Caring for the 40%

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Disclosure: I am a Bariatric Patient

- Pre op in 2005

Mt. Baldy, 2006
Disclosures

- No financial disclosures
Introductions

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Introductions

- The University of Kansas Health System Department of Metabolic, Bariatric, & Minimally Invasive Surgery
Objectives

- Define obesity
- Review epidemic of obesity
- Current state of bariatric operations
- Physiology of Obesity and Bariatric Surgery
- Pre- and Post-operative Care of the Bariatric Patient
Definitions

- BMI: Body Mass Index
  - Weight (kg)/Height (m²)
- Normal weight: BMI 18.5-24.9
- Overweight: BMI >25
- Obese: BMI >30
- Morbid Obesity: BMI >40
  - >100 pounds over ideal body weight
- Super Obese: BMI >50
- Super-super Obese:
  - BMI >60
- Percentage Excess Weight Loss (% EWL)
  - Excess Weight: Weight – Ideal body weight
Definitions

- BMI classifications and disease risk

<table>
<thead>
<tr>
<th>Categories of BMI and disease risk relative to normal weight and waist circumference</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI kg/m²</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Underweight</td>
</tr>
<tr>
<td>Normal ¹</td>
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<tr>
<td>Overweight</td>
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<tr>
<td>Obesity</td>
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<tr>
<td>Obesity</td>
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<tr>
<td>Extreme obesity</td>
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</tbody>
</table>

Men ≤ 102 cm (≤40 in) | Men >102 cm (>40 in) | Women ≤ 88 cm (≤35 in) | Women >88 cm (>35 in)

*Increased waist circumference can also be a marker for increased risk even in persons of normal weight

- General criteria for bariatric surgery
  - BMI >40
  - BMI >35 with co-morbidities

Epidemic of obesity

- Worldwide overweight and obese: >2 billion individuals
  - Percentage of overweight adults highest in US
- Worldwide obesity has more than doubled since 1980
  - 1950
    - 10% of US adults obese
  - 1980
    - 25% of population overweight
    - 15% obese
  - 1990
    - 34% of population overweight
    - 23.2% obese
  - 2004
    - 32.2% of adults obese
  - 2016
    - 39.8% of US adults obese (93.3 million)
Economic Epidemic of Obesity

- Annual health care costs of obesity-related illnesses: $190.2 billion
- 21% of annual medical spending in US
- Obesity-related comorbidities
  - Type 2 Diabetes
  - Hypertension
  - Hypercholesterolemia
  - Sleep apnea
  - Venous stasis
  - Arthritis
  - GERD
  - Nonalcoholic fatty liver disease (NAFLD)
- Annual medical cost $1,429 higher/year vs normal weight individual

Obesity Related Co-Morbidities

- Degenerative joint disease
- Low back pain
- Hypertension
- Obstructive sleep apnea
- Gastroesophageal reflux disease
- Cholelithiasis
- Type 2 diabetes
- Hyperlipidemia
- Hypercholesterolemia
- Asthma
- Hypoventilation syndrome of obesity
- Fatal cardiac arrhythmias
- Right-sided heart failure
- Migraine headaches
- Pseudotumor cerebri
- Venous stasis ulcers
- Deep vein thrombosis
- Fungal skin rashes
- Skin abscesses
- Stress urinary incontinence
- Infertility
- Dysmenorrhea
- Depression
- Abdominal wall hernias
- Increased incidence of various cancers
Mortality of obesity

- Co-Morbidities of obesity
  - 2.5 million deaths/year worldwide
- Loss of life expectancy
  - 25yo morbidly obese man has 22% reduction in expected lifespan
  - Loss of 12 years of life
Treatment of Obesity

- Obesity is a chronic and difficult to treat disease
- Probability of obese person attaining normal weight
  - BMI>30
    - Men: 1/210 (0.4%)
    - Women: 1/124 (0.8%)
  - BMI>40
    - Men: 1/1290 (0.07%)
    - Women: 1/677 (0.14%)

Medical management of obesity

▪ Weight loss programs
  ▪ Decreased caloric intake, increased caloric utilization
  ▪ Daily energy deficit of 500kcal/day → weekly deficit of 3500kcal → loss of 1 pound/week
  ▪ Morbidly obese patients must lose at least 75 pounds to eliminate obesity

▪ Behavior modification programs
  ▪ 10% weight loss at 6 months
  ▪ Sustained in 60% at 40 weeks
  ▪ Sustained in 8.6% at 1 year

▪ Pharmacologic therapy
  ▪ Multiple medications now FDA-approved for weight loss
  ▪ 6-10% weight loss after 1 year
  ▪ Prompt weight regain after cessation

▪ Success rate of medical management: 3%
Treatment of Obesity

- Obesity is a chronic and difficult to treat disease
  - Caloric restriction triggers biological adaptations to prevent starvation\(^1\)
  - Biologic pressure to restore bodyweight to highest-sustained lifetime level increases as weight loss increases\(^2\)
  - Biologic adaptations to obesity may persist indefinitely despite reaching a healthy BMI\(^1\)
    - Adipocyte proliferation to increase fat storage
    - Habituation to rewarding neural dopamine signaling develops with chronic overconsumption
  - Obese patients who reach healthy BMI via diet and weight loss= “obesity in remission”\(^2\)
    - Lower resting metabolic rate to BMI-matched controls who were never obese
  - Once obesity is established, biologically “stamped in and defended”

Who is the biggest loser?

- 30 week competition of intensive diet and exercise
  - 14 subjects from the 2009 show placed in metabolic chamber before, during, after, and yearly for 7 years to measure metabolism
  - Average starting weight 328 lbs
  - % body fat 49%
  - Resting metabolic rate at start: 2607 calories per day

Persistent metabolic adaptation 6 years after "The Biggest Loser" competition.

Fothergill E1, Guo J1, Howard L1, Kerns JC2, Knuth ND3, Brychta R1, Chen KY1, Skarulis MC1, Walter M1, Walter PJ1, Hall KD1, Obesity (Silver Spring). 2016 Aug;24(8):1612-9
Who is the biggest loser?

- After 30 weeks:
  - Average end weight 200 lbs (128 lb average loss)
  - Average percent body fat 28% (21 percentage point decrease)
  - Resting metabolic rate 2000 calories/day, (607 calorie/day decrease)

Persistent metabolic adaptation 6 years after "The Biggest Loser" competition.
Fothergill E1, Guo J1, Howard L1, Kerns JC2, Knuth ND3, Brychta R1, Chen KY1, Skarulis MC1, Walter M1, Walter PJ1, Hall KD1, Obesity (Silver Spring). 2016 Aug;24(8):1612-9
Who is the biggest loser?

- 6 years later…
  - Average weight 292 lbs (still down 36 lbs)
  - Body fat 45% (down 4%)
  - Resting metabolic rate only 1900 kcal!
    - Down from 2,600 kcal pre study
    - Down 100 more kcal from 2000 kcal at end of 30 weeks

Persistent metabolic adaptation 6 years after "The Biggest Loser" competition.
Fothergill E1, Guo J1, Howard L1, Kerns JC2, Knuth ND3, Brychta R1, Chen KY1, Skarulis MC1, Walter M1, Walter PJ1, Hall KD1, Obesity (Silver Spring). 2016 Aug;24(8):1612-9
Who is the biggest loser?

▪ Our bodies strive to maintain our current weight (and probably our current abdominal fat stores)
▪ There is a metabolic increase in efficiency of 600-700 calories with extreme diet and exercise as well as an increase in hunger
▪ This penalty is persistent and worsened with time (at least over the 6 years of the study)
▪ By recommending diet and exercise, are we harming these patients metabolically, and assuring their failure?
Who is the biggest loser?

- Bariatric surgery may offer the current best opportunity to overcome these impediments to maintenance of weight loss.
Are We Prescribing Obesity?

- Common Weight Promoting Medications
  - Anti-psychotics
    - Risperdone
    - Lithium
    - Quetapine
    - Aripiprazole
    - Olanzapine
    - Valproic Acid
  - Anti-depressants
    - Citalopram
    - Duloxetine
    - Venlafaxine
Are We Prescribing Obesity?

- Common Weight Promoting Medications
  - Sleep Agents
    - Zolpidem
    - Eszopiclone
    - Trazadone
    - Zaleplon
  - Neuropathic Agents
    - Gabapentin
    - Pregabalin
  - Beta Blockers
  - Steroids
  - Insulin
  - Hypoglycemics
  - Antihistamines
Medical vs Surgical Management of Obesity

- Swedish Obese Subjects (SOS) Study- 2001
  - First long-term, prospective, controlled trial of medical versus surgical management of obesity
  - 2010 obese patients surgical arm
  - 2037 matched obese control subjects
  - Mean change in body weight
    - Surgery: 2 years -23%, 10 years -17%, 20 years -18%
    - Control: 2 years 0%, 10 years +1%, 20 years -1%
  - Decreased mortality, cancer risk, diabetes in surgical group
Current Bariatric Surgery

- Current state of practice
- Restrictive, malabsorptive, combined procedures

Sleeve gastrectomy

Roux-en-Y Gastric Bypass (RYGB)

Adjustable gastric band

Biliopancreatic Diversion with Duodenal Switch (BPD-DS)
Evolution of Bariatric Surgery

- Mixed malabsorptive and restrictive procedures
- 1970s: waning of JIB, growth of gastric bypass
  - Multiple modifications
    - Initially pouch size not measured or calibrated
    - 1977: Alder and Terry
    - Pouch size 30ml
- 1977: Griffen
  - Modifies gastric bypass with roux limb
  - Roux-en-Y Gastric Bypass
Evolution of Bariatric Surgery

- Mixed malabsorptive and restrictive procedures
    - Improvements
      - Eliminated bile reflux into pouch
      - Lessened tension on jejunal loop
        - Decreased morbidity/mortality of leaks
      - Added malabsorptive component to procedure
    - Cons
      - Malabsorptive sequelae
      - Marginal ulcers
      - Dumping syndrome
  - 1983 Torres: Gastric pouch based on lesser curvature of stomach
    - Anastomosis to upper greater curvature of stomach technically difficult
    - Fundus potentially ischemic
    - Blood supply more easily preserved
    - Lesser curvature gastric wall more muscular and less prone to distention
Evolution of Bariatric Surgery

1980s-1990s
- Birth of fixed gastric banding

1990s
- Laparoscopic approach to bariatric surgery
  - 1994: Belachew, 1st lap gastric band
  - 1994: Wittgrove & Clark, 1st Lap RYGB

2001
- Laparoscopic gastric banding approved by US FDA
- 2007: “Lap band” accounts for 25% of bariatric procedures
- 2004-2007: 329% increase in procedures
Evolution of Bariatric Surgery

▪ The Bariatric Revolution
  ▪ 1998-2003
  ▪ Exponential growth of bariatric procedures performed, membership in bariatric societies, public recognition, professional recognition
  ▪ Swedish Obese Subjects (SOS) Study- 2001
  ▪ Buchwald JAMA 2004
  ▪ Laparoscopic approach with decreased hospital LOS and morbidity
  ▪ Literature supports surgery as successful weight loss and metabolic treatment option
Evolution of Bariatric Surgery

- Laparoscopic adjustable gastric band
  - Outpatient operation
  - Adjustable
  - Moderate weight loss success: 40% EWL
  - Revision rate: initially low
  - 10+ year revision rate: 34.2%
    - Slip
    - Band erosion
    - Over-restriction with esophageal dilatation
    - Intolerance to band
    - Failure of weight loss

Band Complications

- Laparoscopic adjustable gastric band
  - Band slip
    - Signs/symptoms: abdominal pain, nausea, emesis
    - Dx: Plain xray or upper GI
    - Treatment: Band repositioning (viable stomach) versus removal
Band Complications

- Laparoscopic adjustable gastric band
  - Lap band erosion
    - Signs/symptoms:
      - None, or loss of restriction
      - Infection of port site
    - Dx: CT, EGD
  - Treatment: Endoscopic removal, laparoscopic removal with repair of gastrotomy
Band Complications

▪ Lap band
  ▪ Esophageal dilatation
  ▪ The constant quest for the “sweet spot”
  ▪ Consequence of chronic over-restriction
  ▪ Pathologic versus adaptation to restriction
  ▪ Signs/symptoms: silent aspiration
  ▪ Resolves with fluid removal from band
Evolution of Bariatric Surgery

- 2005: Sleeve Gastrectomy
  - Arose from BPD-DS procedure
    - Two-step procedure used in super-obese
    - 1993 BPD-DS
    - 2000 Lap BPD-DS
  - Significant weight loss after sleeve gastrectomy alone
- 2012: Insurance approval
- 2016: Most commonly performed bariatric operation in US
Evolution of Bariatric Surgery

- Laparoscopic sleeve gastrectomy
  - Variations in bougie size, staple height, reinforcement, distance from pylorus
  - Rapid adoption into bariatric armamentarium
- GERD
  - de novo GERD formation
  - GERD contraindication to procedure?
- Successful weight loss procedure?
  - Restrictive
- Complications
  - Leak (1-3%)
    - Delayed presentation
    - Chronic leaks
  - Portal vein thrombosis (0.4%)
Evolution of Bariatric Surgery

▪ Laparoscopic sleeve gastrectomy
  ▪ Long-term results: 8 year follow up
    ▪ Gagner, et al. 2017
    ▪ N= 116 (2005-2008)
    ▪ 29 lost to follow up
    ▪ Avg %EWL:
      ▪ 5 years: 76%
      ▪ 8 years: 67%
  ▪ Comorbidity resolution
    ▪ HTN: 59.4%
    ▪ DM2: 43.4%
    ▪ OSA: 72.4%
  ▪ Revision rate: 19.8%
    ▪ Weight regain: 12% (n=14)
    ▪ Severe reflux: 7.75% (n=9)
Evolution of Bariatric Surgery

- Laparoscopic sleeve gastrectomy
  - 10 year sleeve gastrectomy follow up results
  - Felsenreich, et al. SOARD 2016
  - N= 53
  - %EWL: 50-55%
  - Revision rate: 36%
    - Weight gain (20%)
    - Reflux (11%)
    - Acute revision (3.7%- leak)
  - Leak: 3.7%
  - Stricture: 0%
  - GERD…

Evolution of Bariatric Surgery

- Laparoscopic sleeve gastrectomy
  - Is sleeve gastrectomy always an absolute contraindication in patients with Barrett’s?
      - Pre-op GERD questionnaire, endoscopy, esophageal manometry, & 24h pH monitoring before sleeve gastrectomy and 24months after LSG
      - N= 71
      - Group A (pre-op GERD): n= 28
      - Group B (No pre-op GERD): n= 37
      - Group A GERD symptoms/results improved after sleeve gastrectomy
        - GERD Symptom Assessment Scale: 53.1 → 13.1
        - DeMeester score: 39.5 → 10.6
        - pH <4 time: 10.2 → 4.2
      - Group B:
        - De novo GERD: 5%
        - Esophageal sphincter pressure and esophageal peristalsis unchanged

Evolution of Bariatric Surgery

- Laparoscopic sleeve gastrectomy
  - GERD- Gagner continued
    - Advocates for sleeve gastrectomy in all GERD patients with exception only in those with Barrett’s esophagus
    - Treatment options for severe post-gastrectomy GERD
      - Effective treatment with PPI
      - ? Role of LINX procedure
    - No reports in literature of esophageal adenocarcinoma after DS
      - >25 year history
      - >100,000 patients worldwide
      - If develops, will require colonic interposition or long roux limb
    - “Hence, the hysteria of GERD/esophageal adenocarcinoma after sleeve gastrectomy has to be tempered, as the benefits of sleeve gastrectomy definitely outweigh its potential and actual risks.”
Evolution of Bariatric Surgery

- Laparoscopic Sleeve gastrectomy
  - GERD
    - True incidence of GERD after sleeve gastrectomy?
    - Difficult to qualify/quantify
      - Symptom score, EGD, pH studies?
    - How to diagnose
  - Ann Surg 2019 Meta-analysis
    - N= 10,718
    - Increase symptoms of post-op GERD: 19%
    - De novo reflux: 23%
    - Long-term prevalence of esophagitis: 28%
    - Barrett’s Esophagus: 8%
    - Revision due to severe reflux: 4%

Evolution of Bariatric Surgery

- Review of bariatric operations
  - Restrictive
  - Malabsorptive
  - Combined

<table>
<thead>
<tr>
<th>Type</th>
<th>Procedure Descriptions</th>
</tr>
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<tbody>
<tr>
<td>Restrictive</td>
<td>Laparoscopic adjustable gastric banding (LAGB)</td>
</tr>
<tr>
<td></td>
<td>Sleeve gastrectomy (SG)</td>
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<tr>
<td></td>
<td>Vertical banded gastroplasty (VBG)(^a)</td>
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<tr>
<td>Malabsorptive</td>
<td>Biliopancreatic diversion (BPD)</td>
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<tr>
<td></td>
<td>Jejunoileal bypass (JIB)(^a)</td>
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<tr>
<td>Combined restrictive and malabsorptive</td>
<td>Roux-en-Y gastric bypass (RYGB)</td>
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<td></td>
<td>BPD with duodenal switch (DS)</td>
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</table>
Bariatric Surgical Procedures

- Current state of practice
  - Roux-en-Y Gastric Bypass (RYGB)
  - Sleeve Gastrectomy
  - Biliopancreatic Diversion with Duodenal Switch (BPD-DS)
  - Adjustable Gastric Band
  - Revisional procedures
Evolution of Bariatric Surgery

▪ Is bariatric surgery successful??
Is Bariatric Surgery Successful

- Excess Weight Loss by operation

- **BPD/DS**
  - Percentage loss: 70-80%

- **Roux-en-Y**
  - Percentage loss: 60-65%

- **Gastric Sleeve**
  - Percentage loss: 55-60%

- **Gastric Band**
  - Percentage loss: <50%
**Is Bariatric Surgery Successful?**

- Buchwald JAMA 2004
  - Meta-analysis, >22,000 patients
  - %EWL: 61.2%
  - Diabetes resolution in 76.8%
    - Diabetes resolved or improved in 86%
  - Hyperlipidemia improved in 70%
  - Hypertension resolved in 61.7%
    - Resolved or improved 78.5%
  - OSA resolved 85.7%
  - **Metabolic operation**

Is Bariatric Surgery Successful?

- **STAMPEDE Trial**
  - Diabetes control/remission rates in medical vs surgical treatment (sleeve gastrectomy vs RYGB)
  - BMI 27-43
  - Primary outcome: HbA1c<6.0% without use of diabetes medications
  - 5 year outcome data
    - Medical therapy: 5%
    - Sleeve gastrectomy: 23%
    - RYGB: 29%
  - Surgical groups with superior results for: weight loss, triglyceride level, HDL level, use of insulin, quality of life measures

Is Bariatric Surgery Successful?

- Improved survival rates
  - VA Cohort population
    - 2500 Surgical Patient
      - RYGB
      - Sleeve
      - AGB
  - 7462 Matched Cohort
  - Lower all-cause mortality in obese patients having undergone bariatric surgery

Is Bariatric Surgery Successful?

- Mortality
  - 89% reduction in all-cause mortality
  - Cancer mortality decrease by 60% for bariatric patients
  - Death associated with diabetes decreased by 90%
  - Death from heart disease decreased by 50%

How is bariatric surgery successful?

- Restrictive vs malabsorptive procedure
- METABOLIC operations
  - Weight loss from reduction in appetite and food intake
  - Resolution of Type 2 diabetes can occur immediately after surgery
- An entire presentation…

Is Weight Loss Durable?

- VA Study, 10 year follow up bariatric surgery versus age-matched controls
- 10 years, RYGB lost 28.6% of baseline weight (nonsurgical pts lost 7.3%)
- 10 year RYGB %EWL 56.4%
- 405/564 (71.8%) maintained wt loss of > 20% baseline weight
- 224/564 (39.7%) maintained wt loss >30% of baseline weight
- Only 19 pts (3.4%) RYGB patient regained weight back to within 5% of baseline weight at 10 years

Is Weight Loss Durable?

- Durability of weight loss (12 year follow up)
  - Change from baseline (kg)
    - RYGB: -45 kg (2 yrs); -36.3 kg (6 yrs); --35kg (12 yrs)
    - Non-surgical: +0-2kg (12 yrs)
    - RYGB: 9kg weight regain (after year 2), stable wt after 6 years

Adams TD, et al. Weight and Metabolic Outcomes 12 Years after Gastric Bypass. NEJM.
Definition of success

- >50% excess weight loss
- As many as 50% of pts regain small amt of weight (~5%) 2 years or more following surgery
- Most bariatric patients maintain successful (>50% EWL) weight loss

Other definitions of success

- Continued resolution of comorbidities
- Halting progression of weight gain

Is bariatric surgery safe?

- Post-operative complications
  - Anastomotic leak (1-2%)
  - Hernia
  - VTE (1-3%)
  - Wound infection
  - Margin ulcers (3-15%)
  - Anastomotic stenosis (1-19%)
  - Bowel obstruction (7%)
  - Malnutrition
  - Band prolapse, slippage, erosion
Is bariatric surgery safe?

▪ National Surgical Quality Improvement Program
  ▪ 16,509 patients undergoing L-RYGB
  ▪ Complication rate: 3.4%
    ▪ Similar to lap cholecystectomy and hysterectomy
  ▪ Mortality rate: 0.3%
    ▪ Similar to knee arthroplasty and laparoscopic appendectomy
    ▪ 1/10th of cardiovascular surgery
Which Operation to recommend?

- Which is the best operation?
- Dependent on patient characteristics
- Dependent on surgeon characteristics
  - If a program only does one operation, that is what is recommended
- NOT ONE SIZE FITS ALL!
- Sample bias
  - I had a friend who…
  - Dr. Google said…
  - My patient had this and did well…
  - My patient had this and did poorly…
- Economic bias?
  - If my patient’s diabetes, HTN, etc. is cured, will they need me…YES THEY WILL!
# Roux-en-Y Gastric Bypass Pros/Cons

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>• No implanted prosthetic</td>
<td>• Vitamin/mineral deficiencies requiring annual labs for life</td>
</tr>
<tr>
<td>• No adjustments</td>
<td>• Need for vitamin supplementation</td>
</tr>
<tr>
<td>• 20+ years with positive results</td>
<td>• No NSAIDs/Aspirin/Steroid</td>
</tr>
<tr>
<td>• Low risk after initial healing phase</td>
<td>• Dumping syndrome</td>
</tr>
<tr>
<td>• Metabolic operation</td>
<td>• Higher initial cost</td>
</tr>
<tr>
<td>• Direct effects on diabetes &amp; metabolic syndrome</td>
<td>• Initially high risk</td>
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<tr>
<td></td>
<td>• 0.25% risk of death</td>
</tr>
<tr>
<td></td>
<td>• 1-3% risk of leak</td>
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<tr>
<td></td>
<td>• Nephrolithiasis risk</td>
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</table>
# Sleeve Gastrectomy Pros/Cons

<table>
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<tr>
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<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No implanted prosthetic</td>
<td>• Non-reversible</td>
</tr>
<tr>
<td>• No adjustments</td>
<td>• Can worsen or induce GERD</td>
</tr>
<tr>
<td>• Safer option in higher BMI patients</td>
<td>• Risk of death 0.25%</td>
</tr>
<tr>
<td>• Option for patients with medical issues preventing them from other operations</td>
<td>• Risk of leak 1-3%</td>
</tr>
<tr>
<td>• Metabolic operation</td>
<td>• Dumping possible but much lower than RYGB</td>
</tr>
</tbody>
</table>
### BPD/DS Pros/Cons

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| • No implanted prosthetic  
• No adjustments  
• Able to take NSAIDS/steroids  
• Highest weight loss  
• Easier to partially reverse  
• Direct effects on diabetes and metabolic syndrome | • Higher metabolic complications  
• Must take extra vitamin supplementation  
• Can have loose stools/excessive gas (usually able to control with diet)  
• Most difficult to perform, highest risk nutritionally |
Who qualifies for bariatric surgery?

- Indications for bariatric surgery
  - BMI>40 with or without co-morbid medical conditions associated with obesity
  - BMI>35 with co-morbid medical conditions
  - Failed attempts at other weight loss treatments
  - Psychologically stable
  - Non-smokers
- **ALL** insurances have different requirements
- Some insurances STILL do not cover bariatric surgery
Relative contraindications to Bariatric Surgery

- Severe medical disease that makes anesthesia or surgery prohibitively risky (ASA class IV)
- Mental incompetence that prevents patient understanding of the procedure
- Inability or unwillingness of the patient to change lifestyle postoperatively
- Drug, alcohol, or other substance addiction
- Uncontrolled bulimia or other eating disorder
- Psychologic instability
- Nonambulatory status
- Patient view of surgery as a “magic bullet”
- Antagonistic family, unsupportive home environment
- Noncompliant behavior
Pre-Operative Issues

- Patient selection by multidisciplinary team
- Optimization of co-morbidities
  - Smoking cessation for 6 months—we test for nicotine!
  - Diabetes control
  - Assess for sleep apnea
  - Physician supervised 6 month diet history
  - Psych evaluation
- Pre-operative weight loss
- Patient education
  - Important events of peri-operative period
  - Expected post-operative course
  - Instructions for diet and activity
  - Need for lifelong vitamin and mineral supplementation
- Surgery is a tool and not a cure!
Post-operative Management

- Hydration and adequate protein/nutrient intake
- Monitor for complications
- Monitor for vitamin and nutrient deficiencies
- Establish new, healthier diet and exercise habits

---

Post Operative Management

- Peri-operative statin use—when to stop?
  - Holding or stopping statins preoperatively may lead to increased cardiovascular risk and death
  - Should be continued for at least 6 months after surgery
  - This is in spite of the fact that lipid panels may rapidly return to normal post-operatively
  - If they are on them, keep them on them for at least 6 months!

Perioperative pleiotropic statin effects in general surgery
Post Operative Care - RNY GP

- An environment of pouch hyperacidity
  - Loss or entero-enteric neural feedback
  - Loss of cholecystokinin and secretin loop
- NO NICOTINE OF ANY KIND!
  - nicotinic cholinergic receptors
- NO SYSTEMIC STEROIDS
  - If must use, PPI is essential
- NO NSAIDS
  - Even ASA 81mg causes ulcers
  - Have seen marginal ulcers with topicals
Treatment of Marginal Ulcer

- Esomeprazole Capsules, 40 mg PO BID in applesauce
  - Open the capsule into a tablespoon of unsweetened applesauce and swallow
  - PPI’s require binding to actively secreting parietal cells to be effective
  - Only 1/3 of parietal cells secrete hydrogen ions at any given time, and 2/3 are dormant
  - The small pouch and rapid gastric transit time after RNY gastric bypass do not allow for adequate binding to parietal cells when tablets or unopened capsules are used
  - Studies have shown 50% reduction in marginal ulcer healing when PPI’s are used in this fashion
Post Operative Management B-12

- B-12 deficiency
  - Parietal cells secrete intrinsic factor
  - Less intrinsic factor to bind B12
  - Less B12 absorbed in terminal ileum
- Sublingual replacement, 500 ucg daily
- Patch replacement
- Nasal spray replacement
- Same recommendation for Sleeve
Post Operative Management RNY-GB

- Bilious vomiting is an EMERGENCY!
- Internal hernias with BOWEL ISCHEMIA
- These can happen YEARS post op
- Bariatric Protocol CT scan
  - Internal hernias can still be missed
  - Diagnostic laparoscopy is gold standard
Post Operative Care  Early Problems

▪ LEAKS
  ▪ Most happen in first 4 weeks
  ▪ Operate if 1-2 days post op
  ▪ Later leaks treated with drains and stents

▪ STRICTURES
  ▪ Happen at 6 weeks
  ▪ Treated with endoscopic dilatation

▪ INTRACTABLE NAUSEA
  ▪ May require outpatient fluids
  ▪ May require IV thiamine
  ▪ When severe, may require laparoscopic or IR gastrostomy placement in the gastric remnant
  ▪ This almost always resolves with time
  ▪ Sleeve patients may need a lap jejunal feeding tube
Routine Lab monitoring - Pre OP

- UP TO 40% HAVE VITAMIN DEFICIENCIES PRE-OP!
  - CBC
  - Chem Comp
  - TSH (if none in last 3 months)
  - HB A1C (if elevated fasting glucose)
  - Iron Panel
  - Vitamin B12
  - Folate
  - 25-OH Vitamin D
  - Lipid Panel
Post Op Labs Sleeve and RNY at 3 & 12 Mos.

- CBC
- Chem Comp
- Serum B-12
- Serum Folate
- Serum Iron
- PTH level
- 25-OH Vitamin D
- Lipid Panel
- Vitamin A level (12 months only)
Post-Op Labs for BPD-DS at 3, 6 and 12 Mos.

- CBC with diff
- Chem Comp
- Serum B-12
- Serum Folate
- Vitamin A level (6, 12 mos, yearly)
- Serum Iron
- PTH level
- 25-OH Vitamin D
Vitamin Deficiencies Repletion Protocol

- Thiamine Repletion
  - 500 mg IV daily for 3 days, then 250 mg IV for 3 days
  - Start oral thiamine 100 mg daily
  - Recheck thiamine level in one month
**Vitamin Deficiencies Repletion Protocol**

- **Vitamin D repletion**
  - If Vitamin D level is 20-30 (deficient)
    - Vit. D2 50,000 IU twice a week for 8 weeks
    - Increase oral Vit. D2 to 5,000 IU daily
  - If Vitamin D level is < 20 (severely deficient)
    - Vit. D2 50,000 IU three times a week for 8 weeks
    - Increase oral Vit. D2 to 5,000 IU daily
  - Recheck 25-OH Vitamin D in two months
Vitamin Deficiencies Repletion Protocol

- Iron repletion
  - Oral elemental iron 200 mg twice a day
  - Separate from calcium and acid reducing medications
  - Repeat iron panel, Vitamin B-12, Zinc, Folate, and reticulocyte count in two months
  - If no response in two months, then refer for IV iron/hematologist
Vitamin Deficiencies Repletion Protocol

- Vitamin A repletion
  - Oral Vitamin A 10,000 IU daily for two weeks
  - Recheck Vitamin A level in two months
Vitamin Deficiencies Repletion Protocol

- Calcium repletion (for elevated PTH level)
  - Check Vitamin D level
  - Verify patient is taking Calcium Citrate supplement according to the recommendations for their surgery type
  - If the patient is taking the supplement as directed, increase the supplement by one dose, not to exceed four doses per day
Consensus Panel Vitamin Replacement

- For RNY-GP and Sleeve Gastrectomy
  - Vitamin B1 (thiamine) 12 mg daily
  - Folate 400 mcg daily
  - Vitamin A 5000 IU daily
  - Vitamin E 15 mg daily
  - Vitamin K 90 mcg daily
  - Zinc 11 mg daily
  - Copper 2 mg daily
  - Vitamin B-12 500 mcg daily or 100 mcg IM monthly
  - 25-OH Vitamin D 5000 IU daily
  - Ferrous fumarate 45-60 mg daily
  - Calcium Citrate 600 mg plus 400 IU 25-OH Vitamin D twice daily for a total of 1200 mg Calcium Citrate and 800 IU 25-OH Vitamin D
**Consensus Panel Vitamin Replacement**

- **BPD-DS**
  - Vitamin B-1 (Thiamine) 12 mg daily
  - Folate 400 mcg daily
  - Vitamin A 10,000 IU daily
  - Vitamin E 15 mg daily
  - Vitamin K 300 mcg daily
  - Zinc > 16 mg daily
  - Copper 2 mg daily
  - Vitamin B-12 500 mcg daily
  - 25-OH Vitamin D 5000 IU daily
  - Iron Fumarate 45-60 mg daily
  - 600 mg Calcium Citrate with 400 IU 25-OH Vitamin D three times daily (1800 mg Calcium, 1200 IU 25-OH Vitamin D)
Caring for the 40%: Ks. Chapter of ACP

▪ Questions??
Thank you

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References


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