Recent Modalities In Debulking Procedures For Morbid obesity.

Essay:

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Introduction :

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems. ***(Allison DB,etal;2011).***

Body mass index (BMI), a measurement which compares weight and height, defines people as overweight (pre-obese) if their BMI is between 25 and 30 kg/m^2, and obese when it is greater than 30 kg/m^2 ***.(Fried M,etal; 2010).***

Acombination of excessive caloric diet intake , and a lack of physical activity is thought to explain most cases of obesity. A limited number of cases are primarily due to genetics, medical reasons, or psychiatric illness***. (Adams JP &Murphy PG,2010).***

Obesity increases the risk of many physical and mental conditions. These comorbidities are most commonly shown in metabolic syndrome, a combination of medical disorders which includes, diabetes mellitus type 2, high blood pressure, high blood cholesterol, and high triglyceride levels ***(Grundy SM,2011).***

Non surgical treatment for obesity consists of dieting , physical exercise &medication. Diet programs may produce weight loss over the short term, but maintaining this weight loss is frequently difficult and often requires making exercise and a lower caloric diet a permanent part of a person's lifestyle. Success rates of long-term weight loss maintenance with lifestyle changes are low ranging from 2–20%. ***(Bray GA,etal;2011).***

Bariatric surgery is currently the only modality that provides a significant, sustained weight loss for the patient who is morbidly obese, with resultant improvement in obesity-related comorbidities ***(Sjöström L, et al. ;2012)***

Weight loss is achieved by reducing the size of the stomach with an implanted medical device (gastric banding) or through removal of a portion of the stomach (sleeve gastrectomy or biliopancreatic diversion with duodenal switch) or by resecting and re-constructing the small intestines to a small stomach pouch (gastric bypass surgery). Long-term studies show the procedures cause significant long-term loss of weight, recovery from diabetes, improvement in cardiovascular risk factors, and a reduction in mortality of 23% from 40%. ***(Robinson MK,2010).***

Anatomy of stomach:

The stomach is the most dilated part of the digestive tube, and is situated between the end of the esophagus and the beginning of the small intestine. It lies in the epigastric, umbilical, and left hypochondriac regions of the abdomen, and occupies a recess bounded by the upper abdominal viscera, and completed in front and on the left side by the anterior abdominal wall and the diaphragm. ***(Gray H&Lewis WH,2003).***

The shape and position of the stomach are so greatly modified by changes within itself and in the surrounding viscera that no one form can be described as typical. The chief modifications are determined by (1) the amount of the stomach contents, (2) the stage which the digestive process has reached, (3) the degree of development of the gastric musculature, and (4) the condition of the adjacent intestines. It is, however, possible by comparing a series of stomachs to determine certain markings more or less common to all ***(Gray H&Lewis WH,2003).***

The stomach presents two openings, two borders or curvatures, and two surfaces.

A) Openings:

1)cardiac orifice:

The opening by which the esophagus communicates with the stomach is known as the cardiac orifice, and is situated on the left of the middle line at the level of the tenth thoracic vertebra. The short abdominal portion of the esophagus (antrum cardiacum) is conical in shape and curved sharply to the left, the base of the cone being continuous with the cardiac orifice of the stomach. The right margin of the esophagus is continuous with the lesser curvature of the stomach, while the left margin joins the greater curvature at an acute angle, termed the

incisura cardiaca. ***(Romanes GJ ,etal;2006)***

2) The pyloric orifice:

The pyloric orifice communicates with the duodenum, and its position is usually indicated on the surface of the stomach by a circular groove, the duodenopyloric constriction. This orifice lies to the right of the middle line at the level of the upper border of the first lumbar vertebra ***(Romanes GJ ,etal;2006).***

B.Curvatures:

1) The lesser curvature:

The lesser curvature (curvatura ventriculi minor), extending between The cardiac and pyloric orifices, forms the right or posterior border of The stomach. It descends as a continuation of the right margin of the eosophagus in front of the fibers of the right crus of the diaphragm, and then, turning to the right, it crosses the first lumbar vertebra and ends at the pylorus. Nearer its pyloric than its cardiac end is a well-marked notch, the incisura angularis, which varies somewhat in position with the state of distension of the viscus; it serves to separate the stomach into a right and a left portion. The lesser curvature gives hepatogastric ligament, and between these two layers are the left gastric artery and the right gastric branch of the hepatic artery***.(Grant JCB,etal;2007).***

2) The greater curvature:

The greater curvature (curvatura ventriculi major) is directed mainly forward, and is four or five times as long as the lesser curvature. Starting from the cardiac orifice at the incisura cardiaca, it forms an arch backward, upward, and to the left; the highest point of the convexity is on a level with the sixth left costal cartilage. From this level it may be followed downward and forward, with a slight convexity to the left as low as the cartilage of the ninth rib; it then turns to the right, to the end of the pylorus. Directly opposite the incisura angularis of the lesser curvature the greater curvature presents a dilatation, which is the left extremity of the pyloric part; this dilatation is limited on the right by a slight

groove, the sulcus intermedius, which is about 2.5 cm, from the duodenopyloric constriction. The portion between the sulcus intermedius and the duodenopyloric constriction is termed the pyloric antrum. At its commencement the greater curvature is covered by peritoneum continuous with that covering the front of the organ. The left part of the curvature gives attachment to the gastrolienal ligament, while to its anterior portion are attached the two layers of the greater omentum, separated from each other by the gastroepiploic vessels. ***(Grant JCB,etal;2007).***

C.Surfaces:

1)The antero-superior Surface:

The left half of this surface is in contact with the diaphragm, which separates it from the base of the left lung, the pericardium, and the seventh, eighth, and ninth ribs, and intercostal spaces of the left side. The right half is in relation with the left and quadrate lobes of the liver and with the anterior abdominal wall. When the stomach is empty, the transverse colon may lie on the front part of this surface. The whole surface is covered by peritoneum. ***(Agur AMR,etal;2008).***

2) The Postero-inferior Surface

The Postero-inferior Surface is in relation with the diaphragm, the spleen, theleft suprarenal gland, the upper part of the front of the left kidney, the anterior surface of the pancreas, the left colic flexure, and the upper layer of the transverse mesocolon. These structures form a shallow bed, the stomach bed, on which the viscus rests. The transverse mesocolon separates the stomach from the duodenojejunal flexure and small intestine. The postero-inferior surface is covered by peritoneum, except over a small area close to the cardiac orifice; this area is limited by the lines of attachment of the gastrophrenic ligament, and lies in apposition with the diaphragm, and frequently with the upper portion of the

left suprarenal gland***.(Agur AMR,etal;2008).***

Component parts of the stomach:

A plane passing through the incisura angularis on the lesser curvature and the left limit of the opposed dilatation on the greater curvature divides the stomach into a left portion or body and a right or pyloric portion. The left portion of the body is known as the fundus, and is marked off from the remainder of the body by a plane passing horizontally through the cardiac orifice. The pyloric portion is divided by a plane through the sulcus intermedius at right angles to the long axis of this portion; the part to the right of this plane is the pyloric antrum (Fig.1) ***(Gray H&Lewis WH,2003)***

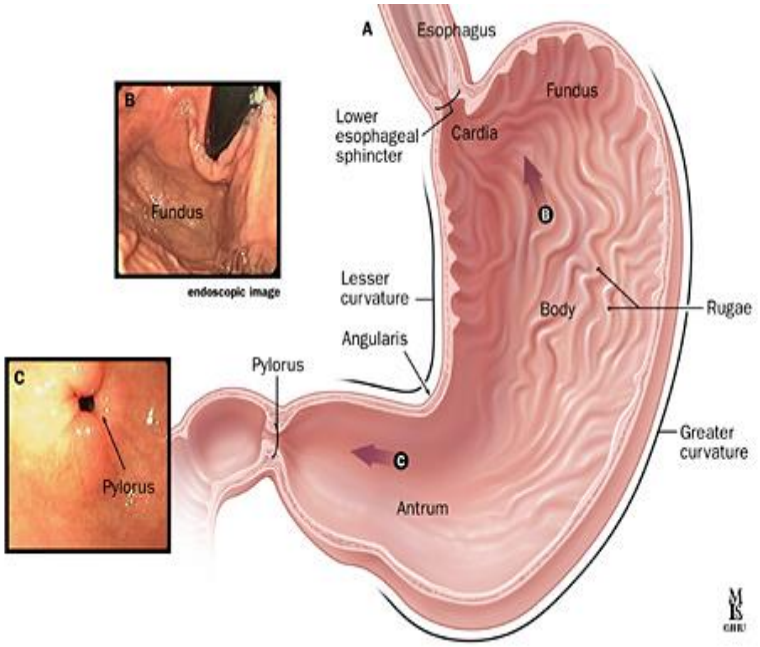


FIG. 1– Outline of stomach, showing its anatomical landmarks.B&C(endoscopic view) ***(GrayH&Lewis WH,2003)***

Position of the stomach:

If the stomach be examined during the process of digestion it will be founddivided by a muscular constriction into a large dilated left portion, and a narrow contracted tubular right portion. The constriction is in the body of the stomach, and does not follow any of the anatomical landmarks; indeed, it shifts gradually toward the left as digestion progresses, i. e., more of the body is gradually absorbed does not follow any of the anatomical landmarks; indeed, it shifts gradually toward the left as digestion progresses, i. e., more of the body is gradually absorbed into the tubular part ***(Gray H&Lewis WH,2003).***

Structure of stomach wall:

mucosa	The first main layer. This consists of the epithelium and the lamina propria (composed of loose connective tissue), with a thin layer of smooth muscle called the muscularis mucosae separating it from the submucosa beneath.
submucosa	This layer lies over the mucosa and consists of fibrous connective tissue, separating the mucosa from the next layer. The Meissner's plexus is in this layer (AKA submucosal plexus).
muscularis externa	Over the submucosa, the muscularis externa in the stomach differs from that of other GI organs in that it has three layers of smooth muscle instead of two. • inner oblique layer: This layer is responsible for creating the motion that churns and physically breaks down the food. It is the only layer of the three which is not seen in other parts of the digestive system. The antrum has thicker skin cells in its walls and performs more forceful contractions than the fundus. • middle circular layer: At this layer, the pylorus is surrounded by a thick circular muscular wall which is normally tonically constricted forming a functional (if not anatomically discrete) pyloric sphincter, which controls the movement of chyme into the duodenum.

	This layer is concentric to the longitudinal axis of the stomach. • Auerbach's plexus (AKA myenteric plexus) is found between the outer longitundinal and the middle circular layer and is responsible for the innervation of both (causing peristalsis and mixing) • outer longitudinal layer(fig.2).
serosa	This layer is over the muscularis externa, consisting of layers of connective tissue continuous with the peritoneum.

Table 1-structure of stomach wall ***(SinnatambyCS,2008).***

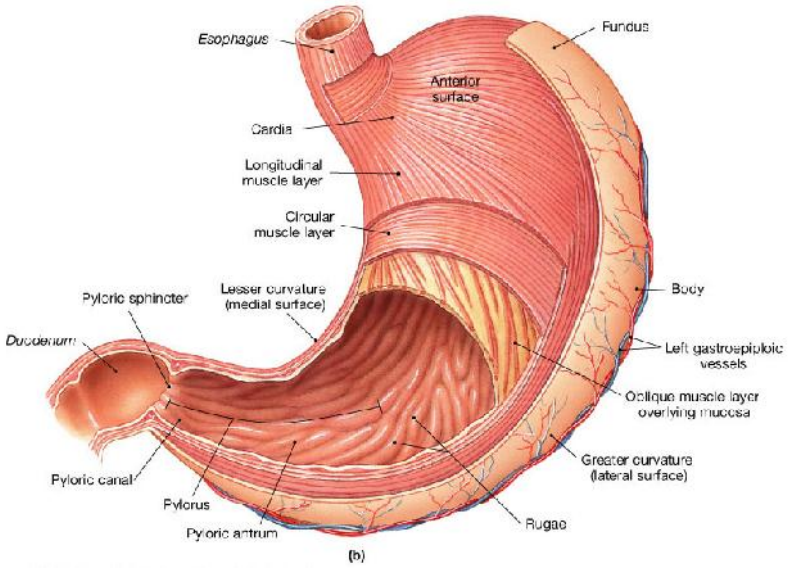


FiG .2-longitudinal,circular&oblique muscle fibers of stomach***(Richard M,etat;2009)***

The gastric glands:

The gastric glands are of three kinds: (a) pyloric, (b) cardiac, and (c) fundus or oxyntic glands. They are tubular in character, and are formed of a delicate basement membrane, consisting of flattened transparent endothelial cells lined by epithelium (Table 2) ***(Sinnatamby CS,2008).***

A) The pyloric glands:

The pyloric glands , are found in the pyloric portion of thestomach. They consist of two or three short closed tubes opening intoa common duct or mouth. These tubes are wavy, and are about one-half the length of the duct.

The duct is lined by columnar cells, continuous with the epithelium lining the surface of the mucous membrane of thestomach, the tubes by shorter and more by shorter and more cubical cell which are finely granular***.(De Araujo,etal;2008)***

B) The cardiac glands:

The cardiac glands , few in number, occur close to the cardiac orifice. They are of two kinds: (1) simple tubular glands resembling those of the pyloric end of the stomach, but with short ducts; (2) compound racemose glands resemblingthe duodenal glands ***(De Araujo,etal;2008***

C) The fundus glands:

The fundus glands , are found in the body and fundus of the stomach; they are simple tubes, two or more of which open into a single duct. The duct, however, in these glands is shorter than in the pyloric variety, sometimes not amounting to more than one-sixth of the whole length of the gland; it is lined throughout by columnar epithelium. The gland tubes are straight and parallel to each***(De Araujo,etal;2008)***.

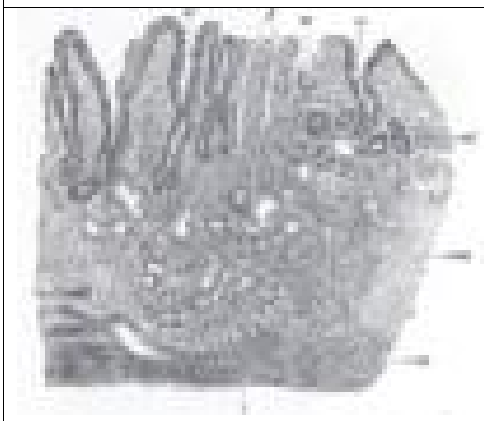
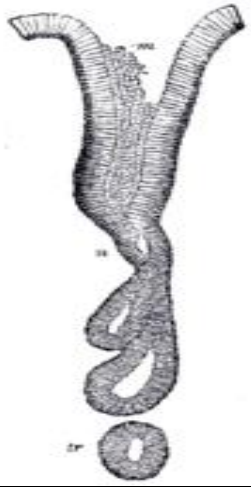
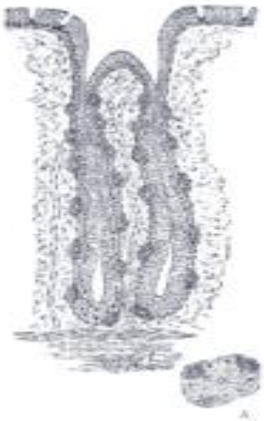
Cardiac glands	**Pyloric glands**	**Fundic glands**
		

Table 2- The gastric glands ***(Sinnatamby CS,2008).***

Types of cells found in gastric glands:

Table 3-different types of cells found in gastric gland ***(Ackroff,etal;2005)***.

Layer of stomach	Name	Secretion	Region of stomach	Staining
Isthmus of gland	Mucous neck cells	mucus gel layer	Fundic, cardiac, pyloric	Clear
Body of gland	parietal (oxyntic) cells	gastric acid and intrinsic factor	Fundic only	Acidophilic
Base of gland	chief (zymogenic) cells	pepsinogen	Fundic only	Basophilic
Base of gland	enteroendocrine (APUD) cells	hormones gastrin, histamine, endorphins, serotonin, cholecystokinin and somatostatin	Fundic, cardiac, pyloric	-

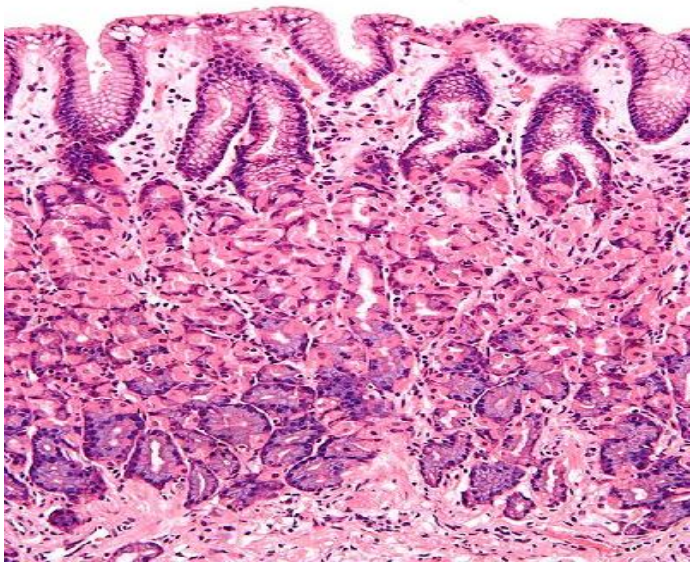


FiG 3-Micrograph showing a cross section of the stomach wall, in the body portion of the stomach. H&E stain.(***Venturi S.&Venturi M., 2009).***

FiG 4-Microscopic cross section of the pyloric part of the stomach wall***(Venturi S.&Venturi M.,2009).***

Blood supply of stomach:

The celiac trunk (axis) arises from the anterior surface of the abdominalaorta at the level of L1. It has a short length (about 1 cm) and trifurcatesinto the common hepatic artery (CHA), the splenic artery, and the left gastricartery (LGA).

The LGA runs toward the lesser curvature of the stomach and divides intoan ascending branch (supplying the abdominal esophagus) and a descendingbranch (supplying the stomach). The CHA runs toward the right on thesuperior border of the pancreas and gives off the gastroduodenal artery (GDA), which runs down behind the first part of the duodenum. After giving off theGDA, the CHA continues as the proper hepatic artery. ***(Anne M,etal;2010).***

The right gastric artery, a branch from the proper hepatic artery, runs alongthe lesser curvature from right to left and joins the descending branch of the LGA to form an arcade along the lesser curvature between the 2 leaves of peritoneumof the lesser omentum. The GDA divides into the right gastro-omental (gastroepiploic) artery (RGEA) and the anterior superior pancreaticoduodenalartery (SPDA); it also gives off