

Video case report

# A video case report of stomach intestinal pylorus sparing surgery with laparoscopic fundoplication: a surgical procedure to treat gastrointestinal reflux disease in the setting of morbid obesity

Amit Surve, M.D., Hinali Zaveri, M.D., Daniel Cottam, M.D.\*

*Bariatric Medicine Institute, Salt Lake City, UT*

Received March 16, 2016; accepted April 1, 2016

**Keywords:** SIPS; Fundoplication; GERD; Reflux; Management; Obesity; Video case report

The increasing prevalence of obesity worldwide has coincided with an increased prevalence of gastroesophageal reflux disease (GERD) [1]. Laparoscopic antireflux procedures such as fundoplication have gained widespread acceptance. However, obesity predisposes patients to high rates of laparoscopic fundoplication (LF) failure [2, 3]. The question of which procedures are appropriate to perform in the setting of obesity and GERD still has not been answered.

We present a video case report concerning the combination of Nissen fundoplication with a stomach intestinal pylorus sparing surgery (SIPS) for a severely obese patient with GERD who did not want a gastric bypass (GBP). This is also the first video report of its kind in the literature. This combination of the 2 procedures promotes weight loss along with GERD control (Fig. 1).

## Case presentation

The patient, a 65-year-old morbidly obese woman with a body mass index of 38 kg/m<sup>2</sup>, came to the clinic with the need for weight loss. She had experienced severe acid reflux for 2 years that required a daily high-dose proton pump inhibitor.

The patient underwent a thorough workup for morbid obesity and GERD. Preoperative transnasal endoscopy and esophagogastroduodenoscopy with biopsy revealed a hiatal

hernia, a Grade III gastroesophageal valve [4], and Grade D esophagitis [5] (Fig. 2).

The patient consented to undergo SIPS surgery along with a LF procedure, and was followed at regular intervals to assess weight loss and GERD symptoms with a GERD health-related quality of life (GERD-HRQL) questionnaire [6].

## Management

Four trocars were placed in the abdominal cavity under direct vision. The terminal ileum was located, and 3 meters of small bowel were measured and tacked to the gastrocolic omentum. The short gastric vessels were transected; this facilitated the dissection of the hiatal hernia. The entire sac was removed via blunt and sharp dissection using an ultrasonic dissector (Covidien LLC, Dublin, Ireland). This dissection was carried superiorly until approximately 5 cm of intraabdominal length was achieved. The hernia was repaired posterior to the esophagus with a 2-layer running Endostich and 2.0 Surgidac sutures (Covidien). The first layer was a deep layer that started where the crus met inferiorly and went up to the base of the esophagus. Once the esophagus was reached and checked to make sure there was no anterior defect, the suture line was run down back to the starting point and tied to the end of the stitch. This repair was reinforced with a polytetrafluoroethylene felt or pariatex mesh (Covidien). A 40-French bougie was placed, and the wrap was created in the fashion described by Nissen.

\*Correspondence: Daniel Cottam, M.D., Bariatric Medicine Institute, 1046 East 100 South, Salt Lake City, UT 84102.

E-mail: [drdanielcottam@yahoo.com](mailto:drdanielcottam@yahoo.com)

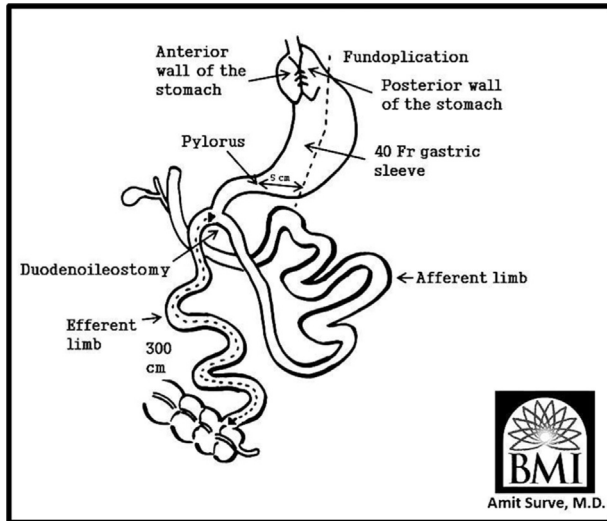


Fig. 1. Hand-drawn sketch of SIPS with LF surgery. SIPS = stomach intestinal pylorus sparing surgery; LF = laparoscopic fundoplication.

Next, a sleeve gastrectomy was performed. The lesser sac was entered 4–6 cm from the pylorus. Then, an Endo GIA (Covidien) stapler was fired along the previously placed bougie. Once the staple line reached the prior LF, the staple line deviated laterally in an attempt to resect as much of the fundus as possible. Blood vessels to the lesser curve were preserved so as to ensure adequate blood supply.

Once the sleeve was complete, the gastroepiploic vessels were taken down from the end of the sleeve staple line past the pylorus to where the perforating vessels from the pancreas entered the duodenum; this is almost always 2 to 3 cm beyond the pylorus. A blunt instrument was passed behind the duodenum to create a passageway for the division of the duodenum. The duodenum was now divided with an Endo gastrointestinal anastomosis stapler (GIA, Covidien) [7]. The antimesenteric border of the bowel was attached to the end of the proximal duodenum staple line using an absorbable suture. The loop was set up so the efferent limb was descending on the patient's right and the afferent limb was ascending from the left. Approximate 2-cm duodenotomy and enterotomy were made, and the

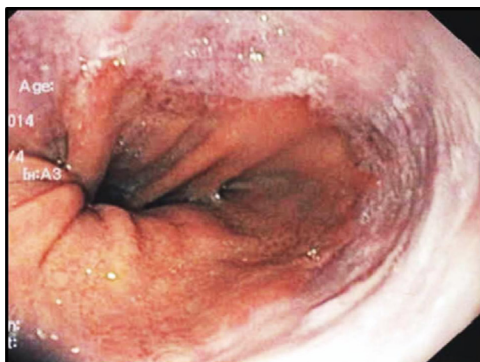


Fig. 2. Preoperative EGD showing a 2 cm sliding hiatal hernia and esophagitis. EGD = esophagogastroduodenoscopy.

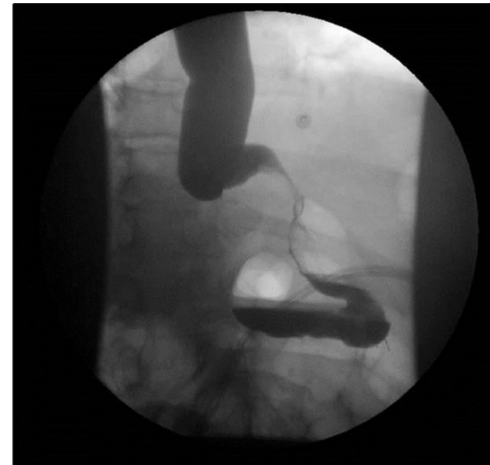


Fig. 3. Postoperative upper gastrointestinal series done on day 2.

enterotomy was closed with a running posterior layer and running anterior layer using 3.0 Polysorb (Covidien). The anastomosis was tested intraoperatively for leaks (using methylene blue, endoscopy, or nasogastric tube). An upper gastrointestinal series done on postoperative day 2 was unremarkable (Fig. 3), and the patient was discharged home on day 2.

Postoperatively at 1 month, she reported no heartburn at all; her GERD-HRQL score was 5 with an excess weight loss (EWL) of 19.7%. An upper gastrointestinal series done at the 3-month visit found no reflux and she required no antacid medications. The GERD-HRQL score at the same visit was 2 with an EWL of 38.4%. The GERD-HRQL score reached 0 at 6 months with an EWL of 45%.

## Discussion

Obesity has been associated with increased intraabdominal pressures, impaired gastric emptying, decreased lower esophageal sphincter pressure, and increased frequency of transient sphincter relaxation [8], thus leading to increased esophageal acid exposure. Obese patients may have an increased risk for hiatal hernia, which has a role in initiating and promoting GERD [9]. LF is a standard surgical treatment for GERD; however, laparoscopic Roux-en-Y gastric bypass (LRYGB) has also been shown to effectively resolve GERD symptoms in patients with severe obesity [10]. However, LRYGB is associated with number of side effects and long-term weight regain, which are not commonly seen with the SIPS and LF procedure [11]. This is one of the reasons LRYGB is not ideal for treating GERD in morbidly obese patients.

In 2011, Torres in Spain started performing the loop duodenal switch, which they named the single anastomosis duodenal-ileal bypass [12]. The main reason for this change was to simplify the biliopancreatic diversion/duodenal switch (BPD/DS). However, they postulated that it would have less weight loss than the BPD/DS and be more

comparable to the GBP. Torres's first 4 papers reported great weight loss results and low complication rates [12–15]. In the US, surgeons began doing the SIPS in 2013. SIPS is similar in design and extrapolates our experience with laparoscopic duodenal switch [16].

Indeed, weight loss helps improve GERD, but there are some other theoretical explanations for this improvement that can occur before weight loss [17]. By performing the sleeve gastrectomy as the first procedure of SIPS, we remove most oxyntic cells, which reduces acid production (although this might be obvious, it has never been properly proved). Even the faster rate of gastric emptying for liquids that is observed with the sleeve helps in preventing and treating GERD. Additionally, we have data about the effect of LF on transient LES relaxations. Both partial [18] and Nissen fundoplication [19] reduce the occurrence of LF on transient LES relaxations. Thus, combining SIPS with LF can be a feasible option for the treatment of GERD in morbidly obese patients.

The advantage of this novel technique of adding SIPS to LF to treat both obesity and GERD is that the addition of malabsorption with the sleeve and the intestinal bypass make its weight loss more reliable than a sleeve alone [20], and this compensates for the larger volumes involved in making the LF.

## Conclusion

Combining SIPS with LF is a feasible option for the treatment of GERD in the setting of morbid obesity. This novel procedure provides both GERD control and weight loss. Larger prospective series are needed to ascertain if this combination of procedures is a viable alternative to GBP.

## Disclosures

*The authors have no commercial associations that might be a conflict of interest in relation to this article. One author did disclose a financial relationship relative to industry that has no bearing on the publication of this article.*

## References

- [1] Hampel H, Abraham NS, El-Serag HB. Meta-analysis: obesity and the risk for gastroesophageal reflux disease and its complications. *Ann Intern Med* 2005;143(3):199–211.
- [2] Makris KL, Lee T, Mittal SK. Roux-en-Y reconstruction for failed fundoplication. *J Gastrointest Surg* 2009;13(12):2226–32.
- [3] Antanavicius G, Leslie D, Torres-Villalobos G, et al. Distal esophageal erosion after laparoscopic adjustable gastric band placement with Nissen fundoplication taken down. *Obes Surg* 2008;18(10):1350–3.
- [4] Hill LD, Kozarek RA, Kraemer SJM, et al. The gastroesophageal flap valve: in vitro and in vivo observations. *Gastrointest Endosc* 1996;44(5):541–7.
- [5] Lundell LR, Dent J, Bennette JR, et al. Endoscopic assessment of esophagitis: clinical and functional correlates and further validation of Los Angeles classification. *Gut* 1999;45(2):172–80.
- [6] Velanovich V. The development of the GERD-HRQL symptom severity instrument. *Dis Esophagus* 2007;20(2):130–4.
- [7] Surve A, Zaveri H, Cottam D. A safer and simpler technique of duodenal dissection and transection of the duodenal bulb for duodenal switch. *Surg Obes Relat Dis*. Epub 2016 Feb 25.
- [8] Barak N, Ehrenpreis ED, Harrison JR, Sitrin MD. Gastroesophageal reflux disease in obesity: pathophysiological and therapeutic considerations. *Obes Rev* 2002;3(1):9–15.
- [9] Kahrilas PJ. The role of hiatus hernia in GERD. *Yale J Biol Med* 1999;72(2-3):101–11.
- [10] Varela JE, Hinojosa MW, Nguyen NT. Laparoscopic fundoplication compared with laparoscopic gastric bypass in morbidly obese patients with gastroesophageal reflux disease. *Surg Obes Related Dis* 2009;5(2):139–43.
- [11] Cottam A, Cottam D, Medlin W, et al. A matched cohort analysis of single anastomosis loop duodenal switch versus Roux-en-Y gastric bypass with 18-month follow-up. *Surg Endosc*. Epub 2015 Dec 22.
- [12] Sanchez-Pernaute A, Herrera MA, Perez-Aguirre ME, et al. Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S). One to three-year follow-up. *Obes Surg* 2010;20(12):1720–6.
- [13] Sánchez-Pernaute A, Rubio MÁ, Cabrerizo L, Ramos-Levi A, Pérez-Aguirre E, Torres A. Single-anastomosis duodenoileal bypass with sleeve gastrectomy (SADI-S) for obese diabetic patients. *Surg Obes Related Dis* 2015;11(2):1092–8.
- [14] Sánchez-Pernaute A, Rubio MÁ, Conde M, Arrue E, Pérez-Aguirre E, Torres A. Single-anastomosis duodenoileal bypass as a second step after sleeve gastrectomy. *Surg Obes Relat Dis* 2015;11(2):351–5.
- [15] Sánchez-Pernaute A, Rubio MÁ, Pérez Aguirre E, Barabash A, Cabrerizo L, Torres A. Single-anastomosis duodenoileal bypass with sleeve gastrectomy: metabolic improvement and weight loss in first 100 patients. *Surg Obes Relat Dis* 2013;9(5):731–5.
- [16] Mitzman B, Cottam DR, Goriparthi R, et al. Stomach intestinal pylorus sparing surgery for morbid obesity: retrospective analysis of our preliminary experiences. *Obes Surg*. Epub 2016 Mar 1.
- [17] Peterson WV, Meile T, Kuper MA, Zdichavsky M, Konigsrainer A, Schneider JH. Functional importance of laparoscopic sleeve gastrectomy for the lower esophageal sphincter in patients with morbid obesity. *Obes Surg* 2012;22(3):360–6.
- [18] Lindeboom MA, Ringers J, Straathof JW, van Rijn PJ, Neijenhuis P, Masclee AA. Effect of partial fundoplication on reflux mechanisms. *Am J Gastroenterol* 2003;98(1):29–34.
- [19] Staathof JW, Ringers J, Lamers CB, Masclee AA. Provocation of transient lower esophageal sphincter relaxations by gastric distention with air. *Am J Gastroenterol* 2001;96(8):2317–23.
- [20] Cottam AH, Cottam DR, Roslin MS, et al. A matched cohort analysis of sleeve gastrectomy with and without 300 cm loop duodenal switch with 18 month follows up. *Obes Surg*. Epub 2016 Mar 18.