

Esophageal Reflux Disease Before and After Bariatric Surgery

HAMED GHOLIZADEH

Introduction

- ▶ obesity is a risk factor for the development of esophageal reflux disease (GERD)
- ▶ surgery types can be creative
- ▶ treatment of GERD involves dietary and lifestyle intervention along with proton pump inhibitors (PPIs) bariatric patients with GERD refractory to PPIs, surgical options will need to be investigated and personalized
- ▶ fundoplication for treatment of GERD has been associated with higher failure rates in the severely obese patients
- ▶ Bariatric surgical procedures (AGB, SG, RYGB, BPD-DS) can be used to treat not only obesity but also GERD

Prevalence of Reflux in Bariatric Patients

- ▶ 10–20% of the general population suffers from reflux-related symptoms 30%
- ▶ BMI of 50.1, 38% of patients complained of reflux-related symptoms, 54% of patients having abnormal manometric findings, consisting of LES dysfunction and other esophageal dysmotility issues
- ▶ over 50%, with greater than 70% of the morbidly obese on pH monitoring
- ▶ odds ratio for GERD to be 2.6 for obese individuals as compared to the nonobese
- ▶ the prevalence of GERD after bariatric surgical procedures is quite variable and is dependent on the type of bariatric procedure that the patient undergoes.
- ▶ when hiatal hernias were repaired, if identified, at the time of the SG. Follow-up after surgery, however, was poor (7%) after 36 months and so long-term benefit or symptom recurrence was not able to be assessed
- ▶ Adjustable gastric banding (AGB) has been shown to provide a short-term benefit in the reduction of GERD symptoms. with long-term worsening and loss of benefit due to the link between AGB and esophageal dysmotility Newly developed GERD symptoms after AGB are quoted as high as 50%
- ▶ The prevalence of GERD after RYGB is quite low, and overall RYGB is linked to a decreased incidence of GERD

Pathophysiology of GERD in Obese Patients before Bariatric Surgery

- ▶ GERD arises when the normal gastroesophageal pressure gradient is altered and intragastric pressure becomes greater than that of the distal esophagus
- ▶ occur from the failure of endogenous anti-reflux mechanisms, namely, lower esophageal sphincter tone and spontaneous esophageal clearance.
 - hiatal hernia causing disruption of the gastroesophageal junction
 - incompetence of the lower esophageal sphincter
 - transient lower esophageal sphincter relaxations (TLESRs) or spontaneous LES relaxations
- ▶ increased intra-abdominal adiposity often seen in obese patients contributes to extrinsic gastric compression and subsequently promotes a gradient favorable for reflux to occur
- ▶ Anatomic displacement of the esophagus into the chest in obese patients
- ▶ decreased impact of the diaphragm on the LES
- ▶ Decreasing the overall LES pressure, which promotes an increased gradient across the GE junction and production of GERD symptoms

Pathophysiology of GERD in Obese Patients before Bariatric Surgery

- ▶ Increased fatty food intake reduces the effects of endogenous and exogenous gastrin release on the LES, thus leading to decreased LES pressures in the postprandial period and the development of reflux symptoms
- ▶ approximately 2–20% of all carbohydrates consumed remain undigested and are metabolized by colonic microflora into short-chain fatty acids. In the setting of excessive carbohydrate intake, common among obese individuals, a humoral pathway, mediated by regulatory peptides, is described by which exposure of the ileum and proximal colon to increased short-chain fatty acids creates a dose-dependent relaxation of the proximal stomach, triggering TLESRs
- ▶ Altered regulatory pathways with respect to the hormones ghrelin and leptin may also be important biochemical, pathophysiologic mechanisms that contribute to the development of GERD in the bariatric patient, with ghrelin having an effect on gastric motility and leptin on LES tone
- ▶ autonomic nervous system, obesity, and GERD

Pathophysiology of GERD in Post-bariatric Surgery Patients

- ▶ The gastric band creates a longer, intra-abdominal pressure zone and prevents against hiatal hernia due to its physical presence. These mechanisms, as a result, create a reduction in GERD symptoms. In the long term, distal esophageal dilatation proximal to the band has been shown, due to narrowing of the esophageal outlet and as a result reduced flow across the banded area
- ▶ The finding of new or worsened GERD symptoms after SG is multifactorial but has been linked to the alteration created at the angle of His after SG. This angle is often blunted as a result of SG. There is also an increased prevalence of hiatal hernia (6–27%) after SG and migration of the proximal sleeve above the diaphragmatic hiatus, dysfunction of the LES after SG is seen, due to division of gastric fundal sling fibers, which causes decreased LES pressures
- ▶ also an increased prevalence of hiatal hernia after SG as previously mentioned, the overall weight loss and decreased intra-abdominal adiposity as well as the increased gastric emptying and removal of the acid-producing parietal cells of the gastric fundus with SG have been shown to cause an improvement in GERD symptoms

Pathophysiology of GERD in Post-bariatric Surgery Patients

- ▶ Worsening of GERD symptoms after RYGB is highly uncommon. Decreased acid production after RYGB due to the proximal gastric division, the small gastric pouch created (20–30 mL) that minimizes any reservoir creation for food stasis, and regurgitation and rapid gastric emptying in addition to the rapid weight loss, an anti-reflux effect from diverting bile from the Roux limb contributes to decreased reflux symptoms

Rationale and Management of Reflux in Bariatric Patients

- ▶ all bariatric patients need to be evaluated for the presence and severity of GERD and counseled regarding the relative efficacy of weight loss operations before surgery

Fundoplication

- ▶ Laparoscopic Nissen fundoplication is a safe and effective treatment for GERD, but several studies have questioned the efficacy for patients with obesity and GERD
- ▶ still remains controversial with regard to the long-term efficacy and durability of fundoplication in the setting of obesity. In a study of 224 patients with 3-year follow-up who underwent laparoscopic fundoplication, overall symptomatic recurrence was 31.3% in obese patients compared to 4.5% in normal-weight patients

Intragastric Balloon

- ▶ The intragastric balloon (IGB) typically is inserted endoscopically and left in place for 6 months. During that time, the patient is kept on proton pump inhibitor (PPI) therapy for ulcer prophylaxis. In spite of this, one study showed that more than 50% of patients required increased dosage of PPI to control worsening GERD symptoms
- ▶ up to 70% in some studies
- ▶ antral position associated with a higher risk of prolonged GERD than the fundal position, but the antral position was associated with slightly more weight loss
- ▶ GERD, unless severe and intractable, is not a contraindication to placement of an intragastric balloon, patients should be counseled as to the risk of increased GERD during the time the balloon is indwelling. In addition, a greater than 5 cm hiatal hernia on endoscopy is a contraindication to balloon placement, regardless of preoperative GERD symptoms.

Adjustable Gastric Banding

- ▶ AGB is associated with impaired motility and an increased risk of dilation in a significant percentage of patients

Sleeve Gastrectomy

- ▶ SG was officially endorsed by the ASMBS in 2012 as a stand-alone procedure for the treatment of obesity
- ▶ “easy to perform but easy to perform poorly.”
- ▶ 44.5% of patients undergoing SG had symptoms of GERD preoperatively. Only 15.9% of patients with preoperative GERD who underwent SG experienced resolution of symptoms, while 84.1% continued having symptoms, with 9% having symptom increase. In addition, 8.6% of patients who did not have GERD symptoms preoperatively developed them after SG. Preoperative GERD was associated with a statistically significant increase in the risk of complications after SG (15.1% vs. 10.6%) as well as an increased risk of failure to achieve at least 50% excess weight loss (34% vs. 28%)
- ▶ impairment of the valve mechanism at the angle of His, decreased gastric compliance, missed hiatal hernia at surgery, development of new hiatal hernia after surgery, an formation of a “neofundus” [

Gastric Bypass

- ▶ The Roux-en-Y gastric bypass has long been regarded as the gold standard not only for bariatric procedures but specifically for bariatric procedures in patients with preexisting GERD
- ▶ the mechanisms for GERD improvement after RYGB include decreasing abdominal pressure over the LES, diversion of bile from the roux limb, promoting weight loss, low or no gastric acid production in the pouch, and decreased reservoir capacity of the pouch for regurgitation
- ▶ extreme reductions in typical and atypical GERD symptoms, antisecretory medication use, and DeMeester score
- ▶ preoperative GERD symptoms were associated with an increased risk of complications and inadequate weight loss after SG, but these risks were not present in the RYGB group
- ▶ RYGB positively affect Barrett's esophagus (BE). The RYGB is a significantly effective procedure for both weight loss and GERD. The chance of improvement in symptoms and objective measures is high, and the chance of persistent, worsening, or new symptoms is low

Biliopancreatic Diversion with Duodenal Switch (BPD-DS)

- ▶ effective procedure for weight loss and comorbidity reduction but is performed less frequently
- ▶ Weight loss is superior to AGB, SG, and RYGB, Its effects on diabetes mellitus and several other comorbidities are greater
- ▶ But less resolution of GERD compared to the RYGB but better than AGB and SG
- ▶ Using AGB as the reference for odds of disease remission at 1 year, 1.53 for RYGB and 1.20 for BPD-DS ($p < 0.0001$). Interestingly, SG performed more poorly with OR of 0.87.
- ▶ The mechanism for resolution of GERD in BPD-DS has been hypothesized to involve not only weight loss but diversion of biliopancreatic secretions (account for the greater effect of BPD-DS on GERD than SG alone)

Evaluation for Reflux Following Bariatric Surgery

- ▶ Initial treatment of GERD in the post-bariatric patient is medical therapy
- ▶ weight loss surgery is performed at another institution, information regarding previous studies can be helpful.
- the 24-hour pH study(gold standard),
- upper endoscopy (evaluate for Barrett's esophagus, esophagitis, gastro-gastric fistula, patency of the anastomosis, or presence of a hiatal hernia)
- Manometry (evaluates esophageal motility dysfunction)
- impedance studies (differentiate acid and nonacid reflux)
- Gastrointestinal radiographic images (helpful for detection of hiatal hernia and to help identify an outlet problem as well as gastro-gastric Fistula)
- real-time fluoroscopy (detect reflux events) can include standing, prone oblique, and other provocative maneuvers

Anti-reflux Treatment Options after Bariatric Surgery

- ▶ all four bariatric surgical procedures (AGB, SG, RYGB, BPD-DS) can be used to treat not only obesity but also GERD
- ▶ risk of new or worsening GERD is not zero for any of these procedures
- ▶ GERD symptoms are common complaints for any bariatric preoperatively and postoperatively
- ▶ Postoperative complications from any of the above procedures can mimic GERD Ruling out band prolapse, anastomotic ulcer or stricture, sleeve stenosis, gastro-gastric fistula, and new or recurrent hiatal hernia
- ▶ acid reducing medications and anti-reflux behavior changes. Titrating dosage and frequency of proton pump inhibitors (some advocate opening the capsules), addition of H2 blockers, and avoidance of food and position triggers
- ▶ If the diagnosis of GERD is established with other complications ruled out and symptoms are refractory to medical therapy, then surgery
- ▶ LINX device, the MUSE system, Stretta procedure, and EsophyX, among other endolumenal therapies

Treatment Options for GERD after AGB


- ▶ a high risk for reoperation over the life of the device mostly for weight gain/regain and mechanical problems
- GERD with evidence of relative obstruction or dilated esophagus on contrast swallow removal of fluid from the band
- If there is evidence of slippage or no resolution of obstruction, surgical management
- completely emptying the band can lead to weight regain and patient dissatisfaction
- ▶ If the primary indication for revision surgery is to treat GERD, conversion to a gastric bypass

Treatment Options for GERD after SG

- ▶ GERD is a common problem after SG
- ▶ can in spite of normal anatomy in a well-performed sleeve but often occurs due to errors in technique and anatomical factors that develop after surgery
- ▶ contrast swallow and upper endoscopy: technical factors such as a neo fundus, narrowing at the incisura, twisting of the sleeve, and new or recurrent hiatal hernia
- ▶ Manometry and pH probe can also be useful

- ▶ LINX®
- ▶ revision surgery (often weight regain or inadequate weight loss) re-sleeve & BPD-DS
- ▶ GERD as primary or secondary for revision ranges from 2% to 27%
- ▶ Conversion to RYGB

Treatment Options for GERD after RYGB

- ▶ RYGB is the best of the currently available procedures in terms of resolution of GERD
- ▶ marginal ulceration, stricture, or gastro-gastric fistula, which often includes upper endoscopy
- ▶ A contrast swallow study (real-time fluoroscopy)  size of pouch, patency of anastomosis
 - radiofrequency energy, or Stretta®
 - The LINX® magnetic sphincter
 - pouch resizing
 - lengthening the alimentary limb if short enough to allow for bile reflux
 - Fundoplication with the remnant stomach
 - conversion to a Belsey Mark IV fundoplication, although that is not standard
 - Hill gastropasty

Treatment Options for GERD after BPD-DS

- ▶ similar to the SG

- LINX®

- Stretta®

- Re-sleeve

Conclusion

- ▶ GERD is a significant comorbidity in bariatric patients preoperatively and postoperatively
- ▶ up to 70% of weight loss surgery patients have GERD
- ▶ appropriate evaluation, procedure choices, and management options.
- ▶ Revision surgery for reflux symptoms is not uncommon
- ▶ appropriate anatomy and outcomes should be considered
- ▶ Patient selection is important to avoid postoperative development or worsening of GERD