Title Page

A Video Case Report of Stomach Intestinal Pylorus Sparing Surgery (SIPS) with Laparoscopic Fundoplication (LF): A Surgical Procedure to Treat Gastrointestinal Reflux Disease (GERD) in the Setting of Morbid Obesity.

Short Title: A video case report of Stomach Intestinal Pylorus Sparing Surgery with Laparoscopic Fundoplication.

Keywords: SIPS; Fundoplication; GERD; Reflux; Management; Obesity; Video Case report.

Introduction

The increasing prevalence of obesity worldwide has coincided with an increased prevalence of gastroesophageal reflux disease (GERD) [1]. Laparoscopic anti-reflux procedures, like fundoplication, have gained widespread acceptance. However, obesity predisposes the 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 that demonstrates the combination of Nissen fundoplication with a Stomach Intestinal Pylorus Sparing Surgery (SIPS) for a patient with severe obesity 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 two procedures promotes weight loss along with GERD control (Fig. 1).

Case Presentation

The patient, a 65-year-old morbidly obese woman, body mass index (BMI) of 38 kg/m^2, came to the clinic with the need for weight loss and severe acid reflux for 2 years requiring a daily high dose proton pump inhibitor (PPI).

The patient underwent a thorough workup for morbid obesity and GERD. Pre-operative transnasal endoscopy (TNE) and esophagogastroduodenoscopy (EGD) with biopsy showed a hiatal hernia, a Grade III gastroesophageal (GE) 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 (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 using blunt and sharp dissection using an ultrasonic dissector (Covidien LLC). This dissection was carried superiorly until approximately 5 cm of intra-abdominal length was achieved. The hernia was repaired posterior to the esophagus with a two layer running endostich and 2.0 surgidac sutures. 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 (PTFE) mesh or Pariatex mesh (Covidien Corp.). A 40 French Bougie was placed and the wrap was created in a fashion described by Nissen.

Next, a Sleeve Gastrectomy (SG) 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 attempting to resect as much of the fundus as possible. Blood vessels to the lesser curve were persevered ensuring 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 (GIA^{TM}) stapler (Covidien) [7]. The

anti-mesenteric 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 enterotomy was closed with a running posterior layer and a running anterior layer, using xxx. The anastomosis was tested intraoperatively for leaks (using methylene blue, endoscopy or nasogastric tube). An upper gastrointestinal series (UGI) done on post-operative day 2 was unremarkable (Fig. 3) and the patient was discharged home on day 2.

Post-operatively 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 UGI series done at the 3 month visit showed no reflux and she required no anti-acid 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 intra-abdominal 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 been also 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 very ideal for treating GERD in morbidly obese patient.

In 2011 Torres in Spain started performing the loop duodenal switch, which they have named as a Single Anastomosis Duodenal-Ileal bypass (SADI) [12]. The main reason for this change was to simplify the 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 four papers showed great weight loss results and low complication rates [12-15]. In the US we began doing the SIPS in 2013. SIPS is similar in design and extrapolates our experience with laparoscopic duodenal switch [16].

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

Conflict of Interest

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

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Figure Legends

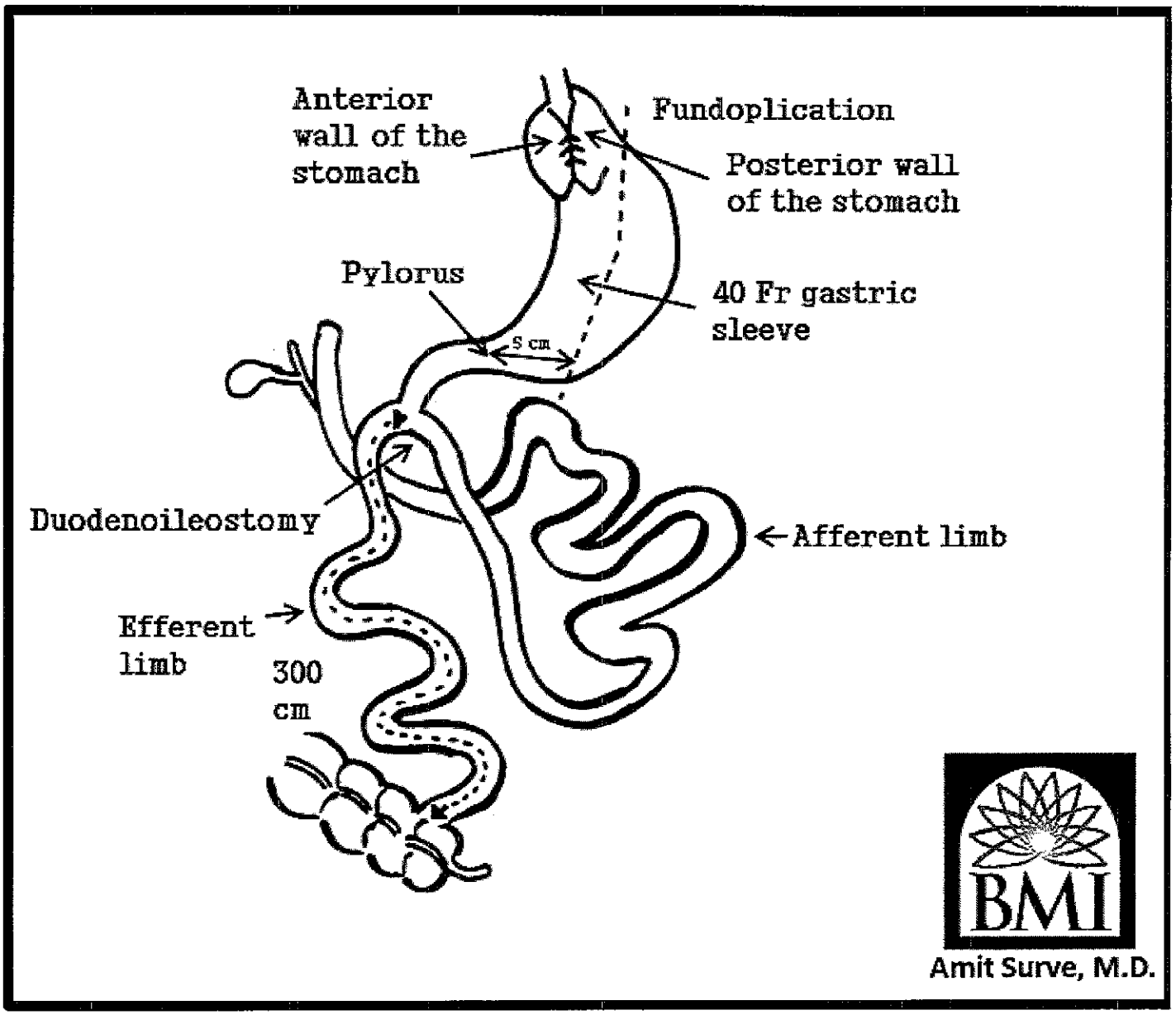
Figure 1: Hand drawn sketch of SIPS with LF surgery

Abbreviation: SIPS = Stomach intestinal pylorus sparing surgery, LF= laparoscopic fundoplication

Figure 2: Pre-operative EGD showing a 2 cm sliding hiatal hernia and esophagitis

Abbreviation: EGD = Esophagogastroduodenoscopy

Figure 3: Post-operative upper gastrointestinal series done on day 2



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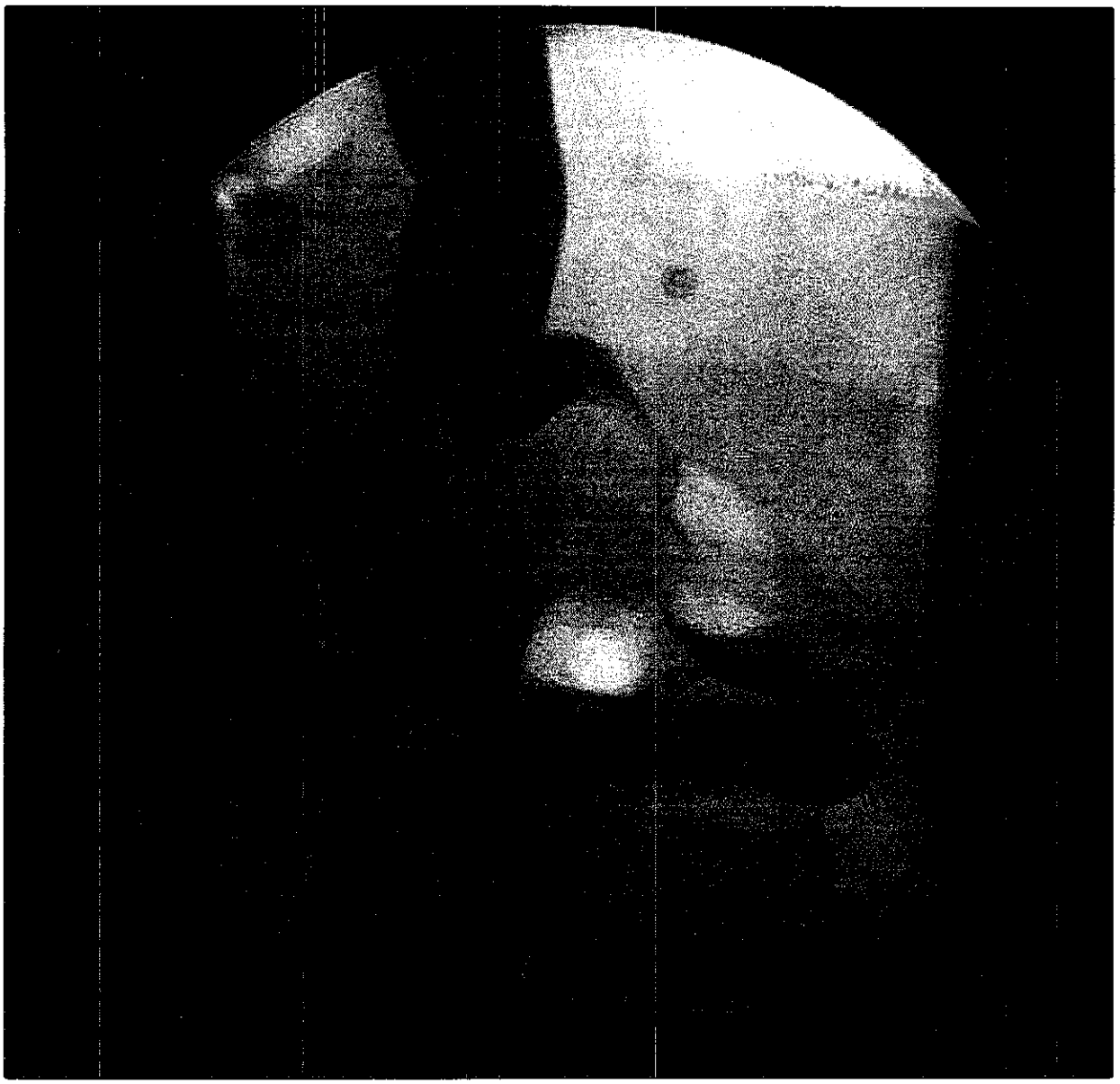

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