2016 ACG Southern Regional PG Course  
Nashville, TN

Management of Challenges in the  
Postoperative Bariatric Patient

John K. DiBaise, MD, FACP  
Mayo Clinic in Arizona  
Professor of Medicine  
dibaise.john@mayo.edu

Learning objectives

• Recognize and diagnose gastrointestinal and surgical complications occurring after bariatric surgery
• Recognize and diagnose nutritional disorders occurring after bariatric surgery
• Implement the appropriate treatment of these complications occurring after bariatric surgery

No relevant conflicts of interest or disclosures
Bariatric Surgery

- Bariatric surgery is the most effective way to achieve long-term weight loss in severely obese patients

### Indications for Bariatric surgery

- 1991 NIH Consensus Conference
  - Class III obesity (BMI > 40)
  - Class II obesity (BMI 35-39.9) plus obesity-related complications
- December 2010 FDA panel approval of gastric band
  - Class II obesity
  - Class I obesity plus obesity-related complications

**Calls to include Class I obesity plus metabolic conditions**

### Contemporary Bariatric Surgery Options

- Adjustable Gastric Band (AGB)
- Roux-en-Y Gastric Bypass (RYGB)
- Vertical Sleeve Gastrectomy (VSG)
- Biliopancreatic Diversion With a Duodenal Switch (BPD-DS)

**Mechanisms: Restrictive, Malabsorptive, Both, Neither**
Estimated Bariatric Operations in the U.S. from 2011-2014

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<tr>
<td>Total</td>
<td>13,000</td>
<td>70,000</td>
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<td>RYGB</td>
<td>36.7%</td>
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<td>LAGB</td>
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<td>11.5%</td>
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< 1% eligible severely obese

Ponce J et al. Surg Obes Rel Dis 2015

GI Issues after bariatric surgery

Early versus Late

**Signs and Symptoms**
- Upper GI symptoms
  - Abdominal pain, nausea, vomiting, heartburn, dysphagia, dumping
- Diarrhea
- Anemia/bleeding
- Weight regain or inadequate weight

**Complications**
- Marginal ulcers
- Anastomotic strictures, leaks, fistulae
- Band stenosis, erosion and slippage
- Bezoars
- Choledocholithiasis
Abdominal pain

- Marginal ulcer
- Anastomotic strictures
- Band/prosthetic material erosion
- ? Intraluminal suture material
- Small Intestinal bacterial overgrowth
- Internal hernia
- SMA syndrome
- Pancreaticobiliary limb/gastric remnant obstruction
- Dumping syndrome
- Abdominal wall pain
- Gallstones

Gallstones

- Gallstones often develop after rapid weight loss and supersaturation of cholesterol in bile
- One-third of patients may develop gallstones after bariatric surgery (within 6-12 mo) and up to 15% may be symptomatic
  - MRCP useful in diagnostic evaluation
  - ERCP technically challenging after RYGB and BPD
    - Balloon-assisted enteroscopy; via laparoscopic gastrotomy or PEG
- Some surgeons recommend prophylactic cholecystectomy
  - Some, only when stones are present
  - Routine pre-op GB imaging not generally recommended
- Urso has been recommended for 6 months post-op
  - Cost-effectiveness questioned

Caruana JA et al. Surg Obes Relat Dis 2005
Swartz DE et al. Surg Obes Relat Dis 2005
Marginal ulcers

• Ulceration at the gastrojejunal anastomosis
  – Usually present with nausea, pain, bleeding, or perforation
  – Usually on jejunal side
  – Presents a bleeding risk
• Occurs in up to 16%
• Risk factors
  – Smoking
  – NSAIDs
  – *H. pylori*
  – Tissue ischemia
  – Foreign body (suture) reaction
  – Gastric acidity (lack of PPI use)
  – Gastrogastric fistula

Remember: If you find a marginal ulcer, check for *H pylori* and look carefully for a gastrogastric fistula

Azagury DE et al. Endoscopy 2011
Steinemann et al. Obes Surg 2014

Marginal ulcers

• Evaluation
  – Endoscopy for gastrogastric fistula, biopsy for HP, remove sutures if possible (?)
  – Medical therapy
    • PPI ± sucralfate
    • Eradicate *H. pylori* if present
    • Stop smoking
    • Avoid NSAIDs
  – Surgical revision
Bleeding

- Uncommon (1-4%)
  - Minimal acid in gastric pouch
- Early or late
- Usually presents with hematemesis or melena
- Etiology: usually marginal ulcers, don’t forget bypassed stomach
  - Avoid NSAIDs
- Start with an upper endoscope, then pediatric colonoscopy if necessary.
- Endotherapy effective in majority patients using thermal/mechanical

Nausea and Vomiting

- Common after RYGB
- Most commonly associated with inappropriate diet
- Medical etiology
  - Medication-induced, stricture, marginal ulceration
- Surgical etiology
  - SBO, internal hernia, intussusception, biliopancreatic limb obstruction, acute gastric distention
- Intractable vomiting
  - Thiamine deficiency (Wernicke’s)
  - Remember to give thiamine before glucose!

After bariatric surgery, chew meticulously, never drink with meals and wait 2 hours before drinking after solid food is consumed. If associated with pain or significant dehydration, look for other causes such as anastomotic ulcers and/or stomal stenosis.
**Obstruction**

- Roux limb
  - Difficulty eating
  - Suspect internal hernia (retrocolic mesocolon, enlarged jejunojejunal site)
  - Diagnose with CT or surgery
- Biliopancreatic limb (Afferent loop syndrome)
  - Upper abdominal pain with dry heaves
  - Acute pancreatitis
- Common channel
  - Obstruction distal to jejuno-jejunostomy (adhesions)
  - Bilious vomiting

**Internal hernia**

- Occur in 0-5% patients after laparoscopic surgery.
  1. Mesenteric at JJ
  2. Petersen’s hernia (space b/t transverse mesocolon & Roux limb mesentery)
  3. Defect in transverse mesocolon if Roux-limb passed retrocolic
- Hard to detect radiologically
  - “Mesenteric swirl”
- Surgery
Dysphagia

- Anastomotic stricture
- Band stenosis
  - 1-3%
  - Surgical removal unless RYGB
- Band slippage
  - 2-18%
  - Difficult to diagnose
    - UGI series
- Achalasia-like process after gastric banding
  - ? prevalence
  - May be reversible

Stenosis

- Occurs in 6-20% of patients with RYGB
  - Usually at gastrojejunal site
- May be due to ischemia or tension with associated ulceration
  - Higher rate if RYGB performed laparoscopically
- Usually presents with vomiting/inability to eat
- Diagnosed radiologically or endoscopically
  - Gastrograffin studies during first 2 wks postop
- May occur early (4-10%): Usually responds to a single (1-3) dilation to 15 mm (3% perf. risk)
  - ? Role of temporary stenting
- May occur late (2-4%): More problematic and may require surgical revision (0.05% of pts)

Feifer KJ et al. GI Endosc 2007
Stenosis after sleeve gastrectomy

- GEJ or incisura angularis
- UGI series to diagnose
- Risk factors: Oversewing staple line or too small bougie (36-40 French)
- Treatments: Endoscopic dilation, temporary stent placement, surgery

Diarrhea

- Early
  - *C. difficile* or antibiotic-associated
  - Dumping
  - Carbohydrate malabsorption
- Late/Chronic
  - Small intestinal bacterial overgrowth
  - Celiac disease
  - IBS
  - Bile acid malabsorption
  - Short common channel (75-100cm) with maldigestion
Dumping

- Most common in the RYGB patients
- Characterized by abdominal distension, pain, nausea, vomiting, diarrhea, flushing and/or dizziness
- Thought to result from hyperosmolarity related to the rapid ingestion of large amounts of sugars which empty from the altered gastric pouch at an unregulated rate
- Treatment
  - Increased protein, complex carbohydrates and fiber intake and decreased simple sugars
  - Solid and liquid intake should be separated by 30 minutes
- Typically resolves after the first year

Heartburn

- Heartburn is a common complication of LAGB
  - 13%-69% after LAGB
- Reflux and esophagitis appear to be worsened when a large gastric pouch is present as can occur with band slippage or there is stomal stenosis
- Conflicting evidence about prevalence of GERD following VSG
- GERD often resolves after RYGB
Inadequate Weight Loss or Weight Regain

- Eating frequent small volume meals
  - ? Eating disorder
- Grazing on calorie-dense meals
- High calorie liquid foods
- Structural problems
  - Gastric pouch too large
  - Gastrojejunal anastomosis diameter >15 mm
    - Endoscopic suturing
    - ? Sodium morrhuate (sclerosant) injection into anastomosis

Catalano MF et al. GI Endosc 2007
Abu Dayyeh BK et al. CGH 2011

Gastrogastric fistula

- Disruption between the gastric pouch and the bypassed stomach
- Can be a cause of weight gain
  - Asymptomatic, N/V, abdominal pain
- More common in past when stomach stapled but didn’t divide gastric remnant from pouch
- Diagnosed by endoscopy or barium
  - May be subtle endoscopically
- Treatment
  - Small fistula and marginal ulcer: conservative approach
  - Surgery if problems continue
  - Endotherapy
    - Clips, APC, fibrin glue, suturing

Nutritional complications after bariatric surgery

- Occur in up to 30%
  - Macronutrient, micronutrient or both
  - Cause variety of disorders
    - Most occur insidiously, many clinically silent

- Protein-energy malnutrition
- Anemia
  - Iron, B12, folate, Vitamin E, copper
- Neurologic disorders
  - Thiamine, copper, niacin, B12
- Visual disorders
  - Vitamin A, E and thiamine
- Skin disorders
  - Zinc, vitamin A, protein, riboflavin, vitamin K, essential fatty acids
- Metabolic bone disease
  - Vitamin D, calcium, increased PTH

Remember that micronutrient deficiencies are commonly present in obese individuals

Stein J et al. APT 2014
Nutritional risk relates to type of surgery

LAGB < VSG < RYGB < BPD

Medical follow-up

- Routine postoperative laboratory testing and surveillance is advised
  - May not be prevented with routine supplementation
  - Every 6 months for first 2 years, annually thereafter
    - CBC, chemistries, vitamin D, ferritin, vitamin B12, PTH, folate
  - Annually
    - Bone mineral density and body composition
- Preoperative assessment of micronutrients also advised
  - Vitamin D, ferritin, B12, folate, PTH

Heber D et al. J Clin Endocrinol Metab 2010
Roust L and DiBaise JK. Curr Opin Clin Nutr Met Care (in press)
Lab testing as indicated

- Visual symptoms: vitamin A, vitamin E, whole blood thiamine
- Bleeding disorder: INR
- Neurologic symptoms: vitamin B12/methylmalonic acid, vitamin E, copper, whole blood thiamine, plasma niacin
- Anemia: ferritin, vitamin B12, folate, zinc, copper, vitamin A, vitamin E
- Hair loss: serum/leukocyte zinc, protein
- Skin rash: vitamin A, serum/leukocyte zinc, essential fatty acid profile, plasma niacin

Heber D et al. J Clin Endocrinol Metab 2010
Bal B et al. Nat Rev Gastroenterol Hepatol 2010

Routine micronutrient supplements

- Multivitamin with iron: 1 chewable tablet, twice a day
- Calcium + vitamin D: chewable tablets, total dose of 1 to 1.5 g elemental calcium daily
- Vitamin B12: 500 – 1000 mcg tablet PO/SL or intranasally daily (gastric bypass/BPD)
- Iron + vitamin C (gastric bypass/BPD)

Heber D et al. J Clin Endocrinol Metab 2010
**Take-home points**

- Bariatric procedures are increasingly being performed
  - Be familiar with post-surgical anatomy
- Recognize the complications these treatments may cause
  - Surgical, GI, nutritional, metabolic
  - Often need endoscopy and imaging to diagnose
- Be familiar with the management of these complications
  - Endoscopic treatment techniques are often effective but surgery still needed at times
  - Counseling, lifelong periodic micronutrient monitoring and routine supplementation recommended