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Bariatric Surgery: Long-term Management of the Post-surgical Patient

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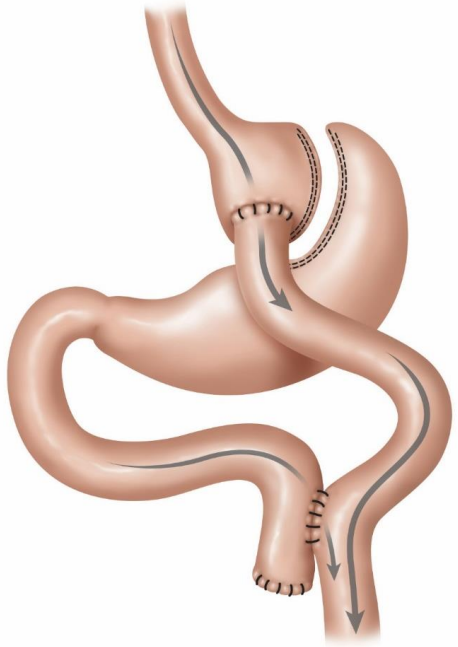
- No financial relationships to disclose.

Who Qualifies for Weight Loss Surgery

- NIH Guidelines, 1991
  - Defined by the 1991 NIH Consensus Conference Statement on Gastrointestinal Surgery for Severe Obesity:
    - BMI greater than or equal to 40 kg/m^2
    - BMI greater than or equal to 35 kg/m^2 in the presence of high-risk associated comorbid condition

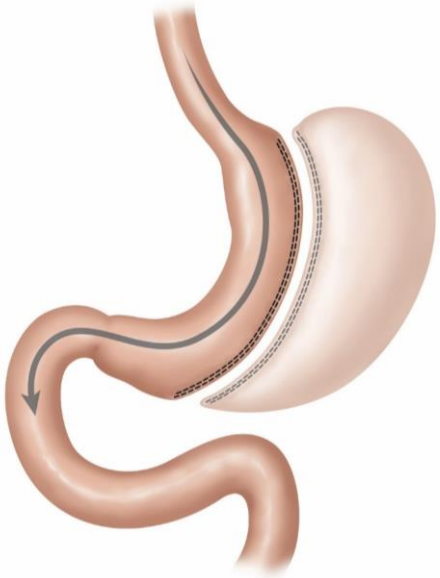
Roux en Y Gastric Bypass
How It Is Done

- Considered the “Gold Standard” of weight loss surgery
- A small stomach pouch 0.5 to 1-ounce (about the size of an egg) is created by dividing the top of the stomach from the remnant of the stomach
- The first portion of the intestine is divided and the bottom end is brought up and connected to the new stomach pouch
- The top of the divided intestine is reattached further down so stomach acids and digestive enzymes from the bypassed stomach and first portion of the small intestine eventually mix with food
- In the first 12 to 18 months after surgery, patients typically lose 50 to 80% of excess body weight



Vertical Sleeve Gastrectomy
How It Is Done

- Performed by removing approximately 75-80% o the stomach
- The remaining stomach is a long tube or “sleeve between 50 and 150 mL (about the size of a banana)
- Sleeve gastrectomy does not affect digestion. Food passes through the digestive tract just as it did before, allowing it to be fully absorbed
- The procedure is permanent once the stomach h been reduced
- On average, patients lose 50 to 65% of their excess weight



Laparoscopic Adjustable Gastric Band
How It Is Done

- Using a silicone band placed around the top portion of the stomach, LAP-BAND® surgery works by restricting the amount of food entering the stomach
- The diameter of the band can be adjusted post-surgically so the rate of weight loss suits your needs
- Unlike bypass surgery and other bariatric procedures, LAP-BAND® is also reversible
- Patients typically lose 45 to 55 percent of excess body weight in the first two years after surgery

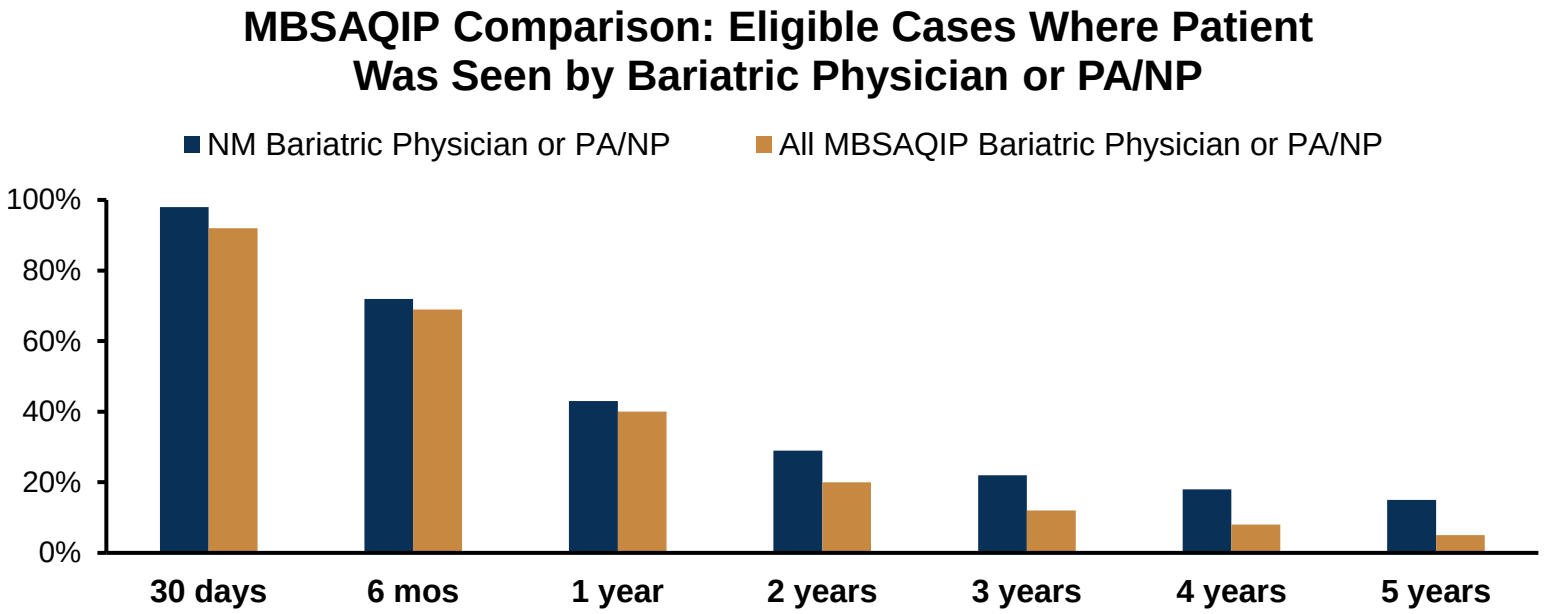
Estimate of Bariatric Surgery Numbers, 2011-2018

	2011	2012	2013	2014	2015	2016	2017	2018*
Total	**158,000**	**173,000**	**179,000**	**193,000**	**196,000**	**216,000**	**228,000**	**252,000**
Sleeve	17.8%	33.0%	42.1%	51.7%	53.6%	58.1%	59.4%	61.4%
RYGB	36.7%	37.5%	34.2%	26.8%	23.0%	18.7%	17.8%	17.0%
Band	35.4%	20.2%	14.0%	9.5%	5.7%	3.4%	2.7%	1.1%
BPD-DS	0.9%	1.0%	1.0%	0.4%	0.6%	0.6%	0.7%	0.8%
Revision	6.0%	6.0%	6.0%	11.5%	13.6%	14.0%	14.1%	15.4%
Other	3.2%	2.3%	2.7%	0.1%	3.2%	2.6%	2.5%	2.3%
Balloons	—	—	—	—	0.3%	2.6%	2.8%	2.0%

Safety and Long Term Survival

- Short term and long term risks of major adverse events including operations, interventions and hospitalizations is greater with RYGB vs Sleeve
- First 30-90 days risks include VTE, bleeding, staple line or anastomotic leak. Reoperation or readmission, rates range from 0.8-5.6% (sleeve) and 1.4-9.4% (RYGB)
- Perioperative mortality rates range from 0.03% to 0.2%
- All cause mortality decreased in bariatric surgery patient than matched nonsurgical patients

Long Term Attrition Rates in Follow Up After Weight Loss Surgery



Improvement in Obesity-Related Comorbidities: Type 2 Diabetes

- Studies of T2DM remission (HgA1c < 6-6.5%) showed outcomes for surgery were better than for medical therapy for glycemic control and remission of T2DM
- Surgery decreased HgA1c by 1.8-3.5% and medical treatment 0.4-1.5%
- Surgery also superior in improving secondary endpoints of weight loss, reduction in medications and improvement in lipids at 1-5 years after surgery
- Decrease in oral hypoglycemic agents or insulin decreased by 18.8% and 4.2% respectively
- Reduced risk of microvascular and macrovascular outcomes of T2DM including neuropathy, nephropathy and retinopathy at 5 years
- Higher rates of remission with RYGB vs sleeve (relapse in as many as 1/3 of RYGB and 42% of sleeve patients)
- Better improvement with lower age, BMI and A1c, as well as earlier stage T2DM, no/less insulin use, less medications and C peptide level

Improvement in Obesity-Related Comorbidities: Dyslipidemia

- 64% of patients with severe obesity seeking WLS have dyslipidemia
- Surgery is associated with short term (1-2 year) improvements in dyslipidemia, still reduced at 7 years post surgery
- Higher for RYGB than sleeve at 1 year
- Lipid levels and the need for lipid-lowering medications should be monitored routinely
- 6% reduction in lipid lowering medication use at 1 month and 24% at 6 months

Improvement in Obesity-Related Comorbidities: Hypertension

- 68% of adults with severe obesity seeking WLS have HTN
- WLS associated with a one year remission rate ranging from 43-83%
- Higher for RYGB vs Sleeve
- Rates of HTN remission and use of antihypertensive medication use is lower among surgical patients compared with medical, but BP control are similar
- The need for antihypertensive medications should be evaluated repeatedly and frequently during the active phase of weight loss, dosages may need to be titrated down as blood pressure improves
- 12% reduction in antihypertensive medication use at 1 month and 25% at 6 months
- Many will need to restart medications within 10 years (likely driven by aging)

Improvement in Obesity-Related Comorbidities: Other

- **Sleep apnea** – Improvement in AHI from 39.3 events per hour pre surgery to 12.5 after surgery
- Patients on **thyroid** hormone replacement or supplementation, TSH levels must be monitored after surgery and medication dosing adjusted (reductions with weight loss, but increases with malabsorption)
- **Osteoarthritis** – improvement in knee pain and functional status in the first 6-12 months after surgery. Associated with reduced short term medical complications, length of stay and operative time of total joint arthroplasty after WLS
- **Urinary Incontinence** – Reduced from 49% of women and 22% of men to 18.3% and 9.8% at 1 year after surgery
- **Cancer** – Associated with a reduced risk of all types of CA, specifically obesity associated CA such as postmenopausal breast, endometrial, colon, liver, pancreatic and ovarian

Long Term Complications: Postprandial Hypoglycemia

- Relatively common complication after RYGB
- Patients after RYGB have higher peak glucose levels early after a meal and higher levels of glucagon-like peptide-1 (GLP-1) which together result in exaggerated insulin response
- May be partially explained by rapid glucose absorption from the gut and increased GLP-1 secretion from the L-cells of the small intestine due to fast intestinal transit time, resulting in enhanced insulin secretion and low postprandial glucose levels
- Management includes low carbohydrate, low glycemic index diet with adequate protein and inclusion of heart healthy fats along with restricting alcohol and caffeine intake
- Pharmacological interventions includes octreotide, diazoxide, acarbose, and calcium channel antagonists
- Can consider continuous glucose monitoring

Long Term Complications: GERD

- Highly prevalent in severely obese patients, up to 65%
- Impact of sleeve on GERD is widely debated
- Overall 19% increased rate of postoperative GERD after sleeve, 23% increase in de novo reflux, 28% increase in esophagitis, 8% increase rate of BE
- Patients with de novo GERD should be treated with PPI therapy, only those with symptoms recalcitrant to medical therapy should be converted to RYGB
- 4% of all patients will require conversion to RYGB for GERD that is non-responsive to medical therapy
- Concomitant sleeve and anti-reflux surgery (HH repair or fundoplication) can prevent GERD after sleeve
- The presence of a hiatal hernia, erosive esophagitis and GERD are relative contraindications for sleeve

Long Term Complications: Band Slip/Erosion

- Persistent vomiting, regurgitation and upper GI obstruction after LAGB should be treated with immediate removal of fluid from the band
- Persistent symptoms of GERD, regurgitation, chronic cough or recurrent aspiration pneumonia in a patient after LAGB raise concern for band slippage, esophageal dilation and erosion
- Prompt evaluation with UGI or endoscopy and consideration of removal/revision

Long Term Complications: Marginal Ulcer

- Endoscopy should be the preferred procedure to evaluate GI symptoms suggestive of stricture or ulcer
- Occurred in 0.6%to 25% of patients
- Anastomotic ulcers should be treated with PPIs
  - H_2 receptor blockers and sucralfate may also be considered
- If *H pylori* is found, triple therapy may be used
- NSAIDS should be avoided after bariatric procedures, as they are implicated in the development of anastomotic ulcerations, perforations and leaks
  - NSAIDs, alcohol and tobacco use significantly increased risk of ulceration
  - If the use of NSAIDs is unavoidable then the use of PPIs should be considered

Long Term Considerations: Gallbladder

- US should be used to evaluate patients with right upper quadrant pain for cholecystitis
- WLS patients are at increased risk for cholelithiasis as a result of rapid weight loss
- Cholecystectomy should be reserved for patients with symptomatic biliary disease
- For patients with asymptomatic gallstones, prophylactic cholesystectomy may be considered to avoid choledocholithiasis because traditional endoscopic retrograde cholangiopancreatopgraphy can no longer be performed after some WLS procedures

Vitamin and Nutrient Deficiencies

- Weight loss after WLS is due in part to reduction in dietary intake which can lead to deficiencies
- Particularly at risk for deficiencies in D, B1 (thiamine), B12 (cobalamin), iron, calcium and folate
- Routine monitoring of Vitamin B1, Vitamin B12, Folate, Iron, Vitamin D and calcium, Vitamin A, Vitamin E, Vitamin K, zinc and copper (baseline, 6 months and annually)
- Long term compliance with nutritional supplements is relatively poor
- Most patients report intakes below the DRI for protein, zinc, calcium, thiamin, riboflavin, vitamin B6 and vitamin A
- Need for continued education, monitoring and long term nutrient supplementation

Vitamin and Dietary Recommendations

- ASMBS recommends 60g/day of protein at a minimum to maintain lean tissue during active weight loss
- 2 Complete Multivitamins daily (chewable preferred) containing iron, folic acid and thiamine
- Calcium CITRATE 1200-1500mg/day in divided doses
- Vitamin D 2000-3000 IU Daily
- Total iron as 18-60 mg (MVI and additional supplements)
- B12 350-1000 mcg daily
- Thiamine 50-100mg daily (B complex or MVI)
- Folate 400-800 mcg daily (MVI)
- Vitamin A 5000 to 10000 IU/day (MVI)
- Vitamin E 15mg/day (MVI)
- Vitamin K 90-120 mcg/day (MVI)
- Zinc 8-22 mg/day (MVI)
- Copper (gluconate or sulfate) 2mg/day (MVI)

Weight Regain

- WLS still results in greater LT weight loss than the best available nonsurgical interventions regardless of procedure used
- Weight regain is poorly and inconsistently assessed and reported
- Typical patients can expect to regain some weight, usually beginning with the second year postoperatively
- Significant weight regain should prompt a comprehensive evaluation for decreased patient adherence with lifestyle modification, evaluation of medications associated with weight gain, development of maladaptive eating behaviors, psychological complications, and radiographic or endoscopic evaluation to assess pouch enlargement, anastomotic dilation, or formation of gastrogastric fistula
- Interventions should first include dietary change, physical activity, behavioral modification with frequent follow up
- If appropriate, pharmacological intervention or surgical revision can be considered

Case Study – ED 32 YO Female

- Presents to Bariatric APN 9/1 for follow up after emergency surgery at outside facility 8/7 (not Bariatric Surgery Center)
- VS stable today: H: 5’8”, W: 138lb, BMI: 21.1, BP: 107/73, P: 73, T: 96.8
- She underwent a RYGB on 2/25/19 (Pre Op Weight: 295lb)
- Saw our RD in July and stated that she had moved in with her girlfriend in June – thought she injured her ribs during the move
- Pt did a virtual 5k followed by a protest and believes she injured her rib; lots of pain, saw PCP got muscle relaxer and advised to take ibuprofen
- Saw chiropractor who agreed with diagnosis and plan of care, again advised NSAIDs for pain management
- Physical therapy with no relief, worsening pain and difficulty breathing with activity

Case Study – ED 32 YO Female

- 8/7 excruciating pain in abd, went to closest ED, CT scan
- Small bowel perforation, with free air in abd. Open laparotomy for repair
- Pt was terrified of recurrence, outside hospital unable to explain to patient what may have caused the SB perforation, not familiar with RYGB or after care/management
- Pt brought CT and imaging reports to visit. Op report dated 8/7/20 which showed repair of “perforation of the small bowel, just proximal to the GJ. Punctate, 3mm in diameter”
- Believe the cause could have been a perforated marginal ulcer
- Plan: Increase PPI to BID. Schedule EGD (with Bariatric Surgeon) to assess healing/ulcer formation
- Pt will need to stop all NSAID use moving forward

A Note on COVID and WLS

- ASMBS does not believe that WLS is not “elective” but rather medically necessary for those with severe obesity
- WLS is life-saving surgery with evidence based survival benefits for patients, creating long term changes in metabolism and reducing or eliminating multiple obesity-related diseases, improving long-term health and quality of life
- Metabolic surgery should be restarted when it is safe to do so, and not wait until the pandemic is declared “over”
- Obesity and obesity-related diseases have been identified as independent risk factors for adverse outcomes in COVID-19 infection, making WLS critical to resume
- Careful consideration of these risk factors must be taken into consideration for temporarily postponing WLS in certain higher risk subsets of patients

Conclusions

- Given the current evidence for the long term efficacy and safety of bariatric surgery, all patients with severe obesity, especially those with T2DM should be considered for bariatric surgery for the long term treatment of these conditions
- All providers, especially in primary care, have an important role to play in initiating the conversation about bariatric surgery as a treatment option and offering referrals for interested patients and supporting patients with their long term follow up care

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Questions or Comments?

Thank you for your time and attention!