Management of Hiatal Hernia and Gastroesophageal Reflux Disease in Obese Patients

Anthony T. Petrick, MD, Director of Department of Minimally Invasive and Bariatric Surgery; Associate Director, Department of General Surgery, Geisinger Medical Center, Danville, PA

Obesity and GERD: increasing body weight associated with higher intra-abdominal and intragastric pressures and gastroesophageal pressure gradient; negative intraesophageal pressure—higher body mass index (BMI) associated with greater negative intraesophageal pressure; transient lower esophageal sphincter (LES) relaxation—dependent on swallowing; not accompanied by esophageal peristalsis, but accompanied by diaphragmatic inhibition (interlude between breaths); implicated as mechanism for GERD; contributing factors include crural diaphragmatic inhibition, contraction of distal esophageal longitudinal muscle (causing foreshortening of esophagus), increasing pressure gradient (especially during inspiration), increasing intra-abdominal pressure (which can overcome the valve and lead to reflux), and axial movement of gastroesophageal junction (GEJ; associated with hiatal hernia [HH]); study comparing normal, overweight, and obese patients demonstrated that increasing BMI and waist circumference associated with increasing episodes of transient LES relaxation (with reflux) and gastroesophageal pressure gradient

Hiatal hernia: disruption of phrenoesophageal ligament; associated with aging, smoking, and factors that increase intraabdominal pressure (eg, obesity); contribution of HH to GERD—in study of patients with small hernias, demonstrated by high-resolution manometry that reflux symptoms doubled when hernia present compared with when hernia reduced; HH and obesity—incidence of HH difficult to assess; probably 40% to 50% in obesity, compared with 12% in general population

Motility: Patients with morbid obesity much more commonly have nonspecific motility disorders, nutcracker esophagus, and hypotensive LES

Clinical manifestations of GERD: Suter et al studied 345 patients with morbid obesity; prevalence of reflux symptoms 36%, reflux esophagitis 30%, and HH 52%; 16% of patients with esophagitis had no HH; ≥50% of patients with HH had esophagitis; presence of HH significantly associated with increase time pH <4 and higher DeMeester scores, but number of episodes of reflux not significantly different in obese patients; when considering age, sex, race, and BMI, only BMI significantly correlated with presence of HH; powerful association between HH and esophagitis

Treatment Options for Patients with Type 3 or 4 Hiatal Hernia and Severe Obesity

Bruno Dillemans, MD, Chief of Staff, Department of General, Pediatric, and Vascular Surgery, AZ Sint-Jan, Bruges, Belgium

Type 3 or 4 hiatal hernia: 95% of HH type 1; type 3 defined as major portion or all of stomach in chest; GEJ higher, but fundus still higher than GEJ; volvulus main problem with type 2 hernia; type 4 HH defined as large defect with other organs herniated (eg, small bowel, colon); symptoms of type 2, 3, or 4 HH include anemia, dyspepsia, and partial volvulus

Options in treatment: repair consists of closure of crura and either Nissen or Toupet fundoplication; alternative approach thoracoscopic Belsey Mark IV procedure; technique—reduction of stomach, dissection of hernia sac, dissection of left and right crura, closure of crura with or without mesh, and then fundoplication; results of reflux procedures in obesity—classic antireflux procedure less successful than in nonobese patients; one study showed 30% rate of recurrence of GERD symptoms

Combining HH repair with bariatric surgery: Patel et al recently reviewed repair of paraesophageal hernia combined with bariatric surgery; <70 patients reported in literature who had undergone combined procedures; sleeve gastrectomy most common bariatric procedure; HH repair and laparoscopic adjustable gastric banding (LAGB)—Dolan et al reported 62 patients undergoing repair of crura and insertion of laparoscopic band; need for antireflux medications decreased from 71% preoperatively to 10% postoperatively; no increased risk of slippage of band or dysphagia; Gulkarov et al (2008)—compared 1298 patients undergoing LAGB alone vs 520 patients with concurrent HH repair; significantly less need for revisional surgery in patients undergoing combined repair because of lower incidence of pouch dilation and slippage

Sleeve gastrectomy plus repair of HH: Pham et al (2014)—23 patients with obesity and paraesophageal hernia; technique included reduction of stomach, resection of hernia sac, repair of crura, and (in vast majority of patients) placement of biologic mesh; costs comparable to each procedure done separately; mean excess weight loss 39% at 6 mo follow-up; Soricelli et al (2010)—reviewed patients undergoing

Educational Objectives

The goal of this program is to improve the management of gastroesophageal reflux disease (GERD), hiatal hernia, failed placement of gastric band, and complications of bariatric surgery in obese patients. After hearing and assimilating this program, the clinician will be better able to:

1. Outline the relationship between morbid obesity and GERD.
2. Discuss the role of bariatric procedures in obese patients with type 3 or 4 hiatal hernias.
4. Formulate a diagnostic workup for patients presenting with complications after bariatric surgery.
5. Explain treatment options for the surgical complications of bariatric surgery.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, members of the faculty and planning committee reported nothing to disclose.
combined repair; demonstrated much improved control of reflux symptoms and substantially fewer new symptoms of GERD; Santonico et al (2014) — compared 78 patients who underwent sleeve gastrectomy plus HH repair to patients without HH who underwent sleeve gastrectomy alone; patients undergoing combined procedure had significantly less control of heartburn and regurgitation; authors concluded that sleeve gastrectomy alone has beneficial effect in the treatment of GERD and adding repair of HH did not improve symptoms of GERD.

Roux-en-Y gastric bypass (RYGB) with closure of hiatal hernia: Chaudry et al (2014) — reported on 14 patients with paraesophageal hernia and BMI >35; achieved 67% loss of excess weight; need for medications for GERD decreased from 89% preoperatively to 30%; 78% reported very good quality of life; from database of >20,000 patients with reflux — of 3 common bariatric operations (LAGB, RYGB, and sleeve gastrectomy), RYGB associated with by far greatest improvement in control of reflux.

Conclusion: patient with large HH and morbid obesity should be treated with combined procedure when feasible; RYGB procedure of choice because of better control of symptoms; recommended to preserve fundus to utilize for possible fundoplication.

Conversion of a Failed Gastric Band: 1- vs 2-Step Approach

Dr. Dilemmas

Complications of LAGB: popularity has waned; problems include unsuccessful weight loss, regain of weight, surgical complications, and intolerance of band.

Treatment of failed LAGB: RYGB preferred procedure; controversy whether repair should be done in 1 or 2 stages; 2011 study reported 108 patients undergoing secondary RYGB with 12% rate of leakage at gastrojejunal anastomosis.

Study from speaker’s institution: 1030 patients underwent secondary RYGB after failed LAGB; 784 still had band in place (246 already had band removed and excluded from study); RYGB after removal of band not necessarily easy procedure; 639 patients (81.5%) underwent simultaneous removal of band and RYGB; 145 underwent removal of band in first stage and RYGB in second stage (minimum 3-mo wait); since 2010, 94% of patients have undergone 1-stage procedure; reasons for revision included insufficient weight loss or regain of weight (63%), complications of band (60%), and poor quality of life (56%; overlap among reasons); early complications (within 30 days) — incidence 4.8% for 1-stage procedure and 6.2% for 2-stage procedure; bleeding most important complication, with incidence of 2.5% and 2.7%, respectively; 1 patient suffered iatrogenic perforation of small bowel; rate of infection 1.2% vs 1.4%, respectively; 3 patients had incisional hernias at trocar site, all requiring reoperation for entrapment of small bowel; 20 patients had bleeding (15 cases endoluminal and likely related to use of circular stapler); 3 patients had extraluminal bleeding and 2 bad bleeding in abdominal wall; reintervention required in 8 patients; hospital stay averaged 3.8 days for 1-stage and 4.2 days for 2-stage procedure (not statistically significant); when results compared to previous group of primary RYGB, total complications, rate of reoperation, bleeding, and leak similar (although groups may not be comparable because of increased experience of surgeons during period of secondary operations).

Key principles: upper gastrointestinal barium study should be performed before surgery because it may indicate whether 1-stage or 2-stage procedure should be performed (eg, slippage of band and presence of large pouch indicate procedure should not be done in single stage); possible advantages of 2-step procedure — less inflammation after waiting 3 to 4 mo as well as improved blood supply to gastric pouch (especially with dilated pouch); 2 reports have demonstrated fewer anastomotic strictures when done in 2 stages; advantages of 1-stage approach — avoidance of 2 operations and 2 anesthetics; reduced cost; fewer adhesions with fewer operations; when band located abnormally high and not many gastric-gastric sutures, may be easier to perform in 1 step; 1-stage procedure may be more difficult when band located in more typical position and with many gastric-gastric sutures; 2 steps preferred if band has migrated.

Technical details: speaker favors removing band before starting dissection; scissors preferred to harmonic scalpel or other ultrasonic device because of concern for undetected thermal injury; important to perform complete transection of gastric-gastric sutures; dissect up until angle of His; desirable to cut dorsal fibers to free-gastric fundus; attempt to restore normal anatomy; define appropriate location for gastrojejunostomy; vertical stapler should be positioned at least 1 cm from gastric tube (34F recommended); circular stapler used for anastomosis, which may be reason for low rate of leak; leaving band in place — now being done if initial BMI >45; for such patients, leaving band yields better long-term weight loss; necessary to open band, perform vertical staple line, and then reposition band (because in vast majority of cases band placed too high); fix pouch above and below band to prevent slippage; band should not be reactivated for 12 to 18 mo, and then only if insufficient weight loss or regaining of weight occurs.

Managing Complications of Bariatric Surgery

Matthew J. Martin, MD, Colonel, Medical Corp, Trauma Medical Director, Madigan Army Medical Center, Tacoma, WA

Approach to complications: patient’s bariatric history — what procedure did patient have, what complications occurred after surgery, and how long was patient hospitalized; helpful to contact surgeon; if patient had surgery at bariatric center of excellence, requirement for 24-hr availability of bariatric surgeon, who can be contacted for advice; types of operations — 99% of operations performed in last 15 yr either adjustable gastric band (restrictive), gastric sleeve (restrictive), or gastric bypass (restrictive and malabsorptive); type of operation key to guiding differential diagnosis and workup.

Treatment algorithm: presence of peritonitis, sepsis, or instability requires expeditious surgical exploration; for other patients, diagnostic workup guided by type of surgery, symptoms, and findings.

**Gastric band:** high rate of long-term complications; most common complication related to obstructive symptoms, eg, nausea, intolerance of oral intake, severe GERD; new onset of severe GERD suggests problem with band; determine whether band in normal position but too tight, or out of position; upright anteroposterior radiography — band should appear as hockey puck angled at 45°; draw line through spine and second line through band and measure angle (phi angle); normal angle ranges from 0° to 58°; larger angle indicates slipped band, ie, band has slipped distally or stomach has herniated through band; O-sign indicates band has come off axis (resembles circle).

Management of displaced band: herniation of stomach above band similar to any incarcerated hernia, which causes obstruction and risks ischemia, perforation, and necrosis; aspiration of fluid may resolve symptoms and prevent need for urgent surgery; and may result in band slipping back into correct position; if aspiration does not relieve symptoms, then band must be removed urgently; may be difficult to remove; start on medial side (considered safe zone).

Erosion of band: usually not emergency because band migrates slowly and tract commonly closes; may be seen, and sometimes removed, endoscopically.

**Early complications with sleeve gastrectomy or bypass:** leak major concern and should be suspected in any patient not recovering normally; can occur ≤60 days postoperatively; signs...
Suggested Reading


Leak after gastric bypass: leak can be from small bowel or pouch; small bowel obstruction most important complication; obtain CT to determine location of obstruction; if dilation of limbs seen (especially of stomach remnant), surgery required

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Drs. Petrick and Dillemans spoke at the 14th Annual Surgery of the Foregut Symposium, sponsored by the Cleveland Clinic Foundation and held February 14-18, 2015, in Coral Gables, FL. For information about the next Surgery of the Foregut Symposium, please go to clevelandclinicmeded.com. Dr. Martin spoke at Trauma, Critical Care, and Acute Care Surgery Conference 2015, presented by the Trauma and Critical Care Foundation and held March 23-25, 2015, in Las Vegas, NV. For information about the next Trauma, Critical Care, and Acute Care Surgery Conference, please go to www.tauroma-criticalcare.com or visit our website, Audiogigest.org. The Audio Digest Foundation thanks the speakers and sponsors for their cooperation in the production of this program.

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include pain, tachycardia, fever, nausea, and vomiting; leak may present with pulmonary symptoms; diagnosis — in most series, swallowing studies miss 50% of leaks; CT yields higher rate of detection; when upper GI series combined with CT, 95% detected; 100 mL of oral contrast sufficient for patients after sleeve gastrectomy

Leak after sleeve gastrectomy: complications, especially leak, present complex problems; leak usually involves thinnest and most avascular part of stomach; back-pressure created because of intact pyloric tone; leak most commonly at GEJ and sometimes onto esophagus; most leaks do not need immediate surgery (except patients with peritonitis; trying to repair hole usually fails; ensure wide local drainage); usually leak contained, and patient presents with low-grade symptoms; first priority to control leak and determine cause; initial treatment percutaneous drainage, nothing by mouth, and intravenous antibiotics,
1. Which of the following is a contributing factor to transient lower esophageal sphincter relaxation?
   (A) Swallowing
   (B) Esophageal peristalsis
   (C) Expiration
   (D) Contraction of distal esophageal longitudinal muscle **

2. The incidence of hiatal hernia in patients with morbid obesity is most likely:
   (A) ≈15% (B) ≈25% (C) ≈35% (D) ≈45% **

3. Hiatal hernia is significantly associated with which of the following factors?
   1. Obesity
   2. Age
   3. Sex
   4. Race
   (A) 1 ** (B) 1,3 (C) 1,2,3 (D) 1,2,3,4

4. A study showed that after surgical repair of hiatal hernia, reflux symptoms recur in _______ of patients with morbid obesity.
   (A) 7% (B) 15% (C) 30% (D) 45% **

5. Based on information in a database of >20,000 patients with reflux, which of the following was associated with the greatest reduction in reflux symptoms?
   (A) Gastric band (B) Sleeve gastrectomy (C) Roux-en-Y gastric bypass ** (D) Above procedures yielded equivalent results

6. Which of the following is the most common complication associated with secondary Roux-en-Y gastric bypass after failed gastric band procedure?
   (A) Bleeding (B) Infection (C) Obstruction (D) Anastomotic leak

7. Which of the following situations is most amenable to a 1-stage Roux-en-Y gastric bypass for revision of a failed gastric band?
   (A) High placement of gastric band (B) Large gastric pouch (C) Multiple gastric-gastric sutures (D) Slippage or migration of band

8. Which of the following is the most common complication after placement of an adjustable gastric band?
   (A) Obstruction (B) Erosion (C) Herniation (D) Ischemia

9. The preferred initial diagnostic test for a patient presenting with obstructive symptoms after placement of a gastric band is:
   (A) Upper endoscopy (B) Plain abdominal radiography (C) Upper gastrointestinal contrast study (D) Computed tomography

10. Which of the following is the preferred initial treatment option for a herniated gastric band?
    (A) Nasogastric decompression (B) Aspiration of the band (C) Upper endoscopy (D) Surgery

Answers to Audio Digest General Surgery Volume 62, Issue 11: 1-D, 2-A, 3-D, 4-D, 5-D, 6-B, 7-B, 8-C, 9-A, 10-B