Laparoscopic Gastric Plication for Morbid Obese Patients

An Essay

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By

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Hussein Ahmed Mohamed

[List of Abbreviations

(AGB) : Adjustable gastric banding

(AgRP) : agouti-related peptide

(AP) : anterior plication

(ARC) : arcuate nucleus

(ASMBS) : American Society for Metabolic and Bariatric Surgery

(BMI) : body mass index

(BPD) : Biliopancreatic Diversion

(CART) : cocaine and amphetamine-regulated

(CCK) : cholecystokinin

(DS) : duodenal switch

(EWL) : excess weight loss

(GCP) : greater curvature plication

(GERD) : Gastroesophageal reflux disease

(GHD) : Growth hormone deficiency

(GLP) : glucagon-like peptide

(GRP) : gastrin-releasing peptide

(HDL) : high density lipoproteins

(IAP) : increased intra-abdominal pressure

(IL-6) : interleukin-6

(IRS) : insulin receptor substrate protein,

[List of Abbreviations

(LAGB) : laparoscopic adjustable gastric banding

(LDL) : low-density lipoproteins

(LGP) : Laparoscopic gastric plication

(LH) : lateral hypothalamus

(MO) : Morbid obese

(MS) : metabolic syndrome

(NASH) : non-alcoholic steatohepatitis

(NPY) : neuropeptide Y

(OHS) : obesity hypoventilation syndrome

(OSA) : obstructive sleep apnea syndrome

(PAI-1) : plasminogen activator inhibitor-1

(POMC) : pro-opiomelanocortin

(PYY) : peptide YY

(RYGBP) : RouxenY gastric bypass

(SG) : Sleeve Gastrectomy

(THC) : Tetrahydrocannabinol

(TNF-α) : tumor necrosis factor-α

(VBG) : Vertical banded gastroplasty

(VMH) : ventromedial hypothalamus

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Introduction

Obesity is a worldwide epidemic problem which is associated with increased morbidity and mortality. Morbidity appears with hypertension, lipid disturbances, non-alcoholic steatohepatitis, obstructive sleep apnea and polycystic ovary syndrome, insulin resistance, and diabetes. These co morbidities are responsible for more than 2.5 million deaths per year worldwide***(Bray, 2004).***

Nonsurgical approaches to weight loss have had limited long-term efficacy for the treatment of morbid obesity***(Buchwald* et *al., 2004).***For patients in whom other methods of weight reduction have failed, bariatric surgery is considered if the body mass index is greater than 40 kg/m^2 or greater than 35 kg/m^2 with the presence of associated co morbidities***(Herron, 2004).***

Bariatric surgical procedures are categorized into 2 main types; restrictive and malabsorptive. Some operations combine both restriction and malabsorption. The operations that are most frequently performed are the Roux-en-Y gastric bypass, vertical banded gastroplasty, biliopancreatic diversion, and various banding procedures ***(Buchwald et al, 2004).***

Historically, many types of restrictive procedures have been performed to achieve weight loss. Most of these have been abandoned owing to poor long-term weight loss, food intolerance, or severe gastro esophageal reflux ***(Buchwald, 2002).***

Vertical banded gastroplasty (VBG), in particular, has resulted in poor long-term outcomes, and a high percentage of VBG patients have required revision to Roux-en-Y gastric bypass to alleviate intolerable reflux symptoms and dysphagia or to achieve weight loss again ***(Balsiger et al, 2000).***

Currently, gastric restrictive procedures include laparoscopic adjustable gastric banding & sleeve gastrectomy and the placement of an implantable device or the irreversible resection of gastric tissue, however, has limited the acceptance of these procedures by some patients, referring physicians, and surgeons***(Moreno et al, 2008).***

Gastric Plication is a restrictive procedure can achieve gastric volume reduction either by anterior plication in which the anterior gastric wall is folded inward from the fundus to the antrum using 2 rows of running sutures or by greater curvature plication in which the greater and lesser curvatures are approximated to create an intraluminal fold of the stomach, the short gastric vessels are divided, and the greater curvature is folded inward, with 2 suture lines to reduce the gastric capacity by a large intraluminal gastric fold ***(ASMBS, 2011).***

Total gastric vertical plication, as a restrictive operation, It has the same result of weight loss as others with minimal risk of complication and very low cost, especially in developing countries, early postoperative complications of this method are minimal, without any important late complications ***(Talebpour&Bazman, 2007).***

Aim of the work

To review laparoscopic gastric plication in morbid obese patients as a new restrictive procedure, as regard effectiveness and safety.

ANATOMY & PHYSIOLOGY OF THE STOMACH

Anatomy of stomach

The stomach is the first intra-abdominal part of the gastrointestinal (GI), or digestive tract. It is a muscular, highly vascular bag-shaped organ that is distensible and may take varying shapes, depending on the build and posture of the person and the state of fullness of the organ the stomach lies in the left upper quadrant of the abdomen ***(Gray & Lewis, 2000).***

The thoracic esophagus enters the abdomen via the esophageal hiatus of the diaphragm at the level of T10. The abdominal portion of the esophagus has a small intra-abdominal length (2-3 cm). The esophagogastric junction (cardia), therefore, lies in the abdomen below the diaphragm to the left of the midline at the T11 level ***(Gray& Lewis, 2000).***

The cardiac notch is the acute angle between the abdominal esophagus and the fundus of the stomach (the part of stomach above a horizontal line drawn from the cardia). The body (corpus) of the stomach leads to the pyloric antrum. The pyloric antrum narrows toward the right to become the pyloric canal, surrounded by the pyloric sphincter, which joins the duodenum at the L1 level (transpyloric plane) to the right of the midline (Figure, 1) ***(Gray & Lewis, 2000).***

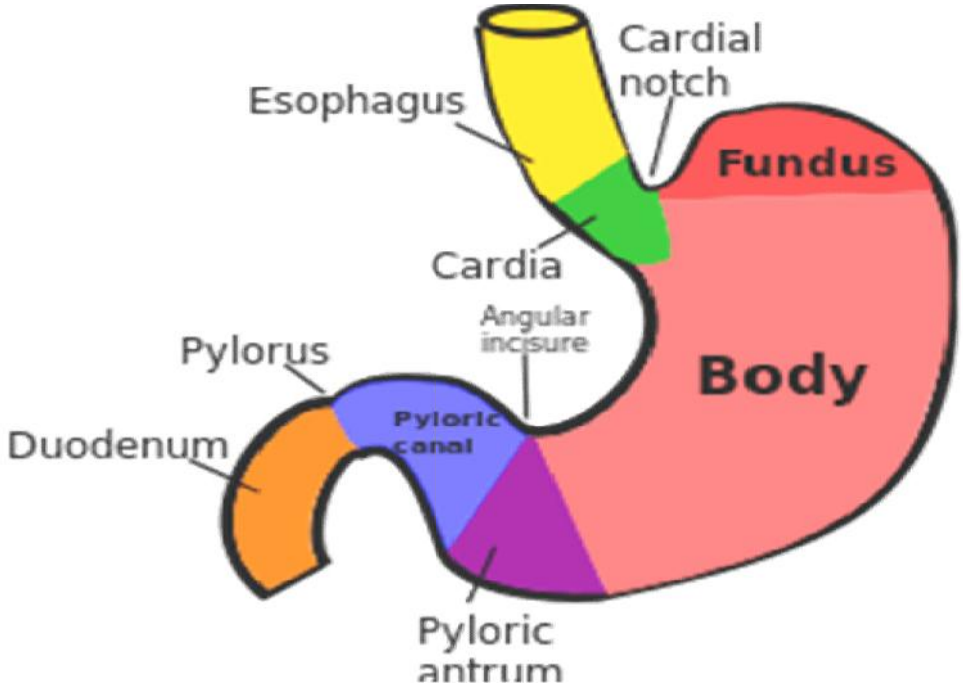


Figure 1: Sections of the stomach ***(Gray & Lewis, 2000).***

The anterior surface of stomach is related to the left lobe (segments II, III and IV) of the liver, the anterior abdominal wall, and the distal transverse colon. The posterior surface of the stomach is related to the left hemidiaphragm, the spleen, the left kidney, and the pancreas (stomach bed) ***(Agur et al, 2009).***

The omental bursa (lesser sac) lies behind the stomach and in front of the pancreas; it communicates with the greater sac (main peritoneal cavity) via the omental (epiploic) foramen (of Winslow) behind the hepatoduodenal ligament (HDL; the free edge of the lesser omentum) ***(Agur et al, 2009).***

The greater curvature of the stomach starts at the left of the cardia and runs from the fundus along the left border of the body and the inferior border of the pylorus. The lesser curvature starts at the right of the cardia and runs a short distance along the right border of the body and the superior border of the pylorus ***(Agur et al, 2009).***

The stomach and the first part of the duodenum are attached to the liver by the hepatogastric ligament (the left portion of the lesser omentum), to the left hemidiaphragm by the gastrophrenic ligament, to the spleen by the gastrosplenic ligament, and to the transverse colon by the gastrocolic ligament (part of the greater omentum). Part of the greater omentum hangs like an apron from the transverse colon, with 4 layers of the peritoneum (often fused): 2 layers go downward from the stomach and then run upward to be attached to the transverse colon ***(Agur et al, 2009).***

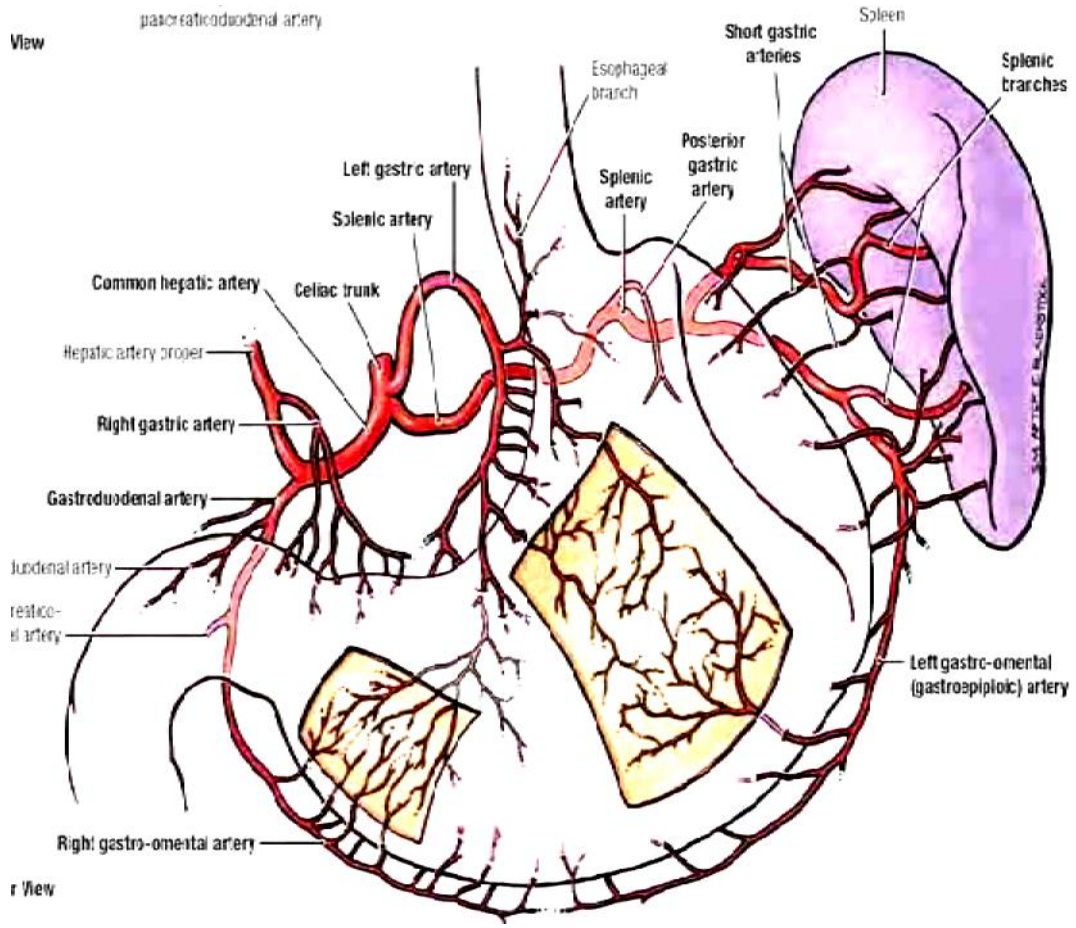
Blood supply of stomach **(figure.2)**

The celiac trunk (axis) arises from the anterior surface of the abdominal aorta at the level of L1. It has a short length (about 1 cm) and trifurcates into the common hepatic artery (CHA), the splenic artery, and the left gastric artery (LGA) ***(Sinnatamby, 1999).***

The LGA runs toward the lesser curvature of the stomach and divides into an ascending branch (supplying the abdominal esophagus) and a descending branch (supplying the stomach). The CHA runs toward the right on the superior border of the pancreas and gives off the gastroduodenal artery (GDA), which runs down behind the first part of the duodenum. After giving off the GDA, the CHA continues as the proper hepatic artery ***(Sinnatamby, 1999).***

The right gastric artery, a branch from the proper hepatic artery, runs along the lesser curvature from right to left and joins the descending branch of the LGA to form an arcade along the lesser curvature between the 2 leaves of peritoneum of the lesser omentum. The GDA divides into the right gastro-omental (gastroepiploic) artery (RGEA) and the anterior superior pancreaticoduodenal artery (SPDA); it also gives off the small supraduodenal artery (of Wilkie). The RGEA runs along the greater curvature from right to left ***(Sinnatamby, 1999).***

The spleen artery runs toward the left on the superior border of the distal body and tail of pancreas and gives off the left gastro-omental artery (LGEA), which runs from left to right along the greater curvature and joins the RGEA to form an arcade along the greater curvature between the two leaves of peritoneum of the greater omentum ***(Sinnatamby, 1999).***



Figure, 2: Blood supply of stomach ***(Agur et al, 2009)***