Laparoscopic Roux-en-Y Gastric Bypass: The Procedure

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The concept of the laparoscopic Roux-en-Y gastric bypass (LRYGB) is both restriction and malabsorption (mostly fat malabsorption since most of the duodenum is bypassed). This procedure was initially described in the 1960s by Drs. Mason and Ito [1]. Prior to being a weight loss tool, this procedure was performed for patients with chronic ulcers. However, the long-term weight loss noted in these patients led to the conclusion that it could also be used to help patients with morbid obesity. Over the course of the years since it has been introduced, this procedure has undergone multiple modifications to become the procedure that it is now.

The procedure involves four major steps, the order of which may vary by surgeon:

1. Creation of a 15-mL stapled gastric pouch
2. Gastrojejunostomy – connection between the gastric pouch and jejunum which creates the Roux limb
3. 75- to 150-cm Roux limb
4. Jejunojejunostomy – connection between the two limbs of jejunum which creates the bypass

20.1 Patient Positioning, Access, and Port Placement

After informed consent is obtained, the patient is placed supine on the operating room table. These tables are designed to hold someone who weighs up to 800 lbs; secure straps are placed across the patient above and below the waist. The patient's arms are extended and placed on padded arm boards. This is to prevent tension on

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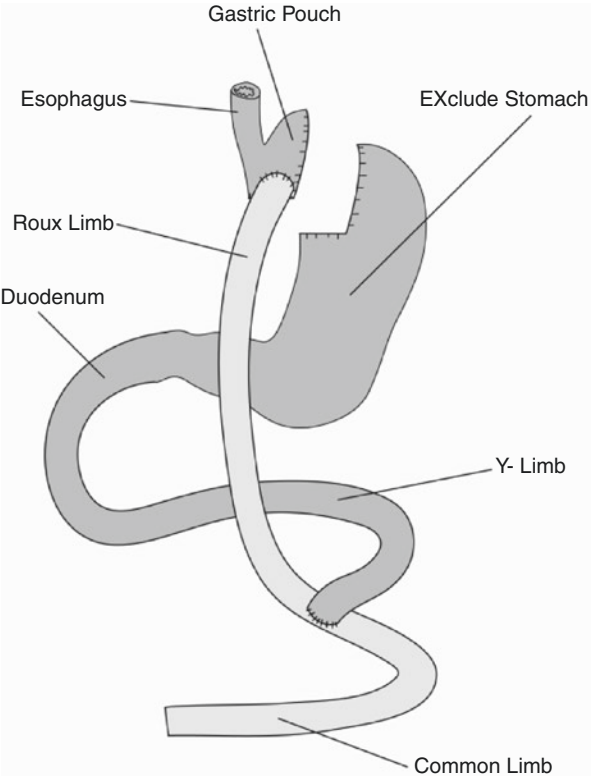

Fig. 20.1 Roux-en-Y gastric bypass

the shoulders and the brachial plexus [1]. After general anesthesia is induced, the patient's abdomen is prepped widely.

The surgeon generally stands on the right with the assistants on the opposite side, facing the surgeon. Placement of port sites varies with surgeons, but most bariatric procedures require five to six port sites [2]. A liver retractor is placed through one of the ports to help expose the stomach.

20.2 Creation of the Gastric Pouch

The LRYGB can begin with the creation of the gastric pouch (Fig. 20.1). A tunnel is created beneath the upper portion of the stomach, being careful to avoid injury to the diaphragm, spleen, and esophagus. An endoscopic stapler is then used to divide the stomach, first horizontally and then vertically to create a gastric pouch of about 10–15 mL [1].

20.3 Creation of the Biliary Pancreatic Limb

The most proximal portion of the small bowel is located and then measured approximately 50 cm distally where the jejunum is transected using an endoscopic stapler.

20.4 Creation of Gastrojejunostomy

A connection between the stomach and the previously transected jejunum is made to create the Roux limb which will carry gastric contents from the newly created gastric pouch directly to the distal jejunum creating the bypass. There are many ways to create this connection using a variety of stapling devices or by laparoscopic suturing [2].

20.5 Creation of Jejunojejunostomy

The jejunojejunostomy (JJ) is the connection between the Roux limb (which carries the pouch contents) and the biliopancreatic limb (which carries the remnant stomach contents). The point where this connection is made marks the end of the bypass. Prior to creating the jejunojejunostomy, the surgeon measures out between 75 and 150 cm of the jejunum. This is then determined to be the area where the JJ anastomosis will be created. The pieces of bowel are connected using staplers or sewing techniques similar to those used for the gastrojejunostomy.

There are several holes in the mesentery of the bowel which are created when making these connections. It is important to close these as it may be a potential site for bowel to slip through in the future, called an internal hernia. This can have devastating consequences including death of nearly all the small bowel.

The last step many surgeons perform is a leak test. The abdomen is filled with fluid and the gastrojejunostomy is submerged. An endoscope is placed in the stomach, and air is inflated to examine for occult leaks. If a leak is noted, it is repaired.

Once it is confirmed that there is no leak, the abdomen is inspected for any signs of bleeding, and the bowel is laid in appropriate anatomic position, the ports are removed, the pneumoperitoneum is released, and incisions are closed.

Review Questions

1. Which of the following is not a part of the RYGBP?

   A. Creation of a jejunojejunostomy
   B. Small gastric pouch
   C. Connecting the biliopancreatic limb to the stomach
   D. Creation of gastrojejunostomy

2. Why is it imperative to close defects in the mesentery where bowel connections are made?

   A. Prevent future internal hernias.
   B. It helps secure the gastrojejunal anastomotic site.
   C. This stops small vessel bleeding caused during dissection of the omentum.
   D. Prevents abscess formation.

3. The following are options for creation of gastrojejunal anastomosis EXCEPT:

   A. Using an energy device
   B. Using the Endo GIA stapler
   C. Using an anvil-stapling device
   D. Laparoscopically sewing the anastomosis

4. What is the starting point used to measure the jejunum?

   A. Gastrocolic ligament
   B. Phrenoesophageal ligament
   C. Ligament of Treitz
   D. Hepatoduodenal ligament

Answers

1. The answer is *C*. The biliopancreatic limb is the section of the small bowel which includes the duodenum and very proximal jejunum. It functions to drain the remnant stomach, biliary system, and pancreas which produce the digestive juices. These digestive juices then rejoin the Roux limb at the jejunojenunostomy after food has already traveled through much of the intestine, creating the malabsorptive portion of the LRYGB. If the biliopancreatic limb were connected back to the stomach, it would create a loop!
2. The answer is *A*. One of the most feared complications of the LRYGB is an internal hernia. When portions of the small bowel slip through mesenteric defects, the blood supply can become compromised and the bowel can die. For this reason, these defects are typically closed.
3. The answer is *A*. Remember, an anastomosis is the connection between two pieces of intestine. It is created using a stapling or suturing device. Using an energy device would result in cutting, not connecting the tissue.
4. The answer is *C*. This is surely beyond the level of knowledge required for the CBN exam, but the ligament of Treitz is an important landmark for surgeons. It marks the transition from the duodenum to jejunum and is typically the most proximal portion of the small bowel encountered in the LRYGB. It has important embryological and anatomical implications.

References

1. Schauer P (2003) Laparoscopic gastric bypass surgery: current technique. J Laparoendosc Adv Surg Tech A 13(4):229–239
2. Zeni T (2009) Laparoscopic Roux-en-Y gastric bypass. In: Atlas of minimally invasive surgery. Elsevier, Philadelphia. pp 75–77