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Primary Care of the Bariatric Surgery Patient

Disclosures

• I have no financial disclosures
Case

• 37 y/o physician presents to your clinic for routine follow up. Her BMI is 43. Hgt 5’6” and Wgt 268. She reports this is her all time highest weight. You refer her to a weight loss clinic.

• 1 year later she follows up having lost 60 lbs, she now has a BMI of 32 after doing 9 months of a medically supervised weight loss program. You congratulate her and tell her to f/u PRN.

• 2 years later she returns for new foot pain. She has not been able to do her usual exercise. She has pain in her Achilles with walking. Now her weight is 250 lbs. Eventually it’s determined that needs surgery and must remain non-weight baring for 3 months. Once she recovers she follows up in clinic weighing 260 lbs, her BMI is now 40.

Full Disclosure

1998 2012  2013
The Obesity Epidemic—CDC Facts

- Obesity is common, serious, and costly
- More than 1/3 (78 million) of US adults are obese
- Obesity related conditions include heart disease, stroke, type 2 diabetes, some cancers.
- The estimated annual medical cost of obesity in the US was $147 billion in 2008. The medical costs for people who are obese were $1,429 higher than those of normal weight.
- Non-Hispanic blacks have the highest age-adjusted rates of obesity (47.8%) followed by Hispanics (42.5%).
- Obesity is higher among middle age adults, 40-59 years (39.5%), than among younger adults, age 20-39 (30%) or adults over 60 (35.4%).

Body Mass Index (BMI)

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Weight</td>
<td>18.5-24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29.9</td>
</tr>
<tr>
<td>Class I Obesity</td>
<td>30-34.9</td>
</tr>
<tr>
<td>Class II Obesity</td>
<td>35-39.9</td>
</tr>
<tr>
<td>Class III Obesity</td>
<td>40-49.0</td>
</tr>
<tr>
<td>Class IV Obesity</td>
<td>50+</td>
</tr>
</tbody>
</table>

- Overweight and obesity classification: Body mass index (BMI) in kilograms per meters squared (kg/m²)
- Different BMI cut-off points may be more appropriate for women versus men, those of different races, and individuals
Question 1

Which of these patients is the least ideal candidate for bariatric surgery?

1) 30 y/o man BMI 42 but no obesity related comorbidities
2) 62 y/o woman BMI 38 and severe urinary incontinence
3) 28 y/o man BMI 52 who quit smoking 2 months ago
4) 39 y/o woman BMI 43 who has been unsuccessful getting pregnant
5) 55 y/o man BMI 34 and poorly controlled type 2 diabetes
NIH Consensus Statement—1991

(1) Patients seeking therapy for severe obesity for the first time should be considered for treatment in a nonsurgical program with integrated components of a dietary regimen, appropriate exercise, and behavioral modification and support.

(2) Gastric restrictive or bypass procedures could be considered for well-informed and motivated patients with acceptable operative risks.

(3) Patients who are candidates for surgical procedures should be selected carefully after evaluation by a multidisciplinary team with medical, surgical, psychiatric, and nutritional expertise.

(4) The operation be performed by a surgeon substantially experienced with the appropriate procedures and working in a clinical setting with adequate support for all aspects of management and assessment.

(5) Lifelong medical surveillance after surgical therapy is a necessity.

Question 2

55 y/o African American woman with BMI 41 who has tried and failed medical management presents for pre-op evaluation for gastric bypass surgery.

PMHx: Knee OA and HTN   Meds: Tylenol and HCTZ

Which of these does NOT need to be performed pre-op?

1) H pylori Ab
2) TSH
3) Mammogram
4) Psychological Evaluation
5) Vitamin D
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H pylori Testing

• Should be checked in high prevalence areas/populations
• In the US
  • Hispanics (60%) and African Americans (54%)
  • Age < 30 (20%) Age > 60 (50%)
  • Equal men to women
• Pre-operative treatment
  • may decrease viscus perforation
  • May decrease post-op marginal ulcers (2.4% vs 6.8%)
• More studies are needed
Preoperative Clearance

• Severely obese patients may have subclinical hypothyroidism
• TSH levels can decrease with weight loss
• Routine screening for primary hypothyroidism is NOT recommended
• Obesity is associate with increased risk of certain cancers (endometrial, renal, gallbladder, breast, colon, pancreatic, esophageal)
• Finding malignancy per se is NOT contraindication to surgery as long as life expectancy is reasonable

The PCP’s role

Preoperative Checklist

Mechanick JI, Adrienne Youldrin, Daniel B. Jones, et al
- Complete H & P: include, obesity-related co-morbidities, causes of obesity, weight/BMI, weight loss history, commitment, and exclusions related to surgical risk
- Labs: fasting glucose and lipid panel, kidney function, liver profile, urine analysis, prothrombin time/INR, blood type, CBC
- Nutrient screening: Iron studies, B12 and folic acid (RBC folate, homocysteine, methylmalonic acid optional), and 25-vitamin D (Vitamin A and E optional); consider more extensive testing in patients undergoing malabsorptive procedures based on symptoms and risks
- Cardiopulmonary: sleep apnea screening, ECG, CXR, echocardiography if cardiac disease or pulmonary hypertension suspected, DVT evaluation if clinically indicated
- GI evaluation: H pylori screening in high-prevalence areas, gallbladder evaluation and upper endoscopy if clinically indicated
- Endocrine evaluation: A1c if suspected or diagnosed pre-diabetes or diabetes; TSH if symptoms or increased risk of thyroid disease; androgens if PCOS suspicion; screening for Cushing’s syndrome if clinically suspected
- PCP evaluation: Document medical necessity for surgery, informed consent, optimize glycemic control, pregnancy and smoking cessation counseling, appropriate healthcare maintenance and cancer screening based on age
- Psychosocial-behavioral and Clinical nutrition evaluation

### Contraindications to Bariatric Surgery

- Severe cardiac disease with high risk for anesthesia
- Severe coagulopathy
- Untreated major depression or psychosis
- Binge-eating disorders
- Current drug or alcohol abuse
- Inability to comply with post op diet and supplementations
Question 3

Which intervention can lead to the largest percentage of sustained excess weight loss?

1) Sleeve Gastrectomy (SG)
2) Diet and Exercise
3) Laparoscopic Adjustable Gastric Banding (LAGB)
4) Biliopancreatic Diversion with Duodenal Switch (BPD/DS)
5) RNY Gastric Bypass (RYGB)
Laparoscopic Weight Loss Surgery

- Laparoscopic Procedure
- Laparoscopy
- Gastric Bypass
- Sleeve Gastrectomy
- Lap Band

Lap Band
Sleeve Gastrectomy
Gastric Bypass

Eric J. DeMaria, M.D.
Laparoscopic Adjustable Gastric Banding (LAGB)

Restrictive Only, Not Metabolic

Ideal Candidate
- BMI 30*-40 kg/m²
- Needs to lose 50-100 pounds

Benefits
- Fewer early risks than other procedures
- One hour procedure
- Fully Reversible/Removable
- Lowest risk of vitamin deficiencies

Considerations/Risks
- Excess Weight Loss (EWL) 50%
- 10-year removal or reoperation rate is >25%
- Slower weight loss (1-2lbs/week) compared to other surgeries
- Appetite suppression may be difficult to achieve
- Least effective for resolving diabetes

*FDA approved LAGB for pts w/ BMI Class I obesity and Type 2 diabetes or other obesity related comorbidity

Sleeve Gastrectomy (SG)

Restriction/Resection and Metabolic

Ideal Candidate
- BMI 35-55 kg/m²
- Needs to lose 80-150 lbs

Benefits
- Excess Weight Loss 70-90%
- 1-2 hour procedure
- Recovery ranges from days to weeks
- Patients report early and lasting fullness
- Intestines stay intact—No malabsorption
- May cure diabetes

Considerations/Risks
- Removal of a portion of the stomach is permanent
- The remaining pouch may expand over time
Roux en Y Gastric Bypass (RNY or Bypass or RYGB)

**Restrictive/Malabsorptive & Metabolic**
Most common procedure performed

**Ideal Candidate**
- BMI 35-55 kg/m²
- Needs to lose 100-150 lbs
- May have severe or prolonged medical conditions

**Benefits**
- Excess Weight Loss 70-90%
- 2 hour procedure
- Recovery of days to weeks
- Very effective for curing diabetes
- Approximately 100-200 calories per day lost through malabsorption
- Procedure is reversible

**Considerations/Risks**
- Greater risk for vitamin deficiencies
- Dumping syndrome
- Smoking, EtOH, NSAIDS use may lead to ulcers

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**Biliopancreatic Diversion w/ or w/o Duodenal Switch (BPD/DS)**

**Restriction, Resection, Malabsorptive & Metabolic**

**Ideal Candidate**
- BMI > 60 kg/m²
- Poorly controlled diabetic

**Benefits**
- Has the highest cure rate for diabetes
- Excess Weight Loss 80-90%
- 3-4 hour procedure
- 200-400 cal lost from malabsorption

**Considerations/Risks**
- Not offered by most surgeons
- Stomach removal is permanent but bypass may be reversed
- Highest risk for vitamin and protein deficiencies, diarrhea and intestinal blockages
Question 4

An elevated CRP on POD #2 is most closely associated with which postoperative event?
1) Use of CPAP on POD #1
2) Intestinal Leakage
3) Thromboembolic event (DVT/PE)
4) Rhabdomyolysis
5) Bleeding at the anastomotic site
Postoperative Management Pearls

- CPAP after surgery does NOT increase risk of anastomotic leaks
- Intestinal leaks and PE can present similarly
  - respiratory distress, failure to wean off ventilator, HR>120, low-grade fever
- An elevated CRP on POD #2 is associate with intestinal leak
- Prophylaxis against DVT is recommended in all patients, consider 30 days of treatment in high risk individuals
- DVT/PE can occur within 30 days of discharge and risk is increased:
  - RYGB > LAGB  Open vs closed procedure  Older patient  Men > women  Hx VTE
- Incidence of post operative rhabdomyolysis (RML) is 7-30%
  - IVF are effective for treatment but not prevention
  - CK > 1000, consider routine post-op testing in high risk individuals
  - Risk is increased with BMI > 55-60 and RYGB > LAGB

Morbidity and Mortality Associated with Bariatric Surgery

- The risk of death within the 30 days following bariatric surgery averages 0.13 percent. This rate is considerably less than most other operations, including gallbladder and hip replacement surgery
- There is an 89% reduction in mortality after weight loss surgery. The benefits of bariatric surgery, with regard to mortality, far outweigh the risks of untreated obesity
- Pulmonary embolism (PE) remains the most common cause of mortality in the perioperative period after bariatric surgery, and accounts for approximately 30 to 50 percent of deaths
- Hospital readmission rate is 5.8% for RYGB and 1.2% for LAGB within 30 days
  - Risk factors associated with readmission: Prolonged LOS; Open vs laparoscopic surgery; Pseudo tumor cerebri; Hx of DVT/PE; Asthma and OSA
- Risk factors associated with increased complications and death after RYGB
  - Type 2 diabetes
  - BMI > 55
  - Cardiomyopathy
Postoperative Medication Considerations

- Diuretics should be discontinued in the hospital
- Attempt to use immediate-release, crushed, liquid or chewable preparations
- Patient may be discharged from the hospital off HTN and DM meds
- If meds are needed in diabetics use immediate release Metformin and/or sliding scale insulin
- Avoid delayed, enteric-coated and extended-release preparations after malabsorption procedures
- Some meds require gastric acidity for dissolution
- Avoid NSAIDS, EtOH and Smoking as it can cause ulcers or impair wound healing

<table>
<thead>
<tr>
<th>Checklist Item for Early Postoperative Care</th>
<th>LAGB</th>
<th>LSG</th>
<th>RYGB</th>
<th>BPD/DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitored telemetry at least 24 hr if high risk for MI</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>protocol-derived staged meal progression supervised by RD</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>healthy eating education by RD</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>multivitamin plus minerals (# tablets for minimal requirement)</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>calcium citrate, 1200–1500 mg/d</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>vitamin D, at least 3000 units/d, titrate to &gt;30 ng/mL</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>vitamin B12 as needed for normal range levels</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>maintain adequate hydration (usually &gt;1.5 L/d PO)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>monitor blood glucose with diabetes or hypoglycemic symptoms</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>pulmonary toilet, spirometry and DVT prophylaxis</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>if unstable, consider pulmonary embolus (PE), intestinal leak (IL)</td>
<td>PE</td>
<td>PE</td>
<td>PE/IL</td>
<td>PE/IL</td>
</tr>
<tr>
<td>if rhabdomyolysis suspected, check CPK</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
## Checklist Item for Follow-up Care

<table>
<thead>
<tr>
<th>Item for Follow-up Care</th>
<th>LAGB</th>
<th>LSG</th>
<th>RYGB</th>
<th>BPD/DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>visits: initial, interval until stable, once stable (months)</td>
<td>1,1–2,12</td>
<td>1,3–6,12</td>
<td>1,3,6–12</td>
<td>1,3,6</td>
</tr>
<tr>
<td>monitor progress with weight loss and evidence of complications</td>
<td>Every visit</td>
<td>Every visit</td>
<td>Every visit</td>
<td>Every visit</td>
</tr>
<tr>
<td>SMA-21, CBC/plt with each visit (and iron at baseline, after PRN)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>avoid nonsteroidal antiinflammatory drugs</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>thiamine evaluation with specific findings</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>consider gout and gallstone prophylaxis in appropriate patients</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Evaluate need for antihypertensive therapy with each visit</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>lipid evaluation every 6–12 months based on risk and therapy</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>B12 (yearly; MMA and Hcy optional; then q 3–6 months if supp)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>folic acid (RBC folic acid optional), iron studies, 25-vitamin D, iPTH</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>vitamin A (initially and q 6–12 months thereafter)</td>
<td>+/-</td>
<td></td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

### Controversies and Considerations

**Pregnancy and Weight Loss Surgery**

**Controversies and Considerations**
• 80% of bariatric procedures are on women; 50% of those women are of reproductive age
• Contraceptive counseling is recommended for all reproductive-aged women undergoing bariatric procedures
• RYGB and BPD reduce absorption of OCPs so use non-oral forms of contraception in women who have undergone malabsorptive surgery
• Stop estrogen prior to surgery to reduce risk of DVT. Stop OCP by 1 cycle and HRT by 3 weeks
• DO NOT administer an Oral Glucose Challenge test to post op pregnant women after gastric bypass, because it can lead to dumping syndrome
• Cesarean delivery is performed for standard obstetrical indications
• Observational studies consistently demonstrate no correlation between prior bariatric surgery and low Apgar scores, meconium-stained amniotic fluid, perinatal mortality rate, and congenital malformations
• Lactation is usually not adversely affected by bariatric surgery and should be encouraged

• Delay pregnancy for at least 12-18 months after surgery (Grade 2C)
  • optimize weight loss. In one such study, women who conceived within 12 months of surgery had less weight gain during pregnancy and less weight loss postpartum than those who waited longer before conceiving
  • reduce potential adverse effects of nutritional deficiencies
• Favorable pregnancy outcome is likely with optimization of nutrition and careful monitoring and follow-up
• Bariatric surgery likely reduces risk of preeclampsia, gestational diabetes, and macrosomia when compared to obese women who have not undergone a bariatric procedure
• Observational studies consistently report a lower prevalence of gestational diabetes mellitus (GDM) among women who have had bariatric surgery than among obese women who have not undergone this surgery, but the overall prevalence is higher compared to the general obstetrical population
• Bariatric surgery may increase the risk of intrauterine growth restriction/small for gestational age infant, but these data have been inconsistent. One could consider doing one or two ultrasounds in the third trimester to evaluate fetal growth especially if the pregnant woman is failing to gain appropriate weight during the pregnancy.
Class I Obesity and Weight Loss Surgery

Controversies and Considerations

• The prevalence of diabetes is 8.9% in the U.S., but more than 25% among individuals with severe obesity
• RYGB causes remission of T2DM in 80% of patients and improvement of the disease in an additional 15%
• Diabetes remission rates SG more than 60% and, in some studies, similar to results seen after RYGB
• Improvement or remission of diabetes in RYGB and SG occurs early after surgery and before there is significant weight-loss. The weight-loss independent mechanisms of diabetes improvement after these surgeries is partially explained by changes in hormones produced by the gut after the surgery
• BPD/DS is most effective surgery in inducing early and sustained remission or improvement of T2DM; more than 85% remission rates with weight-loss independent effects
• After LAGB remission of diabetes occurs in approximately 45-60% of patients; but, this is secondary to the weight-loss produced by the procedure, and there does NOT appear to be any other mechanism for diabetes improvement in band patients. Patients who have diabetes and who are unsuccessful in losing weight with the LAGB will unlikely see any improvement in their diabetes.
• **International Diabetes Foundation Position Statement on Bariatric Surgery in the Treatment of T2DM**
  - In addition to behavioral and medical treatments, bariatric surgeries constitute a powerful option to ameliorate diabetes in patients affected by severe obesity.
  - Bariatric surgery is an appropriate treatment for people with T2DM and obesity not achieving recommended treatment targets with medical therapies.
  - Surgery should be an accepted option in people who have T2DM and a BMI of 35 or more.
  - Surgery should be considered as an alternative treatment option in patients with a BMI between 30 and 35 when T2DM cannot be adequately controlled by optimal medical regimen, especially in the presence of other major cardiovascular disease risk factors.
  - Bariatric surgery for treatment of T2DM is cost-effective.

• There is currently insufficient evidence for recommending a bariatric surgical procedure specifically for glycemic control alone, lipid lowering alone, or cardiovascular disease risk reduction alone, independent of BMI criteria.

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**Effects of Bariatric Surgery on Appetite Control Mechanisms**

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Potential post-surgical effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ GLP-1</td>
<td>Increased satiety and decreased food intake</td>
</tr>
<tr>
<td>↑ Peptide YY</td>
<td>Increase satiety and decreased foot intake</td>
</tr>
<tr>
<td></td>
<td>Possible alterations to energy expenditure</td>
</tr>
<tr>
<td>↑ Oxyntomodulin</td>
<td>Increased satiety and decreased food intake</td>
</tr>
<tr>
<td>↑ GLP-2</td>
<td>Increased mucosal cell mass in response to injury, leading to 1) Long-term increases in GLP-1 and PPYY and 2) Gut proliferation, reducing malabsorption</td>
</tr>
<tr>
<td>↓ GIP</td>
<td>Reduced fat accumulation and long-term weight loss/maintenance</td>
</tr>
<tr>
<td>↓ Ghrelin(?)</td>
<td>Reduce appetite, possibly medicated by vagal denervation</td>
</tr>
<tr>
<td>Vagus denervation</td>
<td>Reduced hunger signals? Alterations in GI hormone release?</td>
</tr>
<tr>
<td>Altered gut flora</td>
<td>Shift in Bacteroidetes and Firmicutes bacterial populations to proportions more like those found in lean individuals</td>
</tr>
</tbody>
</table>

GIP: glucose-dependent insulinotropic polypeptide; GLP: glucagon-like peptide; PYY: peptide YY.
Take Home Points

• It is a team effort! As the PCP you are central to this role

• The morbidity and mortality associated with obesity can out weigh the risks associated with bariatric surgery, especially if the patient is well informed and motivated

• Bariatric surgery is not a quick fix or an easy answer to the obesity epidemic. It is a second line therapy after comprehensive medically-managed weight loss.

• Bariatric surgery does not end one’s challenges with weight, it’s a new beginning…. 