Bariatric Emergencies for Non-bariatric Surgeons

Aaron B. House MD, PGY-5
University of Kentucky Department of General Surgery
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Objectives

• Briefly illustrate the recent obesity trends in the U.S
• Give a brief history of bariatric surgery
• Describe the anatomy of contemporary bariatric operations
• Discuss some of the common emergent bariatric complications and their management
Obesity

"I'm Lovin' it!"

SUPER SIZE ME

The shape of things to come
Obesity

- Defined as BMI >30kg/m²
- 33% of Americans are obese
- 66% of Americans are overweight
- Obesity is risk factor for:
  - Type 2 DM
  - Heart disease
  - Stroke
  - Certain neoplasms
  - Osteoarthritis
  - Liver disease
  - Obstructive sleep apnea
  - Depression
Obesity in the United States
Obesity in the United States
Trends in Bariatric Surgical Procedures

- 2000: 36,700
- 2006: 177,600
- 2009: 220,000

Figure 1. Annual incidence of bariatric operations. Dark circles from 1993 to 2005 represent estimates derived from the inpatient NHDS database. For 2006, the dark circle represents the total number of inpatient and outpatient procedures. The open circles represent the number of bariatric operations performed as inpatient procedures in 2006 and 2007.
Brief History of Bariatric Surgery
History of Bariatric Procedures
History of Bariatric Surgery

- Initial era began with the observation that patients with surgically shortened small intestine had sustained weight loss.
  - 1954 Kremen et al.
    - Resection of controlled length of small bowel in dogs led to impaired fat absorption and resultant weight loss.
Jejunoileal bypass

- 1953: Richard Varco performs first bariatric surgical procedure at the University of Minnesota

End-to-end jejunoileostomy with ileo-caecostomy

1953: Varco, University of Minnesota
1954: Kremen, Linner & Nelson: University of Minnesota
Gastric Bypass

- 1966: Edward Mason developed gastric bypass operation at the University of Iowa

Gastric transection with loop gastrojejunostomy

1967 – Mason & Ito, Iowa
Gastric Bypass

- 1977: Dr. Ward O. Griffen compared jejunoileal bypass with gastric bypass.
- Dr. Griffen modified Mason’s bypass to a Roux-en-Y
- Still the most common bariatric procedure performed in the US (80%)
Horizontal gastric stapling with Roux-en-Y gastrojejunostomy

1977 - Griffen
Contemporary Bariatric Surgery
Types of Bariatric Surgery

- Restrictive
- Malabsorptive
- Combined
Table 1. Summary of Advantages and Disadvantages of Bariatric Surgery

<table>
<thead>
<tr>
<th>Type of Surgery</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Restrictive</td>
<td>Reversible and adjustable</td>
<td>Least amount of initial and long-term weight loss (14%-20%)</td>
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<td>May be performed more than once</td>
<td>Least amount of T2DM resolution (50%-73%)</td>
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<td>Least invasive (52.9% laparoscopic)</td>
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<td>Least likely to result in nutritional deficiencies</td>
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<td>Malabsorptive</td>
<td>Most amount of initial and long-term weight loss (35%)</td>
<td>Most invasive (1% laparoscopic)</td>
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<td>&gt;95% T2DM resolution</td>
<td>Most commonly associated with nutritional deficiencies</td>
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<td>Combination</td>
<td>Large amount of initial and long-term weight loss (25%-30%)</td>
<td>More invasive vs. restrictive type</td>
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<td>Less effect on nutritional absorption vs. malabsorptive type</td>
<td>More effect on nutritional and medication absorption vs. restrictive type</td>
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<td>Commonly done laparoscopically (~50%)</td>
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<td>70%-80% T2DM resolution</td>
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T2DM: type 2 diabetes mellitus. Source: References 5, 9, 15.
Malabsorption Procedures

- Pure malabsorption procedures obsolete
  - Jejunocolic bypass
  - Jejunoileal bypass
Restrictive Procedures

- Laparoscopic Adjustable Gastric Banding
- Sleeve Gastrectomy
Combined Procedures

- Roux en Y gastric bypass (RYGB)
- Biliopancreatic diversion
- Biliopancreatic diversion/Duodenal switch
Roux en Y Gastric Bypass

Retrocolic/Retrogastric  Antecolic/Antegastric
Biliopancreatic diversion

- Partial gastrectomy performed
- Remaining stomach much larger than pouch for RYGB
- Bile/pancreatic enzymes meet SB distal decreasing absorption and digestion of food
Biliopancreatic diversion w/duodenal switch

- Modification of biliopancreatic bypass
- Designed to decrease ulcer formation
- Increases restrictive component
Lap Band

- Restrictive only
- Pars flacida technique most common
- Perigastric technique, increased complication rate
- 20cc virtual pouch
- Gastro-gastric fixation
Gastric sleeve

- Typically fashioned over 32-40F Bougie
- Restrictive only
- Used as staged procedure or stand alone operation
Complications

- 30 day mortality
  - 0.15%
- 1 year readmission rate
  - Gastric bypass 11.6%
  - Gastric band 6.7%
  - Duodenal switch 14.8%
- 1 year overall complication rate
  - Gastric bypass 15%
  - Gastric band 10%
  - Duodenal switch 47%
Early Surgical Complications

- Bleeding
- Anastamotic Leak
- Infection
- Gastric remnant distention
Late Surgical Complications

- Gastric Remnant distension
- Stricture
- Marginal Ulcer
- Gallstones
- Ventral Hernia
- Internal Hernia
- Short Gut Syndrome
- Dumping Syndrome

- Bowel obstruction
- Band erosion
- Band slippage and gastric prolapse
- Port infection
- Port malfunction
- Esophageal dilatation
Gastric remnant distension

- Can occur acutely or chronically
- Acute post operative distension can lead to remnant staple line blow out and peritonitis
- Must be recognized and managed in timely fashion
- Complex problem due to inability to evaluate gastric remnant with endoscopy or contrasted imaging studies
Presentation

Acute
- Pt. in distress
- Abd distention
- Epigastric pain
- Nausea
- Vomiting
- Leukocytosis
- Tachycardia
- Elevated LFTs/pancreatic enzymes

Chronic
- Similar symptoms to acute presentation
- Pts. less ill appearing
- Tachycardia/Leukocytosis rare in chronic setting
Etiology

Acute

- Obstruction
  - Jejunojejunostomy
  - Biliopancreatic limb
  - Common channel
- Technical anastamotic error
- Obstruction from hematoma
  - 2/2 bleeding staple line most common in early post op period.

Chronic

- Pathology in remnant or peripyloric region
  - Peptic ulcer disease
  - Obstructing neoplasm
  - Gastroparesis
- Anastamotic stricture
Diagnosis

Acute

- History & Physical exam
- Plain radiograph or CT scan with dilated remnant in setting of symptoms
Diagnosis

Chronic

- History & Physical examination
- CT with contrast can indicate level of obstruction or presence of masses

Imaging Findings

- Obstruction of common channel
  - Treat as standard SBO
- Duodenum decompressed
  - Pathology is gastric
    - Gastroparesis, PUD, Neoplasm
- Biliopancreatic limb obstruction
  - Stricture, adhesion, neoplasm
Management

**Acute**
- Emergent gastric remnant decompression
  - Percutaneous decompression
  - Surgical gastric tube
- Percutaneous access may be difficult if remnant posterior and tethered by antecolic roux limb
- Treat underlying cause

**Chronic**
- If common channel source treat as SBO
- If duodenal need endoscopy
  - Access to remnant and duodenum difficult
- Medical tx for PUD, gastroparesis
- Failure of med mgmt
  - Remnant gastrectomy or pyloroplasty
Bowel Obstruction

- Incidence
  - Open 1.3%-4%
  - Laparoscopic 1.8%-7.3%
- High index of suspicion required for diagnosis of bowel obstruction in bariatric patients
Etiology

- Adhesions
- Anastamotic Stricture
- Internal Hernia
- Incarcerated Ventral Hernia
- Intussusception
- Hemorrhagic bezoar
Presentation

- Varies depending upon etiology
- Due to change in GI anatomy classic presentation of obstruction may not be present
- Internal Hernia: vague symptoms, nausea, post prandial pain, typically LUQ
- Pt. habitus may limit ability to palpate ventral hernia
Diagnosis

- History & Physical Exam
- Liberal use of CT scan, UGI series, diagnostic laparoscopy
Internal Hernia

- Protrusion of an internal organ through a defect within the peritoneal cavity
- More common after laparoscopic versus open bariatric operation
- Most common cause of SBO after bypass
- Incidence
  - 0.2-8.6%
- Up to 50% mortality if strangulation occurs
Why do they occur?

- Decreased adhesions following laparoscopic surgery
- Presence of mesenteric defects following bypass
- Weight loss may increase potential space for herniation
- Reports of mass effect of pregnancy lead to internal herniation
Where do they occur?

A: Retrocolic mesenteric window (most common site)

B: Petersen’s space between transverse mesocolon and Roux limb

C: Mesenteric defect between Roux limb and biliopancreatic limb
Frequency

- Review of 2000 patients
  - 67% mesocolic
  - 21% jejunal
  - 8% Petersen’s space
Presentation

- Abdominal pain
- Symptoms of bowel obstruction
- Majority of cases within 6-24 months post operatively
- Symptoms may be vague
- Nausea, emesis (rare), pain focused in LUQ and postprandial
Imaging

- Characteristic findings often missed
  - CT Scan
    - Sensitivity 63%, Specificity 76%
- Characteristic findings
  - Small bowel loops in upper quadrants
  - Small bowel mesentery crossing transverse mesocolon
  - Jejunojejunostomy located above transverse colon
  - Signs of small bowel obstruction
  - Mesenteric swirling
  - Displaced and engorged mesenteric vessels
Mesenteric swirl
Treatment

- Laparoscopic or Open reduction of hernia and closure of mesenteric defects
- Begin reduction at Ligament of Treitz to avoid reducing entire small bowel through defect
Marginal Ulcer

- Ulceration at gastrojejunal anastomosis
- Ulceration most commonly at jejunal side of gastrojejunal anastomosis
- Incidence
  - 0.6-16%
Risk Factors

- Gastric acid
- Smoking
- NSAIDS
- H. pylori
- Gastro-gastric fistula
- Anastomotic ischemia/tension
- Foreign body (suture)
- Pouch size
Presentation

- Acute or occult bleeding
- Pain
- Nausea/Vomiting
- Perforation
Diagnosis

- Endoscopy
- UGI series
- CT scan
Treatment

- Risk factor modification
- Medical management
  - PPI, sucralfate x 3 months
  - Tx H. pylori if indicated
- Refractory Marginal Ulcer
  - Evaluate for gastrogastric fistula (EGD, UGI, CT)
  - Consider Zollinger-Ellison etc.
  - Consider pouch too large
Surgical Management of Refractory Marginal Ulcer

- Division of gastro-gastric fistula
- Revise pouch (with or without resection and revision of anastomosis)
  - Resecting anastomosis removes ulcer
- Truncal vagotomy
  - Evaluate pH levels prior to this option as risk of dumping syndrome increased
Perforated Marginal Ulcer

- If field contaminated and patient unstable
  - Repair perforation
  - Butress with omental patch
  - Externally drain
  - G-tube into gastric remnant
- If known ulcer with minimal contamination
  - Consider resection and revision of G-J
Band slippage gastric prolapse

- Occurs when a portion of the stomach prolapses cephalad to the band
- Most commonly posterior with the pars fladica technique
- Incidence
  - Perigastric 25%
  - Pars flacida 7%
Pouch Dilation

- Gradual dilation of pouch
- Related to maladaptive eating and aggressive band adjustment
- Symptoms of reflux and decreased satiety and restriction
- Band typically in normal position on imaging with no obstructive signs

Band Slippage

- Acute onset
- Symptoms of obstruction and pain
- Band in abnormal position on imaging
Imaging

- Normal anatomy
- Virtual pouch, emptying through small stoma created by band
Imaging

- Pouch dilation
- Enlarged pouch
- Band too tight
- No obstruction
- Symmetric dilation
Imaging
Treatment

- 3 options
  - Reduction of stomach without opening band
  - Open band, reduce stomach, reposition band
  - Remove band

- Pouch dilation treated with deflation of band or removal
  - UGI 1 month after deflation to see if dilation resolved
Eroded band

- Incidence 0.3-2.8%
- Insidious in onset
- Presents with failure to lose weight or maintain loss
- May present as abscess or perforation
Figure 1 Foreign body eroding the gastric wall (A) with adjacent ulceration (B)
Treatment

Septic/Peritonitis

- Abscess drainage
- Exploration
- Band must eventually be removed

Stable patient

- Consider endoscopic band removal
VIDEO of band removal
Biliary complications

- Incidence of gallstones following gastric bypass 6.7-52.8%
- Treatment of patients with symptomatic gallstones or acute cholecystitis, CBD stones should mimic that of non-bariatric patients
- Access to biliary tree and duodenum makes the issue more complex
Choledocholithiasis

- If labs or imaging suggestive of common duct stone may need IOC with lap or open duct exploration
- Transcystic access should be attempted before choledochotomy to avoid increased mortality of the former or t tube placement
- If patient unstable decompress with PTC drain to temporize
Novel Approach

- Transgastric ERCP
  - Scope through laparoscopic assisted gastrostomy
  - Scope through G tube tract that is serially dilated
Summary

- Non-bariatric surgeons need to be familiar with common bariatric complications and their management.
- Bariatric patients are out there.
  - They will find you.
- Complications such as internal hernia, marginal ulcer, band erosion/slippage should be aggressively sought in this pt. population.
- Biliary disease is complicated by lack of access to biliary tree and duodenum.
  - Consider IOC, surgical exploration, transgastric access in these cases.
References

- www.uptodate.com
- www.asmbs.org