Optimal Management of Obesity Related Co-morbidities Pre and Post Bariatric Surgery

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Objectives

• Present an overview of comorbid medical problems associated with obesity

• Review optimal management of these conditions preoperatively

• Describe the various bariatric surgical procedures and how we “think” they work

• Explain the impact bariatric surgery has on these comorbidities postoperatively
Bariatric Surgery Criteria

BMI:
- <18.5
- 18.5-24.9
- 25.0-29.9
- 30.0-34.9
- >35
- >40

With ≥1 severe obesity-associated comorbidity (e.g., diabetes or OSA)

With no comorbidities

www.cdc.gov/healthyweight/assessing/bmi/adult_bmi
Why Consider Surgery?

- Men with a BMI >40, ages 25-34, have a 12-fold increase in overall mortality
  - Plus the morbidity of the obesity-related medical problems

- Decrease in quality of life

- Management of obesity related co-morbidities
  - Diabetes
  - Obstructive sleep apnea
  - Hypertension
  - Fatty liver disease
  - Degenerative joint disease
Medical Complications of Obesity

Pulmonary Disease
- Abnormal function
- Obstructive sleep apnea/pul HTN
- Hypoventilation syndrome

Nonalcoholic Fatty Liver Disease
- Steatosis
- Steatohepatitis
- Cirrhosis

Cardiovascular Disease
- Diabetes
- Dyslipidemia
- Hypertension, LVH, AF,
  Systolic and Diastolic dysfx

Gall Bladder Disease

Gynecologic Abnormalities
- Abnormal menses
- Infertility
- Polycystic ovarian syndrome

Osteoarthritis

Skin

Gout

Idiopathic Intracranial Hypertension

Stroke

Cataracts

Severe Pancreatitis

Cancer
- Breast, uterus, cervix
- colon, esophagus, pancreas
- kidney, prostate

Phlebitis
- Venous stasis

Cardiovascular System
Cardiovascular Assessment: Stress Testing
Routine Exercise Testing

• Routine exercise testing on ALL patients does not add significantly to clinical evaluation in predicting cardiac risk...
Stress Testing

Cardiovascular Assessment

Selected patients for cardiac evaluation

– Age > 65
– Diabetes > 10 years
– History of CAD/CVA/CHF
– Q waves on EKG
– Pre-op creatinine > 2mg/dl

• 2-3 of above $\rightarrow$ Non-invasive stress testing
• 4-5 of above $\rightarrow$ Cards Consult
Which Stress Test is Best?

Cardiovascular Assessment

• **Stress Imaging Study:**
  – Stress echo
    • Body habitus and echo windows
    • Dobutamine
  – Persantine / Adenosine Nuclear Studies
  – Cardiac MRI
12-Lead EKG
Cardiovascular Assessment

• Detection of prior myocardial infarctions
• Determination of rhythm disturbances and bundle branch blocks
• Baseline comparison for post-operative cardiopulmonary events

• Q-Tc Prolongation Syndrome
  – Obese patients with acquired Q-Tc prolongation have increased risk for postoperative malignant arrhythmias
  – Caution if > 460 msec
Pulmonary
Pathophysiology in Morbid Obesity

- **Physiologic Consequences:**
  - Decreased FRC, VC, TLC, IC, MVV, ERV
  - Decreased FEV1:FVC Ratio → Obstructive pattern
  - Polycythemia

- **Obstructive Sleep Apnea:**
  - Most common
Obstructive Sleep Apnea

- Often overlooked or misdiagnosed

- Loud snoring with witnessed apneic episodes

- Daytime somnolence and/or early morning headaches
Obstructive Sleep Apnea

• Polysomnogram
  – Gold standard

• Nocturnal pulse oximetry

• If warranted, CPAP/BIPAP should be initiated at least 2 weeks prior to surgery and used during the peri-operative stay
Endocrine

• Thyroid function studies

• Aggressive blood sugar control
  – Target is HgA1c <7
  – Caution with HgA1c > 9
    • Use of insulin therapy pre-operatively
Thromboembolic Disease
Pathophysiology in Morbid Obesity

• Increased blood viscosity
• Decreased concentration of Anti-thrombin III
• Increased concentration fibrinogen & PAI-1 produced by adipose tissue
• Sedentary lifestyle, venous stasis and pulmonary HTN augments the risk
• Endothelial injury completes “Virchow’s Triad” increasing the risk even further
Thromboembolic Disease

• **Multi-modality prophylaxis pre-op**
  – Graded compression stockings (impulse boots)
  – Enoxaparin 40 mg Q12
  – Early Ambulation if possible
  – Prophylaxis begin at the time of induction

• **Prophylactic inferior vena cava filter placement**
Gastrointestinal Tract

- ?? Colon Prep in ultra-high BMI
- Stool Analysis for H. Pylori antigen
- Steatohepatitis
  - RUQ Ultra sound
Additional Serologies/Studies

• CBC with Differential

• Comprehensive Metabolic Panel
  – Kidney and liver functions
  – Blood sugar

• Disease specific serologies
  – HgA1c
  – Lipid Profile
  – Fasting insulin
Additional Serologies/Studies/

- Measurement of bone mineral density (DEXA)
- Baseline PTH, 25-OH vitamin D
- Metabolic rate / body composition
- Greenfield filter placement
  - Prior DVT/ PE
  - Significant venous stasis disease
The BEST way
to achieve metabolic control
of ALL co-morbid medical problems
prior to bariatric surgery...
Modest 5 to 10% WEIGHT LOSS!
Outcomes of Preoperative Weight Loss in High-Risk Patients Undergoing Gastric Bypass Surgery

Christopher D. Still, DO; Peter Benotti, MD; G. Craig Wood, MS; Glenn S. Gerhard, MD; Anthony Petrich, MD; Mary Reed, MD; William Strodel, MD

Hypothesis: Modest, preoperative weight loss will improve perioperative outcomes among high-risk, morbidly obese patients undergoing Roux-en-Y gastric bypass.

Design: A prospective, longitudinal assessment of characteristics and outcomes of gastric bypass patients.

Setting: All patients undergoing open or laparoscopic Roux-en-Y gastric bypass surgery for morbid obesity or its comorbid medical problems at Geisinger Medical Center in Danville, Pennsylvania, during a 3-year period from May 31, 2002, to February 24, 2006, were included in this analysis. Patients were required to participate in a standardized multidisciplinary preoperative program that encompasses medical, psychological, nutritional, and surgical interventions and education. In addition, patients were encouraged to achieve a 10% loss of excess body weight prior to surgical intervention.

Results: Of the 884 subjects, 425 (48%) lost more than 10% of their excess body weight prior to the operation. After surgery (mean follow-up, 12 months), this group was more likely to achieve 70% loss of excess body weight ($P < .001$). Those who lost more than 5% of excess body weight prior to surgery were statistically less likely to have a length of stay of greater than 4 days ($P = .03$).

Conclusions: This study shows that high-risk morbidly obese candidates for bariatric surgery who are able to achieve a loss of 5% to 10% excess body weight prior to surgery have a higher probability of a shorter length of hospital stay and more rapid postoperative weight loss.

Arch Surg. 2007;142(10):994-998
“How can we spend so much time and resources on combating the 2nd most common, preventable cause of death and NOT address the #1 preventable cause?”

Scott Shikora, MD, FACS
ASMBS Meeting, June 2012
# Pre Op Smoking Cessation

## Rational

- Strong association between Helicobacter pylori infection and peptic ulcer disease with current cigarette smoking.
- Increased risk of peri op pulmonary morbidity
- Increased risk of post op marginal ulcers, strictures, and bleeding

## Literature

- Several studies supporting the increased risk of morbidity with smoking; both peri and post operatively
- Prospective study, 150 consecutive LRYGB patients\(^1\)
  - Smoking had no statistical association with operative outcomes in the immediate post op period

## Recommendation

- Patients should stop smoking at least 8 weeks before bariatric surgery and should plan to quit smoking or to participate in a smoking cessation program postoperatively\(^2\)

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2. AACE/TOS/ASMBS Bariatric Surgery Guidelines, (Obesity (2009) 17, S1–S70.)
Week Prior to Surgery

**NSAIDS~ASA~Antiplatelet Medications**
- Hold 7 days prior to surgery

**Diabetic Medications**
- Adjusted if LED liquid diet recommended
- Caution with metformin

**ACE/ARBS**
- Hold 48 hours prior to surgery
  - High BMI and ACE inhibitors was independent risk factor for post-op AKI

**Metformin & Non-essential Diuretic Use**
- Hold 48 hours prior to surgery

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Day of Surgery

B-Blockers, PPI, Thyroid, Arrhythmia Control, Psych meds, Inhalers
– OK to take on the day of surgery

Thromboprophylaxis¹

• 1st dose at induction of anesthesia

• BMI < 50 kg/m² → 40 mg Q 12 hours while hospitalized

• BMI > 50 kg/m² → 60 mg* Q 12 hours while hospitalized
  – Concomitant compression devices
  – Dose adjustment required with renal insufficiency
  – Consider checking anti-factor Xa levels*

Most Common Bariatric Surgery Procedures

- **Roux-en-Y Gastric Bypass**
  - Malabsorptive & Restrictive
  - Bypass a portion of the small intestine and create a 15-30cc stomach pouch

- **Sleeve Gastrectomy**
  - Restrictive
  - Resect approximately three-fourths of the stomach

- **Adjustable Gastric Banding**
  - Restrictive
  - Place implantable device around upper most part of stomach

260,000 procedures annually, 90% laparoscopic
Sleeve Gastrectomy

Bariatric procedure originally as part of BPDDS, now used as a first stage or stand alone if patient loses enough weight

Remove part of stomach, creating a sleeve from esophagus to antrum

A 36Fr bougie is used to size the sleeve

Covered benefit in US - NOT BCBS in AZ or MEDICARE
How the Sleeve Gastrectomy Works

- Hormonal Changes:
  - Marked increase in GLP1 and PYY (which cause satiety)
  - Decrease in Grehlin by removing the majority of the stomach.

- Disrupts normal anatomy/digestion: No except removal of excess stomach.

- Reversible: No

- Conversion for Failure to Lose Weight: Yes to Duodenal Switch or Gastric Bypass Roux-en-Y

- Weight Loss: As a stand-alone procedure at 2 years ~50%
Sleeve Gastrectomy

• Major Complications: Based on case review (n=4112) (2) and Spanish Registry (n=504)(3)
  • Death: 0.3% -0.4%
  • Leak: 2.0 - 2.5%
  • Stricture: 0.2 - 0.5%
  • Bleeding: 0.9 - 1.1%
  • Infection: 0.2 - 0.9%

Roux-en-Y gastric bypass (RYGB)

Excess Weight Loss is 85%

Ghrelin
GLP-1
PYY
Insulin
Complications of Gastric Bypass

- Death: 0.14% (3)
- Readmission: 5.4%
- Reoperation within 30 days: 5.4%
- Leak: Circular Stapler 0.6%; Linear Stapler 0.3%, Hand sewn 0.6%
- Stricture: 5.7 - 15.3%
- Vitamin/Protein Malnutrition is a result of non-compliance with vitamin recommendations and food sources. Anemia occurs in 0.2% of patients after gastric bypass.
- Ulcer: 0 - 8%
  - Patient may gets tested for H. pylori and treated prior to surgery (6)
  - Patient may get placed on antacid after surgery for 90 days.
  - A small gastric pouch has been shown to decrease the incidence.
  - May be related to technique
  - Patient factors like the use of non-steroidal anti-inflammatory medications (ibuprofen) after surgery impact incidence.
**Duodenal Switch**

- Combination Operation
  - Sleeve
  - Biliopancreatic Diversion
  - Neurohormonal - decreased Ghrelin and increased GLP1

- Highest Remission rate for Type 2 Diabetes

- Excess Weight Loss is 85%

- Significant risk of malabsorption of nutrients

- Usually performed on patients with a BMI > 60kg/m²
Perioperative Medical Care

- Continued CPAP/ BIPAP*

- Intra-operative LMW heparin then BID administration

- Lower extremity compression devices

- Aggressive pulmonary toilet / Incentive spirometer

- Diligent blood sugar control
  - Intraoperative/postoperative insulin drips

- Adequate pain control

- Early ambulation
Post Operative

“Prolonged” Thromboprophylaxis

• Average LOS ~2.1 days, prolonged thromboprophylaxis may be warranted

• Not well studied in bariatric surgery patients

• Supported use in abdominal and pelvic surgery patients

Prospective, open trial of 223 Lap RYGB patients

• BMI < 50 kg/m2 → 40 mg Q day for 10 days

• BMI > 50 kg/m2 → 60 mg Q day for 10 days

Acute Post-Op Management

- Post-operative pneumonia / atelectasis
- Deep venous thrombosis / PE
- Incisional infections (5%)
- Nausea / vomiting (10%)
- Anastomotic leak
The Dreaded Leak.........

• **Cardinal SIGNS of a leak:**
  – Tachycardia: pulse rate > 120
  – Respiratory rate > 22
  – Fever
  – Extravasation of contrast on UGI

• **Cardinal SYMPTOMS of a leaks:**
  – Feverishness
  – Shoulder pain (leak til proven otherwise)
  – Abdominal pain
  – Shortness of breath
Suggested Work Up…..

- Call the Bariatric Surgeon
- CBC with Differential
- Comprehensive metabolic panel
- Chest X-ray
- Abdominal CT scan with IV and oral contrast

- CALL BARIATRIC SURGEON
Medical Management Post Surgery

- Nausea / vomiting / dehydration
- Medication adjustment
- Nutritional supplements
- Laboratory testing
- Psychological adaptations
- Relapse prevention
Nausea/Vomiting/Dehydration

• **Causes of Nausea/Vomiting:**
  – Dehydration
  – Pain medications
  – Vitamin supplementation
  – Eating too much or too quickly
  – Not chewing food adequately
  – “Small pouch syndrome”

• **Patients unable to keep down fluids for a 24 hour period should be evaluated for possible obstruction and/or dehydration**
Nausea/Vomiting/Dehydration

- **Recurrent Nausea:**
  - Re-hydration and antiemetic medications

- **Nausea and Vomiting:**
  - *Thiamin* /folate and a multiple vitamin in the IVF needed to prevent thiamin deficiency and Wernicke’s encephalopathy
Diarrhea

**Causes:**

- Occult ingestion of sugar in medications/food
- Malabsorption
- New onset (often temporary) lactose intolerance
- *Clostridium difficile* colitis
- Dumping syndrome
  
  - Jejunum’s response to undigested carbohydrates
  - Enteroglucagon and other gut hormones cause an influx of fluid into the lumen
  - Runny nose, excessive salivation, nausea/vomiting, tachycardia, pre-syncope and diarrhea can occur
“Metabolic” Management

- **Antidiabetic Medications**
  - Insulin requirements fall immediately after surgery
  - Oral agents usually held and replaced with SSI

- **Antihypertensive Medications**
  - Usually reduced in dosage or discontinued
  - Diuretic held

- **Antilipid Agents**
  - Usually held during the early postoperative period
  - Tendency to produce nausea
Medication Adjustments

• Essential medications should be administered in “regular-release” rather than sustained release formulations to offset the altered GI absorption after surgery.

• Tolerance can be improved by crushing the tablets or liquid formulations during the early postoperative days.
Pregnancy after Bariatric Surgery

- Not recommended for at least 12 months
- OC not adequate due to altered absorption
- If pregnancy does occur, HIGH RISK OB and monthly f/u for adequate protein and nutrient intake
• **Deficiencies**
  – Iron deficiency: 47%
  – Vitamin B12 deficiency: 40%
  – Folate deficiency: 18%

• **Contributing factors:**
  – Meat and milk intolerances
  – Lack of intrinsic factor, acid PH
Nutritional Supplements

• Multiple vitamin
  – Children chewable Bid X3 months --> adult

• Vitamin B12 Supplementation

• Calcium
  – Ca citrate 2000 mg daily in divided doses

• Iron
  – ferrous sulfate plus vitamin C
Post-op Medications to Avoid

• ASA and NSAID Products
  – Increase risk of bleeding and strictures
Conclusions

• Bariatric surgery is highly effective treatment for morbid obesity and its comorbidities and should be offered to morbidly obese patients who fail conservative management.

• Compared to medical management, surgery results in more profound and long term weight and comorbidity improvements.

• To ensure optimal outcomes, surgery needs to be performed within a multidisciplinary program with aggressive pre and postoperative management.

• Bariatric surgery is a key part of the spectrum of treatments for morbid obesity.