BARIATRIC SURGERY
"Surgery for Morbid Obesity"

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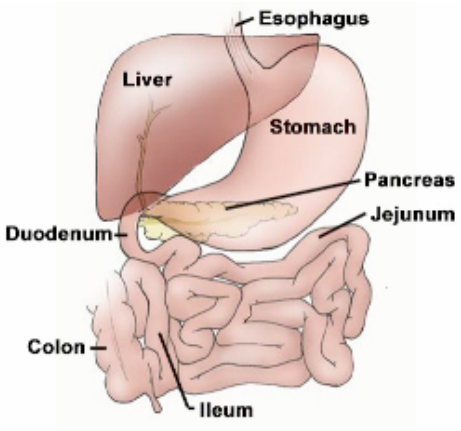
- **Obesity is becoming a major health problem in the United States. Today, more than 1 in every 3 people in the United States is obese. Obese patients are at increased risk of developing illnesses as well as death. Morbidly obese patients have been shown to have a 12 times reduction in life expectancy. Obesity is measured in terms of a person's Body Mass Index (BMI), which is calculated from a person's height and weight. A normal person would have a BMI between 20 and 25. Morbid obesity is defined as a BMI of over 40, and usually correlates to actual body weight exceeding ideal body weight by 100 lbs (45.5 kg).**
- 

Bariatric surgery - Anatomy and Physiology

***In order to understand how bariatric surgery results in weight loss, it is necessary to understand how food is digested.**

***After swallowing, food enters the stomach, which acts to hold the food and then allow small amounts of the food to pass further into the digestive tract. The volume of the stomach is usually between 600 - 1000 cc.**

***In the first part of the small bowel (duodenum), food comes into contact with bile, secreted by the liver as well as enzymes from the pancreas. These secretions help in the digestion and absorption of food. The small bowel is where most of the absorption of food occurs and may reach a length of 6 - 7 meters (over 20 feet). The proximal (closest to the mouth) two-fifths of the small bowel is called the jejunum and the distal (farthest from the mouth) three-fifths is called the ileum**

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*Most bariatric procedures work by two methods - *a restrictive component and a malabsorptive component*

- **Restrictive component** - a portion of the stomach may be removed or bypassed so as to reduce the volume of the stomach. Thus, only a limited amount of food can be eaten prior to getting full
- **Malabsorptive component** - Bile and pancreatic secretions, which are necessary for digestion of food, are directed away from the food. These secretions reach the food several yards down the length of the small bowel, thus delaying and causing incomplete digestion and absorption of the food

Problems Related to Morbid Obesity

Obese patients have a higher risk of developing many diseases

- Heart and blood vessels - hypertension, coronary artery disease, heart failure an varicose veins
- Hormonal - diabetes, abnormal menstrual periods, infertility, abnormal hair growth
- Pulmonary - obstructive sleep apnea, hypoventilation syndrome, asthma
- Arthritis - usually of the knees and hips and chronic back pain
- Gastrointestinal - heartburn, fatty liver, gallstones, hernias
- Urological - urinary incontinence
- Psychological - chronic depression, anxiety and substance abuse
- Cancer - increased incidence of cancer of the uterus, colon, breast and prostate
- Death - there is a 12 time reduction in life expectancy

History and Examination

- **Patients seek help for their obesity for either cosmetic reasons or because they suffer from one or more associated illnesses and have been told that their illness would improve by loss of weight**
- **Every person who is considered for bariatric surgery needs to be thoroughly evaluated. Bariatric surgery involves a long-term commitment because the patient has to make long term changes in physical and dietary habits**
- **Eating and physical habits of the patient are reviewed. The Body Mass Index (BMI) is usually calculated · Other associated illnesses are evaluated as necessary**

- **A bariatric team may have a psychologist or counselor who evaluates the patient for depression or anxiety. Bariatric teams frequently have support groups of patients to help understand lifestyle changes patients may have to make**
- **Patients also need to meet with a dietician to discuss postoperative dietary changes**

TESTS

The following blood tests may be taken since they may change after surgery

- **Hemoglobin - Electrolyte levels such as sodium, potassium and especially calcium – Glucose - Cholesterol and triglyceride levels - Fat soluble vitamins (Vitamins A,D,E and K) - Iron and folic acid levels**
- **Thyroid and cortisone levels**
- **These tests are associated with obesity or may be changed after bariatric surgery**
- **Heart work up including an electrocardiogram and/or a stress test to see if the patient's heart is able to withstand an operation**
- **Pulmonary Function Testing (PFT) may be obtained because some patients may need added assistance on a ventilator (breathing machine) after surgery**
- **A bone density scan is sometimes performed before surgery to check bone calcium which may be low after surgery**
- **Other tests may be obtained to check out some of the illnesses associated with obesity**

Indications for surgery

- **Bariatric surgery is indicated for patients who are morbidly obese, BMI greater than 40, or for patients with a BMI greater than 35 if they have associated medical problems .**
- **Patients with a Body Mass Index of less than 35 are usually treated with a weight reduction diet, a program of increased physical activity, approved weight loss medication and counseling to modify behavior.**
- **Remember that this surgery is one of choice and great care should be taken before undergoing bariatric surgery.**

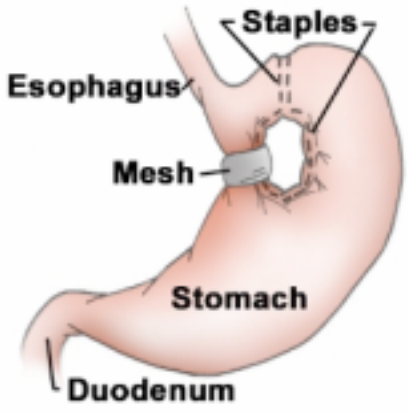
Surgical procedures

- **There are several operations for morbid obesity. A cholecystectomy is frequently included as part of the procedure due to the high risk of gallstone disease in obese patients. Some of the procedures are:**
- **Vertical Banded Gastroplasty; this is a restrictive type of procedure. Food intake is reduced because the stomach is smaller. A vertical (up and down) pouch is constructed using the upper part of the stomach usually by using a surgical stapler. The pouch usually allows only 1 -2 oz of food to enter the stomach. This pouch may be surrounded by cloth mesh to prevent the stomach from distending .**
- **Roux-en-Y Gastric Bypass; this is a combination of a restrictive and malabsorptive procedure. The upper portion of the stomach is freed and a**

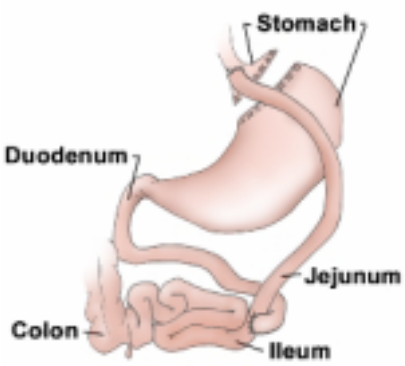
row of staples is placed horizontally (from side to side) a few centimeters (1-2 inches) below the esophagus - stomach junction. The gastric pouch measures also about 1 -2 oz but, unlike the previous procedure, the stomach pouch is totally separated from the rest of the stomach. The small bowel is divided approximately 60 cm. (24 inches) beyond the stomach. The distal loop is brought up and attached to the stomach pouch. This forms the food channel. The proximal loop contains secretions of bile and the pancreas and is called the bilio-pancreatic channel.

This channel is attached to the side of the food channel approximately 60 cm distal to the attachment of the stomach and small bowel forming a Y shaped arrangement of the bowel

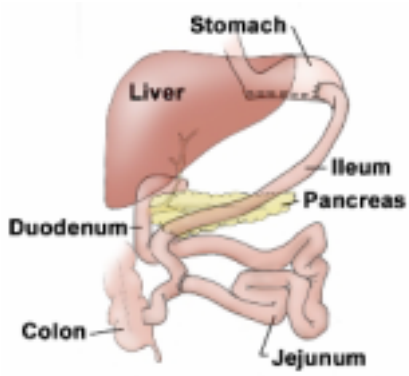
- **In this procedure food intake is restricted because of the small stomach pouch and there is poor absorption of food because the bile and pancreatic secretions do not come into contact with food until about 120 cm beyond the stomach.**
- **Bilio-pancreatic Bypass ; this procedure also has the restrictive and malabsorptive components. Staples are used to create a pouch of the proximal stomach of approximately 200 ml. The distal stomach is then removed from the body . The small bowel is then divided at approximately 250 cm proximal to the ileocecal valve, which is at the end of the small bowel . The distal loop of the bowel is then attached to the stomach pouch to form the food channel. The proximal loop of this bowel (bilio-pancreatic channel) is then attached to the side of the food channel at approximately 50 cm from the ileocecal valve. This procedure is similar to the Roux-en-Y but with a longer bypass of the bile and pancreatic secretions. The food and bilio-pancreatic secretions only mix for the last 50 cm of the small bowel.**



Vertical banded gastroplasty

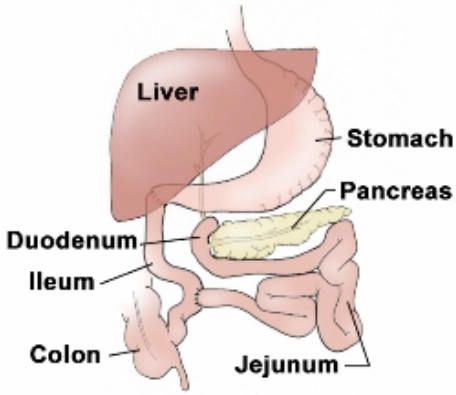


Roux-en-Y Gastric Bypass



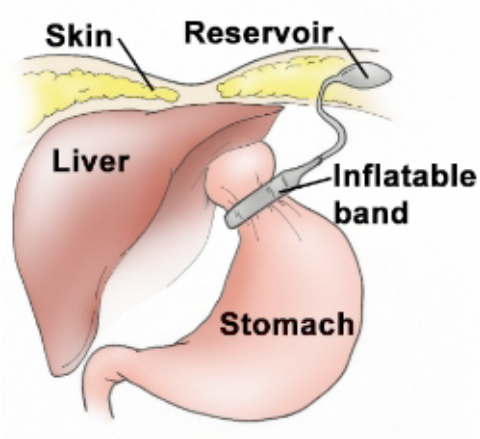
Bilio-pancreatic Bypass

- **Duodenal Switch**; this is a variation of the bilio-pancreatic bypass. Stapling vertically along the length of the stomach creates a narrow tube of the stomach, of approximately 100 ml volume. The duodenum (the first part of the small bowel) is divided just beyond the stomach. Similar to the bilio-pancreatic bypass, the small bowel is divided to form a proximal bilio-pancreatic channel and a distal food channel. The food channel is attached to the stomach-duodenal tube. The bilio-pancreatic channel is then attached to the side of the food channel at approximately 50 cm from the ileocecal valve.



Duodenal Switch

- **Laparoscopic Surgery** - bariatric surgery can be performed laparoscopically. Both the vertical banded gastroplasty and the Roux-en-Y gastric bypass can be performed laparoscopically. Another laparoscopic procedure that is performed is gastric banding. In this procedure an inflatable band is wrapped around the proximal stomach. A reservoir pump containing saline for this band is buried just under the skin of the abdomen. The band may be inflated to different degrees.



Gastric Banding

Complications

- **Several complications although possible with any surgery are more prevalent in obese patients due frequently to poor heart and lung function. These are myocardial infarction (heart attack) or heart failure and pulmonary complications such as respiratory failure requiring ventilator support,**

pulmonary embolus (blood clot from legs or pelvis going to the lungs), lung collapse (atelectasis) or pneumonia

- **Complications specific to bariatric surgery include ; Bowel leaks that may give rise to abscesses (pus) that may need re-operation to repair, Wound dehiscence, Injury to the spleen, Ulcers forming at the attachment of the small bowel to the stomach, If antacids are not effective, surgery may have to be redone, Obstruction of the stomach at the point it joins the small bowel may require dilation , Poor absorption of iron, folate, vitamins B12, A, D, E and calcium, Gallstones and decreased liver function may be seen due to poor absorption of bile salts, Loose skin from loss of fat under the skin may require plastic surgery to excise the loose skin, Excessive weight loss despite vitamin and mineral supplements may require a reversal of the bypass**

Postoperative Care

- **Immediate postoperative care**

***Patients stay in the hospital for 5 -7 days for recovery of bowel function**
***A tube is placed through the nose and into the stomach to drain the stomach pouch**
***One or more drains may be placed in the abdomen. These are removed as the drainage decreases and the bowel regains function**
***Sutures or staples in the abdominal incision usually are removed around 10 days**
***Some surgeons obtain an X- ray dye swallowing study to see if there is adequate emptying of the stomach pouch prior to starting a diet. Diet is usually started with liquids and slowly advanced to solid food. A dietician may be consulted to advise a patient of the proper diet. It is important to remember that the amount of food that a patient can eat is much more limited**

- **Long term care**

***Patients may experience diarrhea with flatulence due to partially digested food for a few months**
***Patients may need to increase the number of meals a day due to the small size of each meal. Patients notice a quick loss of weight over the first six months, followed by a slower loss of weight over the next 12 to 18 months. By about two years the weight stabilizes**
***Many patients notice that associated illnesses improve after a few months with the weight loss**
***It is important is to check for anemia (low blood iron) and deficiency of vitamins and minerals, which can occur from surgery. Multivitamins and iron supplements may be needed to make up for their poor absorption**
***Follow up visits may include blood tests sugar and cholesterol, which usually fall after surgery**
***There may be excessive loose skin hanging from the abdomen due to loss of fat under the skin. This may require a plastic surgery to trim away the excess skin**