• A 35-year-old morbidly obese male undergoes a laparoscopic Roux-en-Y gastric bypass. Prior to surgery he weighs 160 kg. Suppose his ideal weight is 60 kg.
• A 35-year-old morbidly obese male undergoes a laparoscopic Roux-en-Y gastric bypass. Prior to surgery he weighs 160 kg. Suppose his ideal weight is 60 kg.

• At his two-year follow-up, what would be his approximate expected weight loss?
At his two-year follow-up, what would be his approximate expected weight loss?

- A. 30 kg
- B. 35 kg
- C. 40 kg
- D. 45 kg
- E. 60 kg
• Patient weighs 160 kg
• Ideal weight is 60 kg,
• Excess weight is 100 kg.
• Expected to lose 60% EWL
• Laparoscopic banding: ~40-55%
• Sleeve gastrectomy: ~54-69%
• Gastric bypass: ~61%
• Duodenal switch: ~70%
Body Mass Index (BMI)

- Measure of body fat based on height and weight
- Calculate the person’s weight in kilograms divided by height in meters squared (Kg/m²)
Obesity Trends* Among U.S. Adults
BRFSS, 1986
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 1992

(*BMI ≥30, or ~ 30 lbs. overweight for 5′ 4″ person)
Obesity Trends* Among U.S. Adults
BRFSS, 1994
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 1996
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

No Data           <10%          10%–14% 15%–19%
Obesity Trends* Among U.S. Adults
BRFSS, 1998

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2000

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2002
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2004
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4’’ person)
Obesity Trends* Among U.S. Adults
BRFSS, 2005

(*BMI ≥30, or ~30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2006

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2007
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Defining Obesity and Prevalence

Gray, DS. 1989, NHANES 2009-2010, NHIS

Department of Surgery, University of Pennsylvania Health System
• Why the need for Bariatric Surgery?
• Does Medical Management Work?
• Look AHED Study 8.6% Weight Loss at 1 Year
• Weight Regain after 4 Years
Which of the following patients meet criteria to receive bariatric surgery?

A. 37-year-old female, BMI 34, compliant with preoperative nutrition program
B. 44-year-old male, BMI 36, hypertension, GERD and urinary incontinence
C. 51-year-old female, BMI 42, recent alcohol addiction
D. 23-year-old male, BMI 50, CHF, does not plan to change eating habits post operatively
E. 33-year-old female, BMI 46, lack of home support structure
• A 49-year-old woman has a BMI of 41.2.
• She has tried multiple nonoperative weight loss modalities.
• Her past history is notable for diabetes, obstructive sleep apnea (OSA), and bilateral knee osteoarthritis.
• She is on insulin glargine and nonsteroidal antiinflammatory drugs and is a nonsmoker and nondrinker.
A. This patient does not meet the indications for weight loss surgery set forth in the NIH Consensus

B. Lifestyle modifications and caloric restriction alone have not been shown to reduce body weight more than 3 to 5% in formal studies

C. Initial consultation with a nutritionist or dietitian should take place in the immediate postoperative period, prior to hospital discharge

D. Perioperative heparin administration should be avoided given the risk of staple-line bleeding due to the rich gastric blood supply

E. Patients with dysphagia should undergo upper gastrointestinal fluoroscopic imaging prior to adjustable band gastroplasty
NIH Consensus Statement

• Weight loss surgery is an option for carefully selected patients with clinically severe obesity: BMI $\geq 40$ or BMI $\geq 35$ with coexisting conditions when less invasive methods have failed and the patient is at high risk for obesity associated illness.
## Obesity Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>&lt;24</th>
<th>25-26.9</th>
<th>27-29.9</th>
<th>30-35</th>
<th>35-39.9</th>
<th>&gt;40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet, exercise, behavior therapy</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Pharmacotherapy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Surgery</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td><em>devices</em></td>
<td>+</td>
</tr>
</tbody>
</table>

**BMI Category**

- **<24**: -
- **25-26.9**: +
- **27-29.9**: +
- **30-35**: +
- **35-39.9**: +
- **>40**: +

- **5-7%**: Diet, exercise, behavior therapy
- **7-10%**: Pharmacotherapy
- **20-35%**: Surgery

---

TOS/ACC/AHA Guidelines for Managing Overweight and Obesity in Adults, 2013

Department of Surgery, University of Pennsylvania Health System
What are the most common Surgical Procedures

- SLEEVE GASTRECTOMY
- RYGB
- AGB
- DS
Surgical Options

Restrictive

Laparoscopic adjustable gastric banding

Gastric pouch
Gastric band
Common bile duct
Subcutaneous reservoir

Restrictive

Sleeve gastrectomy

Stomach
Common bile duct
Combination:
Malabsorptive
Restrictive

DS

RYGB

Roux-en-Y gastric bypass

Department of Surgery, University of Pennsylvania Health System
Which of the following techniques is NOT used with the intent of preventing an anastomotic leak in sleeve gastrectomy?

• A Oversewing the staple line
• B Using taller staple height in the distal stomach and shorter staple height in the proximal stomach when constructing the sleeve
• C Fundoplication to buttress the proximal staple line
• D Use of larger bougies
In regards to laparoscopic sleeve gastrectomy which of the following is FALSE?

• A Excess weight loss at five years postoperatively in a patient who has had a sleeve gastrectomy is approximately 60%

• B Sleeve gastrectomy has inferior 5-year results when compared to Roux-en-y gastric bypass in regards to improvement in comorbidities

• C The incidence of postoperative leak is higher for sleeve gastrectomy when compared to Roux-en-y gastric bypass

• D A sleeve gastrectomy can be used as part of a 2-stage procedure for super obese patients
Which of the following vessels is considered the main blood supply to the stomach after a sleeve gastrectomy?

- A Short gastric arteries
- B Left gastric artery
- C Right gastric artery
- D Right gastroepiploic artery
Patient undergoes laparoscopic sleeve gastrectomy. She is intubated and sedated.

The ports are placed and greater omentum is taken off the greater curvature of the stomach. A 36°F bougie is passed along the lesser curvature of the stomach. The first stapler load firing is being planned out. Where do you place it?

A. 2 cm inferior to the angle incisure
B. 2 cm inferior to the right gastroepiploic artery
E. Directly inferior to the nerve of latarjet
Which of the following obesity-related comorbidities is considered a relative contraindication to sleeve gastrectomy and is better treated with Roux-en-Y gastric bypass (RYGB)?

A. Type 2 diabetes mellitus
B. Gastroesophageal reflux disease
C. Hypertension
D. Obstructive sleep apnea
- **A** = Preserve Antrum
- **B** = Use Bougie 34-36 French
- **C** = This is the high risk region for Leaks

*Department of Surgery, University of Pennsylvania Health System*
When performing a laparoscopic Roux-en-Y gastric bypass (LRYGB) for weight loss, which of the following is true in regards to the gastric pouch?

A  The minimum volume of a gastric pouch should be 50 ml

B  A vertical orientation of the gastric pouch is the ideal technique

C  The gastric pouch should retain the cardia and the fundus of the stomach

D  It is acceptable to staple the stomach with or without dividing it to create the gastric pouch and the remnant stomach
In regards to Roux limb length during a laparoscopic Roux-en-Y gastric bypass (LRYGB), which of the following are FALSE

**A** In regards to weight loss surgery, the minimum length of a Roux limb should be 75 cm

**B** In a patient with a BMI less than 50, there have been no statistically significant differences in excess weight loss (%EWL) between a Roux limb of 100 cm versus 150 cm

**C** In patients with a BMI greater than 50 longer Roux limb greater than 150 cm have led to short-term improved EWL% but this is lost in the long-term

**D** When performing an RYGB for treatment of alkaline reflux gastritis, the minimal Roux limb length should be 35 cm distal to the gastrojejunostomy
A 42-year-old female with h/o laparoscopic Roux-en-Y gastric bypass constructed with a retrocolic retrogastric roux limb four years prior presents with nausea, vomiting and abdominal pain. She is distended on exam and exhibits focal peritoneal signs in the mid abdomen. Radiography suggests a small bowel obstruction.

Which of the following regarding bowel obstruction in LRYGB patients is true?

A  The most common cause of small bowel obstruction in a retrocolic LRYGB is intestinal adhesions

B  The rate of internal hernia is decreased with the use of laparoscopy as opposed to open RYGB

C  Small bowel obstruction is more common in retrocolic reconstructions as opposed to antecolic reconstructions

D  The most common cause of small bowel obstruction in an antecolic LRYGB is an internal hernia
Which of the following descriptions of a cause of small bowel obstruction following laparoscopic Roux-en-Y gastric bypass (LRYGB) is incorrect?

A  Petersen defect is a defect seen in all LRYGB regardless of the placement of roux limb (antecolic versus retrocolic) bordered by the roux limb mesentery, the transverse mesocolon, and the retroperitoneum

B  Jejunojejunostomy space is a defect seen in all patients with LRYGB regardless of the placement of roux limb (antecolic versus retrocolic) and is in the small bowel mesentery of the jejunojejunal anastomosis between the biliopancreatic limb and the Roux limb to form the common channel

Transverse mesocolon defect = defect seen in all LRYGB regardless of the placement of roux limb (antecolic versus retrocolic) and is found at the ligament of Treitz

D  Jejunojejunostomy mechanical obstruction secondary to kinking of the jejunum immediately distal to the J-J anastomosis
RYGB

- **A = Pouch, 20-30 cm, no Fundus**
- **B = GJ, C/L/HS/Stricture/Leak**
- **C = 150 cm, Antecolic, Antegastric, Alkaline Reflux**
- **D = Never (rarely) Leaks**
A 35-year-old morbidly obese male undergoes a laparoscopic adjustable gastric band. Prior to surgery he weighs 160 kg. Suppose his ideal weight is 60 kg.

At his two-year follow-up, what would be his approximate expected weight loss be?

A 10 kg
B 25 kg
C 50 kg
D 75 kg
E 80 kg
Pars Flaccida Technique
Suture it
Office Band Fill OK

JACS, 2012 Hashimoto DA, Gomez ED, Danzer E, Edelson PK, Morris JB, Williams NN, Dumon KR.
A 57-year-old female who is 9 months status post laparoscopic adjustable gastric banding (LAGB) is having difficulty with band fills. She had been steadily losing weight since the operation but recently presented for a band fill and no fluid was able to be injected or withdrawn from the band.

Abdominal x-ray appears to show kinking of the tubing connecting the band to the subcutaneous port.

Which of the following should be done?

A Exploration of the port and tubing under local anesthesia
B Laparoscopic removal of the band
C Laparoscopic removal of the band and conversion to roux-en-Y gastric bypass
D Upper endoscopy
E Laparoscopic band repositioning
A 44-year-old female who is 4 years status post laparoscopic adjustable gastric banding presents with erythema and tenderness on her abdomen around her port.

Which of the following is the MOST likely underlying diagnosis?

A  Marginal ulcer
B  Band slippage
C  A kink in the tubing
D  Prolapse of the proximal stomach above the band
E  Band erosion into the stomach
A 45-year-old female s/p laparoscopic gastric band insertion two years ago presents with complaints of nausea, vomiting, and abdominal pain. She has been unable to keep anything she eats down and vomits it almost immediately.

What is your next step?
What is your diagnosis?

Band Slip

What do you do?

- Immediate Removal of fluid from the band
- Removal of the Gastric Band
Adjustable Gastric Band Complications (10 years follow-up)

- Pouch prolapse – 26%
- Band erosion – 3%
- Port-related complications – 21%
- Removal – 6%
- Revision surgery – 26%

Note: All of these complications may require a re-operation

An obese 44-year-old male with history of laparoscopic gastric band surgery three years ago presents for evaluation. He says that before having surgery he had a BMI of 38 kg/m² and that while he has lost weight since surgery, he still has a BMI of 35 kg/m². Also, he has recently been diagnosed with type 2 diabetes mellitus. He would like to know his surgical options to address these issues. What should he be told?

A  Although he is still obese, he should allow more time and surgery is not advisable at this point

B  Laparoscopic gastric band surgery is the most extreme type of weight loss surgery, and if it did not work, then nothing will

C  He could undergo laparoscopic removal of the gastric band, and subsequently, have either sleeve gastrectomy or Roux-en-y gastric bypass in order to lose the rest of the weight and possibly have remission of his diabetes

D  He has the option of having the band removed and undergoing further surgery, but it will not help his diabetes
<table>
<thead>
<tr>
<th>Procedure</th>
<th>GI Leak</th>
<th>Marginal Ulcers</th>
<th>Dumping Syndrome</th>
<th>Stenosis/Stricture</th>
<th>Internal hernia</th>
<th>Slip/Erosions</th>
<th>GERD</th>
<th>Vitamin Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSG</td>
<td>++</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
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<td>+</td>
<td>+</td>
</tr>
<tr>
<td>AGB</td>
<td>++</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td>+++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>VBG</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>++</td>
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<tr>
<td>DS</td>
<td>+++</td>
<td>++</td>
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<td>+</td>
<td>++</td>
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<td>+</td>
<td>++</td>
</tr>
<tr>
<td>RYGB</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>-</td>
<td>++</td>
</tr>
</tbody>
</table>
• A 38-year-old morbidly obese female has just undergone laparoscopic sleeve gastrectomy. The surgery was uneventful and on postoperative day 1 she is started on stage 1 bariatric clear liquid diet. Later in the afternoon, she is noted by a surgical resident to be tachycardic in the 130's despite a liter bolus of crystalloid. EKG shows sinus tachycardia. She has also been tachypneic for the past hour and is febrile to 101 F.

• What is your work-up?

• What is your treatment?
A 40-year-old morbidly obese female has undergone laparoscopic sleeve gastrectomy 6 weeks ago. The surgery was uneventful. She presents with abdominal pain in the left upper quadrant, night fevers and general malaise.

What is your Next Step?
• Vitals are BP 110/70, HR 85, RR 14. EKG shows sinus. Her temperature is 98.5 F.

• Abdominal exam left upper quadrant tenderness

• What is your next step?
• What is your treatment?
Type I
Tiny leak with no documented collection

Type II
Leak with an associated intra-abdominal abscess

Type III
Internal or externally draining complex fistula
RYEJ, Roux-en-Yesophagojejunostomy;
RYFJ, Roux-en-Yfistulo-jejunostomy;
RYGB,Roux-en-Y gastric bypass
There are 3 fistula/leak types:

Type I, a small leak with no collection
Type II, a leak with associated intra-abdominal abscess
Type III, a leak with multiple internal or external abscesses, a complex fistula.

without sepsis -> conservative treatment initially
  - Type I: Often sufficient
  - Type II: Internal or internal or external percutaneous drainage and/or stenting/endoprosthesis
  - Type III/Treatment failure: surgery

Sepsis -> surgery

• You are in the office
• 4 weeks s/p RYGB your patient complains about dysphagia
• What is your work-up?
• Treatment?
• Balloon Dilation
Number of dilatations needed before resolution of stricture. The maximum number of dilatations needed was 20. Fifty percent of strictures resolved with 2 dilatations or less.
• Patient is s/p RYGB two year ago, current BMI 38, she complains about abdominal pain out of proportion to clinical exam

• What is your work up?
CT scan coronal slice, showing jejunal occlusion and duodenal distention.
Petersen space hernia. Note the jejunal limb crossing the Petersen space.
Potential sites of internal hernia following Roux-en-Y gastric bypass:
mesocolic defect (A)
Petersen defect (B)
jejunojejunal (C)
When Is a Petersen’s Hernia Not a Petersen’s Hernia
Ann M Rogers, MD, FACS, Adrian M Ionescu, BS, Eric M Pauli, MD, Andreas H Meier, MD, FACS, Timothy R Shope, MD, FACS, Randy S Haluck, MD, FACS

Department of Surgery, University of Pennsylvania Health System
When Is a Petersen’s Hernia Not a Petersen’s Hernia
Ann M Rogers, MD, FACS, Adrian M Ionescu, BS, Eric M Pauli, MD, Andreas H Meier, MD, FACS, Timothy R Shope, MD, FACS, Randy S Haluck, MD, FACS
Does Bariatric Surgery Lead to:

• Life Long Weight Loss?
• Survival Benefit?
• Which Study?

• YES
• YES

Department of Surgery, University of Pennsylvania Health System
Effects of bariatric surgery on mortality in Swedish obese subjects

Percent Weight Change during a 15-Year Period

Sjöström et al. NEJM 357 (8): 741, 2007
Morbidly obese patients treated with bariatric surgery lived on average 7 years longer than those who had non-surgical treatment alone.
Sjöström, L. 2013, Arterburn 2015
The in-hospital mortality rate for bariatric surgery is one-fifth that of gallbladder surgery.
<table>
<thead>
<tr>
<th>OR</th>
<th>Dx</th>
<th>Operation</th>
<th>Surgeon</th>
</tr>
</thead>
<tbody>
<tr>
<td>#14</td>
<td>Diabetes</td>
<td>Gastric Bypass</td>
<td>Brown</td>
</tr>
<tr>
<td>#14</td>
<td>Hypertension</td>
<td>Gastric Bypass</td>
<td>Brown</td>
</tr>
<tr>
<td>#14</td>
<td>Cardiopulmonary Failure</td>
<td>Gastric Bypass</td>
<td>Brown</td>
</tr>
<tr>
<td>#17</td>
<td>Asthma</td>
<td>Gastric Bypass</td>
<td>Jones</td>
</tr>
<tr>
<td>#17</td>
<td>Pseudotumor Cerebri</td>
<td>Gastric Bypass</td>
<td>Jones</td>
</tr>
<tr>
<td>#17</td>
<td>Crippling Arthritis</td>
<td>Gastric Bypass</td>
<td>Jones</td>
</tr>
</tbody>
</table>
## Comparison of Bariatric Procedures

<table>
<thead>
<tr>
<th></th>
<th>Gastric Band</th>
<th>Gastric Sleeve</th>
<th>Gastric Bypass</th>
<th>Duodenal Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess weight loss</td>
<td>47.5%</td>
<td>55%</td>
<td>62%</td>
<td>70%</td>
</tr>
<tr>
<td>Operative mortality</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.5%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Resolution of diabetes</td>
<td>47.8%</td>
<td>70%</td>
<td>83.6%</td>
<td>97.9%</td>
</tr>
</tbody>
</table>

_Brethauer et al. SOARD 2009 (4): 469-475_
Estimation of Bariatric Surgeries Performed

~60 million US Adults have BMI > 40 kg/m^2

1.24\% of estimated eligible candidates underwent surgery in 2015

Insurance coverage in PA

---

Table 1
Total number of bariatric procedures, 2011–2015

<table>
<thead>
<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>158,000</td>
<td>173,000</td>
<td>179,000</td>
<td>193,000</td>
<td>196,000</td>
</tr>
<tr>
<td>RYGB</td>
<td>36.7%</td>
<td>37.5%</td>
<td>34.2%</td>
<td>26.8%</td>
<td>23.1%</td>
</tr>
<tr>
<td>LAGB</td>
<td>35.4%</td>
<td>20.2%</td>
<td>14%</td>
<td>9.5%</td>
<td>5.7%</td>
</tr>
<tr>
<td>SG</td>
<td>17.8%</td>
<td>33%</td>
<td>42.1%</td>
<td>51.7%</td>
<td>53.8%</td>
</tr>
<tr>
<td>BPD/DS</td>
<td>.9%</td>
<td>1%</td>
<td>1%</td>
<td>.4%</td>
<td>.6%</td>
</tr>
<tr>
<td>Revisions</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>11.5%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Other</td>
<td>3.2%</td>
<td>2.3%</td>
<td>2.7%</td>
<td>.1%</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

RYGB = Roux-en-Y gastric bypass; LAGB = laparoscopic adjustable gastric band; SG = sleeve gastrectomy; BPD/DS = biliopancreatic diversion/duodenal switch.
Mechanism of Action of Gastric Bypass on DM

Proximal Hypothesis

- Exclusion of duodenal nutrient passage may offset an existing abnormality
Mechanism of Action of Gastric Bypass on DM

**Distal Hypothesis**

- Nutrients reach distal ileum within 5 minutes of food ingestion, stimulating GLP-1 secretion.
How does RYGB (Sleeve) Improve T2DM?

- T2DM Incretin Effect Blunted
- RYGB/VSG -> Incretin Effect Restored
What is Incretin Effect?

- ORAL Glucose load leads to Greater insulin secretion than IV Load
- Why: Gut Hormones (GLP1/GIP) Modulate Insulin
- T2DM -> Incretin blunted
- RYGB/VSG -> GLP1/GIP Up -> T2DM Cure
# Metabolic Effect of Surgery

<table>
<thead>
<tr>
<th>HORMONE</th>
<th>RYGB</th>
<th>SLEEVE</th>
<th>LAP BAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHRELIN</td>
<td>DOWN</td>
<td>DOWN</td>
<td>UP</td>
</tr>
<tr>
<td>CCK</td>
<td>NO CHANGE</td>
<td>UP</td>
<td>??</td>
</tr>
<tr>
<td>PYY</td>
<td>UP</td>
<td>UP</td>
<td>NO CHANGE</td>
</tr>
<tr>
<td>GLP1/GIP</td>
<td>UP</td>
<td>UP</td>
<td>NO CHANGE</td>
</tr>
</tbody>
</table>
Acute effects (days to weeks)

Energy restriction → Increased hepatic insulin sensitivity → Decreased fasting plasma glucose → Improved glycaemic control

Unretarded nutrient passage into the small intestine → Increased satiety → Prolonged exposure of L cells to nutrients causing increased release of L cell products (GLP-1, PYY, OXM) → Increased postprandial insulin secretion → Decreased postprandial plasma glucose
Long-term effects (months to years)

- Weight loss
  - Increased hepatic insulin sensitivity
  - Increased peripheral insulin sensitivity
  - Sustained improvement in glycaemic control

- Unretarded nutrient passage into the small intestine
  - Increased satiety
  - Prolonged exposure of L cells to nutrients causing increased release of L cell products (GLP-1, PYY, OXM)
  - Increased postprandial insulin secretion
  - Decreased postprandial plasma glucose
Obesity hypoventilation syndrome is characterized by which of the following:

- Alveolar collapse leads to ventilation/perfusion mismatch
- B. Diagnosis is based on spirometry alone
- C. It is directly associated with the degree of obesity
- D. It is marked by hypocapnea
- E. It may result in left heart failure over time
What are the Most Common Obesity Related Co-Morbidities?
Obesity Related Co-Morbid Medical Conditions

- Diabetes
- Hypertension
- Hyperlipidemia
- Cardiac disease
- Sleep Apnea
- Arthritis
Morbid Obesity and OSA

- MO Predisposes to OSA.
- How? Increased fat in the pharyngeal tissues -> turbulent airflow within the upper pharynx
- Decrease alveolar oxygen saturation
- Decrease in expiratory reserve volume and reduction in all lung volumes
Increase in airway collapsibility
PL: Light propofol anesthesia

PD1: Increasing the depth of propofol anesthesia

PD + CPAP: application of 10 cm H2O continuous positive airway pressure (CPAP) and continued infusion propofol

PD2: removal of CPAP

Anesthesiology, July 2006
ATELECTASIS

Before induction

After intubation
Positioning
Head Elevated Laryngoscopy Position (HELP) + Reverse Trendelenburg (RT) Position

- Increased “safe apnea” time
- Improved view during direct laryngoscopy
Surgical Technique
Question 2
The patient is prepared to undergo bariatric surgery. She wants to discuss the procedural details of the various surgical options. Which of the following is true regarding the RYGB procedure?

- A) The benefit of a 150 cm Roux limb is to limit acid reflux
- **B) Optimal gastric pouch volume is 20 to 30 mL**
- C) Antecolic, antegastric gastrojejunostomy should be avoided because it places undue tension on the anastomosis
- D) If an antecolic anastomosis were to be fashioned, the defect between the mesentery of the Roux limb and transverse mesocolon need not be closed
- E) The Roux limb should measure 150 cm or greater to avoid below-average, long-term weight loss results
Question

Patient asks about details of alternatives to gastric bypass surgery. Which of the following is true regarding vertical sleeve gastrectomy (VSG) and AGB?

- A) In VSG, branches of the right and left gastric vessels should be divided to clear the lesser curvature for partial gastric resection
- B) In VSG, gastric resection begins at the pylorus and extends to the gastroesophageal junction
- C) In AGB, the pars flaccida technique has not been shown to impact postoperative complication rates
- D) In AGB, the band should be secured so that it is seated at the gastroesophageal junction
- E) In AGB, the subcutaneous access port can be accessed in the office postoperatively for band adjustments without the assistance of imaging
Migraines 57% resolved
Pseudotumor Cerebri 96% resolved
Dyslipidemia
Hypercholesterolemia 63% resolved
Non-Alcoholic Fatty Liver Disease
90% improved steatosis
37% resolution of inflammation
20% resolution of fibrosis
Metabolic Syndrome 80% resolved
Type II Diabetes Mellitus 83% resolved
Polycystic Ovarian Syndrome
79% resolution of hirsutism
100% resolution of menstrual dysfunction
Venous Stasis Disease 95% resolved
Depression 55% resolved
Obstructive Sleep Apnea 74-98% resolved
Asthma 82% improved or resolved
Cardiovascular Disease 82% risk reduction
Hypertension 52-92% resolved
GERD 72-98% resolved
Stress Urinary Incontinence 44-88% resolved
Degenerative Joint Disease 41-76% resolved
Gout 77% resolved

Quality of Life-improved in 95% of patients
Mortality-89% reduction in 5-year mortality
What is the Impact on Comorbid Conditions?
<table>
<thead>
<tr>
<th></th>
<th>Restrictive (AGB)</th>
<th>Malabsorptive (BPD)</th>
<th>Combined (RYGB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWL, %</td>
<td>48</td>
<td>70</td>
<td>62</td>
</tr>
<tr>
<td>Resolution of comorbid conditions, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 2 diabetes</td>
<td>48</td>
<td>98</td>
<td>84</td>
</tr>
<tr>
<td>Hypertension</td>
<td>38</td>
<td>81</td>
<td>75</td>
</tr>
<tr>
<td>Hyperlipidemia (improved)</td>
<td>71</td>
<td>100</td>
<td>94</td>
</tr>
<tr>
<td>Sleep apnea</td>
<td>95</td>
<td>95</td>
<td>87</td>
</tr>
<tr>
<td>Operative mortality rate, %</td>
<td>0.1</td>
<td>1.1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Mean values from a meta-analysis of 22,094 patients.\textsuperscript{18}
What is the 30 Day Mortality Rate for Bariatric Surgery?

- 0.15%

What is the 1 Year Readmission Rate?

- > 10%
The in-hospital mortality rate for bariatric surgery is one-fifth that of gallbladder surgery.
Mortality Rates

- **Adjustable Gastric Band** 0.1%
- **Gastric Bypass** 0.5%
- **Vertical Sleeve Gastrectomy** 0.15%
**Question**

The patient asks what she should expect surgery to have on her body weight and comorbid conditions.

- A) Two-year mean weight loss is approximately 15% for RYGB versus 8% for AGB
- B) Complete resolution of type 2 diabetes mellitus may be seen in 57% of patients undergoing AGB and 80% of patients undergoing RYGB
- C) Signs of OSA improve in 33% of patients undergoing AGB and 50% of patients undergoing RYGB
- D) Cancer incidence and cancer-related mortality are higher in patients who undergo bariatric surgery
- E) Survival has been shown to be statistically significantly lower in obese patients who underwent weight loss surgery when compared with those who did not in studies with long-term follow-up
• **Patient is S/p Lap Band and complains about dysphagia**

• **What is your work up ?**
• Concentric Dilation
• Band Slip
• Treatment?

Department of Surgery, University of Pennsylvania Health System
Question

The patient wants to know what potential postoperative and long-term complications may arise from weight loss surgery. Which of the following is true regarding complications of bariatric surgery?

- **A)** Although perioperative mortality has fallen below 0.5%, readmission rates have been reported to exceed 10% in the first year after surgery for some procedures
- **B)** Symptomatic biliary disease develops in 20% of patients following RYGB
- **C)** Although the specificity is low, the sensitivity of computed tomography (CT) with oral contrast is virtually 100%
- **D)** If removal of fluid from an AGB fails to resolve obstructive symptoms, patients can be admitted for a 48- to 72-hour trial of expectant management
- **E)** Hypovitaminosis C is the most common nutritional deficiency after RYGB
KEY LEARNING POINTS

• Bariatric surgery is safe

• Specific criteria must be met and the patient must be motivated and fully informed.

• Most obesity comorbidity is durably (>10 years) improved after surgery

• mortality is less than after nonsurgical care
KEY LEARNING POINTS

• After bariatric surgery most patients do not reach ‘normal’ weight; however, the weight loss induced by surgery is sufficient to improve morbidity and mortality

• A dedicated, comprehensive team is needed to assess, educate and manage the patient before and after surgery
KEY LEARNING POINTS

- Laparoscopic Roux-en Y gastric bypass and Sleeve Gastrectomy are the two most common operative procedures.
- Obesity surgery may be considered for adolescent obese patients.
- Patients require long-term follow-up to ensure success and appropriate support.
Thank You!
Our Team ....