

Laparoscopic Weight Reduction Surgery

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Abstract Obesity is a major health care problem, In U. S .A. 30 million overweight, 7 million morbidly obese. Cost for management of Bariatric comorbidities in states \$ 100 billion annually

Weight reduction surgery is performed by either the open or laparoscopic approach, improves health outcomes of morbidly obese patients by leading to substantial weight loss with relatively low rates of adverse events.

In my study, I am discussing different approaches of laparoscopic Weight reduction operations, comparing between technique, advantage, disadvantage, complication and long term benefit.

Key words

Obesity, Laparoscopic approaches, bariatric, comparison

Introduction:

Morbid obesity is defined as a body mass index (BMI) greater than 40 kg/m². The prevalence of morbid obesity in the U.S. is 6% for women and 2% for men; morbid obesity is associated with a shortened life span. For example, a morbidly obese man at age 20 can expect to live 13 years less than his counterpart with a normal BMI, which equates to a 22% reduction in life expectancy.

Classification of obesity

Obesity class	BMI (kg/m ²)
Underweight!	18.5
Normal	18.5–24.9
Overweight	25.0–29.9
Mild obesity I	30.0–34.9
Moderate obesity II	35.0–39.9
Severe obesity III	R40.0

Materials and methods: A literature search was performed using search engine Google, HighWire Press, SpringerLink and library facility available at laparoscopic hospital. The following search terms were used: laparoscopic _ bariatric.

Criteria for selection of papers were upon statistical way of analysis, institute if they were specialized for laparoscopy, the way of management and the technique of operations

Pathophysiology

- Not Clear
- Genetic Factor
- Metabolism
- Endocrine regulation
- Psychosocial & cultural

The basic mechanism is ((Energy Intake > Energy output))

Complications of obesity

Risk Factor for:

- 1- Coronary artery disease
- 2- Type II Diabetes Mellitus.
- 3- Hypertension.
- 4- Dyslipidemia.
- 5- Gallbladder disease
- 6- GERD.
- 7- Arthritis of W t bearing joints
- 8- Obstructive Sleep apnea
- 9- Psychosocial & Socioeconomic
- 10- Certain Malignancies

Treatment

1. Non -surgical

The first treatment of morbid obesity involves dietary and lifestyle changes. Although this strategy may be effective in some patients, frequently the weight loss is not durable, with only 5%-10% of patients able to comply with lifestyle modifications on a long-term basis.

1. Conventional (Non pharmacological)

- Diet
- Physical exercise
- Behavioral therapy

1. Pharmacological treatment

2 Surgical Treatment:

is the only effective long-term treatment for patients with morbid obesity .When conservative measures fail; some patients may consider surgical approaches. A 1991

National Institutes of Health (NIH) Consensus Conference defined surgical candidates as those BMI of greater than 40 kg/m², or greater than 35 kg/m² in conjunction with severe co morbidities such as cardiopulmonary complications or severe diabetes. (2) Super obesity has been described as a BMI greater than 50 kg/m²

Indication for Surgery in M. O

1. BMI of 40 & more
2. BMI of 35 – 40 with obesity related co morbidities
e.g. D.M., HTN, Severe arthritis, Sleep apnea Syndrome.
3. No history of alcohol or drug abuse.
4. Age over 18 & under 55 years

Contraindications–

- Significant psychiatric disorders
- Endocrine problem
- Inflammatory bowel disease
- Severe Organic disease.

Criteria for surgical therapy:

1. Safe, as little invasive as possible.
2. Highly efficient i.e. 50% of excess W t. eliminated within 5 Years.
3. The operative risk should be lower than the risk of natural evolution of the disease
4. Carry few long term Complications

Evaluation of patient prior to surgery:

Multidisciplinary Team:

- Nutritionist
- Anesthesiologist
- Endocrinologist
- Psychiatrist.
- Surgeon

Rationale For Laparoscopic Surgery for M.O.

1. Reduce Wound – related complications.
2. Shorten hospital stay.
3. Decrease postoperative pain
4. Improve respiratory function.
5. Faster convalescence

Types of Operations for M. O.

I. Gastric restrictive procedures

*Lap. Vertical banded gastroplasty.

*Lap. Adjustable gastric Banding

II. Malabsorptive Procedure

*Biliopancreatic diversion + duodenal switch , jejuno-ileal Bypass

|||. mixed procedure

*R – Y Gastrojejunostomy

1) Laparoscopic Vertical Banded Gastroplasty (VBG)

- Described in 1994 by Hess .
- Purely restrictive procedure with no Malabsorptive component .
- Relatively simple operation with low operative risk.

-Techniques:

In this procedure the stomach is segmented along its vertical axis. To create a durable reinforced and rate-limiting stoma at the distal end of the pouch, a plug of stomach is removed and a propylene collar is placed through this hole and then stapled to itself. Because the normal flow of food is preserved, metabolic complications are rare

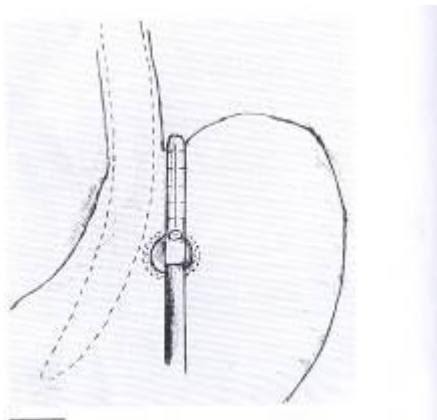
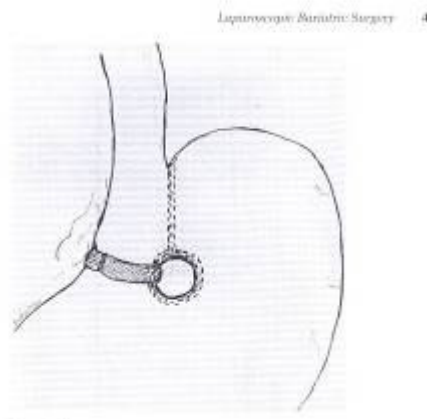


FIGURE 1.
Laparoscopic vertical banded gastroplasty: partitioning of the stomach.



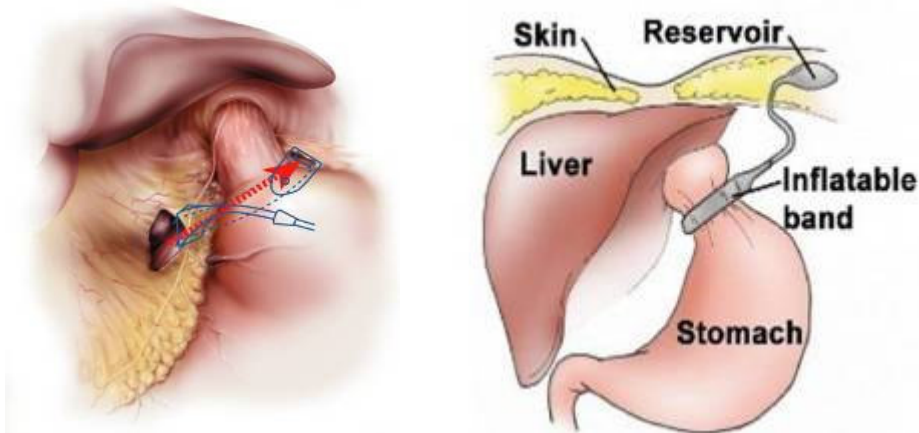
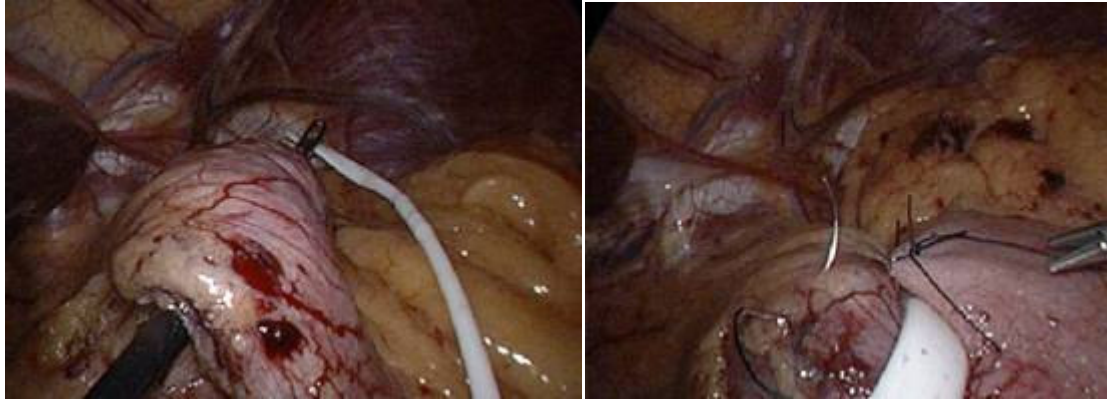
Adjustable Gastric Banding

- It is the least invasive surgical treatment of Morbid obesity.
- Described in 1993 by *Catona* .
- It is purely restrictive procedure .
- In Europe ,it is the bariatric procedure of choice.
- In U.S.A. ,FDA approval since June 2001 .

-Techniques

Adjustable gastric banding involves placing a gastric band around the exterior of the stomach. The band is attached to a reservoir that is implanted subcutaneously in the rectus sheath. Injecting the reservoir with saline alters the diameter of the gastric band; therefore, the rate limiting stoma in the stomach can be progressively narrowed to induce greater weight loss, or expanded if complications develop. Because the stomach is not entered, the surgery and any revisions, if necessary, are relatively

simple



Malabsorptive Procedures

There are multiple variants of malabsorptive procedures, which differ in the lengths of the alimentary limb, the biliopancreatic limb, and the common limb, where the alimentary and biliopancreatic limb are anastomosed. These procedures also may include an element of a restrictive surgery based on the size of the stomach pouch. The degree of malabsorption is related to the length of the alimentary and common limbs.

1. Biliopancreatic Bypass Procedure (also known as the Scopinaro procedure)

The biliopancreatic bypass (BPB) procedure, developed and used extensively in Italy, was designed to address some of the drawbacks of the original intestinal bypass procedures that have been abandoned due to unacceptable metabolic complications. Many of the complications were thought to be related to bacterial overgrowth and toxin production in the blind, bypassed segment. In contrast, BPB consists of a subtotal gastrectomy and diversion of the biliopancreatic juices into the distal ileum by a long Roux-en-Y procedure. The procedure consists of the following components:

1. A distal gastrectomy functions to induce a temporary early satiety and/or the dumping syndrome in the early postoperative period, both of which limit food intake.

2. A 200-cm long "alimentary tract" consists of 200 cm of ileum connecting the stomach to a common distal segment.
3. A 300- to 400-cm "biliary tract," which connects the duodenum, jejunum, and remaining ileum to the common distal segment.
4. A 50- to 100-cm "common tract," where food from the alimentary tract mixes with biliopancreatic juices from the biliary tract. Food digestion and absorption, particularly of fats and starches, are therefore limited to this small segment of bowel, creating a selective malabsorption. The length of the common segment influences the degree of malabsorption.
5. Because of the high incidence of cholelithiasis associated with the procedure, patients typically undergo an associated cholecystectomy.

1. Biliopancreatic Bypass with Duodenal Switch -

The duodenal switch procedure is essentially a variant of the biliopancreatic bypass described above. However, instead of performing a distal gastrectomy, a "sleeve" gastrectomy is performed along the vertical axis of the stomach, preserving the pylorus and initial segment of the duodenum, which is then anastomosed to a segment of the ileum, similar to the above procedure, to create the alimentary limb. Preservation of the pyloric sphincter is intended to ameliorate the dumping syndrome and decrease the incidence of ulcers at the duodenoileal anastomosis by providing a more physiologic transfer of stomach contents to the duodenum. The sleeve gastrectomy decreases the volume of the stomach and also decreases the parietal cell mass. However, the basic principle of the procedure is similar to that of the biliopancreatic bypass; i.e., producing selective malabsorption by limiting the food digestion and absorption to a short common ileal segment.

1. Distal (Long Limb) Gastric Bypass (Roux or alimentary limb > 150 cm

Recently variations of gastric bypass procedures have been described, consisting primarily of long limb Roux-en-Y procedures, which vary in the length of the alimentary and common limbs. For example, the stomach may be divided with a long segment of the jejunum (instead of ileum) anastomosed to the proximal gastric stump, creating the alimentary limb. The remaining pancreaticobiliary limb, consisting of stomach remnant, duodenum, and length of proximal jejunum is then anastomosed to the ileum, creating a common limb of variable length in which the ingested food mixes with the pancreaticobiliary juices. While the long alimentary limb permits absorption of most nutrients, the short common limb primarily limits absorption of fats. The stomach may be bypassed in a variety of ways, either by resection or stapling along the horizontal or vertical axis. Unlike the traditional gastric bypass, which is essentially a gastric restrictive procedure, these very long limb Roux-en-Y gastric bypasses combine gastric restriction with some element of malabsorptive procedure, depending on the location of the anastomoses.

. For gastric restrictive procedures, the weight loss is primarily due to reduced caloric intake, and thus the patient must be committed to eating small meals, reinforced by early satiety. For example, gastric restrictive surgery will not be successful in patients

who consume high volumes of calorie rich liquids. In patients undergoing biliopancreatic bypass, reduced intake may not be as much of an issue, but patients must adhere to a balanced diet to avoid metabolic complications. In addition, the high potential for metabolic complications requires life-long follow-up. Surgeons need to be adequately trained in the particular techniques and should perform a high volume of these procedures.

Laparoscopic Roux -En -Y Gastric Bypass (GBP)

- Described in 1994 by *Wittgrove*.
- It is a restrictive procedure with malabsorptive component .
- It is the procedure of choice in superobese ,sweet eaters & in patients with GERD

1. – Technique

The original gastric bypass surgeries were based on the observation that post-gastrectomy patients tended to lose weight. The current procedure, gastric bypass with horizontal or vertical partition of the stomach in association with a Roux-en-Y procedure (i.e., a gastrojejunal anastomosis). Thus the flow of food bypasses the duodenum and proximal small bowel. The procedure may also be associated with an unpleasant "dumping syndrome," in which a large osmotic load delivered directly to the jejunum from the stomach produces abdominal pain and/or vomiting. The dumping syndrome may further reduce intake, particularly in "sweets eaters. Because the normal flow of food is disrupted, there are more metabolic complications compared to other gastric restrictive procedures, all of which can be corrected by oral supplementation. Another concern is the ability to evaluate the "blind" bypassed portion of the stomach. Gastric bypass may be performed with either an open or laparoscopic technique.

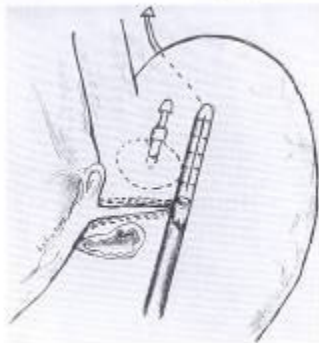


FIGURE 4.
Laparoscopic Roux-en-Y gastric bypass; gastric pouch creation with linear stapler.

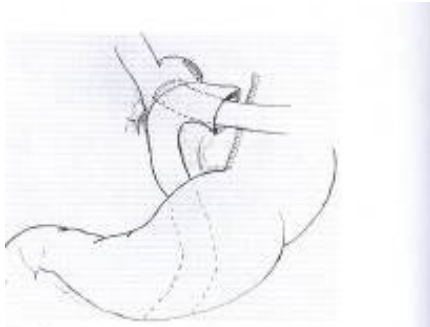


FIGURE 5. Laparoscopic Roux-en-Y gastric bypass gastrectomy using the stapler.

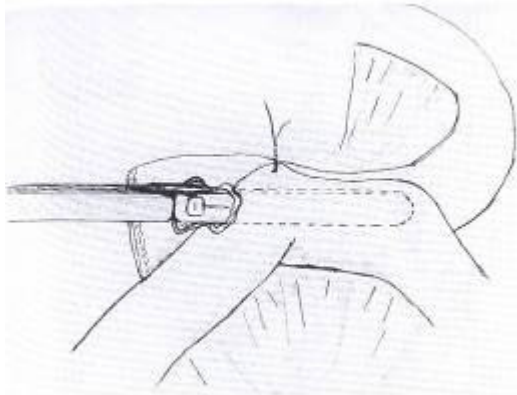
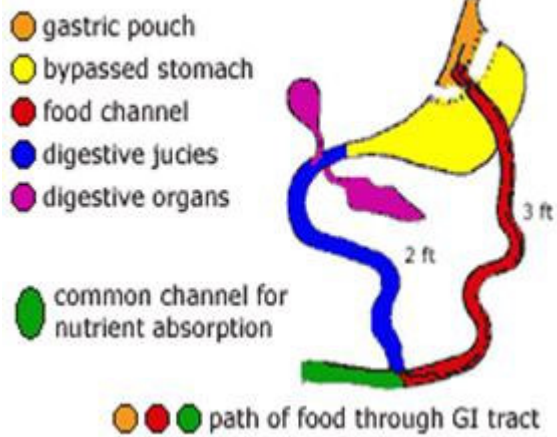


FIGURE 6. Laparoscopic Roux-en-Y gastric bypass; jejunocolic anastomosis.



FIGURE 7. Laparoscopic Roux-en-Y gastric bypass; passage of the Roux limb via the cecocolic retrogastric path.

Gastric Bypass



Surgical Complications :

Surgery
Late

Early

Roux-en-Y gastric bypass	Pulmonary embolus	
Anastomotic stricture	Anastomotic leak	
Marginal ulcer	Deep venous thrombosis	
Gastrointestinal bleeding	Gastrointestinal bleeding	
Dumping syndrome	Wound infection	
Anemia	Enterocutaneous fistula	
Neuropathy-B12 deficiency	Small bowel obstruction	
Dermatitis	Sepsis	Hair
loss	Respiratory failure	
Weight gain		
Incisional hernia		
bowel obstruction		Small
Osteoporosis		
		Malnutrition
Duodenal switch	Similar to Roux-en-Y gastric bypass	Bile
salt wasting		
		Diarrhea-
secretory		
Malabsorption		
Vitamin deficiency		
	Dermatitis	
Laparoscopic adjustable gastric band	Gastric prolapse	Band
erosion	Band slippage	Port
migration	Band malposition	Port
infection	Gastric occlusion	
Disconnection of port tubing	Esophageal dilation	Malnutrition

Lap. Vertical banded gastroplasty.

erosion of the polypropylene mesh
enlargement of the pouch,

stomal stenosis,

reflux esophagitis,

vitamin deficiencies

mild

Discussion:

The criteria of efficacy of any surgery and benefit depend on many factors such as :

Weight Loss

Durability of weight loss

Short-term complications

Reoperation Rate

Long-term complications

Improved health outcomes in terms of weight-related comorbidities

***Lap. Vertical banded gastroplasty.**

There are numerous clinical series that report substantial amounts of weight loss following vertical

banded gastroplasty. weight loss of 75% to 100% of excess weight in first one year. But vertical banded

gastroplasty has largely been abandoned as longer term, less favorable outcomes have been reported in

the literature. While initial results in terms of weight loss, complications and improvement in comorbid

conditions were good, these results deteriorated over time. The rate of revision surgery was 29.51% due

to inadequate weight loss or complications. Also the procedure was less successful in the super obese

patient.

***Adjustable Gastric Banding**

A major advantage of the LAGB is its safety. also Lower perioperative morbidity and mortality, gradual

weight loss with few nutritional complications, and reversibility make LAGB a good option. LAGB was

associated with a median overall morbidity rate of 11.3% with a mean short-term mortality of 0.05%,

compared with a 23.6% morbidity and 0.5% mortality for RYGB . Short operative time and hospital stay

also is good advantage .

Weight loss after LAGB (especially in sweet eater) is significantly slower than after

RYGB, so comparisons between the operations demonstrate superior

weight loss with RYGB . also The need for frequent adjustments is sometimes considered as

disadvantage .

The ability to place a band laparoscopically in the massively super obese and in the older morbidly obese

patient. offers significant advantages .

Laparoscopic Roux --En --Y Gastric Bypass (GBP)

Laparoscopic Roux-en-Y gastric bypass is fast becoming the gold standard for treatment of refractory

morbid obesity. The magnitude of weight loss can be achieved quickly , hospital stay about

3- 4 days, but long operation time ,need good skills and its irriversaple and risk of leak and

malabsorption is high .

The Duodenal Switch Operation

The magnitude of weight loss that occurs after the duodenal switch procedure is better than that

achieved after the Roux-en-Y gastric bypass procedure.

The mortality and morbidity of the duodenal switch are comparable to other common weight loss

procedures, also minimal dietary limitations and metabolic sequelae. also risk of leak is low as

compared RYGB surgery

The only limitation is long operation time ,long hospital stay , need good skills and its irreversible.

.Conclusion:

1. Bariatric Surgery is an effective option for sustained weight loss in M. O.
2. Long term result from Lap. Bariatric operations should be similar to those of open.
3. Lap. Approaches for treatment of M.O. are now available for all bariatric operations.
4. Lap. ASGB is emerging as an alternative bariatric surgical option to VBG ,& GBP .
5. The criteria used for selecting a patient for a particular operation are still based on surgeon`s experience , training & preference.
6. Further studies are required to define subgroups of patients who will benefit from a particular operation.
7. The Lap. Malabsorptive procedure is still experimental until further data support it`s safety

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