



Modified Sleeve Gastrectomy Combined with Laparoscopic Rossetti Fundoplication and Vascularization Assessment with Indocyanine Green

Stefano Olmi¹ · Giulia David¹  · Giovanni Cesana¹ · Francesca Ciccarese¹ · Riccardo Giorgi¹ · Stefano De Carli¹ · Matteo Uccelli¹

Published online: 21 May 2019
© Springer Science+Business Media, LLC, part of Springer Nature 2019

Abstract

Aim Morbid obesity is a key risk factor for gastroesophageal reflux; the aim of this study is to describe the technique of modified laparoscopic Rossetti fundoplication to treat morbid obesity related to GERD.

Methods This is a video/dynamic manuscript on operative technique. We present the case of a 38-year-old patient referred to our institution for morbid obesity (BMI 43 kg/m²) related to GERD symptoms with grade A esophagitis at the preoperative upper gastro intestinal endoscopy and in daily therapy with PPI since years. The patient was scheduled for a laparoscopic sleeve gastrectomy combined with Rossetti fundoplication.

Results Intraoperative and postoperative course were uneventful. One year later, the BMI is 27.9 kg/m² and at clinical and endoscopic follow-up demonstrates absence of esophagitis and any PPI therapy is needed.

Conclusion The modified sleeve gastrectomy combined with laparoscopic Rossetti fundoplication seems to be a safe, effective procedure and a suitable alternative to gastric bypass in obese patients with GERD.

Keywords Sleeve gastrectomy · Fundoplication · Gastroesophageal reflux · Bariatric surgery

Introduction

It has been already established that morbid obesity is a key risk factor for gastroesophageal reflux (GERD). Patti et al. found that for each 5-point increase in BMI, the DeMeester score was expected to increase by 3 U [1]. The main factors involved in the development of GERD in morbid obese patients are as follows: central obesity and increasing of intra-abdominal pressure, distorted anatomy of the lower esophageal sphincter [2], type 2 diabetes [3], and high fat-containing diet [4].

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s11695-019-03970-w>) contains supplementary material, which is available to authorized users.

✉ Giulia David
giuliadavid.gd@gmail.com

¹ Department of Surgery, S.I.C.O.B. (Italian Society of Bariatric Surgery) Referral Center for Bariatric Surgery, San Donato Group, Policlinico San Marco, 24040 Zingonia-Osio Sotto, Bergamo, Italy

Weight loss or waist decrease is an important treatment option for GERD in obese patients [5] and bariatric surgery is a valuable option as a treatment for morbid obesity and subsequent morbidities. Laparoscopic sleeve gastrectomy (LSG) has become in the last decades the most frequently performed bariatric procedure worldwide since it is a less demanding procedure compared to Roux-en-Y gastric bypass (BRGY), with a shorter operative time and absence of anastomosis. However, there is a growing concern about LSG and worsening of GERD symptoms or occurrence of de novo GERD after bariatric surgery, even though data are extremely heterogeneous [6, 7].

In obese patients suffering from GERD, RYBP is considered the gold standard, although several observational prospective studies indicate that the association of hiato-plasty and/or fundoplication with LSG guarantees a reduction of postoperative GERD, ranging from 20 to 34% [8].

The purpose of this video is to present and describe our technique for LSG and associated Rossetti anti reflux fundoplication, combined in a one-step procedure, in order to avoid the worsening of post-surgical GERD symptoms.

Material and Methods

From January 2015 to November 2018, we performed this technique in 138 patients. All patients were suffering from GERD and obesity and underwent a preoperative endoscopic examination and a GERD Q test for symptoms investigation.

Informed consent was obtained from all individual participants included in the study.

All procedures performed were in accordance with the ethical standards of the institutional and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

In this high definition video, we present the case of a 38-year-old patient referred to our institution for morbid obesity (BMI 43 kg/m²) related to GERD symptoms with grade A esophagitis at the preoperative upper gastro intestinal endoscopy and in daily therapy with PPI since years. The patient was scheduled for a laparoscopic sleeve gastrectomy combined with Rossetti fundoplication.

Technique

The patient was placed in a half sitting position. A 38 Fr bougie is preoperatively inserted into the esophagus. A 15-mmHg pneumoperitoneum was induced using a Veress needle in left subcostal space. A 4-port technique was used, a 12-mm port is inserted in left subcostal space in order to see the stomach from a lateral view improving the vision of the esophagogastric junction, two 5-mm ports, one in epigastric region for the liver retractor and the other one in right ipocondria, and a 15-mm in supra umbilical space for the surgeon.

The procedure starts with the dissection of the greater gastric curvature from the short gastric vessels and gastrocolic ligament, using a 5-mm dissector (Ligasure™ Maryland jaw - Medtronic). The dissection begins 3 cm far from the pylorus and continues upward to the fundus with the section of the phreno-fundic ligament.

It is important to avoid any injury of the upper part of the gastric wall, since this portion will be used for the creation of the valve. Bleeding from the short gastric vessels and burn from electrocautery are the most common reasons of damage during this step.

The procedure continues with the dissection of the left diaphragmatic pillar and limited crural dissection, without any repair, subsequently the right diaphragmatic pillar is cleared up, with the creation of a minimum space between the right pillar and the diaphragmatic hiatus, avoiding the creation of a wide retroesophageal space. A grasper is passed behind the esophagus, bluntly dissecting up and down to create a space just large enough for the wrap. Care is taken not to injure the vagal nerves during this procedure.

The second step is the creation of a Rossetti valve, the fundus of the stomach is passed behind the esophagus, and a 1.5-cm wrap is performed. The fundus is gently pulled under the esophagus with two atraumatic graspers. It is important for the surgeon to create a valve using less fundus as possible, in order to resect as much fundus as possible during the sleeve.

The two edges of the valve are tightened with two stiches, 1 cm of distance from each other, fixed with extracorporeal Roeder knots, without sutures of the esophagus. After removing the 38Fr boogie, a 10-mm stake is inserted in between the esophagus and the valve to check the tightness since the valve must be floppy.

The 38Fr bougie is then carefully inserted again until the antrum and the sleeve gastrectomy is performed starting 3 cm from the pylorus. A mechanical articulated endostapler is used for the section (Tristaple Signia™ stapling system-Medtronic) with two black cartridges, two purple cartridges for the gastric section, one black and one purple cartridge for the valve. The bougie is removed under vision and the vascularization is assessed using indocyanine green fluorescence imaging (SPIES™, Storz). The indocyanine green test performed at the end of the operation demonstrates the proper vascularization of the stapler line. A drain is positioned along the staple line.

Results

The surgical time was 35 min in this case and the overall surgical time range in our experience is 25–120 min. The patient underwent a gastroesophageal X-ray with water-soluble contrast per os in postoperative day 2 which demonstrated a regular transit and was discharged in postoperative day 3.

The clinical and endoscopic follow-up at 1 year demonstrates absence of esophagitis and any PPI therapy is needed. The BMI of the patient is 29.1 kg/m². The overall BMI at 1 year follow-up is 28.4 ± 3.7 kg/m², with GERD symptoms in 1/138 patients (0.9%) and only 1 patient is under PPI.

Conclusions

The modified sleeve gastrectomy combined with laparoscopic Rossetti fundoplication seems to be a safe procedure and, according to our preliminary data [8], a suitable alternative to gastric bypass in obese patients with GERD. However, longer series and longer follow-up are needed; an observational study is ongoing in our department in order to verify the effectiveness of this new technique.

Compliance with Ethical Standards

All procedures performed were in accordance with the ethical standards of the institutional and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

References

1. Herbella FA, Sweet MP, Tesesco P, et al. Gastroesophageal reflux disease and obesity. Pathophysiology and implications for treatment. *J Gastrointest Surg.* 2007;11:286–90.
2. Wu JC, Mui LM, Cheung CM, et al. Obesity is associated with increased transient lower esophageal sphincter relaxation. *Gastroenterology.* 2007;132(3):883–9.
3. Gokturk S, Akyuz F, Arici S, et al. Gastroesophageal reflux in asymptomatic patients with diabetes: an impedance study diabetes, obesity and gastroesophageal reflux. *Exp Clin Endocrinol Diabetes.* 2018; <https://doi.org/10.1055/a-0783-2327>.
4. Fan WJ, Hou YT, Sun XH, et al. Effect of high-fat, standard, and functional food meals on esophageal and gastric pH in patients with gastroesophageal reflux disease and healthy subjects. *J Dig Dis.* 2018;19:664–73. <https://doi.org/10.1111/1751-2980.12676>.
5. Park S-K, Lee T, Yang H-J, et al. Weight loss and waist reduction is associated with improvement in gastroesophageal disease reflux symptoms: a longitudinal study of 15 295 subjects undergoing health checkups. *Neurogastroenterol Motil.* 2016;29(5)
6. Hendricks L, Alvarenga E, Dhanabalsamy N, et al. Impact of sleeve gastrectomy on gastroesophageal reflux disease in a morbidly obese population. Undergoing bariatric surgery. *Surg Obes Relat Dis.* 2016;12:511–7.
7. Rebecchi F, Allaix ME, Patti MG, et al. Gastroesophageal reflux disease and morbid obesity: to sleeve or not to sleeve? *World J Gastroenterol.* 2017;23(13):2269–75.
8. Olmi S, Caruso F, Uccelli M, et al. Laparoscopic sleeve gastrectomy combined with Rossetti fundoplication (R-sleeve) for treatment of morbid obesity and gastroesophageal reflux. *Surg Obes Relat Dis.* 2017;13(12):1945–50.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.