Bariatric Surgery Update

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Learning Objectives

1. Current national obesity and bariatric surgery statistics, types of operations
2. Outcomes of bariatric procedures: Weight loss, resolution of comorbidities, and changes in relative risk: diabetes, heart disease, cancer
3. Surgical candidacy and the pre-operative process, dietary management, nutrition guidelines
4. Complications-recognition and management (including also plateaus, weight regain, return of comorbid conditions)

CURRENT OBESITY STATISTICS AND RATES OF BARIATRIC PROCEDURES PERFORMED
 Estimates (2013) are about 24 million have severe or morbid obesity (1/3).

Obesity linked to more than 40 diseases including type 2 diabetes, heart disease, stroke, osteoarthritis and cancer

50-100% increased risk of premature death compared to healthy weight individuals

Median survival is reduced by two-to-four years for individuals with BMI 30-35
Median survival is reduced by eight-to-ten years for individuals with BMI 40-45
(comparable to smoking)

Weight loss, as modest as 5 to 15% of total body weight in a person who is overweight or has obesity, reduces the risk factors for some diseases, particularly heart disease

U.S. economic costs of the disease of obesity $270 billion in 2011
Relative Risk and Obesity

Resolution and Improvement=Reduction in Relative Risk

- Heart Disease: 56% reduction in mortality
- Diabetes: 86% resolved or improved, 92% reduction in mortality
- Sleep Apnea: 85.7% resolved or improved (our study 75% by 6 months)
- Cancer: 60% reduction in mortality (colon, breast)
- Mortality: Premature death risk decrease 30-40%

Improved or Resolved Co-Morbidities After Bariatric Surgery
Estimated Numbers of Bariatric Surgery Procedures in the US 2011-2014

### Safety and Outcomes

- **Risks of Surgery:** Major Complications: 4%. Death: 0.1% (Mortality risk from gallbladder surgery: 0.7%, hip replacement 0.93%)
- **Average WEIGHT LOSS results:** About 50% of EBW lost is maintained.
- **Comorbid conditions are resolved or improved in >>50%**
- This makes bariatric surgery the most effective treatment we have for obesity but also for comorbid conditions. But less than 0.5% of eligible patients are referred.
- The success of surgery is about risk reduction via improvement or resolution of comorbid disease
- Is there an ideal window?

<0.05% of ‘eligible’ patients have surgery. Why?

- Old information about the risks and success rates of surgery?
  - The operations are done differently
  - The approach to the patient is different and includes YOU
  - Our knowledge of the problem has grown exponentially
- Bias? We know obesity is a chronic disease, providers know it’s multifactorial, yet the general public sees it as an individual’s responsibility and so patients themselves may not seek care
- Most providers surveyed cite futility as the number one reason for not addressing overweight/obesity
- Experience with failure? The major successes you might not see...
Access to Care, Provider Bias, Healthcare Disparities

- There is a never-ending source in the literature regarding provider bias and obesity. Most of this literature are studies in Primary Care.
- Patients with obesity are less likely to be referred by providers for essential healthcare maintenance needs like colorectal or breast cancer screening.
- Racial/ethnic and lower income patients are even more susceptible to this disparity, and are less likely to be referred or be eligible for bariatric surgery.

Access to Care, Provider Bias, Healthcare Disparities

- Once eligible are less likely than whites of higher income patients to have surgery
- It is PROBABLE that our own bias in caring for patients with obesity is contributing to poorer outcomes for this disease.
Who Should be Referred and When?

- **Risk** is a continuous concept based on much more than BMI.
- Referral should occur following: "A finite period (e.g., 6 months?) of unsuccessful combined non-surgical therapies".
- Notes that psychologic comorbidities are highly under-investigated and patients who suffer from them are significantly under-referred.
- Categorizes "Weight-loss responsive comorbidities" (RR>S: DMII, HLD, OSA, IIH, Nonalcoholic steatohepatitis) to determine whether surgery may be indicated or is indicated. Terms obesity as a "serious chronic relapsing condition."

Dixon: "Referral for a Bariatric Surgical Consultation: It is Time to Set a Standard of Care" Obes Surg 2009

Bariatric Surgery in Type 2 Diabetes

- Bariatric surgery may be considered for adults with type 2 diabetes whose BMI is >35 kg/m². In particular, in individuals in whom their diabetes or associated comorbidities are difficult to control with lifestyle and pharmacologic therapy. 
- Lifelong support and monitoring are necessary.
- There is insufficient evidence to recommend bariatric surgery for individuals with BMI ≤35 kg/m² outside of a research protocol.

Advantages of bariatric surgery:

- Achieves near or complete normalization of glycemia 2 years after surgery. **1**
- Younger age, shorter diabetes duration, lower A1C, higher insulin levels, and non-use of insulin are associated with higher post-surgery remission rates.

Disadvantages of bariatric surgery:

- Costly
- Outcomes are variable based on the procedure and experience of the surgeon.
- Long term: Dumping syndrome, Vitamin and mineral deficiencies, Osteoporosis, Severe hypoglycemia from insulin hypersecretion, Increased risk for substance abuse.

**1** Among 72% of subjects compared with 16% control subjects treated with lifestyle and pharmacologic therapy.

ADA Diabetes Management Guidelines 2016
A PATIENT STORY USING A RISK ASSESSMENT CALCULATOR

BMI = 42.5

Questions 1 to 5

1. GENDER
   What is your gender? Male

2. AGE
   What is your age? 35 years

3. HEIGHT
   What is your height? 5 ft 1 in

4. EXISTING CONDITIONS
   Do you have any of these existing conditions?
   - Heart disease
   - Heart failure
   - Kidney failure

Questions 6 to 9

6. SMOKING
   Do you smoke? No

7. PHYSICAL ACTIVITY
   What is your level of physical activity for most active of the week?
   Low

8. WEIGHT
   What is your weight? 333 lbs

9. BLOOD SUGAR LEVEL
   What is your blood sugar (HbA1c) level?
   12.4 %
Primary Bariatric Procedures, Sample Long-Term Outcomes

- Adjustable Gastric Banding (AGB)
- Roux-En-Y Gastric Bypass (RYGB)
- Sleeve Gastrectomy (SG, VSG)
- BPD/DS
- SADI or SI/PS, loop DS (Single Anastomosis Duodeno-Ileal Bypass or Stomach-Intestinal Pylorus Sparing Procedure), often revision of SG
Adjustable Gastric Band Outcomes, up to 18 yr follow-up

| Time of Follow-up (years) | % EBWL | Number of Patients
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Sleeve Gastrectomy and Gastric Bypass Outcomes

- Nadir/Maximal %EBWL by 12 months
- Predictable by 3 months by mathematical model (Cottam and others)
- Preoperative BMI, Sleep Apnea, Diabetes Predictive of <50% EBWL >5yrs
- Approximately 40% weight loss failure rate by standard definition
- Resolution of co-morbidities better than for weight loss for both stapled procedures

Results 11 years after sleeve gastrectomy-Himpens

- Weight Progression
- Obesity-Related Co-morbidities (DM2, HLD, OSA, HTN. on treatment)
- GERD Evolution: PPI or Need for Conversion-de novo in 9 patients, 1 converted to RYGB
- 118 pts, 60% f/u, 63 pts in final analysis
- Reoperation in 32% for weight issues (81%) or GERD (19%)
- At 3, 6 and 11 yrs %EBWL 82.4, 75.9, 62.5% respectively in sleeve group; overall failure rate 49.2%
12 Years After Gastric Bypass-Adams, Hunt et al NEJM Sept 2017

- 418 pts, >90% 12 yr follow-up
- Endpoints: %Change in body weight, T2DM, remission of HTN, HLD at 2, 6 and 12 years
- >20% TBW definition: 2yrs 35%, 6 yrs 27%, 12 yrs 27%; authors note multiple studies with identical results
- DM2 75%/62%/51%
- HTN, HLD higher remission and lower incidence rates compared to non-surgical group

Outcomes of Gastric Bypass vs. Sleeve Gastrectomy

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<thead>
<tr>
<th></th>
<th>Bypass</th>
<th>Sleeve</th>
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<tr>
<td>Excess weight loss (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>69</td>
<td>60</td>
</tr>
<tr>
<td>2 year</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>3 year</td>
<td>67</td>
<td>56</td>
</tr>
<tr>
<td>Patient satisfaction(% very satisfied)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>92</td>
<td>87</td>
</tr>
<tr>
<td>2 year</td>
<td>89</td>
<td>76</td>
</tr>
<tr>
<td>3 year</td>
<td>94</td>
<td>74</td>
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Obesity as a Chronic Disease

- Obesity is relapsing and remitting in our patients too. Results best with bariatric surgery but still 40% will be unsuccessful in losing >50% of EBW permanently
- "Failure" most often defined as 50% EBWL (also seen as <20%TBWL). Medical definition is different (>10% TWL kept off for one year), many suggest a change to our surgical definition…
- How should we approach those patients? Dietary and lifestyle intervention, weight-loss medication, behavioral psychology, repeat weight loss procedures? How about all of the above?
- It requires a multidisciplinary, lifelong, team-based approach
Who is a Candidate for Surgery? 2013 Consensus AACE-TOS-ASMBS:

• R1(1): Patients with a BMI≥40 kg/m² and for whom bariatric surgery would not be associated with excessive risk should be eligible for 1 of the procedures (Grade A, BEL 1).

• R2(2/3): Patients with a BMI≥35 kg/m² and 1 or more severe obesity-related co-morbidities, including T2D, hypertension, hyperlipidemia, obstructive sleep apnea (OSA), obesity-hypoventilation syndrome (OHS), Pickwickian syndrome (a combination of OSA and OHS), nonalcoholic fatty liver disease (NAFLD) or nonalcoholic steatohepatitis (NASH), pseudotumor cerebi, gastroesophageal reflux disease (GERD), asthma, venous stasis disease, severe urinary incontinence, debilitating arthritis, or considerably impaired quality of life, may also be offered a bariatric procedure. Grade A, BEL 1 for BMI≥35 kg/m² and therapeutic target of weight control and improved biochemical markers of cardiovascular disease (CVD) risk.

Who is a Candidate for Surgery?

• Age limit?
• BMI limit?
• Medical stability?

Contraindications for Bariatric Surgery:

• Active drug or alcohol problem including treatment within 2 years of application
• Severe cognitive impairment
• Active psychiatric problem (does not include well-controlled depression, anxiety) or untreated eating disorder
• Self-destructive lifestyle
• Inability to integrate lifestyle adjustments
• Weight gain while compliance and education process
What is the Process? Program Components

- New Patient education and evaluation
- Dietary compliance (education) period (minimum 3; 6; 12 months as determined by progress and insurance). No strict weight loss requirement, goal weight based on many technical considerations.
- Psychological assessment by a trained specialist
- Insurance Approval
- Surgery
- Follow up at 1 week, 1 month, 3 months, 6 months and YEARLY THEREAFTER

Perioperative Period Bariatric Surgery

- After insurance approval patients receive further surgery-specific education
- A very low-calorie blended diet is maintained for the 10-14 days prior to the procedure to insure decreased liver volume and reduction in intra-abdominal adiposity
- Average procedure lengths at our teaching institution: Laparoscopic sleeve gastrectomy 1 hour (+/-), Laparoscopic Roux-en-y Gastric Bypass 2.5+ (+/-)
- Laparoscopic rates for primary (non-revision) cases is 100%, very occasional open surgery is done for referred post-operative complications, patients with history of multiple re-operations. Most revisions and conversions can also be performed laparoscopically.

Perioperative Period Bariatric Surgery

- Average length of stay is 1.2 days
- Time off work 2-4 weeks
- Lifting restriction <10-15 lbs for 4 weeks
- Physical activity and exercise are still required during this time
- Primary care follow-up for hypertension and diabetic medications within 2 weeks post-operatively
- Nutritional monitoring and supplementation begin at 1 week post-operatively
Recommended Supplements and Monitoring

Daily Supplements

- Chewable multivitamin (Flintstones) BID
- Chewable B-Complex -ONCE
- Chewable Vitamin D 2000IU -ONCE
- Chewable Calcium/Vitamin D 500mg -TID
- Chewable Iron (Ferrous Fumarate) 30mg BID (separated from calcium for absorption)
- Chewable or disintegrating B12 500ug – ONCE

Nutrient Deficiencies: Risks, Signs, and Symptoms

Table 2: Prevalence of Common Nutritional Deficiencies and Supplement Recommendations in Burnout Patients

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Deficiency</th>
<th>Prevalence (%)</th>
<th>Prebiotic Recommendation</th>
<th>Supplement Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B12</td>
<td>5% - 10%</td>
<td>75%</td>
<td>Daily vitamin supplement</td>
<td>Daily vitamin supplement</td>
</tr>
<tr>
<td>Thiamine (B1)</td>
<td>30% - 40%</td>
<td>10%</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Iron</td>
<td>5% - 15%</td>
<td>75%</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ca/Vit D</td>
<td>10% - 15%</td>
<td>10%</td>
<td>Daily vitamin supplement</td>
<td>Daily vitamin supplement</td>
</tr>
</tbody>
</table>

B12, Thiamine (B1), iron, Ca/Vit D most common (but not common with monitoring and supplementation). Watch for:

- B12 deficiency: Anemia, fatigue, nerve/neuropathic sx. Check for H. Pylori
- Thiamine (B1): weakness, leg pain, confusion
- Iron: weakness, palpitations
- Ca/Vit D may be asymptomatic, can cause secondary hyperparathyroidism, bone loss
Recommended Supplements and Monitoring

- **Screening labs (New Patients):** Bilirubin, AST, ALT, Alkaline phosphatase, Albumin, Total protein, Glucose, Hemoglobin A1c, Prealbumin, TSH with reflex free T-4, Calcium, Parathyroid hormone, Cholesterol, HDL, Triglycerides, Ferritin, Vitamin B1, Vitamin B12, Vitamin D 25-hydroxy
- **Pre-Op Labs:** BUN, PTT, PT/INR venous, Creatinine, Electrolyte panel, CBC with differential, Urinalysis, Pregnancy test on any woman with a uterus of child bearing age
- **One Week Post-Op Labs:** Hemoglobin, Vitamin B12, Prealbumin
- **One Month Post-Op Labs:** Hemoglobin, Vitamin B12, Prealbumin
- **Three Month Post-Op Labs:** Hemoglobin, Vitamin B12, Prealbumin
- **Six Month Post-Op Labs:** Hemoglobin, Vitamin B12, Prealbumin, Vitamin D, Lipid Panel, If applicable: hemoglobin A1C and glucose
- **Annual Post-Op Labs:** Calcium, Ferritin, Glucose, Hemoglobin, Hemoglobin A1c, Lipid panel, Liver panel, Parathyroid hormone, Prealbumin, Vitamin B1, Vitamin B12, Vitamin D 25-hydroxy. Consider minerals zinc, copper

Choose Your Foods: Guide to Healthy Eating and Portion Size

- Carbohydrate: 15 grams
- Protein: 7 grams
- Fat: 5 grams
- Milk = 12-15 gm Carbohydrate and 6-12 gm Protein. May substitute (1) 6-oz light yogurt = 1 milk bubble
Recognizing and Managing Complications

• Leak
• Stricture
• Marginal Ulcer
• GERD
• Bowel Obstruction
• Nutritional Deficiencies
• Reactive hypoglycemia
• Weight regain

Leak, Stricture, Marginal Ulcer

• Leak: Likely won’t see it in primary care, most are acute, suspect if recent surgery, persistent pain, tachycardia, pain out of proportion, leukocytosis. It is leak until proven otherwise.

• Marginal ulcer, stricture, gastritis/pouchitis: More likely seen with gastric bypass. All our patients are told not to use NSAIDs and not to smoke or consume alcohol. Can present as severe epigastric pain, vomiting, regurgitation, GI bleed
  – Stricture is generally a sequelae of marginal ulcer
  – Smoking is most frequent cause

GERD, bowel obstruction, reactive hypoglycemia

• Reflux after bariatric surgery should be treated with PPI
• Refractory reflux should prompt bariatric consultation, UGI, EGD
• Abdominal pain after gastric bypass requires thorough evaluation, including CT imaging to rule out causes requiring emergency surgery
  – Internal hernia
  – Bowel obstruction
• Reactive hypoglycemia: usually diet-related, lack of protein, fixed by rapidly absorbed carbohydrates, can precipitate dumping. It can be more serious and may warrant bariatric surgery or endocrine consultation, evaluation for Nesidioblastosis, acquired beta islet cell hyperplasia
Weight Loss Plateaus and Weight Regain

- Weight loss plateaus after surgery: 3 months without weight loss in the first 9-12 months
- They are unfortunately predictive of failure to lose >50% of EBW
- Patients need to be seen during this time for re-education, lifestyle and or behavior modification, and potentially adding weight loss medication

Weight Loss Plateaus and Weight Regain

- Weight regain should be treated in the same way if >10% EBW is regained (after the normal nadir and small regain). Patients need to see their surgeon to see if there is any anatomic abnormality or adaptive eating.
- Failure of weight loss and weight regain are the most common reasons we lose patients to follow-up
- Annual follow up after the one-year visit goes from >85% to <50% despite all measures taken to contact lifelong patients
Conclusions

- Bariatric surgery is the most effective treatment we have for obesity and related metabolic diseases. A successful operation can produce a long-term result of >50% EBWL, >50% resolution of T2DM, >50% reduction in all CVD risk factors, and significantly decrease risk of common cancers.
- Less than 0.5% of eligible patients have surgery.
- Patients require supplementation and lifelong monitoring for nutrient deficiencies, complications, and weight regain, as well as for return of comorbidities.
- A multidisciplinary, team-based approach to obesity is the most effective management of this disease.