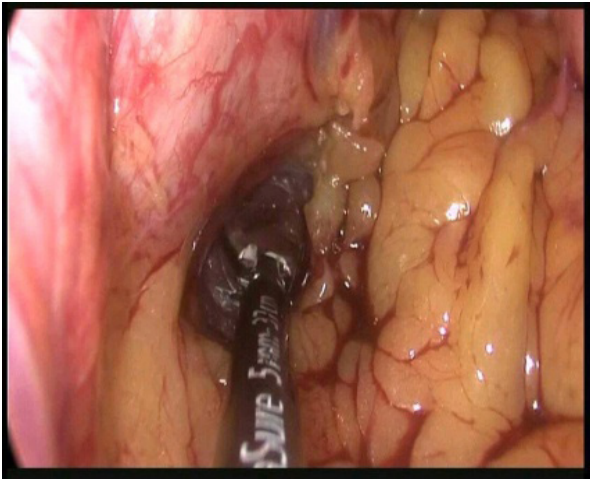


Fig 5: Freeing of the angle of His as done in gastric bypass.

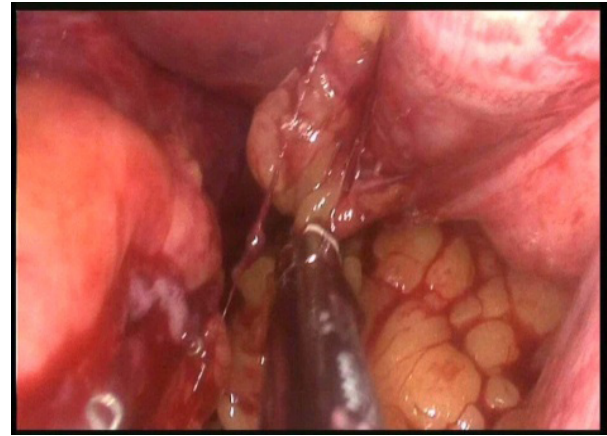


Fig 6: Securing the last short gastrics.

In both groups, the stomach was extracted through one of the 12mm ports, then methylene blue test is done. Placing 18Fr Nelaton drain, closure of muscle at the site of 12mm ports was done before skin closure. Patients were kept NPO for 12h and on intravenous fluids, antibiotics, analgesics and anticoagulants in a prophylactic dose, gastrografin study was done in the first postoperative day. Patients were discharged in the first postoperative day after drain removal except for patients with inadequate oral intake, they were discharged in the second postoperative day.

Drugs prescribed for the patients were antibiotics, analgesics, proton pump inhibitors and anticoagulants in the form of clexane 40 for one week. Patients were informed to come for follow up one week after the surgery, then after 3, 6, 9 and 12 months.

Results

During the period from July 2016 to December 2016, 50 patients underwent laparoscopic sleeve gastrectomy including 19 males, 38% (9 in group A and 10 in group B) and 31 females; 62% (16 in group A, 15 in group B) with mean age of 37 ± 16 years in group A and a mean age of 33 ± 14 years in group B. As for comorbidities 3 (6%) patients had diabetes mellitus, 12 (24%) had hypertension, 6 (12%) had joint pain, and 2 (4%) patients had sleep apnea (**Table 1**). The mean operative time was 63 ± 16 min for group A and 55 ± 18 min for group (B) ($P < 0.05 = \text{significant}$). There were no conversions in both groups. The patients were followed up until December 2017.

Table 1: Demographics of the patients

	A	B
Males	9	10
Females	16	15
Mean age	37 ± 16	33 ± 14
BMI	45 ± 7	46 ± 5
D.M	1	2
Hypertension	4	8
Joint pain	4	2
Sleep apnea	1	1

There were no mortalities in this study. Significant bleeding (500 cc) occurred from short gastric vessels during omental dissection in one of the cases of group (A), the bleeding site was compressed using a gauze to control bleeding, then the bleeder was clipped. Mean total blood loss was, 70 ± 11 mL (group A) and 51 ± 9 mL (group B) ($P < 0.05 = \text{significant}$). Also there was a case of portal vein thrombosis in group (A) presented on day 28 postoperatively with history of abdominal pain 2 days before. Diagnosis was confirmed by means of C.T pelvi-abdomen with both oral and I.V contrast. The patient received anticoagulant in a therapeutic dose, and the patient was discharged

after 4 days on oral anticoagulants for 6 months.

There was one case of stricture near the incisura in group (B), which presented one month after the operation. The patient was readmitted and received IV fluids, and was treated by 2 session of endoscopic balloon dilatation, which successfully resolved the condition without the need of further intervention.

There was complete resolution of diabetes in 2 patients (66.6%) and improvement occurred in 1 patient (33.3%). Complete resolution of hypertension occurred in 6 (50%) patients and improved in six (50%) patients, and joint pain resolved in 5 (83.3%) patients and improved in 1 (16.7%) patient. Sleep apnea resolved in all patients (100%).

Table 2: Postoperative changes in comorbidities

Co-morbidities	Gr A pre	Gr A post		Gr B pre	Gr B post	
		Resol.	Improv.		Resol.	Improv.
D.M	1	1	---	2	1	1
Hypertension	4	1	3	8	5	1
Jointpain	4	3	1	2	2	---
Sleep apnea	1	1	---	1	1	---

Preoperative BMI was 45 ± 7 in group (A) which decreased to 40 ± 5 , 36 ± 6 , 33 ± 5 and 30 ± 6 kg/m² after 3, 6, 9 and 12 months respectively. While in group (B), preoperative BMI was 46 ± 5 decreased to 39 ± 6 , 37 ± 5 , 34 ± 6 and 32 ± 1 kg/m², after 3, 6, 9 and 12 months respectively as shown in **Figure 7**, with $P > 0.05$ = non significant. Mean percentage

of EWL (excess weight loss) at 3, 6, 9 and 12 months was 38.2, 51.9, 64.2 and 68.9% for group (A) and 39.2, 52.6, 65.3, 69.2% for group (B) respectively with $P > 0.05$ = non significant. The mean hospital stay was $1.5 (\pm 0.4)$ days in group (A) and $1.4 (\pm 0.5)$ days in group (B).

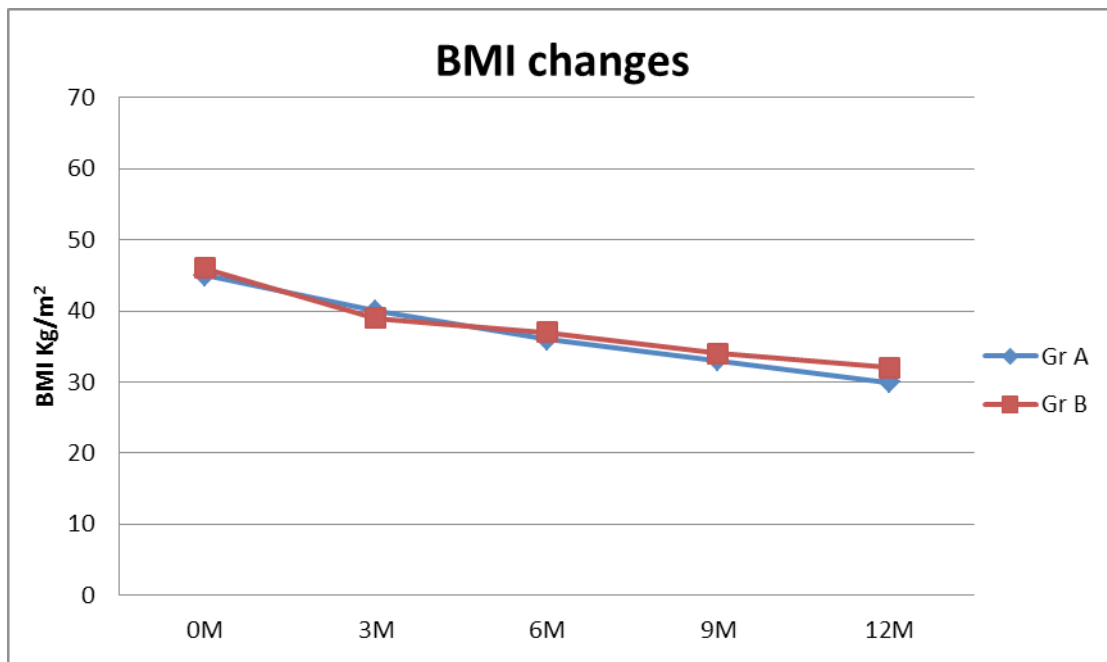


Fig 7: BMI changes.

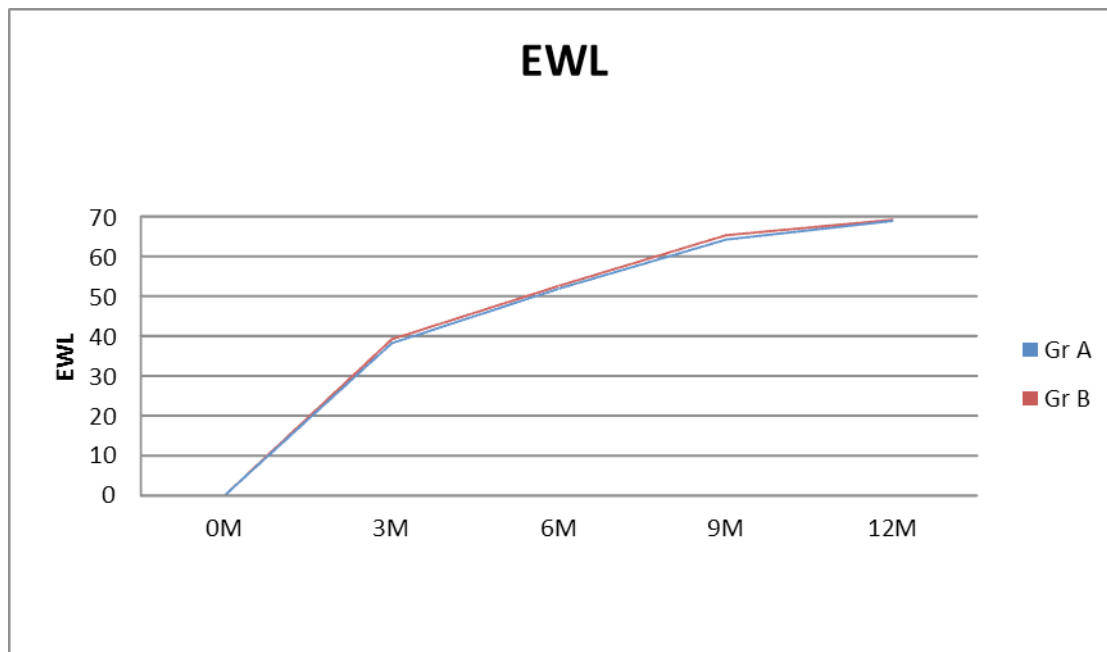


Fig 8: EWL changes.

Discussion

Sleeve gastrectomy is the commonest bariatric surgery done nowadays. The classic technique starts by full dissection of the greater omentum, starting few centimeters from the pylorus to the left crus of the diaphragm then to start stapling.⁶⁻⁸ This may carry some technical difficulties in dissecting the connection with the spleen and may increase the risk of bleeding from short gastric vessels, specially in patients with high BMI,⁹ while in the modified technique stapling starts directly after opening the window in the greater omentum. After the stapling is completed, the last short gastrics were secured, then dissection of the greater omentum from resected part of the stomach is done, which in our opinion is technically easier and carries less risk of bleeding than the classic method.

In a study done by Dapri comparing the 2 techniques, the median operative time was 25 minutes⁹⁻⁵¹ using the classic technique (A) and 34 minutes¹²⁻⁵⁴ using the modified technique (B). While The median hospital stay was 3 days (1-10) for group (A) and 3 days (2-7) for group (B). As for complications there was a case of intraoperative bleeding (450ml) in group (A) and case of leak at the angle of His in group (A).¹⁰ while in our study the mean operative time for group (A) was 63 (± 16 min) while it was 55 (± 18 min) for group B. Also the mean hospital stay was 1.5 (± 0.4) days in group (A) and 1.4 (± 0.5) days in group (B). As for complications in this study there was a case of significant bleeding (500cc) from short gastrics in group (A). Also there was a case of portal vein

thrombosis in group (A) and there was a case of stricture near the incisura in group (B).

Mean percentage of EWL (excess weight loss) at 3, 6, 9 and 12 months was 38.2, 51.9, 64.2 and 68.9 % for group (A) and and 39.2, 52.6, 65.3, 69.2% for group (B) respectively which was lower than results of Maryam et al where the percentage of excess weight loss 3, 6, and 12 months were 42.6%, 57.5%, and 80.7% in the LSG. This may be attributed to smaller bougie size which was 36 F compared to 40F in our study and also to the tightening sutures applied in his study.¹⁰

In our study there was a slight, but statistically significant difference between both groups regarding the operative blood loss and the operative time in favour of group B but there were no statistical differences regarding the hospital stay, BMI changes and EWL. Thus the forementioned technique seems to be safe and effective technique for performing sleeve gastrectomy in morbidly obese patients when compared to the original technique.

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