COMPARTIVE STUDY OF DIFFERENT METHODS OF ELECTIVE SURGICAL TREATMENT OF DUODENAL ULCER

ESSAY

SUBMITTED IN PARTIAL FULFILLMENT FOR MASTER DEGREE OF

GENERAL SURGERY

BY

SAMIR WENIAT ABDOU

M.B.,B.CH.

UNDER THE SUPERVISION OF PROFESSOR DOCTOR

HAMDY MAHMOUD ABD ALLAH

PROFESSOR OF GENERAL SURGERY

AIN SHAMS UNIVERSITY

1983

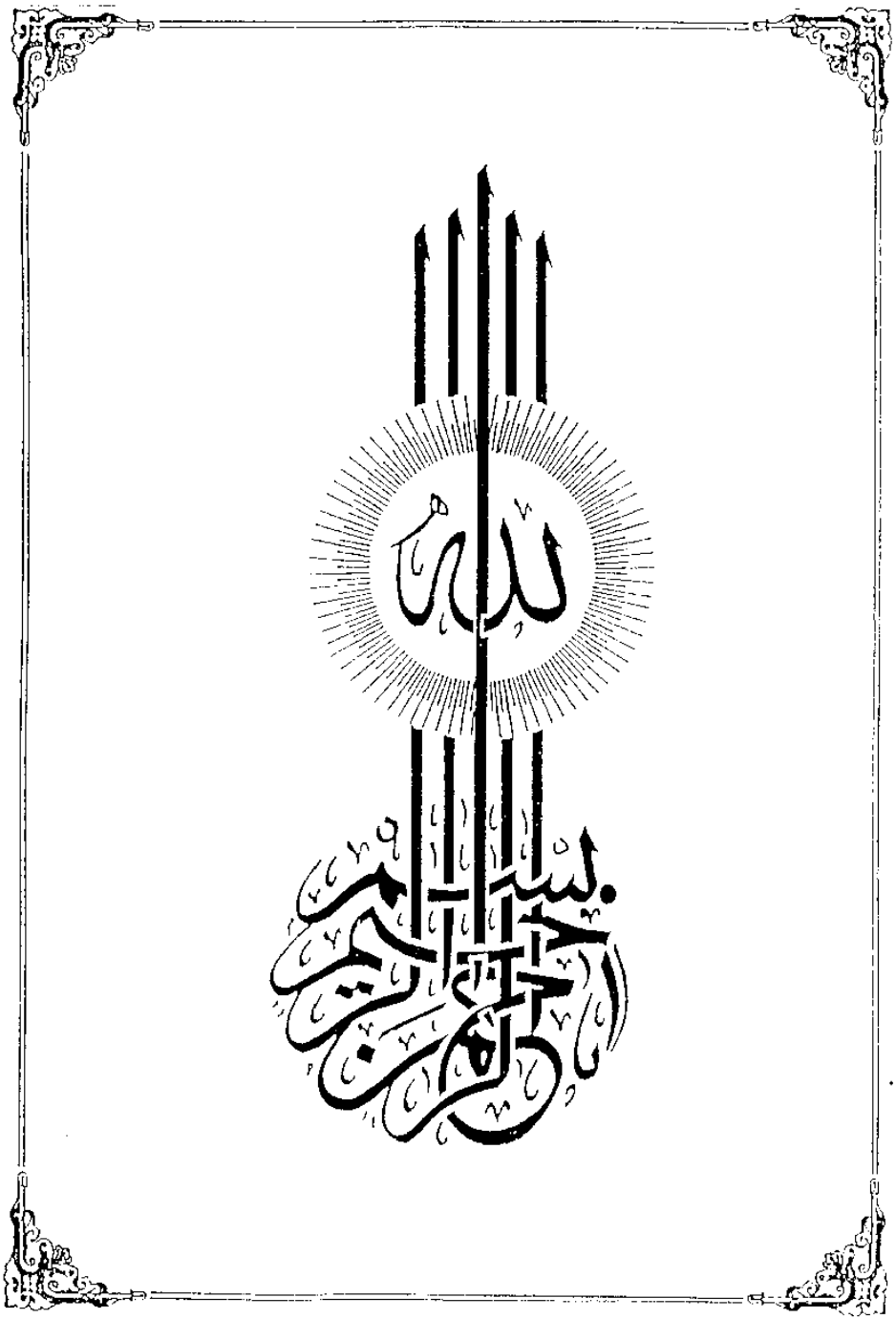
A C K N O W L E D G M E N T

There are no words to express my deep feeling towards my Professor Dr. HAMDY AHMOUD ASSALLY Professor of General Surgery , Faculty of Medicine , Ain Shams University for his kind care in this work and his easy supervision and his merciful hand that always gave me encouragement and confidence . I owe special gratitude to him for his patience and attention in revision.

I am deeply grateful to my Professor Dr. MAGED ZAKLAMA , the Ass. Professor of General Surgery, Faculty of Medicine , Ain Shams University , who began a long way with me and eduated me how to solve the problems that faced me in this work .

Samir Mengat Abdou

1983



C O N T E N T S

ANATOMY OF THE STOMACH

The stomach is the most dilated part of the digestive tube and is situated between the end of the oesophagus and beginning of the duodenum . Most of it lies under the cover of the lower ribs , in the left hypochondrium , epigastrium and umbilical regions . Being fixed at both ends (cardiac and pyloric) and mobile elsewhere , it is subjected to great variation both in size and shape according to the amount of the stomach contents, the stage of digestion , the degree of development and state of contraction of its muscular layers and the condition of adjacent viscera .

The cardiac orifice of the stomach is the opening by which the oesophagus communicates with the stomach , It is about one inch to the left of the median plain at a level of tenth thoracic vertebra . It is related to the diaphragm posteriorly and liver anteriorly . The right margin of the oesophagus is continuous with the lesser curvature of the stomach , while the left margin joins the greater curvature at an acute angle which is termed a cardiac notch .

The pyloric orifice of the stomach lies at the junction of the stomach with the first part of the duodenum . It lies about half an inch to the right of the median plain opposite to the lower part of the first lumber vertebra . The position of the pyloric orifice is indicated during operation by the pre-pyloric

vein of Mayo which is the small vein runs vertically across the anterior surface of the pylorus between right gastric vein and right gastroepiploic vein .

The fundus of the stomach is a part of the stomach that lies above the level of the cardiac orifice and in contact with the left dome of the diaphragm and usually full of gas .

The body of stomach is a part of the stomach which is extended from the fundus to an imaginary plain between the incisura angularis and the left side of the bulge on the greater curvature .

The pyloric antrum is a dilatation at the greater curvature that follows the body of the stomach . The posterior surface of the pyloric antrum is the most dependent part of the stomach and at this portion the anastomosis is done in the posterior gastrojejunostomy operation .

The pyloric canal is a narrow cylindrical part , about one inch in length and follows the pyloric antrum , while the pylorus is the part corresponding to the pyloric orifice which is the thickened part of the stomach that unites with the first part of the duodenum .

The lesser curvature forms the right border of the stomach , it extends from the cardiac orifice to the pylorus , and the lesser omentum passes from this margin to the liver . The right and the left gastric vessels run along it . The incisura angularis is a notch on this border nearer the pylorus than the oesophagus . It marks the junction of the superior part of the stomach with the inferior (pyloric) part .

The greater curvature is a left border of the stomach , that is nearly four times the length of the lesser curvature . It

begins at the cardiac notch , the it arches upwards backwards and to the left to define the fundus of the stomach , then it curves downwards forwards with the convexity downwards and to the left , and finally upwards and to the right till ends at the pylorus . From this curvature , the two layers of the peritoneum pass to the diaphram to form gastrophrenic ligament , then it continues as gastro-splenic ligament from the upper part of the body of the stomach to the spleen . The greater omentum arises from the lower part of the body of the stomach to the transverse colon . On the greater curvature , the right and left gastroepiploic vessels run between the two layers of the peritoneum .

The antrosuperior surface of the stomach is completely covered by peritoneum of the greater sac and is related to the left lobe and quadrate lobe of the liver and also related to the diaphragm which separates it from the left pleura and lung, the pericardium and heart . The left upper part of this surface comes into relation with the gastric impression of the spleen.

The posteroinferior surface of the stomach is covered by the peritoneum of the lesser sac and is related to many structures forming the stomach bed (which are : left crus of the diaphram , a part of the left kidney , left suprarenal gland , caeliac trunk and its branches , anterior surface of the pancreas , transverse colon and mesocolon , caeliac ganglia , lymph nodes and plexus) . These structures are separated from the stomach by the cavity of the lesser sac(omental bursa).

Structurely , the stomach has four coats or layers . They are from within outwards ; the mucous membrane (mucosa) , the submucous layer (submucosa) , the muscular coat and the serous coat (serosa) .

When the stomach is empty , the mucous membrane is thrown into convoluted ridges or rugae owing to the presence of elastic tissue in it . In the region of the lesser curvature , the rugae form [illegible] ridges with intervening depressions . Histologically , the epithelium of the mucous membrane is simple columnar type . These columnar cells are found not only on the surface of the stomach but also lining the gastric pits . At the bottom of these gastric pits , the epithelial cells become continous with the gland cells . The glands are tubular types and closely packed with little connective tissue (lamina propria) in between . The muscularis mucosa consists of smooth muscle fibres longitudinally arranged mainly, forming the outer limit of the mucous membrane , some fibres extend into the stroma between adjacent glands . The gastric glands can be subdivided into the following : -

1 - The oxyntic glands : which are found in the body and fundus of the stomach (oxyntic gland area) . Each gland contains four types of cells ; the mucous neck cell , the parietal (oxyntic) cell , the chief(peptic) cell and the endocrine (G)cell, The neck of the glands contain the mucous neck

cells mainly . These mucous neck cells show minor structural differences from the surface epithelial cells, however, both surface epithelial cells and mucous neck cells secrete the mucous . The parietal cells are usually scattered singly among the mucous neck cells and the chief cells and are more numerous at necks of the glands . Hydrochloric acid and gastric intrensic factor are manufactured by these cells. The chief cells are typical exocrine cells secreting granules of pepsinogen (the precursor of pepsin) and they form the majority of the gland cells . The G cells are found mainly in the gastric antrum .

2 - Thepyloric glands are simple branched tubular glangs and are found in the pyloric part of the stomach (the pyloric gland area) . The G cells which manifacture the hormone gastrin are mainly found in these glangs . Between the oxyntic and pyloric gland areas , there is a transitional zone about one cm. wide .

3 - The cardiac glands are found in a small segment located at the gastro-oesophageal juction (the cardiac gland area). These glands contain mainly mucous secreting cells .

The submucosa of the stomach consists of arealar tissue containing many of elastic fibres and fat . It contains an extensive plexuses of blood vessels and nerves (the submucous or Meissner's plexus) .

The muscular coat of the stomach consists of three layers of muscle fibres ; the inner oblique , middle circular and

outer longitudinal layers . The inner layer is mainly limited to the body of the stomach , while the circular and the longitudinal layers are completely surrounded the stomach . The circular layer is more marked at the pylorus to form the pyloric sphincter . The serous coat consists of mesothelium attached to the muscular coat by a loosely arranged connective tissue .

The arterial blood supply of the stomach is drived from the caeliac trunk . The left gastric artery (one of the three main branches of the caeliac trunk) arches upwards and to the left towards the oesophageal hiatus of the diaphragm and then passes along the lesser curvature between the two layers of the lesser omentum to anastomose there with the right gastric artery which is a branch from the hepatic artery . The fundus is supplied by several short gastric arteries which arise from the splenic branch of the caeliac trunk and run between the layers of the gastrosplenic ligament . The short gastric vessels anastomose with the left gastric and left gastroepiploic vessels . The greater curvature recieves branches from the right gastroepiploic arteries (from the splenic and gastroduodenal arteries respectively) . The two gastroepiploic arteries pass along the greater curvature between the two layrs of peritoneum that form the greater omentum . They usually anastomose freely with each other . Small branches from these vessels run for short

distances over the anterior and posterior surfaces of the stomach and then pierce the muscular coat to form an extensive arterial plexus in the submucosa . The mucous membrane is supplied from this plexus . There are arterovenous anastomosis between the structures of the stomach wall , but possible relationship of these vascular shunts to diseases of the stomach has not been established (Hamilton , 1978) .

Veins accompany the arteries named above . The left and the right gastric veins drain directly to the portal vein . The right gastric vein usually receives a small tributary , the pre-pyloric vein of Mayo , which is a surgically useful guide to the gastro-duodenal junction since it lies on the anterior surface of the junction . The left gastroepiploic and short gastric veins drain into the splenic vein . The right gastroepiploic vein opens int either the superior mesentric vein itself or its middle colic tributary(Hamilton,1978).

NERVE SUPPLY OF THE STOMACH : -

The stomach is supplied by both divisions of autonomic nervous system (sympathetic and parasympathetic) . The anterior and posterior vagal trunks are derived from the oesophageal plexus , conveying preganglionic parasympathetic fibres to the stomach , but also containing many afferent fibres concerning wilh reflex activity and not with the sensation of pain whivh travels by fibres that accompany sympathetic nerve (Hamilton , 1978) . Both trunks give

rise two main branches or group of branches . The anterior vagal trunk passes along the lesser curvature between the two layers of the lesser omentum with the left gastric vessels . It gives off numerous gastric branches mainly to the anterior surface of the stomach including a large branch to the pyloric antrum and pylorus (greater anterior gastric nerve of Latarjet), and a hepatic branch that runs through the lesser omentum into the porta hepatis . The posterior vagal trunk similarly runs between the layers of the lesser omentum giving off gastric branches mainly to the posterior surface of the stomach , and a caeliac branch which accompanies the left gastric artery in a retrograde manner as far as the origin of that vessel from the caeliac trunk to reach the caeliac plexus. The vagal fibres that enter the stomach wall synapse with the ganglion cells in the two nerve plexuses - the myenteric (Auerbach's) plexus which lies between the muscular coats and the submucous (Meissner's) plexus which lies in the submucous layer . These ganglionic cells give origin to the postganglionic fibres .

The sympathetic nerves to the stomach are posganglionic fibres derived from the caeliac ganglia and plexus . They either accompany the various arteries that enter the stomach wall or proceed as separate nerve filamens where they join the myentric and submucous plexuses .

The vagal (parasympathetic) nerves stimulate gastric peristalsis and secretion and relax the pyloric sphincter , while the sympathetic nerves are vaso-constrictor , inhibit peristalsis and secretion of the stomach with contraction of the pyloric sphincter . The sympathetic fibres contain pain fibres that reach the spinal cord via the sympathetic trunk , white rami communicantes and dorsal nerve roots. So in the trunkal vagotomy there is reduction in gastric secretion and motility but has no effect on gastric pain (Hamilton , 1978).

ANATOMY OF THE DUODENUM

The duodenum extends from the pylorus to the duodenojejunal flexure . Its shape is like a letter C and most of the concavity of the loop mouls around the head of the pancreas . In front , the duodenum is partially covered with peritoneum , while behind it is fixed to the posterior abdominal wall by a loose areolar tissue . The duodenum is usually described as consisting of four parts . The superior (first) part passes upwards backwards and laterally to the right side of the vertebral column at the level of the first lumber vertebra above the head of the pancreas . Posteriorly, there are the gastroduodenal artery , bile duct and portal vein . The descending (second) part is about three inches , it turns down on the right side from the second to the third lumber vertebra . Posteriorly, there are the right renal vessels , upper part of the ureter and a part of the right kidney. The horizontal (third) part is about four inches and lies horizontally crossing from right to left to become continuous with the

fourth part at the left side of the third lumber vertebra . The inferior vena cava , aorta , testicular(or ovarian) vessels and the origin of the inferior mesentric artery are situated posterior to the third part of the duodenum. The ascending (fourth)part is about one inch and is directed upwards on the aorta and left psoas major to end at the duodenojejunal flexure at the level of the second lumber vertebra .

The anterior surface of the duodenum above the attachment of the transverse mesocolon is related to the visceral surface of the liver and gall bladder . Below the attachment of the transverse mesocolon , the anterior surface of the duodenum is related to the transverse colon and mesocolon and the upper coils of the jejunum . The superior mesentric vessels cross the anterior surface of the third part of the duodenum to enter the root of the mesentry . The position of the duodeno-jejunal flexure is maintained partialy by a fibromuscular band (ligament of Treitz) . It passes from the right crus of the diaphragm at the right side of the oesophagus behind the pancreas and is attached to the flexure posteriorly .

The bile duct opens into the posteromedial aspect of the second part of the duodenum just below its middle . It unites with the main pancreatic duct to form a dilatation inside the wall of the duodenum which is called ampulla of Vater. This ampulla opens into the lumen of the duodenum by a narrow opening which is situated on the summit of a papilla known as a major duodenal papilla. The accessary pancreatic duct

opens about one inch above major duodenal papilla on the summit of a smaller papilla called minor duodenal papilla .

Structurally , the duodenum has four coats which are from out inwards ; the serous coat , the muscular coat , the submucosa and mucosa . The muscular coat consists of an inner circular and an outer longitudinal layer and in between them lies the myentric plexus . The submucosa is packed by a groop of mucous secreting glands called Brunner's glands which begin abruptly at the pyloroduodenal junction and disappear gradually towards the duodenojejunal junction . The ducts of these glands pierce the muscularis mucosa of the next layer to open in the bases of the duodenal crypts . The mucosa is composed of epithelial layer , lamina proprria and muscularis mucosa . The epithelial layer projects in the lumn of the duodenum to form the villi and dips towards the muscularis mucosa to form crypts . The lamina propria forms a core of the villa and the crypts imbed in it .

The supra-ampullary part of the duodenum (that developes from the foregut) receives its arterial blood supply from the branches of the caeliac trunk through the superior pancreaticoduodenal branch of the gastroduodenal artery and also from small branches of right gastric and hepatic arteries . The supraduodenal artery is a small vessel which arises from the right gastric or hepatic artery , runs on the first part of the duodenum and it was suggested as a factor in the aetiology of the duodenal ulcer by Wilkie , who considered the vessels