Surgical & Nutritional Complications of Bariatric Surgery: What Every GI Doc Needs to Know

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Disclosures—None except for discussion of off-label use of covered esophageal stents
Current US Statistics

- 58 Million overweight
- 40 Million obese
- 3 Million morbidly obese
- 400,000 related deaths annually
- > $93 Billion in annual healthcare costs
Classification of Obesity

- Overweight: 25-29.9 kg/m²
- Obese: 30-34.9 kg/m²
- Severe Obesity: 35-39.9 kg/m²
- Morbid Obesity: 40-49.9 kg/m²
- Super Obesity: 50-59.9 kg/m²
- Super-Super Obesity: 60+ kg/m²
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Indications for Surgical Treatment

- At least 5 year history of severe obesity
- Multiple failed attempts at nonsurgical means of weight loss
- BMI >40 kg/m² or BMI >35 kg/m² with associated with significant obesity-related comorbidities

1991 NIH Consensus Development Conference
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Surgical Options

Bypass
Band
Sleeve
Duodenal Switch/BPD
Post-op Course

- Extubated in OR
- Transferred to surgical ward
- NGT not routinely used
- Patient-controlled analgesia
- Early ambulation
- Incentive spirometry
- Contrast study on postoperative day 1 or 2
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Gastric Bypass
Post-operative Complications--Acute

Bleeding

- Sources:
  - Gastrojejunostomy
  - Jejunojejunostomy
  - Gastric remnant
  - Intra-peritoneal
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Post-operative Complications--Acute Leak

- **Sites**
  - Gastrojejunostomy 30-68%
  - Gastric remnant 4-25%
  - Jejuno jejunostomy 5-20%
  - Candy cane 11%
  - Gastric pouch 9-11%
Post-operative Complications--Acute Leak

- Risk factors for leak
  - Age
  - Male gender
  - OSA
  - Procedure type (revisional > open)

Fernandez et al. Surg Endosc 2004
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Post-operative Complications--Acute

Leak

- Recognition
  - Tachycardia
  - Fever
  - Abdominal pain
  - Hypotension
  - Pulmonary/PE
  - Leukocytosis
  - "Impending doom"

- Etiology
  - Technical factor
  - Ischemia
  - Tension
  - Obstruction

Hamilton et al, Surg Endosc 2003
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Post-operative Complications--Acute

Leak
Post-operative Complications--Acute

Leak
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Post-operative Complications—Chronic Obstruction

• Nausea/vomiting
• Vague upper abdominal or chest pain
  - Internal herniation
  - Jejunojejunual anastomotic stenosis
  - Technical error
  - Adhesions
  - Intraluminal blood clot
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Post-operative Complications—Chronic Obstruction

Supine
Post-operative Complications—Chronic Obstruction
Post-operative Complications--Chronic Obstruction
Post-operative Complications--Chronic Obstruction
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Post-operative Complications--Chronic Obstruction
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Post-operative Complications--Chronic Obstruction
Post-operative Complications--Chronic Obstruction
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Post-operative Complications--Chronic Marginal Ulceration
Post-operative Complications--Chronic
Marginal Ulceration
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Post-operative Complications—Chronic Cholecystitis/Choledocolithiasis
Post-operative Complications

• Risk factors for death
  – Leak
  – Preoperative BMI > 60
  – Procedure type (revisional > open)
  – HTN

Fernandez et al. Surg Endosc 2004
Lap Adjustable Gastric Banding

- Purely restrictive
- Two available devices
- Around gastric cardia
- Create a small gastric pouch (15 ml)
- Inflatable reservoir that can be tightened

Warning signs:
- Vomiting
- GERD
- Dysphagia
- Food gets “stuck”

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Lap Band Complications
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Lap Band Complications
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Lap Band Complications
Lap Sleeve Gastrectomy

- Stomach too big
- Reduce size to 60 ml (80% decrease)
- No malabsorption
- No re-routing
- No ulcers
- Less pouch dilation
- No foreign body
Sleeve Complications

- GERD ~ 12%
- Leak ~ 2%
- Bleeding ~ 1-2%
- Obstruction/stricture < 1%
- Portal vein thrombosis < 1%

- PE still most common cause of death
GERD

• ~10% incidence of new GERD after sleeve
• Fails to improve pre-existing GERD
• Pre-existing GERD patients may have higher leak rate
• Relative contraindication
Lap Sleeve Gastrectomy

Leak

- Typically at angle of His
- Due to narrowing at incisura
- Stomach becomes high pressure tube

Tx:
- Control leak
- Supplement nutrition
- Relieve distal obstruction
- IV Abx/sepsis control
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CT with Contrast
Esophageal Stent

- FDA indicated for management of malignant obstruction or obstruction in a setting of fistula
- **NOT** FDA approved indication for leaks or in benign indications
- Use in combination with surgical or percutaneous drainage
Operative Strategies

- Fully covered; Size 22-23 mm x 150 mm length
- 4-6 weeks
<table>
<thead>
<tr>
<th>Study</th>
<th>Patients</th>
<th>Successes</th>
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<tbody>
<tr>
<td>Serra Obese Surg 2007</td>
<td>6--all sleeve</td>
<td>5/5 fully coated 0/1 uncoated</td>
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<tr>
<td>Eisendrath Endoscopy 2007</td>
<td>21</td>
<td>100% GBP 75% Sleeve 100% BPD</td>
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<tr>
<td>Blackmon Ann Thor Surg 2010</td>
<td>10</td>
<td>6/6 GBP 4/4 Sleeve</td>
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<td>Nguyen Obese Surg 2010</td>
<td>8</td>
<td>8/8 Sleeve</td>
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<td>Spyropoulos SOARD 2011</td>
<td>8</td>
<td>8/8 Sleeve</td>
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<td>De Aretxabala Obese Surg 2011</td>
<td>4</td>
<td>4/4 Sleeve</td>
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</tbody>
</table>
Treatment of gastric leaks with coated self-expanding stents after sleeve gastrectomy

- 6 patients with staple-line leak after sleeve or DS
  - Coated stent (n=5)
  - uncoated stent (n=1)

- All 5 patients with coated stent had complete sealing of leak

- The patient with uncoated stent required total gastrectomy

Endotherapy including temporary stenting of fistulas of the upper gastrointestinal tract after laparoscopic bariatric surgery

- 21 patients with anastomotic leak
  - Gastric bypass (n=8)
  - Sleeve ± DS (n=8)
  - Sleeve (n=4)
  - BPD (n=1)

- Success rate was 100% for gastric bypass, 63% for sleeve ± DS, 75% for sleeve, and 100% for BPD

Utility of removable esophageal covered self-expanding metal stents for leak and fistula management

- Stent for leaks after gastric bypass (n=6) and sleeve gastrectomy (n=4)
- Successful leak management in all patients

The Use of Endoscopic Stent in Management of Leaks After Sleeve Gastrectomy

- 3 patients with staple-line leak after sleeve gastrectomy
  - Acute presentation at 7 days
  - Chronic presentation at 6 & 9 months

- Stent was removed at 6 weeks in 2 patients and 4 months in 1 patient

- Success healing of leak in all patients

Nguyen NT et al. Obes Surg 2010
Management of gastrointestinal leaks after surgery for clinically severe obesity

• 12 patients

• Stent placed in 8

• Rapid management of GI leaks using CT-guided drainage and/or intraluminal stent placement could be the treatment of choice in selected patients

Spyropoulos C et al. SOARD 2011
Gastric leak after sleeve gastrectomy: analysis of its management

- 8 patients
- Treated with laparotomy/laparoscopy & drainage
- Stent placed in 4
- Leak closed in all patients with the healing time ranging from 21 to 240 days

De Aretxabala X et al. Obes Surg 2011
Best Operation?

- **Band**
  - "Smaller" operation
  - Lower risk
  - More reversible

- **Sleeve**
  - "Larger" operation
  - Higher risk
  - Less reversible

- **Bypass**

Risk → Weight Loss
Diet Progression After Surgery

- Clear Liquids
- Protein-based Liquids
- Pureed Foods
- Soft Foods
- New Diet...Modified Regular (2 months after surgery)
Dietary Changes

- Low-calorie, low-fat, low-sugar
- 3 small meals daily
- Protein at each meal
- Eight 8-oz cups water/fluid day
- No beverages with meals
- No carbonation; minimal EtOH, caffeine
- Daily Vitamin / Mineral Supplements
Behavioral Changes

- Eat slowly ~30 minutes per meal
- Stop eating at first signs of fullness
- Chew well
- Avoid snacking
- Physical activity daily
Nutritional Monitoring

- Vitamin deficiencies
  - B12
  - Vit D 25
  - Vit A
  - Thiamine (B1)
  - Folate
  - Pyruvate (B6)
  - Intact PTH
  - Homocysteine
When to Call

• Acute:
  – Abdominal pain
  – Temperature greater than 100.5 °C
  – Increasing wound erythema
  – Any wound drainage
  – New resp distress
  – Vomiting
  – Anything that looks like a PE

• Sub-Acute:
  – New onset abdominal pain
  – New respiratory distress
  – Vomiting/food intolerance
  – Choledocholithiasis
  – Recurrent marginal ulcer
  – Anything that looks like a PE

TACHYCARDIA!!
Thank you
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