

Laparoscopic sleeve gastrectomy technique: How we do it

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ABSTRACT

A total of 1002 bariatric procedures were performed at our clinic between March 2006 and December 2016. The laparoscopic Roux-en-Y gastric bypass (LRYGB) technique was performed on 833 patients. Three of the LRYGB procedures were revisions of a previous laparoscopic sleeve gastrectomy (LSG). In 169 patients, the sleeve gastrectomy technique was used. One procedure was performed via laparotomy, but the others were performed laparoscopically. Six patients' sleeve gastrectomy lines were transected and sutured using a laparoscopic needle holder, while the others were closed with a stapling device. Ileojejunal bypass was added in 21 of the LSG procedures. This clinic's experience with morbid obesity surgery began with open gastric bypass surgery and later evolved into use of the LRYGB method. Sleeve gastrectomy, which is popular in this country and around the world, has been performed since July 2014 (handmade as of May). This article describes some of the nuances and subtleties of the LSG technique.

Keywords: Bariatric surgery; obesity; sleeve gastrectomy; surgical technique.

Introduction

Obesity is an increasingly pan-endemic problem all over the world. This situation induces the risk of developing diseases, such as type II diabetes (DM), dyslipidaemia, hypertension (HT), obstructive sleep apnoea (OSA), cardio vascular diseases, asthma, osteoarthritis, cancer and depression. In recent years, bariatric surgical procedures have become the solution to these problems.^[1] However, patients and surgeons continue to question which surgical technique is preferred. LSG shows similarities to other sophisticated procedures with weight loss success and resolution of the obesity-related co-morbidities. In addition, it is easy to apply and learn this operation. LSG is a first-line operation for LRYGB and Duodenal switch, de-

veloped for high-risk morbidly obese and super-morbid (BMI >60 kg/m²) obesity cases.^[2] However, when weight loss succeeds above expectations, it has gained popularity throughout the world and has become the most performed bariatric procedure.

Preoperative Preparation and Patient Selection

LSG surgery is indicated in cases of co-morbid diseases (DM, HT, OSA, etc.) with BMI above 35 kg/m² or BMI above 40 kg/m². After general operation preparation and routine anaesthesia, psychiatry and endocrinology consultations, the patient's informed consent has been given by verbal, written and video conference. After this stage, the patient is taken to the operation list.



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Patient Position and Operative Field

We prefer the supine position and standard operation table for this procedure. Once the patient's preparations for anaesthesia are completed, naso/orogastric and urinary catheterization are performed. Compression stockings are vested in both legs for deep vein thrombosis prophylaxis. The patient is fixed to the operation table from both legs and chest. The surgical covers and instruments are placed after the iodine wash of the abdominal skin. A 5-mm vessel sealer (Ligasure, Force Triad, Covidien, Boulder, CO USA) or 5-mm harmonic scalpel (Ethicon Endo-Surgery Inc., Cincinnati, OH, USA) is prepared for dissection. The surgeon is placed to the right of the patient, the first assistant to the left of the patient. The camera assistant is located to the right of the surgeon.

Trocar Placement and Pneumoperitoneum

We start the operation with an incision that just the Veres needle enters. This point is at the 2–3 cm caudal of the left arcus costarum in the mid clavicular line. Without trying to hang the abdominal wall by hand or with the laundry clamps, we are trying to feel two strains as we pass through the layers of the belly perpendicular to the Veres needle. A 5-cc saline filled injector is inserted into the Veres needle and 1 cc is delivered into the abdomen. The piston is then withdrawn, and a free flow of saline is observed. Pneumoperitoneum is initiated. The maximum pressure is set to 13–15 mmHg and CO₂ delivery begins. It should be kept in mind that in obese patients the gas flow will be slower than normal, and the intraabdominal pressure level may be displayed, which is due to substantial abdominal fat. We usually use three 12-mm trocars, one 5-mm working trocar and a 5-mm trocar entrance for the liver retractor,

which is fixed to the operation table (Fig. 1). Measuring 15–18 cm from the xiphoid and 4 cm left of the midline gives us the insertion point for the first 12-mm trocar. The trocar must be inserted perpendicular to the abdominal wall, respectively pneumoperitoneum is checked and then the abdominal exploration started with a 30° camera. Initially, the Veres needle examines for viscus injury and is removed, after that continued to the abdominal exploration. The second 12-mm trocar is placed on the right upper quadrant (RUQ), approximately 10 cm away from the first trocar and a few cm above its line. This trocar is used by the surgeon's right hand and for the stapling device insertion. It should be observed that the trocar does not coincide with the falciform ligament. This distance should be considered when trocar entry is planned as it is purposed to work on the left side of the esophagogastric junction and greater curvature. The other RUQ 5-mm trocar is placed approximately 6–8 cm caudal to the 12-mm trocar, and it should be located just lateral to the falciform ligament. This trocar will be used by the left hand of the surgeon. Therefore, care must be taken to avoid conflicting with the other 12-mm trocar during insertion, damaging the liver during operation within the right lobe and right arcus costarum and hindering the movement. Both RUQ trocars should be placed in positions that will not harm the falciform ligament field. This will prevent uncomfortable movements and injuries. The left upper quadrant (LUQ) 12-mm trocar is aligned with first RUQ trocar and should be placed approximately 10 cm away from the optical trocar. It is used by the first assistant. If the insertion is done with the wrong angle or placement, it will make it difficult to work on the cardioesophageal region and block the angle of vision. The 5-mm trocar is inserted just below the xiphoid through the peritoneal

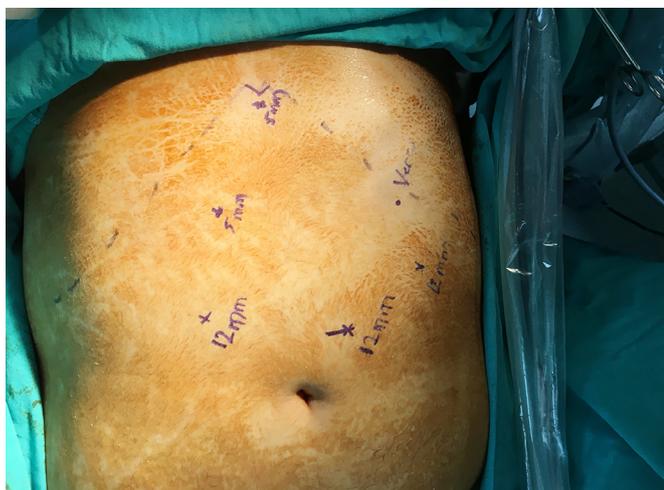


Figure 1. Drawings the entrance of the trocars.



Figure 2. Placement of the trocars.

fatty tissue medial to the falciform ligament and is used to place the liver retractor that is fixed to the table. The retractor can be inserted directly into the tunnel opened by the trocar, or it can be facilitated by using elastic tubes, such as Nelaton or Penrose drain as a guide.^[3] The size of the retractor must be selected according to the length and fullness of the left liver lobe and the position of the left arcus costarum. The retractor should lift the left lobe of the liver so that the diaphragm can be seen above the oesophagus. At least 2–3 cm diaphragmatic space must be created between the cardioesophageal junction and the liver to facilitate both movement and visibility to work adequately. Generally, well-placed retractors can visualize the caudate lobe, left diaphragmatic artery, vein and the fat pad on the oesophagus. Colour changes may occur due to restriction of circulation in the liver. This can be observed with a high level of postoperative liver function tests (Fig. 2).^[4]

Preferably, when the stomach is aspirated with a naso/orogastric tube, the patient is placed in a reverse Trendelenburg position and a slight sitting position. Afterwards, the liver retractor should be fully inserted and fixed.

Dissection

Dissection begins from the great curvature's corpus antrum junction (Fig. 3a). The left hand of the surgeon grasps the stomach while the first assistant catches the gastrocolic ligament gently. The surgeon's right hand

with the energy device transects the omentum from the stomach. Working close to the great curvature should facilitate the extraction of the specimen from the abdomen at the end of the operation. After the gastrocolic ligament is transected and the retrogastric site is reached, the surgeon lifts the stomach slightly to the right and the first assistant gently pulls the omentum to the left. This will provide the appropriate tension and vision for the dissection. During this time, bleeding should be observed carefully because slight oozing can occur after the dissection of the omentum. However, when the intraabdominal pressure decreases at the end of the operation, it may increase and become difficult to find. During the short gastric arteries dissection, the stomach could obscure vision. This can be overcome with a few manoeuvres. Holding the stomach's posterior wall, tilting the patient gently to the left side, and turning the 300 angled camera to the right can be done to reveal and dislodge the close association between the spleen's upper pole with the fundus of the stomach (Fig. 3b). The esophagogastric junction fat pad must be removed from the diaphragm. The left crus of the oesophageal hiatus should be clearly visualized. Retrograde adhesions of the fundus should be transected as far as possible. Otherwise, in the stapler stage, these adhesions can lead to excessive funding of the stomach tissue or bleeding uncontrollably. A sponge is placed in this area and slight oozing after the traction is controlled. The pylorus is then found and measured at approximately 6 cm proximally, and the great curvature omental transection

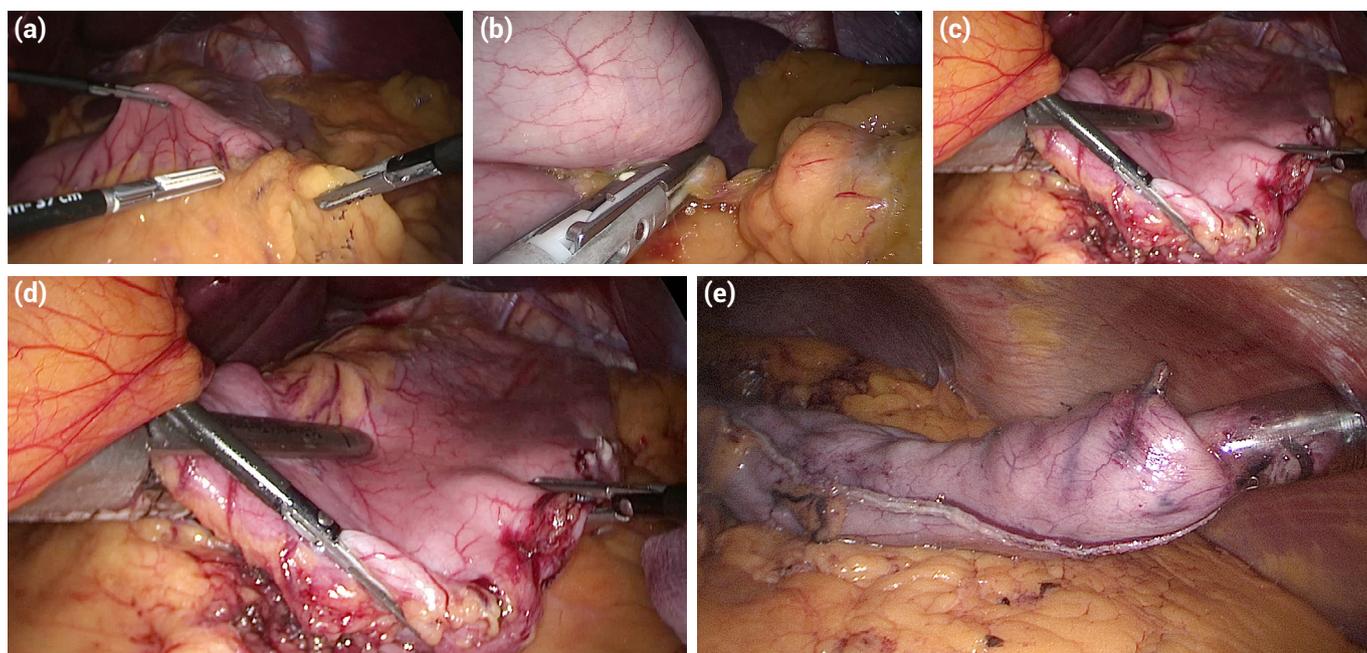


Figure 3. (a) Beginning of the dissection from great curvature. (b) Sealing of the short gastric arteries. (c) First stapler firing. (d) Position of the stomach during the first stapler firing. (e) The specimen extraction inside view.

is extended to there. Adhesions between the back of the antrum and the pancreatic peritoneum are cut for easy placement of the stapling device.

Transection of the Stomach with the Stapling Device

We prefer to perform the first two firings with a 60-mm linear cutter sealer (dense tissue, green coloured, 4.1 mm in sealing size) and the other firing with a 60-mm linear cutter sealer (blue colour cartridge, 3.5 mm in sealing size). The first stapling device is placed from the lower end of the dissection line towards the corpus (Fig. 3c, d). An angle that does not constrict the corpus antrum junction is preferred. As soon as the first stapler is used, the gastric calibration tube is created by adding two 36 fr tubes together and is replaced with the naso/orogastric tube. The tube is passed through the opening in the antrum formed by the first stapling device firing extended to the pylorus. The first assistant pulls the great curvature from the farthest point of the stapling device's level to the left for the second firing. The surgeon must withdraw from the lower end of the stomach specimen, which is to be removed with the left hand, in the direction of the left side of the foot and the patient by the large curvature. At this time, the surgeon pulls from the lower end of the specimen towards the direction of the patient's feet. The stapling line must be checked from the front and rear, and pots should be corrected. The line should generally correspond to the point where the venous vessels are lost in the gastric wall. After the firings, both sides of the lines are fulgurated with electrocautery. Care should be taken to ensure that the

line does continue at the same line in sequential firing, and fluctuations and crossings should be avoided. Generally, two thick tissue cartridges and two or three thin tissue cartridges are used. The final stapling cartridges should be placed in the esophagogastric junction. At this stage, excessive traction should be avoided because of the risk of constriction in the esophagogastric junction. The calibration tube is retracted to the oesophagus and the pylorus closed with an atraumatic grasper. Then, 60–120 cc of methylene blue is injected through the tube and the remaining stomach is filled, thereby leakage test is performed. After this step, the patient's systolic blood pressure is asked to raise to the 150 mmHg from the anaesthesia team. All the stapling lines are checked for oozing and fulgurated if necessary. The sleeve gastrectomy specimen is removed from the left upper quadrant trocar after the surgical field is cleaned (Fig. 3e). The extraction port should be cut and widened a few mm if necessary (Fig. 4a). Drain placement depends on the choice of the surgeon. The process is terminated after the trocars are removed one by one and checked for bleeding.

Examination of Specimen

The extracted sleeve gastrectomy specimen must be in the shape of a tear drop or pancreas, and gradually thicken towards the fundus. The Veres needle penetrates the specimen from the antrum end and is fixed with the help of a clamp in the entrance hole, air escape is prevented. It is specially inflated with 15 mmHg pressure, at which time surgery is performed (Fig. 4b). After the inflation process

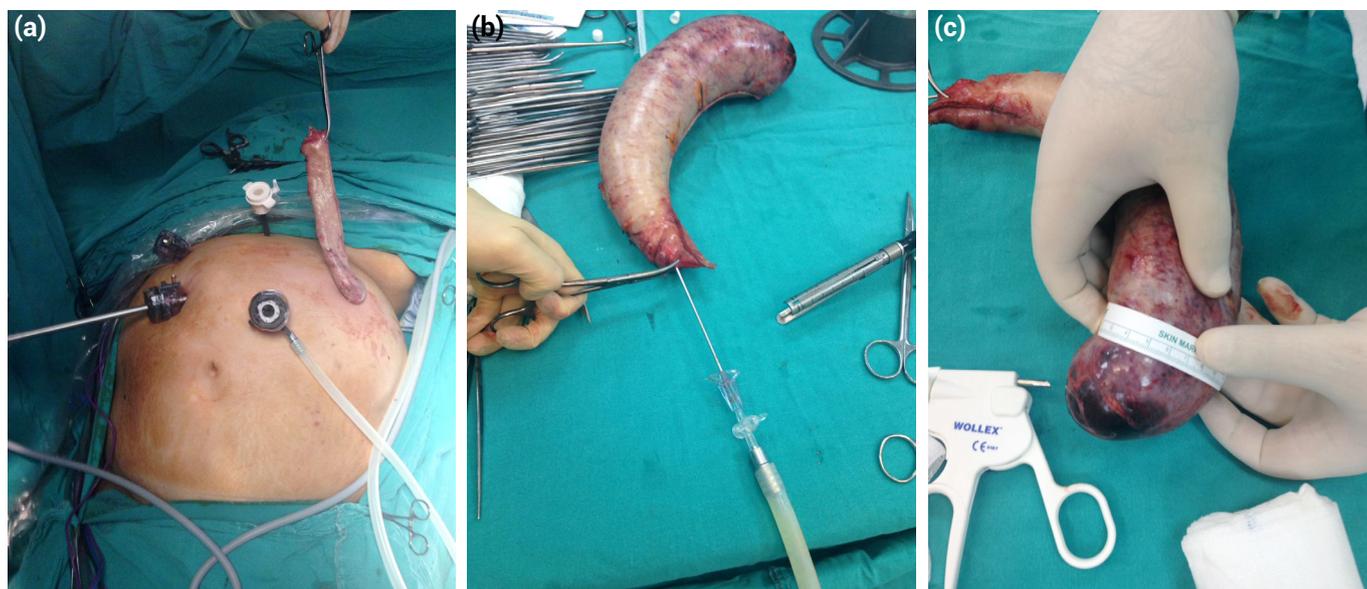


Figure 4. (a) The specimen extraction outside view. (b) Air insufflation of the specimen. (c) Measurement of the fundus diameter.

is complete, the diameter is measured from the widest point of the fundus (Fig. 4c). The air inside the gastric is measured with a 50-cc syringe and discharged. The values are recorded for use in data processing in this area. The specimen is sent to the pathology laboratory.

Postoperative Stage

Patients are mobilized after eight hours postoperatively. A smooth diet is started with water and clear liquids on the first postoperative day. Blood tests are checked and followed up by daily examinations. Low molecular weight heparin is administered twice a day, and the patient is encouraged to move (at least 10 minutes walk per hour). The patient is usually discharged on the third postoperative day when oral fluid diet intake has reached a sufficient level.

Follow-up

When the patient is discharged, daily multivitamins, pain killers, low molecular weight heparin and protein supplements are prescribed. Low molecular weight heparin therapy should be completed at least 30 days for deep

vein thrombosis and portal vein thrombosis prophylaxis. Sutures are taken on the 15th day and blood tests, vitamin levels are checked in the first month.

Disclosures

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Conflict of Interest: None declared.

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