Bariatric Surgery: A lasting option for patients suffering from obesity

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Disclosures

• Nothing to disclose
Obesity Trends Among U.S. Adults
BRFSS, 1990, 2000, 2010
(*BMI \geq 30, or about 30 lbs. overweight for 5’4” person)

1990

2000

2010

Source: Behavioral Risk Factor Surveillance System, CDC.
Obesity Trends in the US 2013
Centers for Disease Control and Prevention
Obesity Trends

• 2011 CDC collected data shows 67% of US adults are overweight, 35.7% of whom are obese
• 2008: $147 billion in medical costs associated with obesity
• Causes of obesity include:
  – More sedentary lifestyle
  – Access to fast food
  – Larger portion sizes
What causes obesity

- Obesity is the result of a combination of influences:
  - Your surroundings
    - The genes you inherited from your parents
    - How well your body turns food into energy
  - Your eating and exercising habits
    - Family environment contributes to the increasing prevalence of obesity.
  - Psychological factors
Causes of Obesity

• Imbalance between caloric intake and energy expenditure:

• Super-Size Phenomenon
  • Regular size McDonald’s meal (600 calories)
  • Super-sized McDonald’s meal (1800 calories)

• In 45 minutes of exercise, a 154-pound person expends:
  • 330 calories bicycling
  • 700 calories running
  • 180 calories walking
  • and 230 calories dancing
Do Diets Work?

• Weight loss study
  – 811 subjects
  – 2 years
  – 4 types of diets
    • 20% fat, 15% protein, 65% carb
    • 20% fat, 25% protein, 55% carb
    • 40% fat, 15% protein, 40% carb
    • 40% fat, 25% protein, 35% carb
  – Average weight loss 4 kg= 8.8 lbs

Sacks, F., Bray, G., Carey, V., et al; Comparison of Weight-loss diets with different compositions of fat, protein and carbohydrates. New England Journal of Medicine, 2009 ; 360(9)
Does size matter?

Cookie 400 calories

Egg 70 calories
Portion Sizes

Quadruple Bypass Burger

Megastuffed Oreo
Harassed by Food
Or Healthy Options
## Starbucks Nutritional Info

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
<th>Calories/fat/Carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venti Café Latte</td>
<td>Whole Milk</td>
<td>290/15/23</td>
</tr>
<tr>
<td>Venti Café Mocha</td>
<td>Whole Milk, Whipped Cream</td>
<td>490/23/55</td>
</tr>
<tr>
<td>Venti White Chocolate Mocha</td>
<td>Whole Milk, Whipped Cream</td>
<td>620/27/79</td>
</tr>
<tr>
<td>Blueberry Scone</td>
<td>Blueberries, buttermilk, lemon</td>
<td>420/17/61</td>
</tr>
<tr>
<td>Reduced fat berry coffee cake with lemon crumble</td>
<td>Blueberries, dried cranberries, lemon crumble</td>
<td>320/11/52</td>
</tr>
</tbody>
</table>
# Healthier Options at Starbucks

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
<th>Calories/fat/carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tazo tea</td>
<td>Tea leaves, herbals</td>
<td>5/0/5</td>
</tr>
<tr>
<td>Grande Cappuccino</td>
<td>Skim milk</td>
<td>80/0/12</td>
</tr>
<tr>
<td>Petite Vanilla Bean Scone</td>
<td>Vanilla bean</td>
<td>120/4.5/18</td>
</tr>
<tr>
<td>Evolution Harvest Almond Cocoa Bar</td>
<td>Almonds, multigrain crisp, agave</td>
<td>180/10/21</td>
</tr>
<tr>
<td>Chicken &amp; Hummus Bistro Box</td>
<td>Chicken, pita, vegetables</td>
<td>270/19/37</td>
</tr>
</tbody>
</table>
Combining options
What classifies someone as obese?

- Using the BMI scale, (a calculation of weight to height ratio)
  - BMI of 18.5 or less = underweight
  - 18.5-24.9 = normal weight
  - 25-29.9 = overweight
  - 30-39.9 = obese
  - 40 or greater = morbidly obese

- BMI- calculation weight to height ratio
  - Formula: weight (kg)/height2/(m2)
  - Or 703 x weight (lb)/height in inches 2)
How does obesity affect a patient’s health

• Higher risk of cardiovascular disease
• Higher risk of stroke
• Higher risk of mortality
• More prone to comorbid conditions, such as:
  – Hypertension
  – Hypercholesterolemia
  – Diabetes Type 2
  – Obstructive Sleep Apnea
  – Osteoarthritis
Understanding the bariatric patient

• Most people who are obese have been that way most all their lives.
• Their body doesn’t tell them when they are full.
• Psychological issues associated with food, eating, weight. This is their main coping mechanism.
• It is often hereditary and other members of their family are obese.
• The decision to have bariatric surgery is not easy.
NIH Guidelines

- BMI 30-39.9 with comorbidities
- BMI 40 or greater without comorbidities
- Can’t lose weight or keep it off over the long term using other methods
- Well informed about the surgery and treatment effects
- Aware of the risks and benefits of surgery
- Ready to lose weight and improve his or her health
- Aware of how life may change after the surgery
- Aware of the limits on food choices, and occasional failures
- Committed to lifelong healthy eating and physical activity, medical follow-up, and the need to take extra vitamins and minerals
Ideal Bariatric Candidate

• Ideal Candidate
  – Motivated
  – Able to follow program
  – Feels like all other options for weight loss have failed and are willing to make necessary changes

• What Makes a Successful Candidate?
  – Willingness to follow the program before and after surgery
  – Successful with trial
  – Follow the guidelines for post-op success
    • Surgery, diet, exercise, follow up
Surgical Options

– Sleeve Gastrectomy
– Gastric Sleeve Plication
– Gastric Band
– Gastric Bypass
– Duodenal Switch
– New options

• Revisions
  – Revision or reversal of gastric bypass

• Endoscopic Procedures
  – ROSE (Revision Obesity Surgery Endolumenal)
  – POSE (Primary Obesity Surgery Endolumenal)
Sleeve Gastrectomy

- Removing 80% stomach
- Not reversible
- 50-60% excess weight loss
- Lose weight by early satiety
Gastric Sleeve Plication

- Fold stomach to reduce surface size
- Prone to nausea
- post-op
- EWL at 9 months 65%
Gastric Band

- Band around upper part of stomach
- Eat smaller meals
- Band is adjusted according to patient’s level of satiety
- No cutting or stapling
- 40-50% excess weight loss
Gastric Bypass

- Hybrid procedure
- Stomach-small pouch
- Y-shaped part of the small intestine attached to the stomach pouch
- Food can bypass the duodenum, as the bypass extends to the initial portion of the jejunum
Duodenal Switch

- Restrictive and malabsorbtive
- Stomach converted to sleeve
- Part of duodenum left intact
- Rearranging the small intestine to separate the flow of food from the flow of bile and pancreatic juices.
- Food and digestive juices interact only in the last 18 to 24 inches of the intestine, allowing for malabsorption.
POSE: Primary Obesity Surgery Endolumenal

- Primary surgery for weight loss
- Done endoscopically—no scars
- Suture anchors are inside the stomach
Pre-op Care

- All bariatric patients
  - Dietitian
  - Bariatrician/Internal Medicine
  - Psychology
  - Surgeon
  - Nurse Practitioner/Fellow
  - Patient Advocate

Are on pre-op liquid diets (except revisions- vary)
4 Factors for Success

- Surgery
- Diet
- Exercise
- Accountability
Why do we do a pre-op liquid diet

- Shrinks liver
- Less bleeding
- Less operating time
- Less pain
Pre-op liquid diet- Effect on Surgery

Followed pre-op liquid diet

Did not follow pre-op liquid diet
Day of Surgery

- All bariatric patients are weighed pre-operatively the day of surgery
- Pre-operatively and while hospitalized patients receive anticoagulation (Lovenox or Heparin)
- Appropriate bed size is needed (for patient’s weighing >350, need Sizewise bed)
Post-op care for Bariatric Patients

- All patients go to med/surg with telemetry; revisions may go to ICU
  - Telemetry
    • Sustained tachycardia- indicates leak
  - Continuous pulse ox
    • Majority of patients have OSA

- Have received post-op instructions prior to admission
Post-op Surgery Risks

• All surgeries come with risk of:
  – Stroke
  – Heart attack
  – Death
  – Infection
  – Bleeding
  – Pneumonia
  – Deep Vein Thrombosis
  – Pulmonary Embolism
Post-op Bariatric Surgery Risks

• Bariatric Surgery Risks:
  – Sleeve Gastrectomy: Gastric leak/perforation
  – Gastric Bypass: Gastric leak/perforation, marginal ulcer, fistula, dumping syndrome, lactose intolerance
  – Gastric Band: Pouch enlargement, band slippage, port or catheter complications
Post-op Bariatric Risks

• Duodenal switch: Malabsorption/malnutrition
  – Vitamin deficiencies: Including night blindness-Vitamin A deficiency
• Osteoporosis
• Chronic diarrhea

• ROSE/POSE: sore throat, gastric/esophageal perforation
Post-operative Pain

Generally located at the incisions
– (except ROSE/POSE- throat pain)
Pain from laparoscopic surgery may radiate to left shoulder
Need to distinguish between post-op pain and chest pain
Pain with PO intake- may indicate leak

INTERVENTIONS:
Check vital signs- note elevated temp, tachycardia
May need CBC to check WBC
Evaluate for leak
Equipment

• Consider weight limitations of furniture
• Toilets- hold 350 lbs- check for toilet jack if your patient weighs greater than 350 lbs
• If larger than 350 lbs, need Sizewise bed
• Note weight limitations of CT scanner
• Walkers
• Beds
• Chairs
COMPLICATIONS: Leak

• Assessing for leak
  – Band/ROSE/POSE- uncommon but can occur during surgery
  – Sleeve- not frequent but generally occurs on staple line at GE Junction
  – Gastric Bypass- can occur at gastrojejunal anastomosis or jejunal/jejunal anastomosis; or unknown perforation of bowel
  – Signs/Symptoms
    • ELEVATED HEART RATE- sustained tachycardia
    • Elevated temperature
    • May experience drop in BP
COMPLICATIONS: Leak

- Abnormal drainage
- Increased pain - may radiate to left shoulder
- Elevated WBC count
- Decreased urine output

INTERVENTIONS:

- Make patient NPO
- Evaluate for leak - imaging
COMPLICATIONS: Leak

- May order CT Scan (with small amount water-soluble contrast)

- Or UPPER GI (water-soluble contrast)

- Patient may need to return to OR or transfer to ICU
COMPLICATIONS: Hemorrhage

• Can occur from leak, injury to internal organ

• Signs/symptoms:
  – Decreased Blood Pressure
  – Elevated heart rate
  – Increased respiratory rate
  – Decreased urinary output
  – Drop O2 saturation
  – Increased bloody drainage in JP or from incisions
COMPLICATIONS: Hemorrhage

- May have hematemesis
- Bloody BM

INTERVENTIONS
  - MAKE PATIENT NPO
  - Check VS
  - Consider 2nd IV access, type and cross, CBC
  - Discontinue Toradol, anticoagulation

- 90 % bleeds may stop spontaneously
- May need to return to OR
COMPLICATIONS: Deep Vein Thrombosis

• Prevention:
  – Anticoagulation: Lovenox 40mg or Heparin 5,000 units pre-op day of surgery
• 40 mg daily for Sleeve/Gastric Bypass
• Athrombic boots while in bed
• Ambulate and hydrate
• Patients with BMI greater than 50 or high risk go home on extended Lovenox
COMPLICATIONS: Deep Vein Thrombosis

• Assess for DVT
  – Pain, generally in calf
  – Assess redness, warmth, tenderness, swelling

INTERVENTIONS
  – Doppler ultrasound
  – D Dimer
  – Anticoagulation
Pulmonary Embolism

• Signs/Symptoms
  – Chest pain- sudden onset, worse with deep inspiration
  – Shortness of breath
  – Anxiety/apprehension
  – Sweating
  – Passing out
  – Low O2

INTERVENTIONS
  – Oxygen
  – CT angiogram chest; VQ scan
  – Thrombolytic therapy
Bariatric Diet: Pre and post-op

- Pre-op: low sugar, low fat, moderate protein 600-800 calories
- Post-op
  - 2 weeks liquid diet, 2 weeks pureed diet
  - weeks soft diet, then full 1200 calorie diet

Recommendations:
  - Variable
    - 60-80 grams protein; duodenal switch 90 grams; or
    - 1 gram per kg daily protein intake
    - 100 grams carbs
    - 20 grams fat
Why Bariatric Surgeries Fail

• Lack of follow up
• Surgical complications
• Patient not following diet, exercise program
• Need the best surgery for the patient- decided on an individual basis
Revision Endoscopic Obesity Surgery

- Revision of Gastric Bypass
- Done endoscopically
- Reduces surface area for experience early satiety
Endoscopic Revision after Gastric Bypass

- Candidate: lost at least 50% with original bypass
- Regained weight (generally 25%)
- Post-op at least 2 years
- Study examined 25 patients who regained ~ 50 lbs from nadir
- Average BMI 43 at revision
- Lost additional 22 lbs at 12 months post revision

Gastric Band Management

• Gastric Band Adjustments
  – Not feeling restricted
  – X ray shows good flow of contrast without restriction
Complications of Gastric Banding

- Requiring urgent intervention
  - Pouchitis
  - Band slippage
  - Gastric Band erosion
  - Port complications
  - Band complications

- Requiring timely intervention
  - Reflux
  - Difficulty swallowing textured foods (chicken, hamburger)
Gastric Band Imaging

Normal

Obstructed
Post-operative

• Follow up - every 3 months for 18 months, then annually
• Support group
• Labs
• What to expect after 18 months?
  – 50-70% excess weight loss
  – Resolution of diabetes, HTN, improvement of OSA
Exercise

• American Society for Metabolic & Bariatric Surgery
• Pre-operative exercise- mild exercise
• (20 minutes, 3-4 times/week)
• Post-operative exercise-
  – Walking post-op day 1
  – Increase walking schedule
  – Light weight training when cleared by surgeon

ASBS Public/Professional Education Committee, ASMBS 2012(1) ; ASBMS Bariatric Surgery. Post-operative concerns, from www.asmbs.org
Types of Exercise

- Aerobic Exercise - cardiovascular strengthening
- Strength Training - weight maintenance; prevent injuries
- Flexibility

Timing

- At least 10 min - time for endorphins to kick in
- Heart rate adjusts to comfortable, elevated rate
Barriers to Exercise

- Lack of time
- Physical discomfort
- Fatigue
- Lack of interest
- Lack of discipline
- Proximity of workout facility

Activities to get started

• Take the stairs versus the elevator.
• Walk up and down a flight of stairs 5 times during each TV commercial.
• Park your car as far away as possible from your destination.
• Do 5 jumping jacks before brushing your teeth.
• Take a walk after lunch or dinner.
Self Monitoring Tools

- Self-monitoring Apps
  - Myfitnesspal
  - Loselt
  - Time2Eat
  - Calorie Counter
Self Monitoring Tools

• Devices
  • Fitbit
  • Jawbone up
  • Garmin Vivosmart

• Fitbit Charge
Self Monitoring and Eating Related Behaviors

• 123 participants
• 12 month study
• Post-menopausal overweight-obese women
• Mean weight loss: 10.7%
• Poor weight loss factors
  – Skipping meals
  – Eating out for lunch

Kong, A., Beresford, S., Alfano, C. et al; Self-monitoring and eating-related behaviors are associated with 12-month Weight loss in postmenopausal overweight-to-obese women; Journal of Academy of Nutrition and Dietetics 122(9) 1428-1435
Resolution of Comorbidities after Bariatric Surgery

- Migraines: 57% resolved
- Obstructive sleep apnea: 74% to 98% resolved
- Hypercholesterolemia: 63% resolved
- Hypertension: 62% to 70% resolved
- Nonalcoholic fatty liver disease: 37% resolution of steatosis
- Type II diabetes: 82% to 96% resolved
- Urinary stress incontinence: 44% resolved
- Osteoarthritis/Degenerative joint disease: 41% resolved
- Depression: 47% reduced
- Pseudotumor cerebri: 84% resolved
- Asthma: 69% improved
- GERD: 72% to 95% resolved
- Metabolic syndrome: 80% resolved
- Polycystic ovarian syndrome: 75% resolution of hirsutism, 100% resolution of menstrual dysfunction
- Venous stasis disease: 95% resolution of venous stasis ulcers
- Gout: 72% resolved
- Quality of life improved in 95% of patients
- Relative risk of mortality reduced by 89% in a 5-year period
Resolution of Diabetes Type 2 after Gastric Bypass

- GLUT-1 - Glucose transporter 1; normally found in intestine of fetus
- Study in rats
- Reprogramming of intestinal glucose metabolism to meet its increased demands
- Glucose is directed toward metabolic pathways that support tissue growth.
- Reprogramming of intestinal glucose metabolism is triggered by the exposure of the Roux limb to undigested nutrients.
- Reprogramming of intestinal glucose metabolism renders the intestine a major tissue for glucose disposal, contributing to the improvement in glycemic control after RYGB

Effects of Gastric Bypass Surgery in Patients With Type 2 Diabetes and Only Mild Obesity

- 66 patients for 6 years
- BMI 30-35
- Severe longstanding diabetes (12.5 +/- 7.4 years)
- HgbA1c 9.7 +/- 1.5
- Mean HgbA1c fell to 5.9 (despite medication cessation)
- Weight loss failed to correlate with several measures of improved glucose homeostasis
- Consistent with weight-independent antidiabetes mechanisms of RYGB.

Empathy Training

- **EMPATHY**: The ability to identify with and understand someone else’s feelings or difficulties.

- All staff working with the bariatric population are required to have empathy training.

- Staff examine:
  - Attitudes toward the obese population
  - Perceptions and beliefs
  - How do they feel?
The future for optimal weight loss

• Combination medication and surgery
• New surgical procedures
Conclusion

• Surgery offers lasting option for weight reduction
• Right surgery in right patient
• Resolution or improvement of comorbidities