LAPAROSCOPIC MANAGEMENT OF PERFORATED PEPTIC ULCER

An essay
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In
General Surgery

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Aim of the work.

The aim of this work is evaluating the efficacy, safety and outcome of laparoscopic surgery of perforated peptic ulcer.

CONTENT

List of Abbreviations

PUD : Peptic ulcer disease

HP : Helicobacter pylori

GU : Gastric ulcer

DU : Duodenal ulcer

NSAIDs : Non-stroidal anti-inflammatory drugs

ASA : Acetylsalicylic acid

ZE : Zollinger-Ellison

PGE2: Prostaglandins E2

GI : Gastrointestinal

IgM : Immunogloblin M

vacA: Vacuolating gene

CagA: Cytotoxin associated gene

IK-8: Interlukin-8

MRI : Magnetic Resonance Imaging

CT : Computed Tomographic

PPI : Proton pump inhibitor

PAF: Platelet-activating factor

HSV : Highly selective vagotomy

GEJ: Gastro-esophageal junction

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Introduction

Peptic ulcer perforation is the second most frequent abdominal perforation requiring surgery and accounts for 5% of abdominal emergencies that need surgery either open or laparoscopic, but the advantages of laparoscopic surgery reduction in postoperative complications as septic abdominal complications, less postoperative pain, shorter hospital stay, earlier return to normal activities and mortality may also be marginally lower in those treated laparoscopically ***(Sanabria et al:2005).***

The current peak age for perforated duodenal ulcer is 40to 60 years but the age of perforated peptic ulcer patients is increasing, especially the number of patients over 60 years old.Perforation occurs in approximately 5 to 10percent of peptic ulcer disease, it usually involves the anterior wall of the duodenum(60 percent), although it may also occur in antral 920 percent) and lesser-curve 20 percent). Perforation of ulcer in childern is rare. Nonsteroidal anti-inflammatory drugs (NSAIDs) and helicobacter pylori infection are the most important risk factor for peptic ulcer perforation **(Svacs C; 2000).**

Treatment for perforated peptic ulcer ranges from conservative treatment (Taylor's approach) to radical surgery (vagotomy, gastrectomy). However, with the use of powerful acid suppressing medication and the eradication of Helicobacter pylori, the need for radical surgery in emergencies has sharply declined. The surgical

technique most often used is closure of the perforation combined with extensive peritoneal lavage. Repair of duodenal perforation by Graham patch plication represents an excellent alternative approach **(Lunevicius R, Morkevicius M; 2005).**

Laparotomy and patch repair was the most commonly performed for perforated peptic ulcer before the early 1980. The recent rapid development in laparoscopic surgery has further complicated the issue of the best approach for the management of perforated peptic ulcer. Perforated peptic ulcer is a condition in wich laparoscopic repair is an attractive option .Not only the site and pathology of the perforation identified , the procedure also allows closure of the perforation and adequate peritoneal lavage just like in open repair ,but without a large upper abdominal incision **(Lau WY; 2002).**

Laparoscopic repair resulted in lower postoperative analgesic use lower wound infection and mortality , but higher reoperative rates .Other benefits, such as better cosmesis, also believed that there were fewer postoperative adhesions and incisional hernias after laparoscopic repair (***Lau H; 2004).***

The "gold standard" for diagnosis remains the finding of pneumoperitoneum, which can be seen on an upright posteroanterior radiograph of the chest or the left lateral decubitus view of the abdomen. In a few patients with perforated ulcer, especially those with microperforations, free peritoneal air was not present and could not be demonstrated by any radiologic studies.

With ultrasound, free intraperitoneal fluid may be the most important indication of perforation**(Robert ;2007).**

CHAPTER 1

ANATOMY OF THE STOMACH AND DOUDENUM

Surgical anatomy of the stomach.

The stomach is the expanded part of the alimentary tract between the esophagus and the small intestine. It is specialized for the accumulation of ingested food, which it chemically and mechanically prepares for digestion and passage into the duodenum. In most people, the shape of the stomach resembles the letter J; however, the shape and position of the stomach can vary markedly in persons of different body types and even in the same individual as a result of diaphragmatic movements during respiration, the stomach's contents, and the position of the person. **(Moore et al., 2006).**

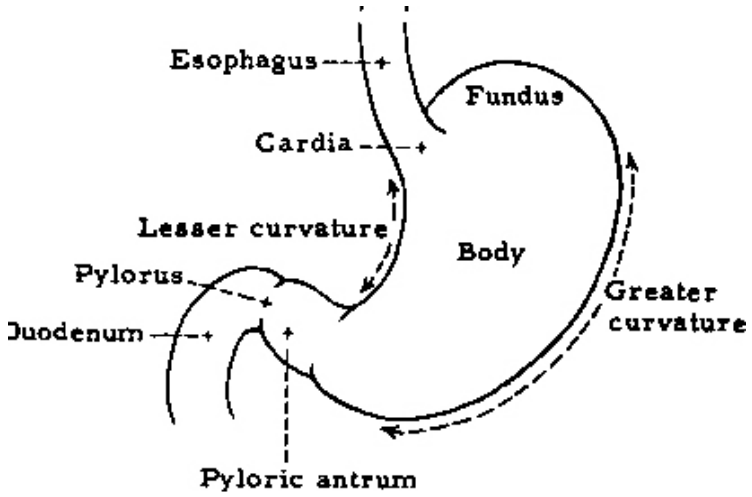

Fig:1- 1 Anatomical parts of the stomach. **(Mercer and Robinson., 2007).**

The stomach can be divided into anatomic regions based on external landmarks (fig: 1-1). The gastric cardia is the region of the stomach just distal to the gastroesophageal junction. The fundus is the portion of the stomach above and to the left of the gastroesophageal junction. The corpus constitutes the region between the fundus and the antrum. The margin between corpus and antrum is not distinct externally but can be defined arbitrarily by a line from the incisura angularis on the lesser curvature to a point one fourth of the distance from the pylorus to

the esophagus along the greater curvature. The gastric antrum is bounded distally by the pylorus**.(Mulholland.,2006).**

Relations of the Stomach

The stomach is covered by peritoneum, except where blood vessels run along its curvatures and in a small area posterior to the cardial orifice. The two layers of the lesser omentum extend around the stomach and leave its greater curvature as the greater omentum . Anteriorly, the stomach is related to the diaphragm, the left lobe of liver, and the anterior abdominal wall. Posteriorly, the stomach is related to the omental bursa and the pancreas; the posterior surface of the stomach forms most of the anterior wall of the omental bursa. The bed of the stomach, on which the stomach rests in the supine position, is formed by the structures forming the posterior wall of the omental bursa. From superior to inferior, the stomach bed is formed by (fig: 1-2) the left dome of the diaphragm, spleen, left kidney and suprarenal gland, splenic artery, pancreas, and transverse mesocolon and colon .(**(Moore et al.,2006)**.

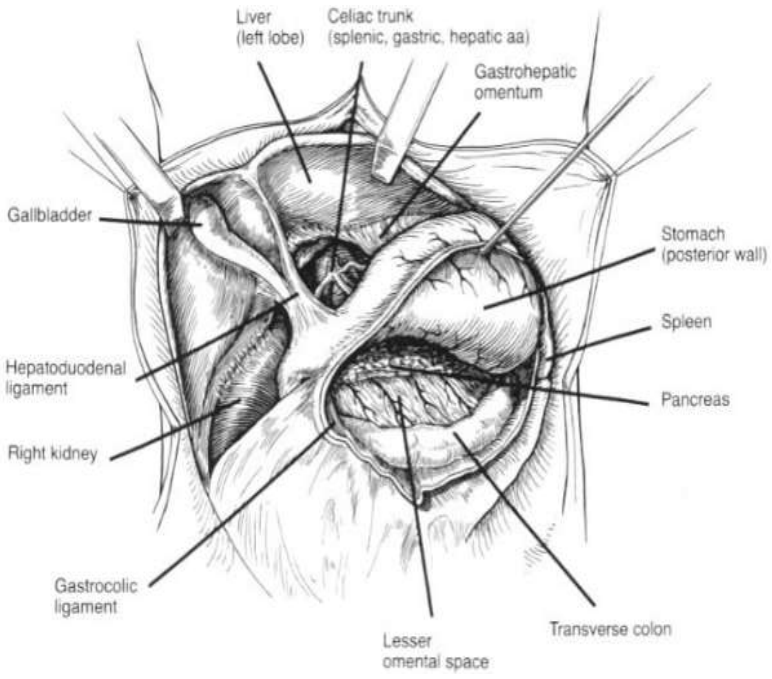

Fig:1- 2 Relation of posterior surface of the stomach. **(Mercer et al., 2002).**

Vagus Nerves

The left and right vagus nerves descend parallel with the esophagus and form the esophageal vagal plexus between the level of the tracheal bifurcation and the level of the diaphragm. From this plexus, two vagal trunks, anterior and posterior, form and pass through the esophageal hiatus of the diaphragm (fig:1-3). Each trunk subsequently separates into two divisions **(Skandalakis et al ., 2007)**.

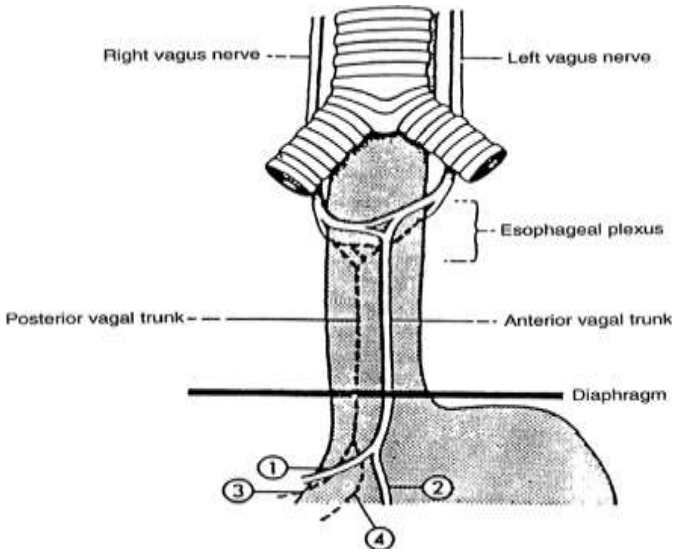

Fig: 1-3 Terminology of vagal structures of thorax and abdomen. In this example, two vagal trunks pass through hiatus to enter abdomen. 1, hepatic division;2, anterior gastric division; 3, celiac division; 4, posterior gastric division**. (Skandalakis et al ., 2007)**.

From the anterior trunk, the hepatic division passes to the right in the lesser omentum, branching before it enters the liver. One branch turns downward to reach the pylorus and sometimes the first part of the duodenum. The second division, the anterior gastric, descends along the lesser curvature of the stomach, giving branches to the anterior gastric wall. From the posterior trunk arises the celiac division, which passes to

the celiac plexus, and the posterior gastric division, which supplies branches to the posterior gastric wall. **(Soybel., 2005)**.

Celiac Division

The celiac division is the largest of the four vagal divisions. it lies in the gastropancreatic peritoneal fold created by the elevation of the peritoneum by the left gastric artery as the nerve follows this artery. It is single and led directly to the celiac plexus. This division may follow the left gastric artery or the right crus of the diaphragm, or it may take an intermediate position in the triangle bounded by the artery, the crus, and the right margin of the stomach. Vagal fibers connect the stomach with the brainstem as they terminate in the gastric mesenteric plexus**.** **(Soybel., 2005)**.

Posterior Gastric Division

The posterior gastric division forms the principal posterior nerve of the lesser curvature (posterior nerve of Latarjet). As a rule, the posterior nerve appears to terminate slightly higher on the lesser curvature and possesses fewer gastric branches than does the anterior nerve. In no case has a posterior nerve been observed to reach the duodenum. **(Skandalakis et al ., 2007)**.

Anterior Gastric Division

The separation of the anterior gastric and hepatic divisions occasionally occurred above the diaphragm, but usually lay on the abdominal esophagus or the cardia. A major branch of the anterior gastric

division formed the principal anterior nerve of the lesser curvature (anterior nerve of Latarjet). It usually lay from 0.5 to 1.0 cm from the lesser curvature. It may lay beneath the serosa of the gastric wall. This nerve can be traced distally to approximately the level of the incisura , but many reach the pylorus, and may be visible as far as the first part of the duodenum. Vagal branches that are subserosal at the surface may penetrate the muscularis and continue down to the antrum by the submucosal(Meissner) plexus. **(Skandalakis et al ., 2007)**.

From 2 to 12 branches pass from the principal nerve to the stomach wall. The anterior nerve of Latarjet may be duplicated; each nerve supplied its own. There is no true nerve of Latarjet; a fan of gastric branches to the stomach wall. The longer of these nerves is called the *antral nerve* arises from the anterior vagal trunk above the origin of the hepatic division, and one or more long branches below this origin descend to supply the antrum. Even where a definite nerve of Latarjet is present, there are usually some, and often many, branches to the gastric cardia and fundus that arise from the anterior trunk proximal to the origin of the hepatic division. **(Soybel., 2005)**.

Hepatic Division

The hepatic division of the anterior vagal trunk usually separates from the anterior gastric division at the level of the abdominal esophagus. It lies between the leaflets of the avascular portion of the hepatogastric ligament. It is frequently found in multiple and usually closely parallel branches. It typically accompanies an aberrant left hepatic branch of the left gastric artery. **(Skandalakis et al ., 2007)**.

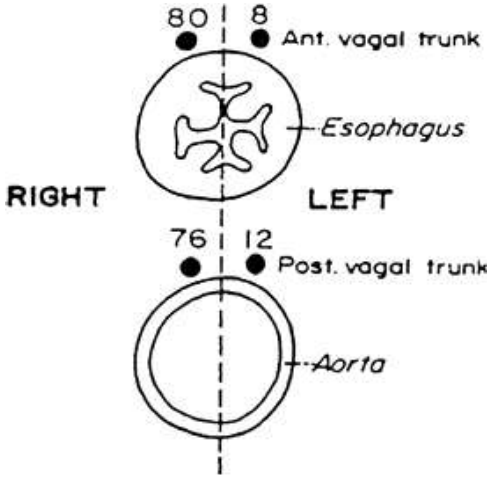

Fig:1-4- Relation of anterior and posterior vagal trunks to aorta and esophagus in . Trunks usually lie to right of midline. Anterior trunks are closer to esophagus than posterior trunks.. **(Skandalakis et al., 2004)**.

Blood supply of the stomach and duodenum

Most of the blood supply to the stomach is from the celiac artery. There are four main arteries: the left and right gastric arteries along the lesser curvature and the left and right gastroepiploic arteries along the greater curvature. In addition, a substantial quantity of blood may be supplied to the proximal stomach by the inferior phrenic arteries and by the short gastric arteries from the spleen(fig:1-5). The largest artery to the stomach is the left gastric artery, and it is not uncommon (15% to 20%) for an aberrant left hepatic artery to originate from it. Consequently, proximal ligation of the left gastric artery may result in acute left-sided hepatic ischemia because the aberrant left hepatic artery occasionally represents the only arterial flow to the left hepatic lobe. The right gastric artery arises from the hepatic artery (or the gastroduodenal artery). The left gastroepiploic artery originates from the splenic artery, and the right gastroepiploic originates from the gastroduodenal artery. The extensive anastomotic connection between these major vessels ensures that, the