Endoscopic Management of Bariatric Surgical Complications

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A Practical Approach to Clinical Gastroenterology and Hepatology

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The problem

Obesity Trends* Among U.S. Adults: BFRSS, 2010
(*BMI ≥30, or ~30 lbs. overweight for 5’4” person)
**Obesity Trends** Among U.S. Adults  
**BRFSS, 1990, 2000, 2010**  
(*BMI ≥ 30, or about 30 lbs. overweight for 5’4” person)*

1990 | 2000 | 2010
---|---|---
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

The problem

- Obesity is now more prevalent worldwide than malnutrition from hunger
- 1.6 billion adults are overweight
  - ≥ 400 million adults are obese
- By 2015, 2.3 billion adults will be overweight
  - > 700 million adults will be obese.

The solution

- Lifestyle modification
  - Diet
  - Exercise
- Medication
- Surgery
- Minimally invasive options

Why surgery?
Why surgery?

- 203 women
  - randomized to control group vs home exercise
- Results
  - Some weight reduction in first 6 months, but no difference noted at 1 year


Why surgery? (continued)

Understanding bariatric surgical anatomy

- Restrictive procedures
- Malabsorptive procedures
- Combination restrictive and malabsorptive procedures

Restrictive Procedures

*VBG*

- Gastric pouch
- Mesh or silastic ring/band

*Lap Band*

- Adjustable Lap band
- Subcutaneous port

Illustration: John E. Pandolfino, MD
Malabsorptive Procedures

BPD

BPD + Duodenal Switch

Roux-en-Y Gastric Bypass: restrictive and malabsorptive

Illustrations: John E. Pandolfino, MD
Upsides of bariatric surgery

- Safe and effective
  - Rapid weight loss
  - Improved comorbidities
  - Durable results

Illustrations: John Pandolfino, MD

The only durably effective therapy for severe obesity is currently surgery

- Significantly reduces the risk of mortality associated with obesity

Illustrations: John Pandolfino, MD

The downsides of bariatric surgery: gastrointestinal complications

- Complications common to all bariatric surgery
  - Gallstone disease
  - Peptic ulcer disease (PUD)
  - Gastroesophageal reflux disease (GERD)
- Complications occurring more commonly after gastric banding
  - GERD
  - Food impaction
  - Band displacement
  - Band erosion
- Complications occurring more commonly in Roux-en-Y gastric bypass (RYGB), gastric resection, and biliopancreatic diversion (BPD)
  - Anastomotic complications
  - Suture-line and staple-line complications

Clinical case: Initial Presentation

- 41 year-old female
- Hypertension, Diabetes, DJD, OSA
- BMI 41 kg/m²
- Underwent uncomplicated RYGB 5 months ago
- Did well postoperatively and transitioned to “regular” diet after 2 months
- Taking MVI, Ca²⁺, B₁₂
- Has lost 50 lbs
- Developed progressive N, V and abdominal pain 6 weeks ago
Clinical case: Initial Presentation

- Upper GI X-ray 3 weeks ago showed “possible 3mm ulcer distal to gastrojejunal anastomotic line”
- Treated with omeprazole 20 mg BID PO with minimal relief
- Always nauseated, afraid to eat because it leads to pain and vomiting
- Currently only eating 2-3 times a day, less than 3 oz at a time, minimal protein
- Tolerating PO liquids
- Admitted to hospital with dehydration

Clinical case: diagnostic workup

- What would you do first?
  - Repeat UGI Xray
  - EGD
  - CT abdomen
  - Surgical exploration
  - Other
Diagnostic Considerations

- Obstructive symptoms (pain, N, V) are the most common presenting symptoms after RYGB
- Abnormalities vary from none (dietary indiscretion) to more serious (ulcer, stricture most common)
- UGI may miss post-anastomotic disease (poor filling beyond)-ulcers invariably post-anastomotic
- In the absence of peritoneal signs, EGD more likely to be useful than CT (leaks, closed-loop obstruction, GOO)
- Exploration is almost never necessary

What to recommend now?

- Increase PPI dose (add sucralfate?)
- Test for *H. pylori*
- TPN
- No smoking
- No NSAIDs
- All of the above
Complications of Roux-en-Y Gastric Bypass (RYGB)

Postoperative Complications

Perioperative mortality of bariatric surgery is less than 1% but morbidity can be substantial:

<table>
<thead>
<tr>
<th>Early (within 30 days)</th>
<th>Late</th>
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<tbody>
<tr>
<td>Mortality 1%</td>
<td>Stomal Stricture 3 – 20 %</td>
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<tr>
<td>Anastomotic Leak 1.5%</td>
<td>Stomal Ulceration 3 – 20 %</td>
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<tr>
<td>Pulmonary Embolism 2%</td>
<td>Marginal ulcer (J)</td>
</tr>
<tr>
<td>Acute Gastric Distention rare</td>
<td>Stomal ulcer (GP)</td>
</tr>
<tr>
<td>Pneumonia 1.9%</td>
<td>Staple line disruption 1%</td>
</tr>
<tr>
<td>Wound Infection 6%</td>
<td>Internal Hernia rare</td>
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<td></td>
<td>Incisional Hernia 15%</td>
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<td></td>
<td>Fistula rare</td>
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Anastomotic Complications: where do they occur?

- Pouch
  - Stomal ulcer
- Anastomosis
  - Marginal ulcer
  - Anastomotic stricture
- Remnant stomach
  - PUD
- Duodenum
  - PUD
- Roux anastomosis
  - Bleeding
  - Stricture
  - Ulceration

Illustrator: John E. Pandolfino, MD

Anastomotic Ulcer

- Occur in 3-20% of patients after RYGB
- Usual presentation is epigastric pain, but nausea and/or vomiting may accompany pain or be the sole presenting symptom(s)
- Ulcers on jejunal side (marginal ulcers) require careful endoscopic examination to detect
Anastomotic Ulcer

- Above: Wash well!
- Below: Look beyond!

Anastomotic Ulcer Treatment

- Treatment is medical
  - Acid suppression with PPI will heal nearly all
  - Sucralfate
  - Eradicate H. pylori
    - Schirmer, et al., 2002: marginal ulcers with + without preop HP screening
      - +screen 2.4%
      - -screen 6.8%
      - P<0.05
- Rare cases require reoperation
Case 2: Initial Presentation

- 37 year-old woman
- Morbidly obese since teen years
  - HTN
  - DM 2
  - GERD
- Underwent RYGB 7 weeks ago
- Lost 35 lbs in 6 weeks
- Never tolerated solids well, now not tolerating liquids either
- Epigastric pain & vomiting 2 weeks

What is your differential diagnosis?
Case 2: Diagnostic workup?

- UGI Xray
- EGD
- CT abdomen
- Surgical consultation
- Ultrasound
- Bloodwork
- Other

Case 2: Endoscopic findings

- What is your diagnosis?
- What are your treatment options?
- What is the treatment of choice?
Anastomotic Stricture

- Occur in 10% of RYGB patients
- Usual presentation is vomiting or early satiety with or without nausea, but abdominal pain may also present
- Stoma diameter usually greater than 1cm when created
- Stricture arbitrarily defined as inability to pass standard diagnostic gastroscope across anastomosis without resistance
- May be early or late complication

Anastomotic Stricture Treatment

Treat Endoscopically

Gastrograffin swallow

Endoscopic view of stomal stenosis with ulceration

Dilation with a through-the-scope balloon dilator

Anastomotic Stricture

- Endoscopic balloon dilation
  - Short through-the-scope dilation balloon, with or without guidewire
  - Balloon diameter approximating anastomotic diameter at original operation
  - More than one session may be required

Leaks, fistulas, suture-line and staple-line disruptions

- Can occur at suture line or at anastomosis
- Most common fistula post-Roux-en-Y gastric bypass is between gastric pouch and gastric remnant

Gastric pouch
Drain

Fistula to excluded stomach

Left: pouch-remnant gastro-gastric fistula.

Right: staple-line disruption revealing surgical drain and suture on serosal side of gastric pouch.
Leaks, fistulas, suture-line and staple-line disruptions
Leaks and Fistulas
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Leaks and Fistulas
Leaks and Fistulas

Fistula closed
Anastomosis widely patent

Removing Foreign Material

Removing retained staples: why bother?

Ulcers

1 2
3 4
Removing Foreign Material
Removing retained sutures: why bother?

Ulcers

Strictures
Removing Foreign Material
Removing retained sutures: more than meets the eye

Removing Foreign Material
Removing retained sutures: what to do
Removing Foreign Material

Removing retained sutures: what to do

1 2 3 4

Removing Foreign Material

Removing retained sutures: double-channel scope approach

1 2 3 4
Gastrointestinal Bleeding

- Anastomotic bleeding
  - Pouch-enteric anastomosis
  - Jejuno-jejunostomy anastomosis
- Peptic ulcer disease
  - Gastric pouch
  - Gastric remnant
  - Duodenum
- Approach to afferent Roux limb or jejuno-jejunostomy anastomosis requires deep-enteroscopy, laparoscopically-assisted endoscopy, or surgery

Complications of Laparoscopic Adjustable Gastric Banding (LAGB)
Laparoscopic Adjustable Gastric Band

Endoscopic Management of Post-Gastric Banding Complications

- Symptoms similar to RYGB patients: GERD symptoms, nausea, vomiting, pain, dysphagia

- Endoscopist’s role much more diagnostic, much less therapeutic

- Endoscopically identifiable etiologies include:
  - GERD-related stigmata
  - Band overinflation
  - Peptic ulcer disease
  - Band slippage or gastric prolapse
Gastric Banding Complications

- Food impaction / pouch outlet obstruction
- Band displacement / slippage
- Band erosion
- Gastric pouch dilatation
- Esophageal dilatation
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Video courtesy Prof. Raul Monserrat, Caracas, Venezuela
Sleeve Gastrectomy Complications

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Sleeve Gastrectomy Complications

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Sleeve Gastrectomy Complications

Endoscopic Management of Other Bariatric Surgical Complications
Endoscopic Management of Other Post-Bariatric Surgery Complications

- Bile duct stone management
  - Post-gastric banding
  - Post-RYGB
    - Laparoscopically-assisted ERC
    - PTC
    - Via deep enteroscopy (Roux ≤ 150 cm)


Endoscopic Management of Other Post-Bariatric Surgery Complications

- Bile duct stone management
- Endoscopic removal of eroded / lumenalized band (VBG)
- Endoscopic removal of endoluminal balloons
- Perforation → clip and co-manage with surgical colleague?
Endoscopy Post-Bariatric Surgery

Symptomatic indications for EGD

- Threshold is lower than in non-bariatric patients
- Vomiting +/- nausea
- Abdominal pain (usually epigastric)
- Weight gain / decelerated weight loss
- GI bleeding
  - Hematemesis
  - Melena
- Bloating (possibly)
- Vague abdominal discomfort (possibly)
- Jaundice (possibly)

What if endoscopy doesn’t provide an answer?
Post-endoscopic Workup of Post-Bariatric Surgery Complications

- Symptoms including GERD, nausea, vomiting, pain, bloating
- Consider CT first if pain is main symptom
- Consider SBFT or CT enterography if nausea or bloating are pre-eminent
- Consider US if symptoms are pancreatico-biliary in character, especially if GB in situ; MRCP if LFT’s are elevated as well
- Role of capsule endoscopy undetermined in this population: case-by-case basis for bleeding or pain; role for Agile patency capsule?

Abdominal pain

- Upper abdominal pain
- Heartburn alone?
  - Yes: Treat empirically with acid suppression (PPI)
  - No:
    - Epigastric: Upper GI endoscopy to exclude GERD, PUD, anastomotic ulcer or stricture
    - Right upper abdomen: Check liver enzymes, ultrasound to exclude biliary source
- Endoscopy normal
- Abdominal CT scan
  - Normal
Nausea and vomiting

Nausea or vomiting

Nausea alone?

Yes

Consider GERD, PUD, anastomotic ulcer

No

Vomiting

EGD or empiric treatment

EGD to exclude anastomotic stricture, food impaction or bezoar, PUD, or GERD

EGD normal

Check liver enzymes, ultrasound to exclude biliary source

Abdominal CT scan and consider systemic or CNS etiology

Normal

Treat endoscopically or medically

EGD abnormal

What do I need to get started?
Bariatric endoscopist’s toolbox

- Necessities (it doesn’t take a lot to get started)
  - Diagnostic endoscope
  - Standard biopsy forceps
  - Hydrostatic dilation balloons
    - Diameter: 8 – 16 mm
    - Length: 4 – 6 cm (“pyloric” or “colonic”)
      - Non wire-guided (when scope visualizes jejunal lumen)
      - Wire-guided (when scope can’t visualize jejunal lumen)
    - Guidewire
  - Endoscopic suture scissors
    - Reusable
    - “surgical scissors”, NOT “endoscopic loop cutter”
  - Small rat-tooth forceps

Bariatric endoscopist’s toolbox

- Necessities (though you’ll reach for them infrequently)
  - Hemostatic clips
    - Small
    - Large
  - Small rat-tooth forceps
  - Large rat-tooth forceps
  - Snares
  - Foreign body retrieval net
  - Stone extraction basket
  - Retrieval forcep (tripod, quadripod, etc.)
  - Overtube
Bariatric endoscopist’s toolbox

- Luxuries or occasional-use instrumentation
  - Dual-channel therapeutic endoscope
  - Pediatric or transnasal-diameter endoscope
  - Fluoroscopy
  - Propofol / MAC anesthesia
  - Pseudocyst drainage needle-catheter (19 or 21 ga)
  - APC unit (with multiple probes)
  - Cytology brush
  - Deep enteroscope (for Roux-en-Y issues)
    - Balloon-overtube type
    - Rotational-type

ASGE / SAGES Clinical Practice Guideline

Role of endoscopy in the bariatric surgery patient


Access at: www.asge.org
Conclusion

- In bariatric patients, scope sooner rather than later
- Change is opportunity
  - New operations create new anatomy with new complications
  - Minimally invasive surgery interfaces seamlessly with interventional endoscopy
  - Both create opportunities for high-impact endoscopy
- Novel technology & concepts are spawning new endoscopic techniques to manage bariatric surgical complications definitively
- A comprehensive interdisciplinary treatment plan constitutes the foundation for every successful endoscopic treatment of a bariatric complication