Introduction

The imbalance between the organic mechanisms of defense and factors of aggression, being the Helicobacter pylori infection and the use of anti-inflammatory drug (NSAID) are the main causes, configures the pathogenesis of peptic ulcer (UP) ***(Byrge et al., 2013)***.

H. pylori infection and nonsteroidal anti-inflammatory drug (NSAID) usage contribute to a great majority of cases; thus, nonoperative management of the disease is indicated in nearly all cases, with the exceptions of hemorrhage, perforation, obstruction, and refractory disease ***(Wright et al., 2014).***

Direct Helicobacter treatment and eradication is paramount because complete mucosal healing occurs less than 0.5% of the time with persistent infection. Other notable sources implicated in benign disease include smoking, steroid usage, and Zollinger-Ellison syndrome ***(Zhou et al., 2015)***.

Decades ago the practice of elective surgeries to correct this type of ulcer was common, however, with the advancement of conservative clinical treatment from the eradication of H. pylori and acid control, mainly through the use of H2 blockers and Proton pump inhibitors (Ppis), the rate of performing these surgeries decreased considerably in the last three decades, becoming the clinical management enough to treat ***(Domínguez-Vega et al., 2013)***.

So, the surgical approaches current therapies are directed to cases of refractory peptic ulcer perforated and bleeding (PUP) ***(Wright et al., 2014; Bertleff et al., 2009)*** and its fundamental goals: treat or prevent complications of ulcer; reduce the secretion of acid to allow healing of the ulcer and tempering their recurrence; and minimize postoperative sequelae related to operation ***(Zimmermann et al., 2015)***.

Although good results in clinical management of peptic ulcer disease, emergency surgeries have increased drilling ***(Byrge et al., 2013; Zhou et al., 2015)***. It is estimated that 2% to 10% of patients with gastric or duodenal peptic ulcer perforation shall in the course of his life, being disproportionately greater mortality risk in the elderly ***(Zhou et al., 2015)***.

Between 5-10% are the values of incidence and mortality of perforated peptic ulcer and the mortality increases by 50% if the drilling last for more than 24 hours ***(Domínguez-Vega et al., 2013; Bertleff et al., 2009).***

Overall, the annual incidence rate of peptic ulcer disease (PUD) is 0,1% to 0,3%, resulting in nearly 300.000 new cases diagnosed each year; approximately one third of these are gastric ulcers. The advent of pharmacologic therapy to address acid hypersecretion and treat Helicobacter pylori infection is the primary reason for reduction in the need for elective surgical intervention ***(Bhogal et al., 2008)***.

Currently the standard surgical treatment for the PUP is the laparotomy ***(Golash, 2008)***, however, recognizes a number of deficiencies in this procedure with regard to a larger incision, considerable pain during the post-operative period and slow recovery. By these implications, laparoscopy is a surgical approach to therapeutic option ***(Thorsen et al., 2011).***

In this context, Mouret et al. published in 1990 the first results on the performance of laparoscopy for correction of perforated peptic ulcer. The conclusion of the study showed that laparoscopy is a good choice of surgical approach and its benefits the reduction of problems with respect to the surgical wound and adhesions ***(Bertleff et al., 2009; Golash, 2008; Thorsen et al., 2011; Wadaani, 2013)***, besides being related to improved and expanded view of the lesion, minor surgical incision, less pain during the post-operative and faster return of patient activities compared to findings post laparotomy ***(Zhou et al., 2015; Sanabria et al., 2013)***.

Despite the development of laparoscopic surgery for peptic ulcer disease, no consensus conclusion favoring its application has been reached. Some research showed that laparoscopic surgery has substantial advantages over open abdominal surgery for peptic ulcer disease, including less postoperative pain and postoperative complications and shorter hospital stay. However, the other research showed that laparoscopic repair is not superior to open abdominal surgery for peptic ulcer disease, and may even have worse outcomes including longer operative time. These inconsistent results make surgeons confounding whether laparoscopic surgery have better advantages than open abdominal surgery for perforated peptic ulcer ***(Quan et al., 2016).***

AIM OF WORK

Compare between laparoscopic and open repair of perforated peptic ulcer as regard postoperative advantage and complications.

Anatomy of Stomach and Duodenum

The stomach develops as an unequal dilatation of the foregut. It extends as a J-shaped loop from the lower end of the oesophagus at the level of the 11th thoracic vertebra and 2cm to the left of the midline to end in the duodenum just to the right of the first lumbar vertebra ***(Moore et al., 2010).***

The stomach is divisible into four parts. The cardia is a small macroscopically indistinct zone immediately distal to the gastrooesophageal junction; it merges distally into the fundus and is distinguishable only by its histological pattern. The fundus, strictly speaking, is that part which lies above a line drawn horizontally through the gastro-oesophageal junction, while the body comprises approximately the proximal two-thirds of the remainder; in many descriptions body and fundus appear to be synonymous. The pyloric antrum forms the distal third, leading into the pyloric sphincter. The body mucosa is rugose and freely mobile on the muscle beneath, while the antral mucosa is flattened, less rugose and more firmly anchored ***(Christensen, 1986).***

The incisural notch, so often used as a landmark in anatomical textbooks, is not an accurate guide. The only reliable distinguishing feature is the difference in histological appearance, for antral mucosa frequently extends far up the lesser curve and may reach almost to the cardia, particularly in women *(Oshida et al., 1959)*.

Topographical relations

In addition to the lesser and greater omenta which are attached to the lesser and greater curvatures of the stomach, respectively, other important topographical relations of the stomach are as follows ***(Ellis, 2013)***.

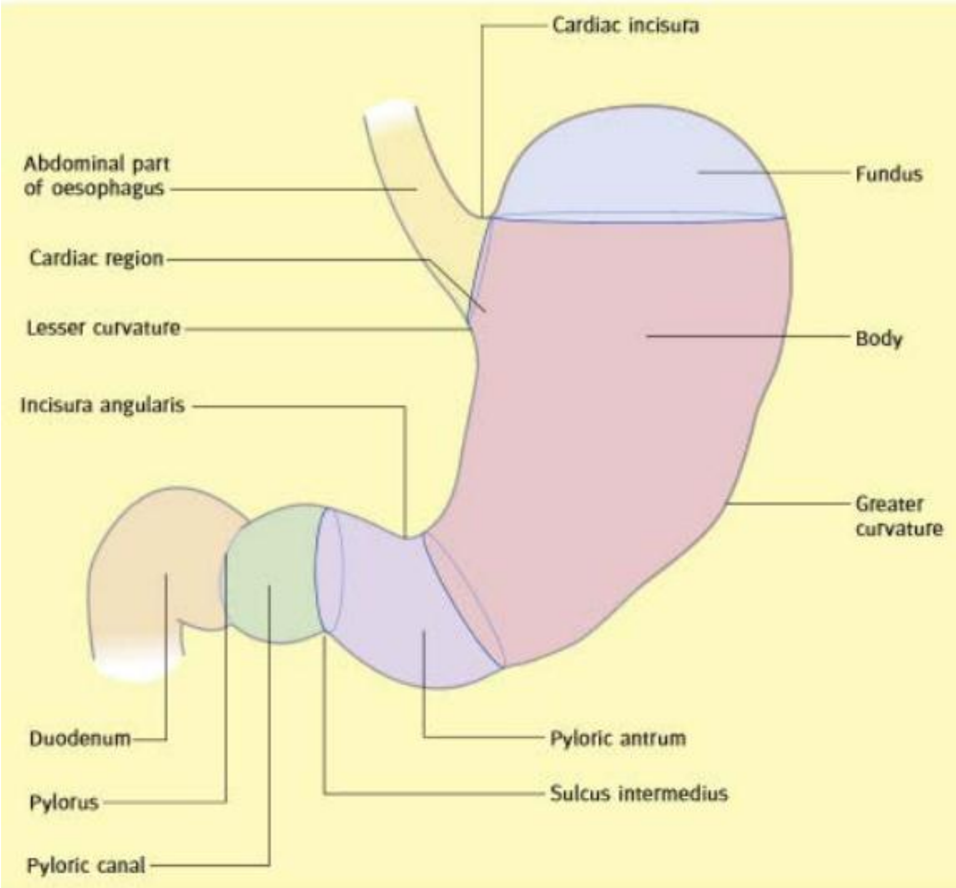

Figure (1): The borders and regions of the stomach (viewed from front) ***(Christensen, 1986)***.

Posterior relations: situated immediately behind the stomach and lesser omentum is the lesser sac (also known as the omental bursa). The lesser sac is, in effect, a diverticulum or recess of the general peritoneal cavity (also known as the greater sac). The window of communication between the lesser sac and general peritoneal cavity is termed the epiploic foramen or (foramen of Winslow). Behind the peritoneum that forms the posterior wall of the lesser sac are a number of structures which collectively make up the 'stomach bed' (Figure 2). These structures include the diaphragmatic crura, left dome of the diaphragm, the initial part of the abdominal aorta with the coeliac axis originating from it, the upper part of the left kidney, the left suprarenal gland, the pancreas, the medial surface of the spleen and the upper surface of the transverse mesocolon ***(Ellis, 2013).***

Anterior relations: the stomach is related anteriorly to a number of structures but is separated from these structures by the greater sac. The portion of the stomach lying under cover of the left rib cage is related anteriorly to the left hemidiaphragm. Further to the left the anterior wall of the stomach is related to the medial surface of the spleen. In the epigastric region the stomach and lesser omentum are overlapped by the left lobe of the liver. Lower still the anterior wall of the stomach is related to the posterior surface of the anterior abdominal wall ***(Ellis, 2013).***

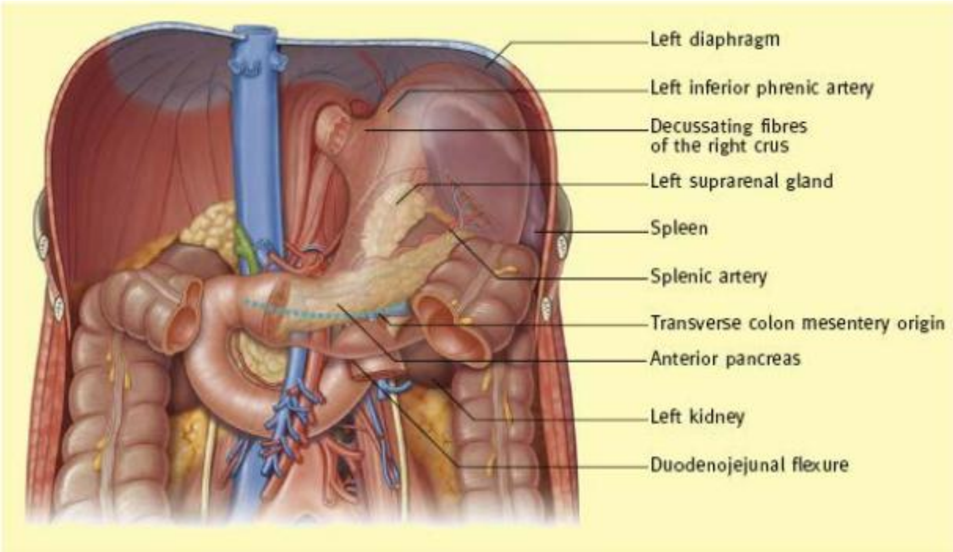

Figure (2): Posterior topographical relations of the stomach ***(Ellis, 2013).***

Arterial supply and venous drainage of the stomach

The stomach has a rich blood supply which it derives entirely from the coeliac axis (coeliac artery) reflecting its embryological derivation from the foregut. The coeliac axis typically gives rise to three branches: the left gastric artery, the common hepatic artery and the splenic artery. These are termed the primary branches of the coeliac artery, and all three contribute to the blood supply of the stomach ***(Sadler, 2012).***

Two arterial arcades, one situated alongside the lesser curvature and the other along the greater curvature of the stomach, provide most of the blood supply to the stomach. The arcade along the lesser curvature lies between the two leaves of the lesser omentum and is formed by the anastomosis of the right and left gastric arteries. This arcade supplies the anterior and posterior walls of the stomach alongside the lesser curvature ***(Sadler, 2012).***

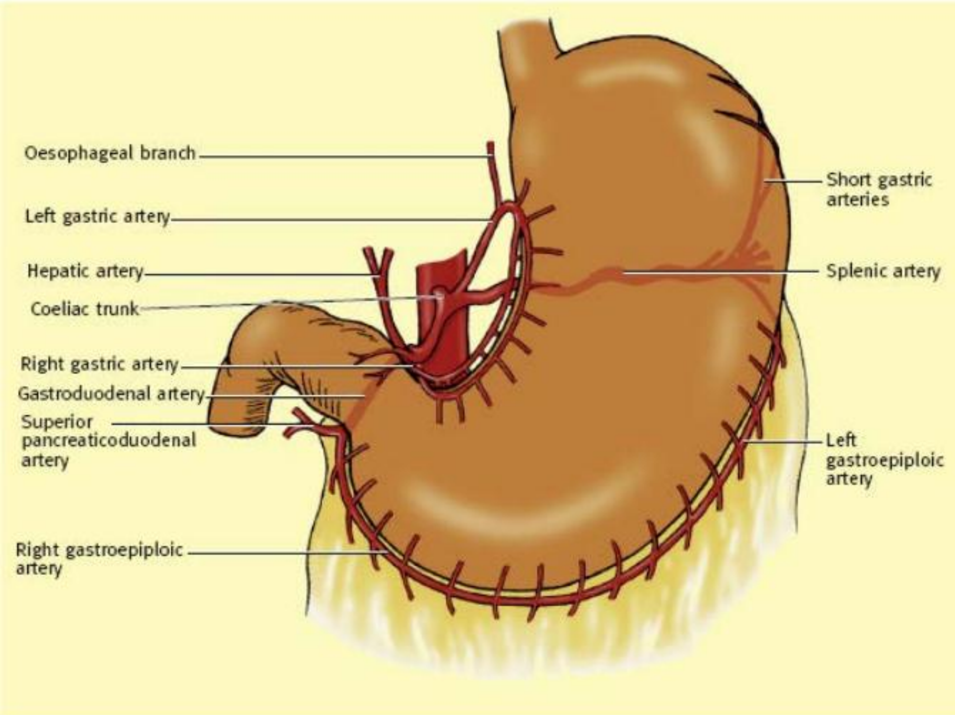

Figure (3): Arterial supply of stomach ***(Salder, 2012).***

Venous drainage of the stomach

Is by veins which correspond to the arteries which supply the stomach. Some of these veins drain directly into the portal vein while the majority drain either into the splenic or superior mesenteric vein, and thereby into the portal vein ***(Sadler, 2012)***.

Lymphatic drainage of the stomach (Figure 4)

The submucosa of the stomach features a rich network of anastomosing vessels. From this plexus lymphatic channels leave the stomach wall to drain into the extramural gastric lymph nodes which are widely distributed along the major arteries which supply the stomach. Practically all gastric lymph will eventually drain into the coeliac lymph nodes. The lymphatic vessels from the stomach generally follow the usual rule of accompanying the blood vessels of the stomach ***(Moore et al., 2010).***

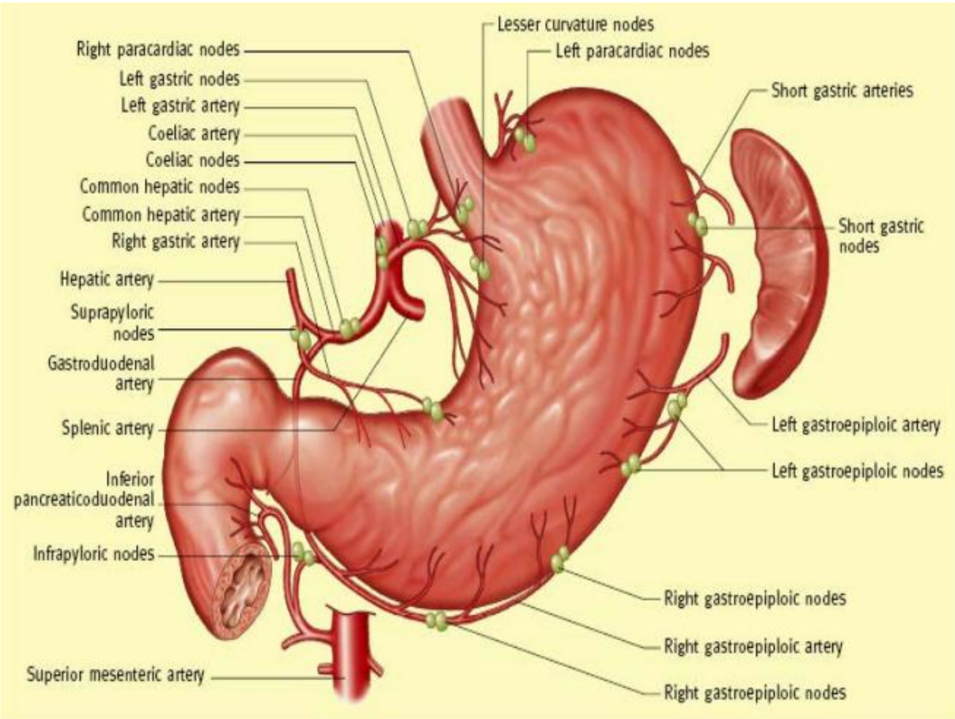

Figure (4): Lymphatic drainage of the stomach ***(Moore et al., 2012).***

Innervation

The stomach is extrinsically innervated by the autonomic nervous system (parasympathetic and sympathetic). The parasympathetic supply comes from the terminal branches of the vagus nerve. The anterior vagal trunk is derived from the left vagus nerve which divides into hepatic and anterior gastric branches. The posterior vagal trunk issues from the right vagus nerve and branches into the coeliac and posterior gastric nerves. This division is (or has been) surgically important because selective vagotomy allows preservation of the hepatic and coeliac branches, which may reduce the incidence of post-vagotomy diarrhoea. Sympathetic innervation derives from the sixth to ninth thoracic segments of the spinal cord, reaching the coeliac ganglion via the greater splanchnic nerves and spreading to the stomach along the gastric and gastro-epiploic arteries ***(Moore et al., 2005)*.**

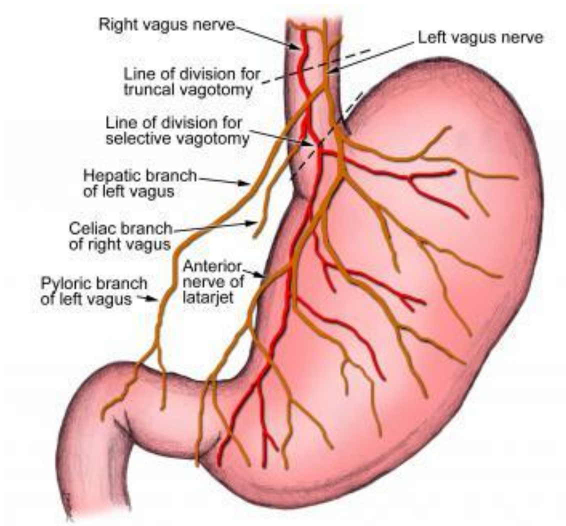

Figure (5): Vagal innervation of stomach ***(Moore et al., 2005)*.**

Anatomy of duodenum

Overview

The duodenum is the first part of the small intestine (5-7 m), followed by the jejunum and ileum (in that order); it is also the widest and shortest (25 cm) part of the small intestine. The duodenum is a C-shaped or horseshoe-shaped structure that lies in the upper abdomen near the midline (see the image below).

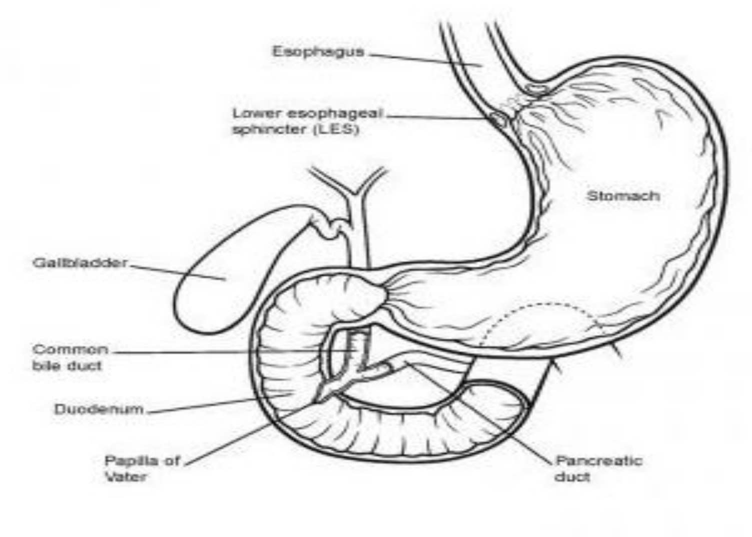

Figure (6): Gastrointestinal system ***(Gray and Lewis, 2000).***

Gross Anatomy

The pylorus of the stomach (at L1 level) leads to the duodenum, which has the following 4 parts:

- The first (superior) part, or duodenal bulb or cap (5 cm), which is connected to the undersurface of the liver (porta hepatis) by the hepatoduodenal ligament (HDL), containing the proper hepatic artery, portal vein, and common bile duct (CBD); the quadrate lobe (segment IV) of the liver and the gallbladder are in front, whereas the CBD, the portal vein (PV), and the gastroduodenal artery (GDA) are behind the first part of the duodenum ***(Gray and Lewis, 2000)***

- The second (descending) part (10 cm), which has an upper and a lower genu (flexure); the transverse mesocolon and transverse colon are in front, and the right kidney and inferior vena cava (IVC) are behind it; the head of the pancreas lies in the concavity of the duodenal C at the level of L2 vertebra ***(Moore et al., 2010).***

- The third (horizontal) part (7.5 cm) runs from right to left in front of the IVC and aorta, with the superior mesenteric vessels (the vein on the right and the artery on the left) in front of it ***(Gray and Lewis, 2000)***

- The fourth (ascending) part (2.5 cm) continues as the jejunum ***(Gray and Lewis, 2000)***

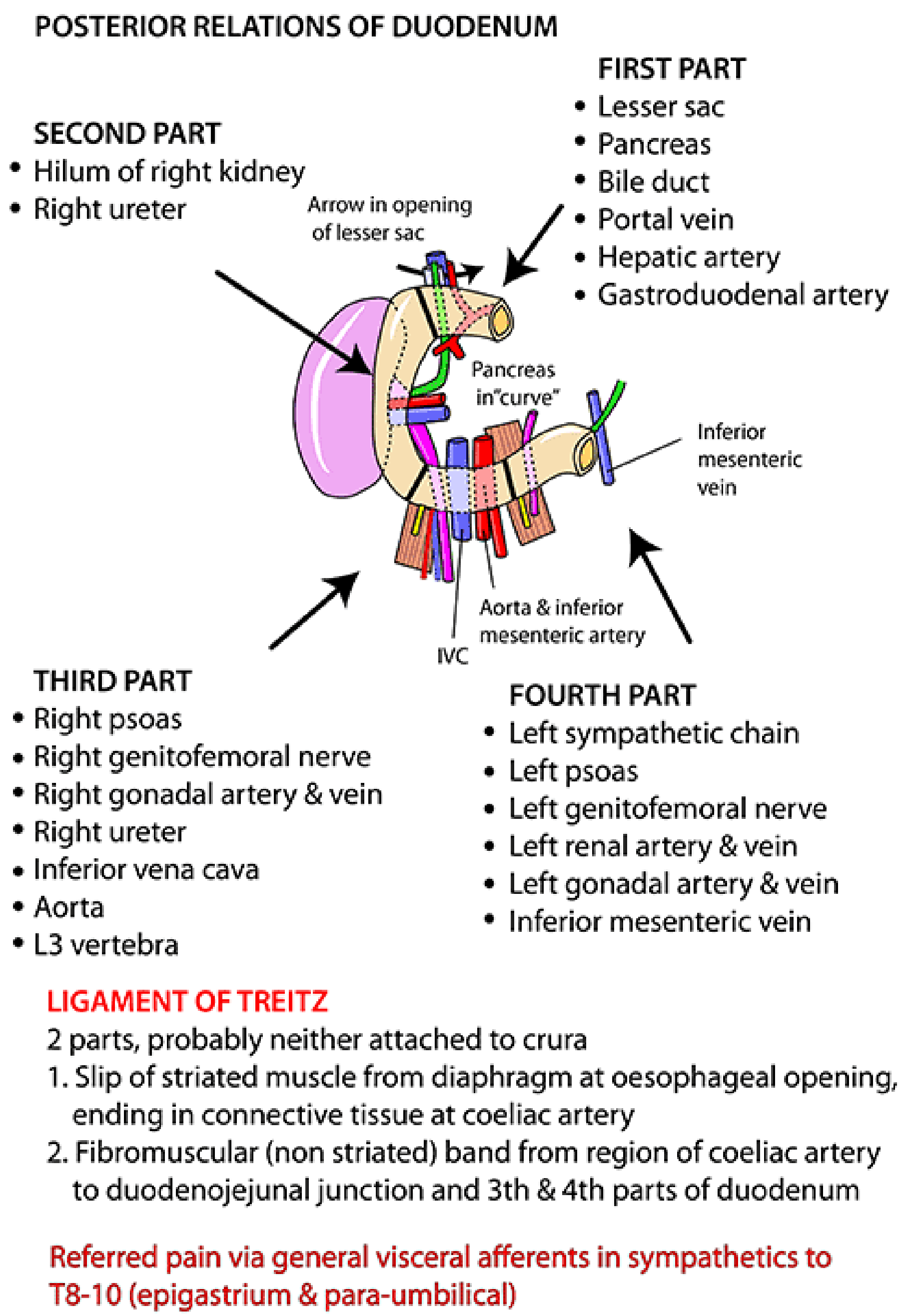

Figure (7): Duodenum – posterior relations and ligament of treitz
(Gray and Lewis, 2000).