GASTROSTOMY AND ITS VALUES IN POST-CORROSIVE OESOPHAGEAL STRICTURE

THESIS

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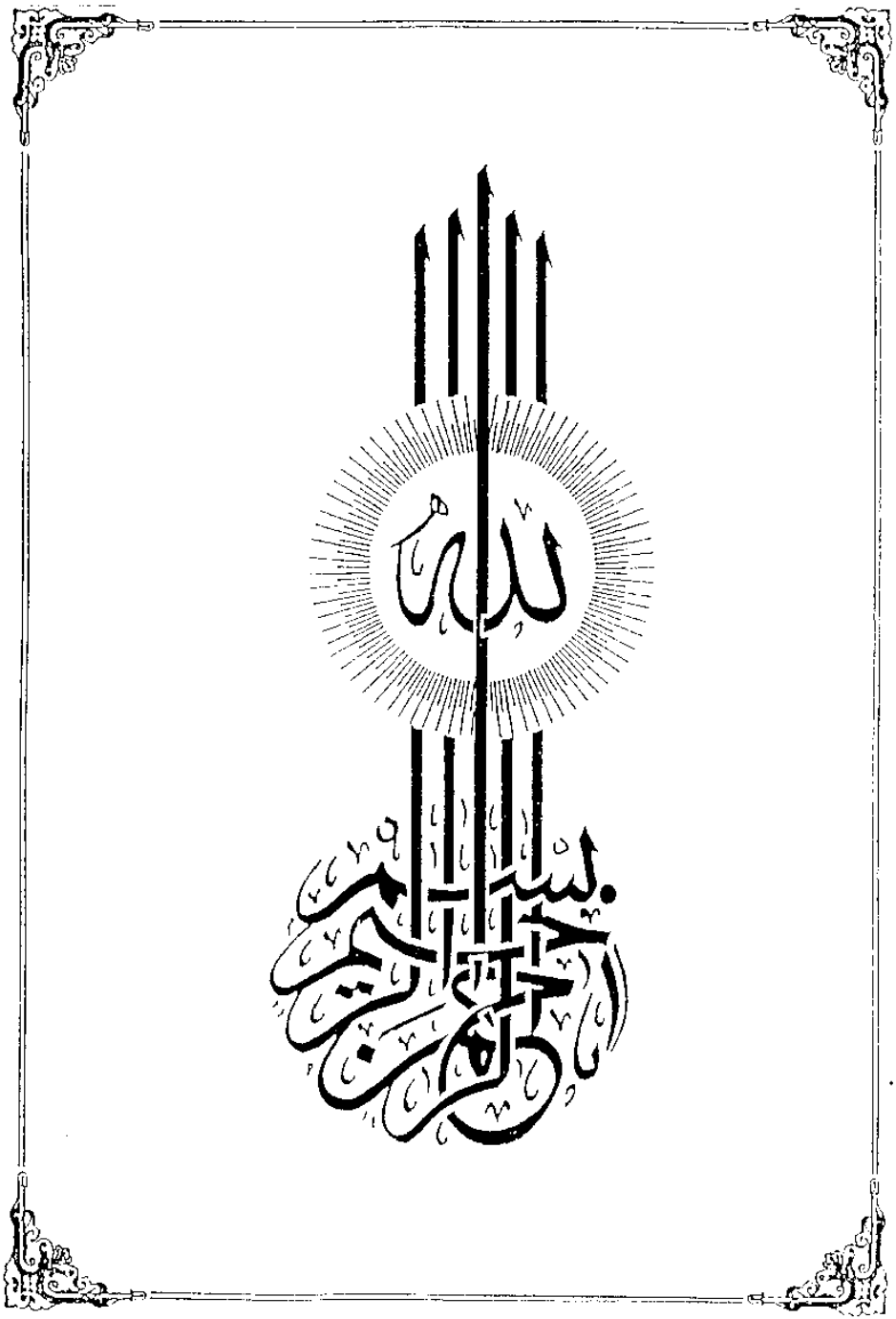

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INTRODUCTION

Gastrostomy is one of the old operations, it is very useful for feeding of those patients who cannot be fed orally especially those with postcorrosive oesophageal stricture. It has many advantages and little complications, if it is compared with other methods for feeding of this group of patients. It is not difficult technically, and feeding through it is an easy process.

Anatomy

Innervation of the Stomach

The stomach is innervated by sympathetic and parasympathetic nerves.

Sympathetic nerves:

Preganglionic efferent fibers destined for the stomach and duodenum leave the spinal cord (fifth or sixth to ninth or tenth thoracic segments), traverse their respective sympathetic ganglia without synapse and unite to join the greater splanchnic nerves. Upon reaching the coeliac ganglia by way of the greater splanchnics, the preganglionic fibers form a synapse with postganglionic fibers that go to the stomach and proximal duodenum by way of various branches of coeliac artery. The afferent system consists of a single neuron that returns along the same pathways (Nyhus, 1977).

Parasympathetic nerves:

The vagus nerves are the sole source of parasympathetic innervation of the foregut and midgut. Below each pulmonary hilus, the left and right vagus nerves descend on either side of the esophagus, and in the lower thorax they branch and communicate with each other as the esophageal plexus, which surrounds the esophagus. The branches of the esophageal

plexus then unite to form two vagal trunks one anterior and the other posterior to the esophagus.

The anterior vagal trunk divides into anterior gastric and hepatic vagal divisions. The posterior trunk divides into posterior gastric and celiac vagal divisions (Griffith, 1964).

Prior to the embryological rotation of the stomach, the vagal trunks lie on either side of the oesophagus, and their gastric divisions descend to the stomach along the lesser curvature. After rotation the trunks and gastric divisions assume anterior and posterior positions (Griffith, 1962).

The gastric vagi, the anterior and posterior gastric divisions reach the stomach at the cardia and descend along the lesser curvature beneath the anterior and posterior peritoneal surfaces of the lesser omentum as the anterior and posterior gastric nerves of Latarget. The stomach is innervated by terminal branches from anterior and posterior gastric nerves (Griffith, 1962).

By means of electrical stimulation of the vagi in the presence of circulating neutral red dye, Prichard et al. (1968) have shown that the vagal innervation of the stomach

is segmental. Through their gastric divisions, the anterior and posterior trunks innervates the anterior and posterior walls of the stomach, respectively. Each terminal branch from the gastric nerves innervates its own segment of stomach with minimum of overlap.

Blood Supply of the Stomach

Coeliac artery:

It is the artery of the foregut, it arises from the front of the aorta, high between the crura of the diaphragm opposite the body of the twelfth thoracic vertebra. It is a short wide trunk, flanked by the coeliac group of lymph nodes. The coeliac ganglia of the sympathetic system lie on each side sending nerves to the artery which are carried along all its branches. It divides immediately into its three branches behind the peritoneum of the posterior wall of the omental bursa.

The left gastric passing upwards to the oesophageal opening and sending an esophageal branch to the lower part of the esophagus, then it enters between the two layers of the lesser omentum, and turns to the right along the lesser curvature. It breaks up into two parallel branches which anastomose end on with the two branches of the right gastric artery. The hepatic runs in opposite direction down to the pylorus, and each raises a fold in the peritoneum.

Splenic artery runs to the left along the upper border of the pancreas, before it breaks up into its terminal

splenic branches, it gives off the left gastro-epiploic artery and the vasa brevia. The later are half a dozen of short arteries that pass to the fundus of the stomach. The left gastro-epiploic passes to the right along the greater curvature, between the two layers of the gastro-colic omentum, and it anastomoses end on with the right gastro-epiploic artery. It lies about a centimetre from the stomach wall, and gives off branches at right angles, the upper branches are the gastric branches which sink in the anterior and posterior walls of the stomach. The lower branches are the epiploic branches which run between the two layers of the greater omentum.

The right gastric artery is a branch of the hepatic it passes to the left between the layers of the lesser omentum, and divides into two branches which anastomose end on with the branches of the left gastric artery.

The right gastro-epiploic artery is a branch from the gastro-duodenal artery, and the later is a branch from the hepatic artery. The right gastro-epiploic artery passes forwards between the first part of the duodenum and the pancreas, and turns to the left between the two layers of the gastro-colic omentum at their attachment over the front

of the head of the pancreas. It lies one centimetre from the greater curvature and usually anastomoses end on with the left gastro-epiploic artery. It gives off branches at right angles to anterior and posterior wall of the stomach and to the greater omentum.

Submucosal plexus:

The arteries supplying the stomach send off specific anterior and posterior gastric branches that penetrate the stomach's muscular coat anteriorly and posteriorly, close to the lesser and greater curvatures. Upon reaching the submucosa, they ramify extensively throughout the entire submucosa. Maintaining a relatively large caliber, these ramifications anastomose frequently with each other to form the submucosal plexus, which consists of both the arteries and their venous counterparts. Independent branches from the submucosal plexus supply the mucosa everywhere except in the lesser curvature, which receives delicate branches directly from the right and left gastric arteries (Bentley, 1952).

Arteriovenous shunts: The submucosal plexus contains arteriovenous shunts (Sherman et al., 1954).

Peters and Womack (1958) showed that the shunts close to supply a maximum of blood to the mucosa for the secretion of gastric juice and open to divert blood from the mucosa when the mucosa is at rest.

Motor Functions of the Stomach

We can describe the motor functions of the stomach in three lines.The first is the storage of food, second is the mixing of food with gastric secretions, and the third is the slow emptying of food to the small intestine.

As regards storage function, it accomodates great quantities of food because of the little tone in its muscular wall so it can bulge progressively without significant change in the pressure inside the stomach.

Mixing of food with the gastric juice which is secreted in the near vicinity is helped by weak constrictor waves called mixing waves in a frequency of about three/min. They tend to move gastric secretions and outermost layer of food gradually towards the antral part of the stomach where they become stronger, and mixing to greater degree of fluidity occur. Mixing waves, are helped by intense peristaltic movements in the antral portion of the stomach.

The resulting mixture of food and gastric secretions called (chyme), the degree of fluidity of it depends on the relative amounts of food, and stomach secretions and on the degree of digestion that has occurred.

The propulsion of food through the stomach is accomplished by strong peristaltic waves about once every about twenty seconds, and exerting fifty to seventy cm of water pressure.

Hunger contractions:

An intense type of contraction, which occurs when the stomach has been empty for a long time.

They are usually rhythmic peristaltic contractions, usually most intense in young healthy persons with high degrees of gastrointestinal tonus, and they are also greatly increased by a low level of blood sugar.

During these contractions, the person sometimes experiences a sensation of pain in the pit of his stomach, usually do not begin until 12-24 hours after the last ingestion of food; in starvation they reach their greatest intensity in three to four days and then gradually weaken in succeeding days.

Hunger contractions are often associated with a feeling of hunger and therefore are perhaps an important means by which the alimentary tract intensifies the desire for food when a person is in a state of incipient starvation.

Reflex regulation of stomach contractions is initiated by distention of the stomach by food through vagal afferent signals that pass to the medulla oblongata, and reflexly inhibit the tone in the storage area of the stomach but at the same time increase the rate of stomach secretion and the intensity of both the mixing and peristaltic waves.