SMALL INTESTINAL FISTULAE

ESSAY

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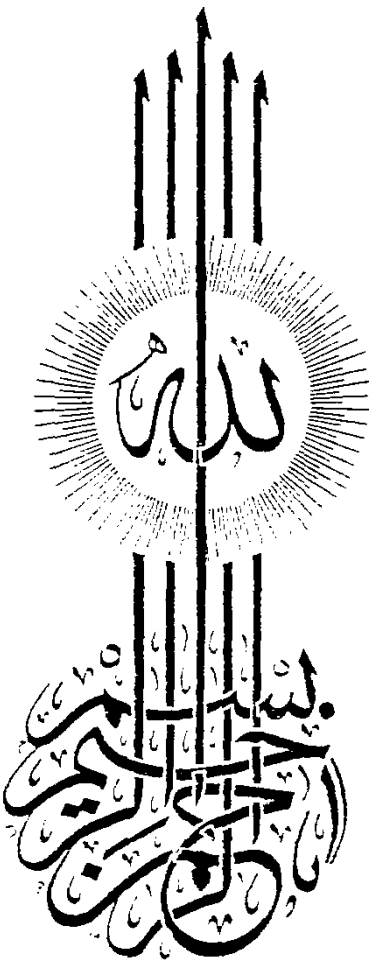

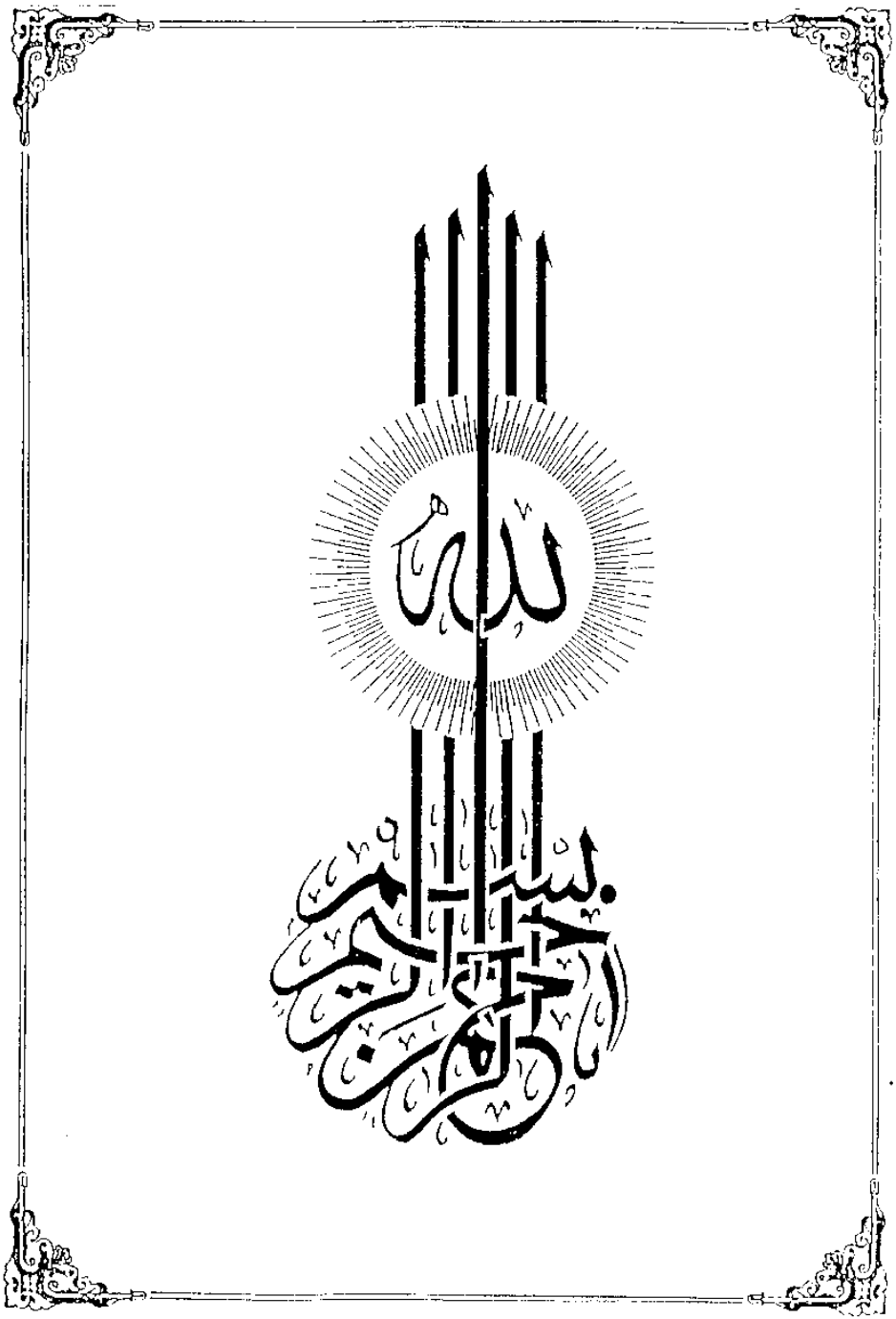

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ANATOMY OF THE SMALL INTESTINE

The small intestine that portion of the alimentary tract which extends from the pylorous to the caecum .

The average distance from the nose to the anus is about 453 cm. The duodenum is approximately 21 cm long ., the combined length of the jejunum and the ileum is 261 cm or about 3/5 of the entire canal or 8/5 of the body height.

The name duodenum [twelve fingers] was applied to the most proximal segment of the small intestine because of its length twelve fingers, its diameter varies from 3-5 cm .

The first inch of the duodenum is contained between the peritoneum of the lesser and greater omenta, but the remainder of this part of the gut is entirly retro-peritoneal. The duodenum is a c-shaped tube curved over the convexity of the forwardly projecting aorta and inferior vena cava, while its descending limb lies more posteriorly in the right paravertebral gutter.

It is divided into four parts all of which run in

ANATOMY OF SMALL INTESTINE

different direction . The tube is 10 inches [25 cm] long and the length of the four parts are 2,3,4 and 1 inches .

The first part of the duodenum runs backwards and somewhate upwards. The first inch lies between the peritoneal folds of the greater and lesser omenta, it forms the lowermost boundary of the opening into the lesser sac.

The epiploic foramen [the foramen of Winslow] lies behind the free edge of the gastro-hepatic omentum, it is 3 cm in size, situated opposite thoracic 12 vertebra.

Ant : Right free border of the lesser omentum containing the bile duct, the vertical part of the hepatic artery and the portal vein.

Post : Inferior vena cava, and right adrenal gland.

Sup. : Caudate process of the liver.

Inf. : Horizontal part of the hepatic artery and below the first part of the duodenum.

The neck of the gall bladder touches the upper convexity of the duodenal cap. The next 3cm. passes backwards and upwords on the right crus of the diaphragm and right psoas

muscle, to the medial border of the right kidney. Its posterior surface is bare of peritoneum, this is to the right of the epiploic foramen. It touches the upper part of the head of the pancreas and is covered in front with the peritoneum of the posterior abdominal wall. The inferior surface of the right lobe of the liver lies over this peritoneum.

The second part of the duodenum curves downwards over the hilum of the right kidney .It is covered in front with peritoneum and is crossed by the attachment of the transverse mesocolon so that its upper half lies in the supracolic compartment to the left of the hepatorenal pouch [in contact with the liver] and its lower half lies in the right infracolic compartment medial to the inferior pole of the right kidney [in contact coils of jejunum] It lies alongside the head of the pancreas.Its postero-medial wall receives the common opening of the bile duct and the main pancreatic duct at the duodenal papilla [papilla of vater]. The papilla lies about halfway along the second part, some 4 inches [10 cm.] from the pylorous. It is guarded by the semilunar flap of mucous membrane which surrounds it . Two cm. proximal to the papilla is the small opening of the accessory pancreatic duct.

The third part of the duodenum curves forwards from the right paravertebral gutter over the slope of the right psoas muscle [gonadal vessels and ureter interventing] and passes over the forwardly projecting inferior vena cava and aorta to reach the left psoas muscle. Its inferior border lies on the aorta at the commencement of the inferior mesentric artery at the level of the umbilicus . Its upper border hugs the lower border of the pancreas. It is covered by the pancreas. it is covered by the peritoneum or the posterior abdominal wall just below the transvers mesocolon. it is crossed by the superior mesentric vessels and by the leaves of the commencement of the mesentry of the small intestine stoping down from the duodenojejunal flexure. It lies therefore in both right and left infracolic compartments. Its anterior surface lies in contact with coils of jejunum.

The fourth part of the duodenum ascends to the left of the aorta lying on the left psoas muscle and left lumbar sympathetic trunk to reach the lower border of the pancreas, almost as high as the root of the transverse mesocolon [L_2 vertebra]. It is covered infront by the peritoneal floor of the left infracolic compartment and

by coils of jujenum. It breaks from the peritoneum that has plastered it down to the posterior abdominal wall and curves forwards and to the right as the duodeno-jujunal flexure. This pulls up a double sheet of peritoneum from the posterior abdominal wall, the mesentry of the small intestine which slopes down to the right across the third part of the duodenum and posterior abdominal wall.

There is no distinction between duodenum and jejunum, save only the peritoneal arrangement. The duodenum is retroperitoneal. The jejunum has a mesentry.

The duodeno-jejunal flexure is fixed to the left psoas fascia by fibrous tissue. It is said to be further supported by the suspensory ligament of the duodenum. This is a thin band of smooth muscle [The muscle of treiz] it descends from the right crus of the diaphragm infront of the acrta, behind the pancreas and blends with the outer muscle coat of the flexure. It is usually impossible to find the muscle.

The jejunum is wider-bored, thicker walled and redder than the ileum, but these differences are only relative and a more useful method of distinguishing one from

the other on the living is by rolling the wall of the intestine gently between finger and thumb.

The lower reaches of the ileum are distinguished by the presence on the antimesentric border of elongated whitish plaques in the mucous membrane usually but not always visible through the mucous wall. These are aggregated lymphatic follicles [Peyer's patches].

The jejunum lies colied in the upper part of the infracolic compartment, the ileum in the lower part and in the pelvis.

Meckel's diverticulum : is present in 2 percent of individuals, it is 2 feet [60 cm.] from the caecum and is 2 inches [5 cm.] long projecting from the antimesentric border of the ileum.

Microscopic anatomy of the small intestine. The duodenum possesses long slinder villi and the crypts extend from the bases of the villi to the muscularis mucosa. The villi are covered with columner epithelium containing many goblet cells. The crypts are lined with spherical cells which stain well.

The whole of the submucosa is packed with mucous glands from the the muscularis mucosae to the inner circular muscle of the bowel wall. These are Brunner's glands and their ducts pierce the musculairs mucosa to open in the depth of the crypts. Brunner's glands commence abruptly at the pyloroduodenal junction and disappear gradually towards the duodeno-jejunal junction.

The jejunum and ileum are similar. Each possesses villi and in each the crypts penetrate through the mucouc membrane to the muscularis mucosa. Villi and crypts are both well developed in the jejunum and there are relatively few goblet cells in the columnar epithelium, in the ileum the villi and crypts become gradually shorter and goblet cells more numerous but there is no abrupt change and it is often impossible to identify a section as one or the other. At all levels the height of a villus equals the length of a crypt.

Under the microscope it is difficult or impossible to distinguish jejunum from ileum especially if the species is not known. IN man the upper jejunum show long slender villi and correspondingly long crypts of lieberkuhn [glandulae intestinales]. The terminal ileum

shows much shorter villi and shorter crypts, the goblet cell content of the crypts is very high, and the crypts resemble mucous crypts of the large gut the transition is graduel along the intestine .

Aggregated lymphatic follicles do not help to distinguish. They are not necessarily but through [they are scattered only along the antimesentric border] and they occur also in the jejunum. [where they are smaller than in the ileum].

BLOOD SUPPLY OF THE SMALL INTESTINE

The duodenum is supplied by the superior and inferior pancreatico duodenal arteries and in its first inch [2 cm.] by multiple small branches from the hepatic and gastroduodenal arteries. It is drained by the corresponding veins into the portal vein and superior mesentric vein. The veins from the multiple arteries to the first inch [2 cm] collects into the prepyloric vein.

The artery of the midgut is the superior mesentric artery which supplies the gut from the entrance of the

bile duct to a level just short of the splenic flexure of the colon

The superior mesentric artery arises from the front of the abdominal aorta at the lower part of the body of the first lumbar vertebra. At its origin it lies behind the body of the pancreas, then it appears at the lower border of the pancreas and runs through the root of the mesentry into the right iliac fossa where it terminates.

The splenic vein crosses in front of the aorta above the origin of the superior mesentric artery while the left renal vein crosses in front of the aorta below the origin of the artery. It runs in front of the following structures in succession. The left renal vein the uncinate process of the pancreas, the thrid part of the duodenum, the abdominal aorta, the inferior vena cava, the right psoas major, right ureter, right testicular or ovarian vessels and the right genito-femoral nerve. It terminates by anastomosing with a branch of the ileocolic artery.

The inferior pancreatico duodenal artery arises from the superior mesentric artery just before it crosses

the duodenum and runs in the concavity of the duodenum between it and the head of pancreas. It gives branches to the duodenum and head of pancreas and anastomoses with the superior pancreatico duodenal artery .

The jejunal and ileal arteries arise from the convex left side of the superior mesentric artery. They are 12 - 15 in number. They run between the two layers of the mesentry. Each artery divides into two branches, which anastomose with the neighbouring ones to form a series of arterial arcades .

Branches arise from these arcades. These rebranch again to form a second series of arcades and the process may be repeated. In the upper quarter of the mesentry one series of arcades is found. In the second quarter two series of arcades are found. In the third quarter three series are present. While in the lower quarter four series of arcades are present. The terminal arcades, give straight end arteries which supply the jejunum and ileum .

The ileo colic artery arises from the concave right side of the superior mesentric artery. It passes downwards and to the right behind the peritoneum of the post-