Lec. 4 | Bariatric and Metabolic Surgery

Introduction

- **Bariatric = Baros:** heaviness, and pressure.
- It is the field of medicine encompassing the study of obesity, its causes, prevention, and treatment.
- **Obesity:** it is ≥ 20% than the ideal weight or Body Mass Index (BMI) ≥ 30 kg/m²
- **BMI** is calculated as weight (Kg) / Height (m²)

Classification of Obesity

A BMI of	Classifies one as
< 18.5	Underweight
18.5 - 24.9	Normal weight
25 - 29.9	Overweight
30 - 34.9	Obesity Class I
35 - 39.9	Obesity Class II
40 - 49.9	Obesity Class III
50 and above	Super Obesity

What Is Morbid Obesity?

- **Clinically severe obesity** at which point serious medical conditions occur as a direct result of obesity.
- Defined as **Body mass index of ≥40 or ≥35 associated with co-morbidities**
- **Obesity is associated with a rise in many comorbid conditions, including:**
  - Type 2 Diabetes
  - Hyperlipidemia
  - Hypertension
  - Obstructive Sleep Apnea
  - Heart Disease
  - Stroke

  - Asthma
  - Back and lower extremity weight bearing degenerative problems
  - Cancer
  - Depression
  - AND MORE!

- **Non-medical problems**
  - » Physical
  - » Economic
  - » Psychological
  - » Social
- Obesity is the 2nd most common cause of death from a modifiable behavioral risk factor.

Different Perceptions of Society

In the Past:

- Obesity was seen as a weakness or failure of individual
- Diet and exercise were prescribed treatments
- Weight loss surgery was viewed as dangerous and extreme

Now in the Present

- Obesity is considered a disease and the cause of many serious health conditions
- Surgery has gained acceptance as the only proven method to treat this disease

Why Surgery?

- Diet and exercise are not effective long term in the morbidly obese.
- Surgery is an accepted and effective approach.
- Medical co-morbidities are improved or resolved.
- Surgical risk is acceptable vs. risk of long term obesity.
- **Medical Co-Morbidities Resolved after Bariatric Surgery** *(Source: Wittgrove AC, Clark GW. Laparoscopic Gastric bypass roux-n-y-500 patients. Obes Surg 2000. And others.)* (NO pic attached)

The National Institute of Health (NIH) Consensus Conference 1991
✓ "Surgery is an accepted and effective approach that provides consistent, permanent weight loss for morbidly obese patients."
✓ **Surgery indicated in patients with:**
» BMI of 40 or over
» BMI of 35-40 with significant co-morbidity
» Previous failed dietary attempts

Who Is a Surgical Candidate?

- ✓ Meets NIH criteria
- ✓ Age 18-65
- ✓ No endocrine cause of obesity
- ✓ Acceptable operative risk
- ✓ Understands surgery and risks
- ✓ Absence of drug or alcohol addiction
- ✓ No uncontrolled psychological conditions Non pregnant female or not going to be pregnant for 18 months
- ✓ Dedicated to life-style change and follow-up

How surgery can treat obesity

The mechanism by which weight loss surgery improves weight:

- ✓ Reduce food intake,
- ✓ Rapid gastric emptying
- ✓ Modifications of the enteroinsular axis
- ✓ Reduce certain GI hormonal level

Types of Bariatric Surgery

Purely Malabsoptive: Jejunoilieal bypass

Purely Restrictive

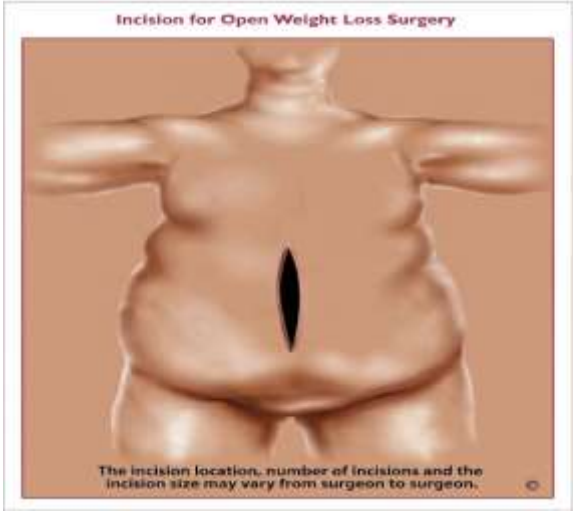
- » Gastric Balloons
- » Vertical-banded gastroplasty
- » Gastric adjustable banding (BWH)
- » Sleeve Gastrectomy
- » Greater Cuvature plication

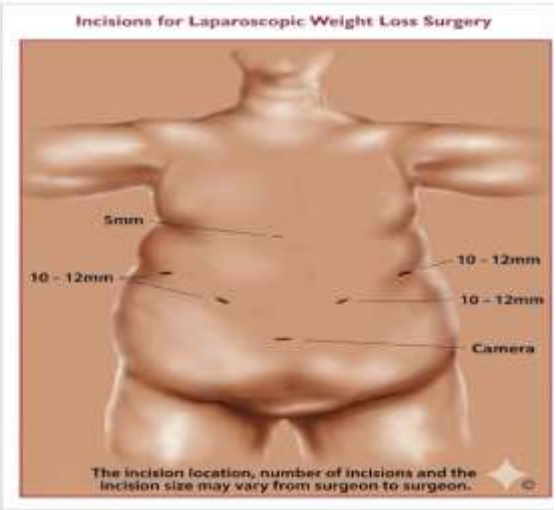
Mixed

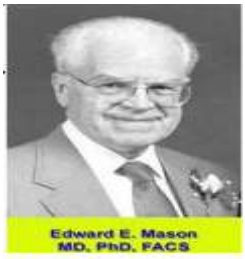
- » Roux-en-Y gastric bypass (BWH)
- » Mini-gastric bypass
- » Biliopancreatic diversion (BPD)
- » BPD with duodenal switch
- » SADI, SASI (New operations)

A Brief History of Bariatric Surgery

- Intestinal bypass (1950s) by Drs. Kremen and Linner
- Gastric bypass surgery pioneered in 1966 by Edward E. Mason
- With the advent of laparoscopy in the 1980s, bariatric surgery began to be performed through minimally invasive techniques thus gaining more popularity



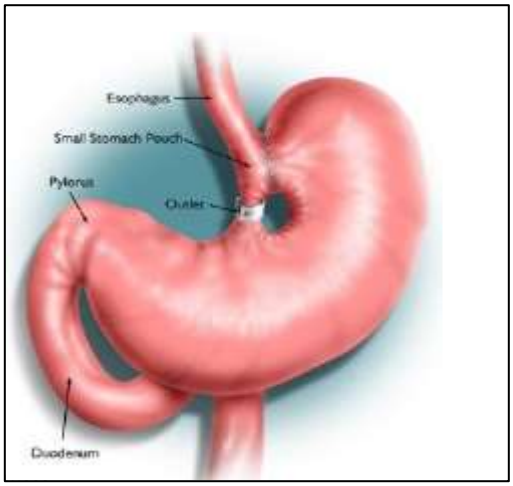




The main advantages of laparoscopy compared to traditional open surgery are

- ✓ Less trauma and adhesions
- ✓ Better visualization
- ✓ Reduced postoperative pain,
- ✓ Lower incidence of abdominal wall infections and incisional hernia,
- ✓ And reduced hospital stay

Vertical banded gastroplasty



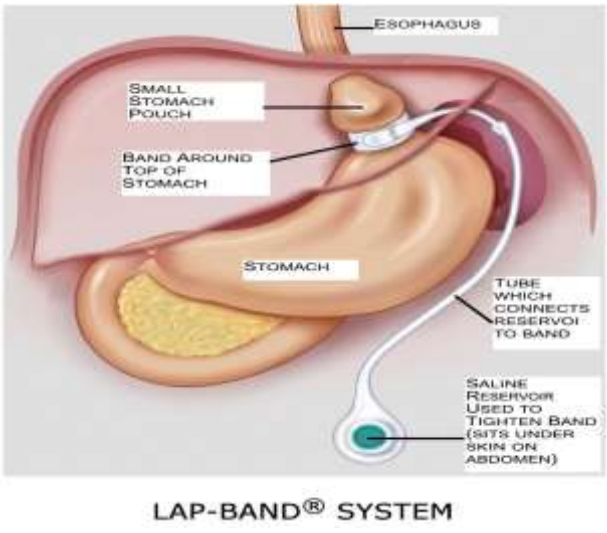
- ▶ Popular in 80's and 90's
- ▶ Open (Obsolete)
- ▶ Purely restrictive
  - Rapid sense of satiety
  - Reduced calorie intake
- ▶ Pouch creation
  - Hole through anterior and posterior wall
  - Staple line to angle of His
  - Non-distensible band around distal neo-pouch

VBG Complications

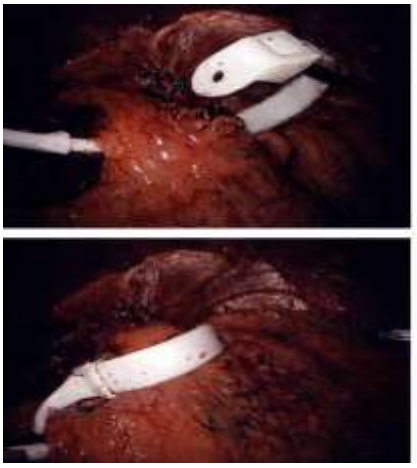
- ○ Stomal narrowing with persistent vomiting
- ○ Staple line leak or disruption
- ○ Band erosion
- ○ Wound infection or hernia
- ○ Death 0.1%
- ○ Overall re-operation rate 43 %

Adjustable gastric banding

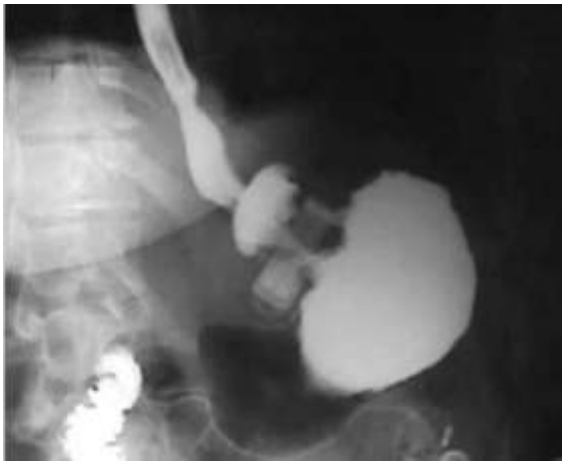
- ▶ Sep/1993= first laparoscopic AGB (Belachew M)
- ▶ **Types of Adjustable Bands:**
  1. Bioenterics = Lap-Band=Silicone
  2. Swedish adjustable gastric band



AGB surgical steps



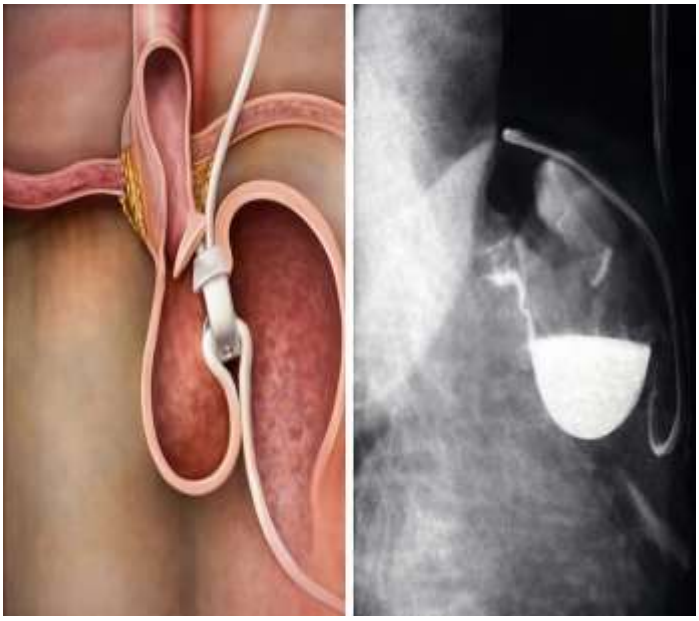
Normal position of AGB



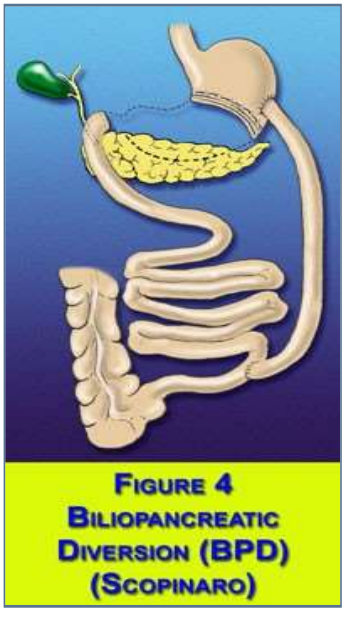
Complications of LAGB

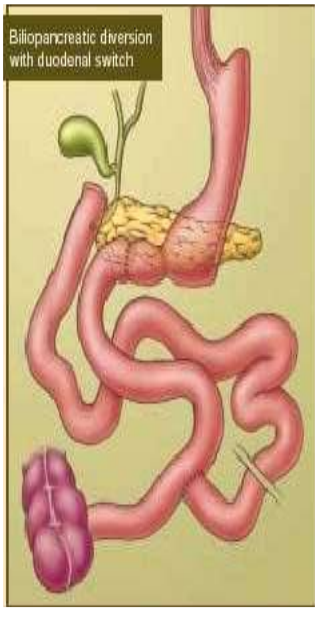
- Gastric prolapse (2.2% to 24%)
- Reflux esophagitis
- Dysphagia
- Stoma obstruction
- Esophageal and pouch dilatation (10%)
- Erosion (1%)
- Gastric necrosis (0.25%)
- Symptomatic gallstone disease (5%)
- Psychological intolerance

Gastric pouch dilatation



Biliopancreatic diversion ± DS

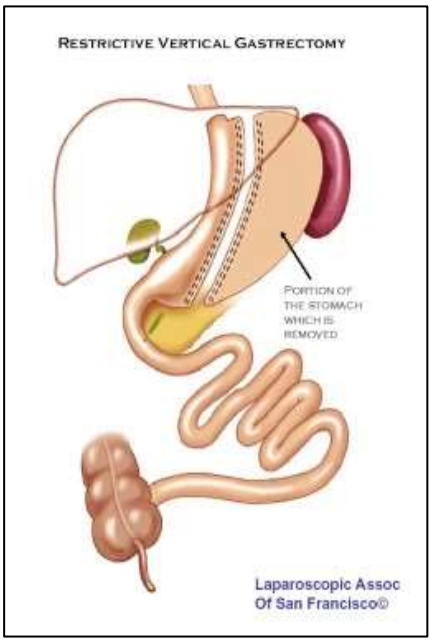




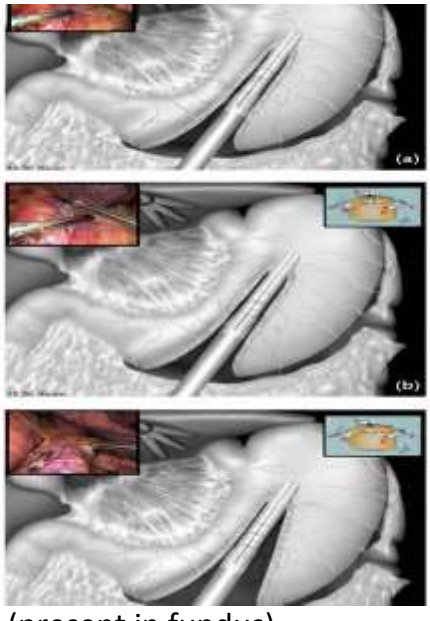
(BPD-DS) Complication

- Protein malnutrition 15%
- Anemia < 5 %
- Marginal ulcer <3 %
- Peripheral neuropathy 1.3 %
- Night Blindness 3 %
- Osteoporosis 14%
- Renal stones
- Nausea 65%
- Diarrhea 62 %
- Vitamin deficiencies: A, D, E, K, B_{12}
- Incisional hernia 10 %
- Death 1.1 %

Sleeve gastrectomy



- It was the first step when you do Biliopancreatic diversion with Duodenal switch procedure (BPD+DS)
- However, sleeve gastrectomy was subsequently found to be effective as a single procedure for the treatment of morbid obesity.
- First introduced as a single procedure by Ganger Micheal in 2002
- LSG is being performed more frequently and is currently very "trendy" among laparoscopic surgeons involved in bariatric surgery.
- SG involves removing the fundus and greater curvature portion, leaving only a lesser curvature tube about 15% of the stomach.
- OR time is 40 - 60 min
- Excess weight loss is 80%



Advantages of sleeve gastrectomy

1) Avoidance of foreign material,
2) Maintenance of normal gastro-intestinal continuity,
3) Absence of malabsorption associated with intestinal bypass,
4) Ability to be converted to multiple other operations,
5) Less technically demanding.

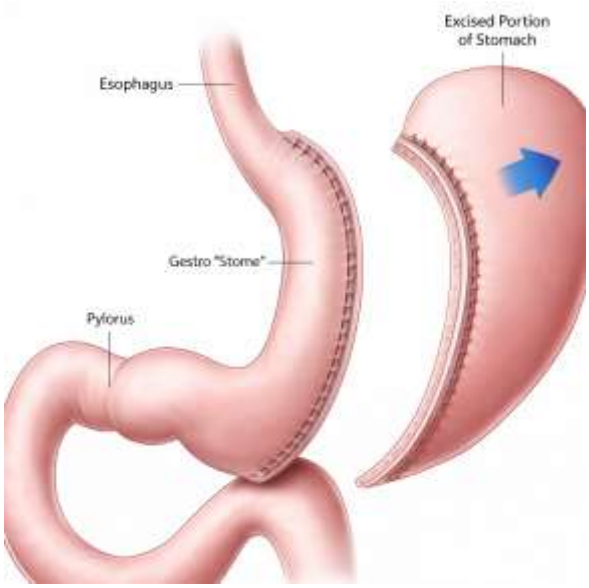
Mechanism of SG

- Dramatic reduction of the capacity of the stomach 85%.
- Rapid gastric emptying.
- The hormonal modifications induced as;
  - Reduction in Ghrelin level is responsible for control of hunger. (present in fundus)
  - Increase in glucagon-like peptide 1(GLP-1) and Peptide YY levels.

Sleeve Gastrectomy Disadvantages

1) Potential for inadequate weight loss or weight regain if the patient is not compliant.
2) Not fitting sweet eaters
3) Because the stomach is removed, it is not reversible. It can be converted to almost any other weight loss procedure.
4) Increased intragastric pressure thus increases incidence of reflux.

Complication of SG



General complications include:

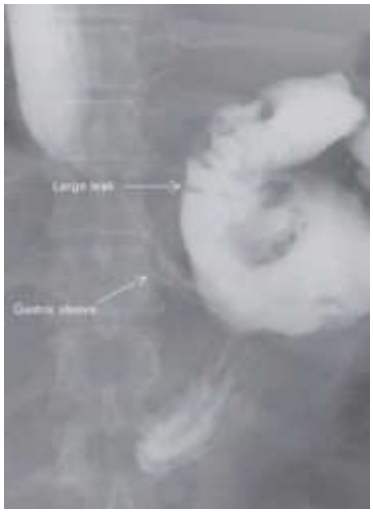
- Anaesthesia
- DVT (blood clot in leg)
- 0.5%Pulmonary Embolus (blood clot to lung)
- 0.5%Pneumonia
- Injury to liver, Spleen, or esophagus
- Wound infection

Specific complications:

1. Bleeding (1-6%)

- Intraopoerative or Postoperative
- Intraluminal → hematemsis or melena
- Extraluminal → tachycardia or hypotension or revealed in the drain.
- Sources→ Staple line, liver, spleen, or trocar sites
- Managed by resuscitation and second look laparoscopy if needed.

2. Leakage from staple line



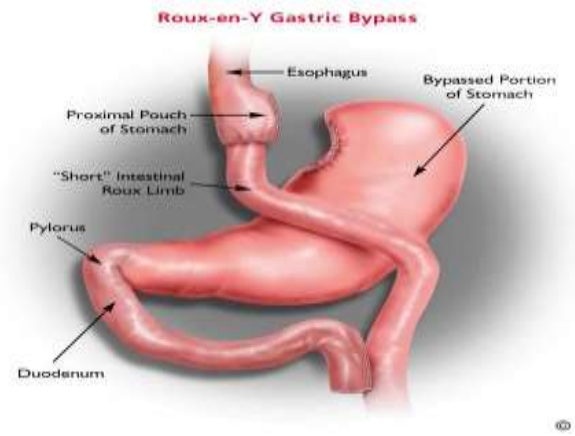
- The most serious and dreaded complication
- Occurs up to 5%.
- Most common site is at the GE junction.
- Diagnosed either clinically or by contrast radiography.
- Mostly managed by drainage and stenting,

Other complications as

- Stricture
- GERD
- Nausea and vomiting
- Gallstone formation
- Nutritional deficiencies
- Failure of weight loss.

Gastric Bypass Surgeries

Roux-en-Y Gastric Bypass



- Classic gastric
- "Gold Standard"
- 80% of bariatric proc.
- Open then Lap
- Restrictive and Malabsorptive:
  - Reduced calorie intake
  - Macronutrient malabsorption
  - Hormonal effects

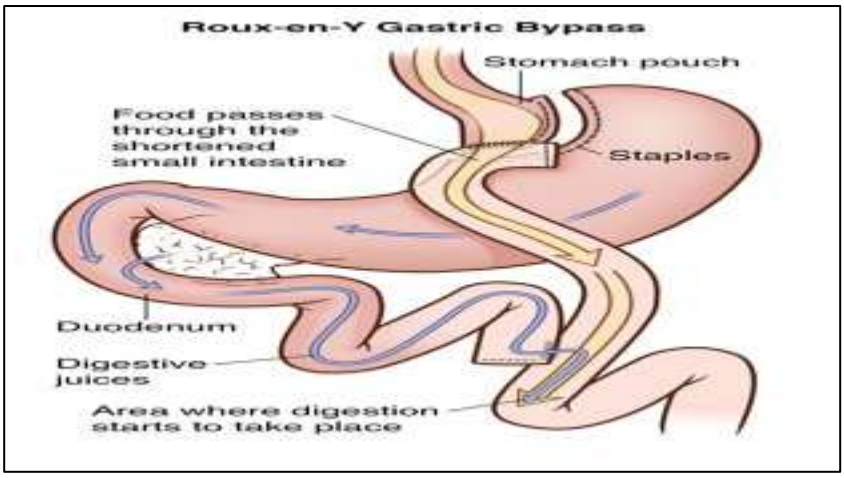
Technique

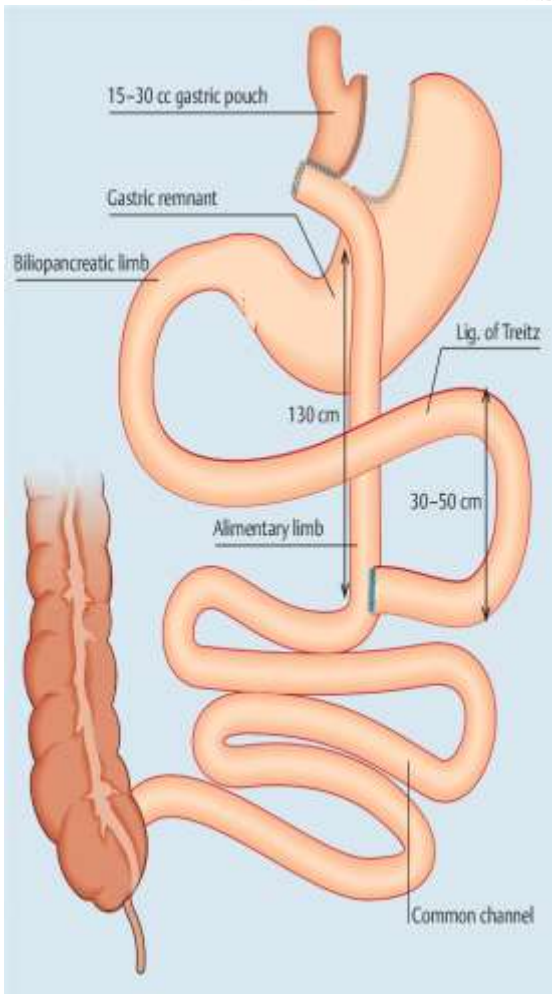
Pouch formation:

» Small gastric pouch
» 15-30 mL

Roux limb creation:

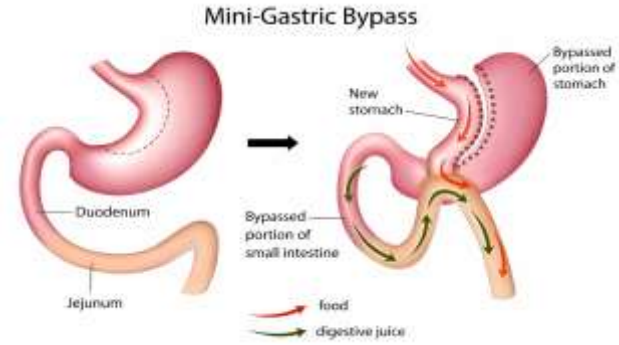
» 30-50 cm distal to Ligament of Treitz
» Jejuno-jejunostomy 150 cm From GJ down Roux limb





Disadvantages of RNYGP

1. Alters GIT anatomy.
2. More complex than SG
3. Needs replacement supplements and monitoring of vitamins and minerals.
4. Dumping syndrome
5. Internal hernia
6. Stomal ulcer



Surgical Indications

- Sweet eater
- Older patients, less activity and motivation
- Better:
  - bigger BMI (BMI ≥ 50)
  - T2DM

Complications of LRYGBP

- Anastomotic leakage (2%-5%)
- Gastro-gastric fistula (0.3%-3%)
- Bowel obstruction (3.5%-20%)
- GI bleeding (2%-4%)
- Stomal stenosis (4%-27%)
- Acute Gastric dilatation (1%)
- Marginal ulcer (1%-10%)
- cholelithiasis (2%-4%)
- Internal hernia (0.7%-3.3%)
- Biliary gastritis (MGP)

Malabsorpative complications

- Diarrhea, Nausea, and vomiting
- Hair loss
- Anemia
- Vitamins deficiency:
  - Iron, Folate, Vitamin B12, Calcium
  - Deficiency of fat soluble vitamins (D, E, A,K)
  - Thiamine (vitamin B1)
  - Zinc
  - Protein malnutrition (after long limb or distal bypass)
- Dumping syndrome

What is Dumping Syndrome?

Stomach contents move too rapidly through the small intestines following surgery

» **Early:** Transient hyperglycemia
» **Late:** Reactive hypogycemia

Symptoms:

Rapid heartbeat, Headache, Sweating, Nausea, Dizziness, Diarrhea Lightheadedness, Stomach cramping, Sleepiness

Intra-Gastric Ballon

COMPLICATIONS OF IGB

a) Pressure necrosis of gastric wall
b) Bleeding from stomach
c) Migration and intestinal obstruction or impaction.
d) Migration and aspiration
e) Intolerance needing removal

Future of obesity treatment