



GI ANATOMY

6



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PERITONEUM 2 (CONT..)

❖ The Peritoneal Recesses and Fossae:

In certain parts of the abdomen (at the junction between intraperitoneal and retro peritoneal organs) the transition from a retroperitoneal organ to an intraperitoneal one creates a fold of peritoneum; this fold may have a recess or fossa beneath it.

An example on this is the fossa found around the epiploic foramen (the foramen between the greater and lesser sacs).

From a surgical point of view, the **omental bursa** can be considered to belong to this category, with its opening at the **epiploic foramen**, bounded in front by the free border of the lesser omentum.

These recesses are of surgical importance since they may become the site of internal hernia, that is, a piece of intestine or the greater omentum may enter a recess or fossa and if there is pressure on the walls of the intestine, internal hernia will become strangulated hernia (the intestine is constricted or strangulated by the peritoneal fold grading the entrance to the recess → cut of blood supply to that part of the intestine).

The cut of the blood supply in strangulated hernia will cause gangrene (degeneration of cells) in the part of the small intestine that is herniated, and this requires urgent surgical intervention where we remove the gangrenous part of the small intestine and connect the two healthy parts together.

A person with internal hernia (especially kids) will have a feeling of discomfort and slight pain but if it progresses to strangulated hernia there will be severe pain.

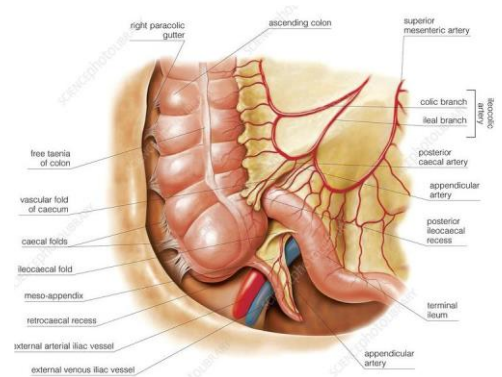
These recesses are sometimes found in relation to **the duodenum** (retroperitoneal except the first and last inches and the jejunum is intraperitoneal so there are recesses around it), **cecum** (in the right iliac fossa, the cecum is retroperitoneal while the ileum is intraperitoneal *please note that the cecum as a whole is considered intraperitoneal*) and **sigmoid colon** (intraperitoneal but the descending colon is retroperitoneal so recesses may form).

1. Duodenal Recesses:

- A. The superior duodenal recess or fossa (posterior abdominal wall)
- B. The inferior duodenal recess or fossa (posterior abdominal wall)
- C. The paraduodenal recess or fossa
- D. The duodenojejunal recess or fossa

2. Cecal Recesses:

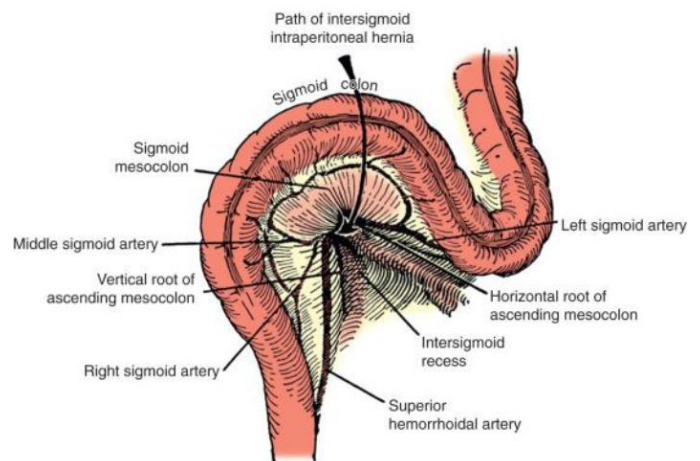
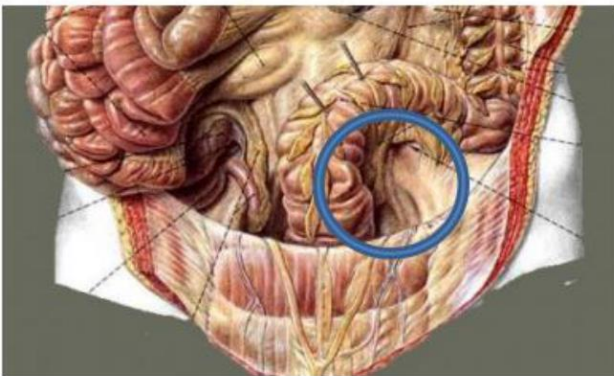
- A. The superior ileocecal or fossa
- B. The inferior ileocecal or fossa
- C. The rectocolic recess or fossa
- D. The retrocecal recesses or fossa (the most important one):



- ✓ It is a large fossa behind the cecum
- ✓ The appendix is frequently find there (common site of appendix)

3. The Intersigmoid Recess

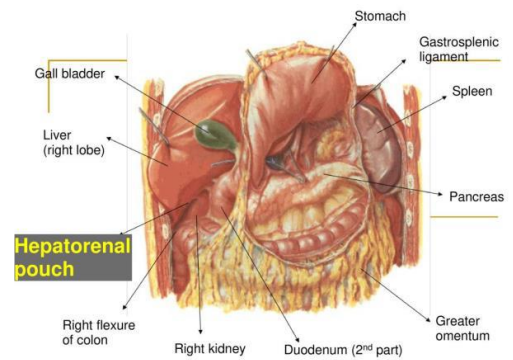
- ✓ It is formed by the inverted V attachment of sigmoid mesocolon
- ✓ In the posterior abdominal wall



4. Hepatorenal Recess (Morison's pouch):

- ✓ Found on the right side.
- ✓ It lies between the right lobe of liver, right kidney, and right colic flexure, and is the lowest parts of the peritoneal cavity when the subject is supine.

- ✓ Sometimes in the case of appendicitis, if rupture occurs the pus may gather there, and abscess will form between the liver and the right kidney. In this case, drainage of abscess is required.



➤ **Folds and recess of the posterior abdominal wall:**

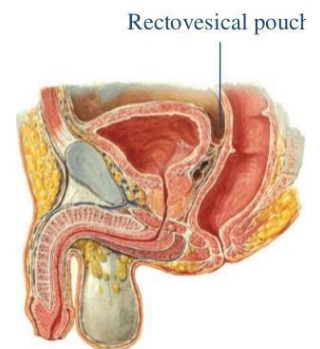
- The superior duodenal fold and recess
- The inferior duodenal fold and recess
- The intersigmoid recess

❖ **Pouches:**

- In the lesser pelvis, the peritoneum dips downwards forming a larger fossa, named pouch.
- **The clinical importance of pouches:** potential sites for internal abdominal hernia.

A. In Males: The Rectovesical Pouch

- It lies between the rectum and the urinary bladder or the seminal vesicles and the ampulla ductus deferentes.
- Remember that the peritoneum covers the upper 3rd of the rectum completely (except the posterior wall) and covers the rest of the rectum anteriorly. Then it covers the upper surface of the urinary bladder creating a pouch between the rectum and the urinary bladder.
- Internal hernia may happen here but not as common because it is wide.
- The retrovesial pouch is the lowest part of the peritoneal cavity in anatomical position in male.



B. In Females: Two Pouches (Anterior and posterior to the uterus)

1. Rectouterine pouch or Douglas pouch:

- ✓ Posterior to the uterus
- ✓ Between the rectum and the uterus

- ✓ Parts of the small and large intestines are usually found here
- ✓ The rectouterine pouch is formed between the anterior surface of the rectum and the posterior surface of the uterus and the upper part of vagina.

2. Vesicouterine pouch

- ✓ Anterior to the uterus.
- ✓ Between the bladder and the uterus.
- ✓ The Vesicouterine pouch is formed between the anteroinferior surface of the uterus and the superior surface of the urinary bladder.

In conclusion: recesses, fossae, and pouches are spaces formed by the **folding of the peritoneum** and internal hernia is a disadvantage of these spaces.



❖ Peritoneal Subdivisions:

The transverse colon and the transverse mesocolon divide the greater sac into:

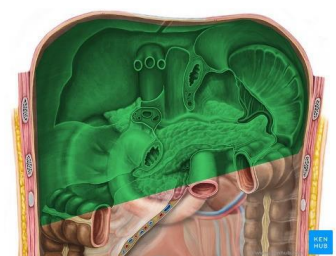
- x Supracolic compartment (above the transverse colon & mesocolon)
- x Infracolic compartment (below the transverse colon & mesocolon)
- x Rt.extraperitoneal space (bare area of liver & diaphragm)

Remember that the transverse colon is bound to the anterior border of the pancreas

A. Supracolic Compartment

The supracolic compartment is divided into a:

1. Subphrenic (subdiaphragmatic) space
2. Subhepatic space



- Remember what we said above about appendicitis and Morison's pouch (which is found between the liver, the right kidney and the right colic flexure)

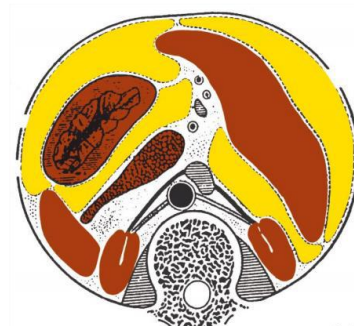
- If acute appendicitis progresses to chronic, abscess formation will occur and in case of rupture the pus could reach Morison's pouch or the right subdiaphragmatic (subphrenic) space further spreading the infection and formation of other abscesses in these spaces will occur which have to be treated by drainage (notice in the following picture the arrows and how there is a connection between the location of the appendix and the aforementioned spaces).



- The patient in this case would have unstable temperature that goes up and down and would sleep on his right side and won't eat. If he had untreated acute appendicitis, you can diagnose the issue based on his history.

1. Subphrenic Space (Subdiaphragmatic):

from sheet 2017: The subphrenic space is a peritoneal space between the anterior part of the liver and the diaphragm, separated into right and left by the falciform ligament, and postero-superiorly bounded by the coronary ligament.



It is divided by the attachment of the falciform ligament into:

- ✓ Right subphrenic space (abscess formation is more common here than in the left space because it is more open, check the picture with the arrows above)
- ✓ Left subphrenic space.

2. Subhepatic Space, It is divided into:

- ✓ Right subhepatic space (morison pouch)
- ✓ Left subhepatic space (lesser sac)

B. Infracolic Compartment:

- The infracolic compartment lies below the transverse colon and transverse mesocolon.

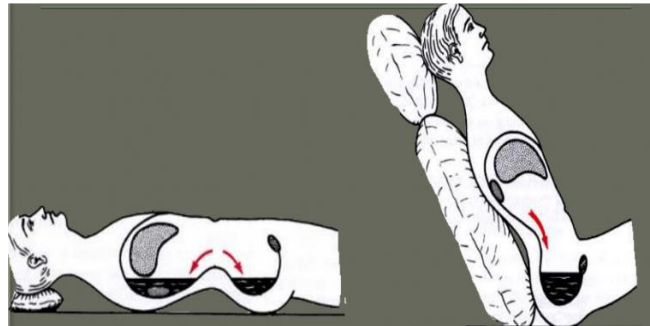
It is divided by root of the mesentery of small intestine into:

- ✓ Right Infracolic compartment (closed from the pelvis by the mesentery)
- ✓ Left infracolic compartment (open to the pelvis)



- When a person is sleeping on his back fluid in the abdomen will gather in 2 cavities, one in the abdomen and one in the pelvis.

- If the person is sitting up fluid will gather in the pelvis. The fluid descends to the pelvis because of the presence of paracolic gutters.



- We know that the ascending and descending colons are retroperitoneal, but the peritoneum not only covers their anterior surfaces but also covers their sides and fixes them to the posterior abdominal wall, and the attachment of the peritoneum to the post. The abdominal wall creates the gutters or sulcus on the sides of the colons, and these gutters or grooves are what allow movement of fluid in the abdominal cavity either above or below (think of them like rivers).

x Right Paracolic Gutter (Sulcus):

Subdivided into:

A. Right medial paracolic gutter:

- It is **closed** from above and below therefore infection in the right medial paracolic gutter is localized and does not spread anywhere.

B. Right lateral paracolic gutter:

It is **open**, it communicates with the hepatorenal recess and the pelvic cavity and provides a route for the spread of infection between the pelvic and the upper abdominal region (to Morrison's pouch or to the subdiaphragmatic space on the right side).

x Left Paracolic Gutter (Sulcus):

Subdivided into:

A. Left medial paracolic gutter:

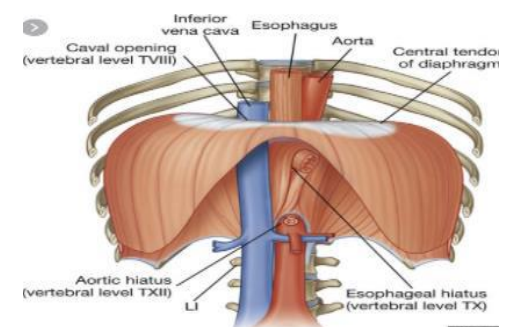
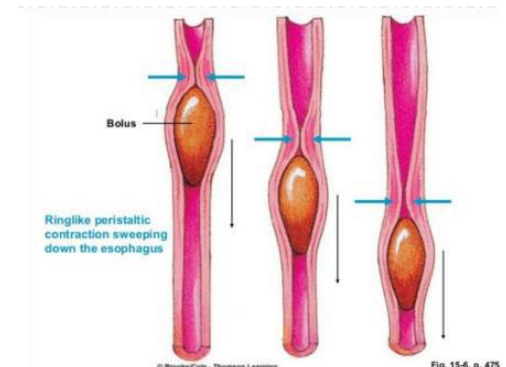
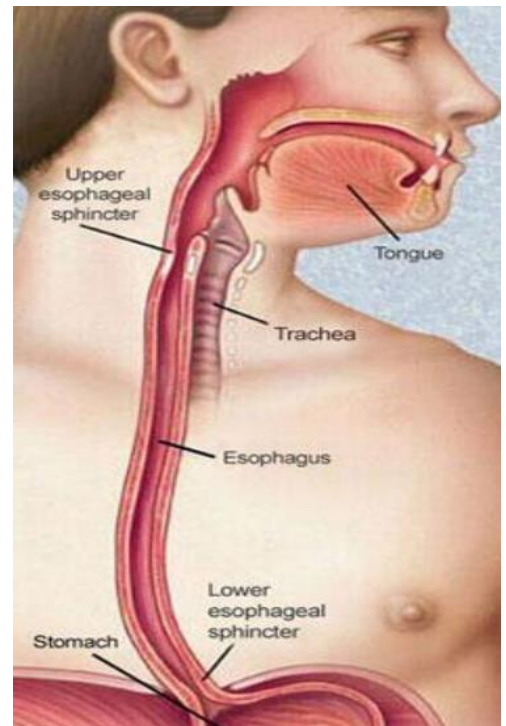
- It is separated from the area around the spleen by the transverse colon and mesocolon which prevent the spread of infection upwards (Notice the arrows in the picture above in page 6)

B. Left Lateral paracolic gutter:

- It is separated from the area around the spleen by the phrenicocolic ligament (a fold of peritoneum that passes from the colic flexure to the diaphragm), and this ligament prevents the spread of infection upwards.
- Infection in this gutter doesn't reach the left subdiaphragmatic space due to the ligament between the left colic flexure and the diaphragm.
- Both of those gutters communicate with the pelvis and are open to the outside through it. Therefore, infection in both gutters can spread only downwards to the pelvis.

ESOPHAGUS

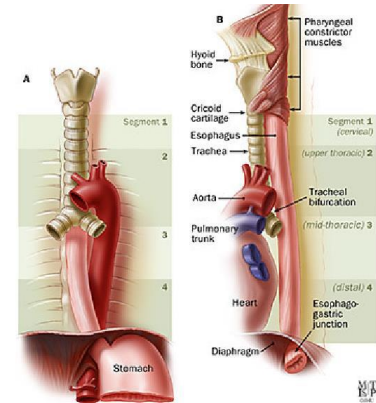
- The esophagus is a tubular structure (muscular, collapsible tube) about 10 in. (25 cm) long that is continuous above with the laryngeal part of the pharynx opposite the sixth cervical vertebra and from molar about 45 cm.
- In general, the esophagus starts at the lower border of cricoid cartilage (6th cervical vertebra) and ends at the cardia of the stomach.
- The esophagus has upper 3rd (skeletal muscle by somatic nerves), middle 3rd (skeletal by Somatic & smooth by ANS), and lower 3rd (smooth muscle by ANS).
- The esophagus conducts food from the pharynx into the stomach. Wavelike contractions of the muscular coat, called **peristalsis**, propel the food onward.
- It passes through the diaphragm by an opening called **ESOPHAGEAL HIATUS (orifice)** at the level of the 10th thoracic vertebra to join the stomach.
- In the neck, the esophagus lies in front of the vertebral column; laterally, it is related to the lobes of the thyroid gland; and anteriorly, it is in contact with the trachea and the recurrent laryngeal nerve.
- **In the thorax**, it passes downward and to the left through the superior and then the posterior mediastinum.
- At the level of the sternal angle, the aortic arch pushes the esophagus over to the midline 1 inch to the left.



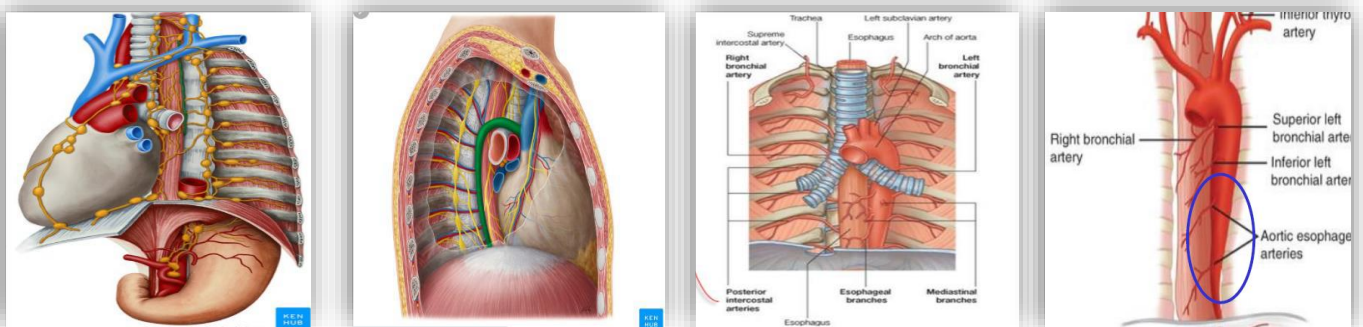
- **Layers of esophagus:** mucosa, submucosa, muscular externa, adventitia because most of it in the chest and part in the neck. 1.3 cm of it below the diaphragm covered by serosum.

❖ **The relations of the thoracic part of the esophagus:**

1-Anteriorly: The trachea and the left recurrent laryngeal nerve; the left principal bronchus, which constricts it (that`s mean any foreign body enters the esophagus will lodge in one of the 4 sites → At the beginning, left main bronchus, arch of the aorta, piercing of diaphragm (at the end)); and the pericardium, which separates the esophagus from the left atrium.

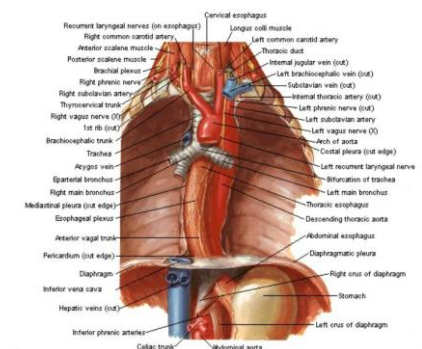


2- Posteriorly: The bodies of the thoracic vertebrae; the thoracic duct; the azygos veins; the right posterior intercostal arteries; and, at its lower end, the descending thoracic aorta.



3- Right side: The right mediastinal pleura & lung and the terminal part of the azygos vein.

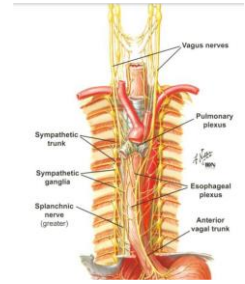
4-Left side: The left subclavian artery, the aortic arch, the thoracic duct, and the left mediastinal pleura & lung.



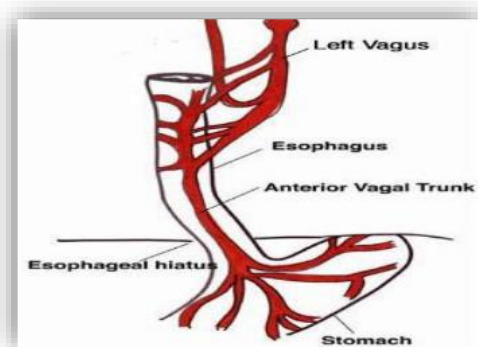
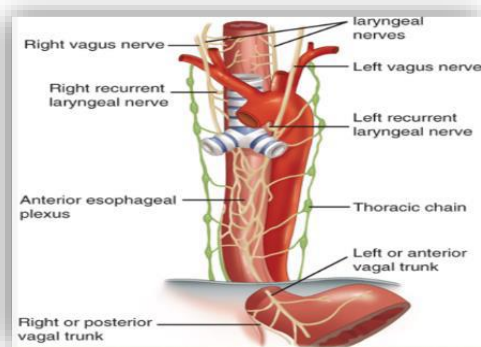
❖ **Abdominal Esophagus:**

- Inferiorly to the level of the roots of the lungs, the vagus nerves (pass behind hilum of the lung) leave the pulmonary plexus and join with sympathetic nerves to form the esophageal plexus.

- Around the esophagus we had left and right vagus nerves. After passing through the opening, the left vagus nerve became anterior, and the right vagus nerve became posterior.



- At the opening in the diaphragm at the level of T10, the esophagus is accompanied by the two vagi, branches of the left gastric blood vessels; which supply the lower third of the esophagus and lymphatic vessels. Fibers from the right crus of the diaphragm pass around the esophagus in the form of a sling (connective tissue fiber).
- In the abdomen, the esophagus descends for about 0.5 in. (1.3 cm) and then enters the stomach, where it forms a physiological sphincter, which is innervated by the vagus nerve and prevents regurgitation of food from the stomach to the esophagus.
- It is related to the left lobe of the liver anteriorly and to the left crus of the diaphragm posteriorly (**The relations of the abdominal part of the esophagus**)



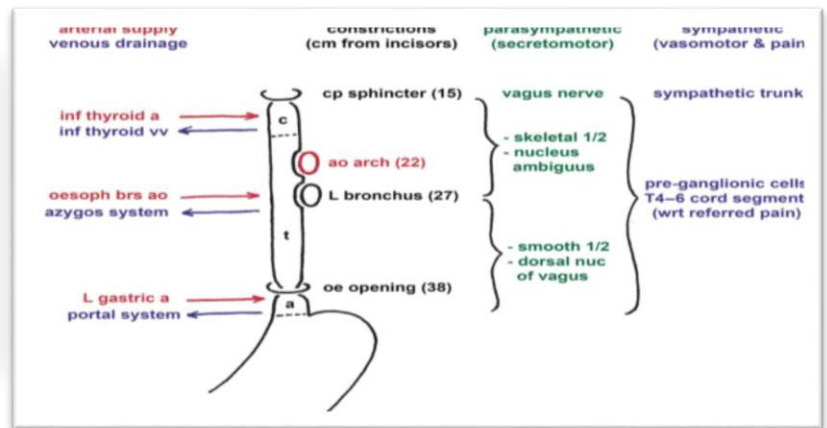
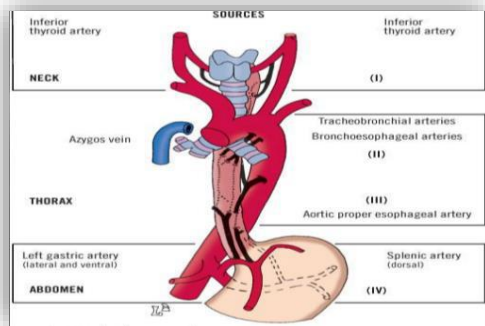
❖ **Innervation & Blood Supply of the Esophagus:**

SECTION	Artery	Vein	Lymph Nodes
Upper third	Inferior thyroid artery	Drain into the inferior thyroid veins	Drain into the deep cervical nodes
Middle third	Descending thoracic aorta	Drain into the azygos veins	Drain into the superior and posterior mediastinal nodes
Lower third	Branches from the left gastric artery	Drain into the left gastric vein, a tributary of the portal vein	Drain into nodes along the left gastric blood vessels and the celiac nodes

➤ They all drain into azygos vein → arch of azygos → SVC

➤ **Nerve Supply:** by parasympathetic (secreto-motor) (for smooth muscle innervation). and sympathetic (vasomotor to the blood supply) efferent and afferent fibers via the vagi and sympathetic trunks respectively.

❖ In the lower part of its thoracic course, the esophagus is surrounded by the esophageal nerve plexus.

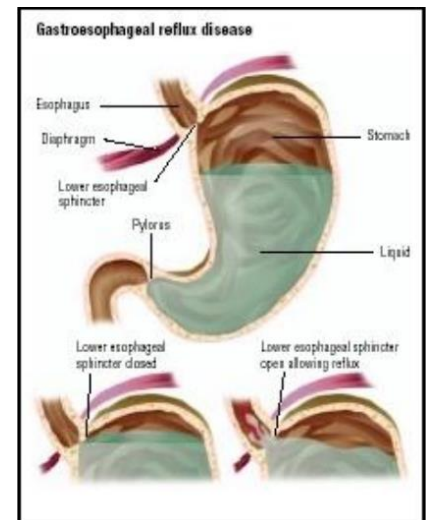


❖ The Gastropharyngeal Sphincter: (cardiac sphincter)

◆ No anatomic sphincter exists at the lower end of the esophagus

◆ However, the circular layer of smooth muscle in this region serves as a physiologic sphincter

◆ As the food descends through the esophagus, relaxation of the muscle at the lower end occurs ahead of the peristaltic wave so that the food enters the stomach



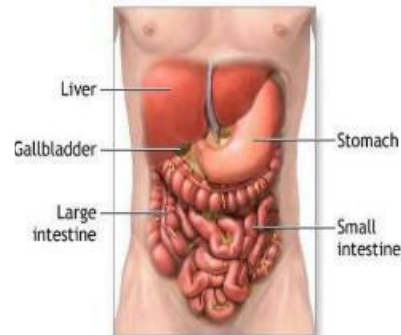
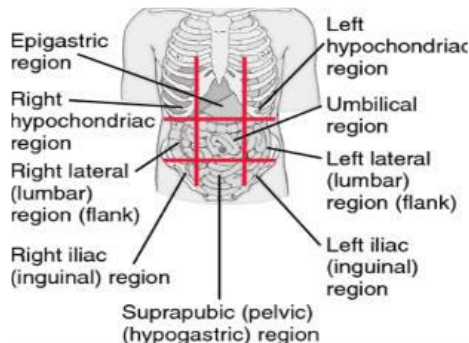
◆ The tonic contraction of this sphincter prevents the stomach contents from regurgitating into the esophagus.

◆ The closure of the sphincter is under vagal control, and this can be augmented by the hormone gastrin and reduced in response to secretin, cholecystokinin, and glucagon.

◆ **Surface anatomy:** 7 th Lt. costal cartilage, 1 inch to Lt. of midline , 45 cm from incisors in the oral cavity, and 10 cm from ant. abdominal wall

STOMACH

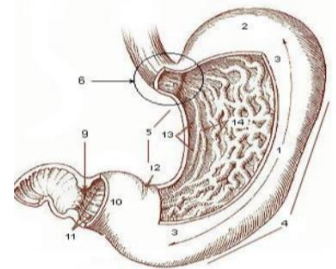
- The stomach is a dilated part of the alimentary canal.
- Between the esophagus and the small intestine (duodenum).
- It occupies the left upper quadrant mainly in the epigastric region.



❖ Shape of the stomach:

- It is roughly J-shaped especially in thin person BUT Steer horn in obese person, and it has:

- 1-Two openings, the cardiac (6) and pyloric orifices (11)
- 2-Two curvatures, the greater (4) and lesser curvatures (5)
- 3-Two surfaces, an anterior and a posterior surface



- (14) folds of mucosa-RUGAE
- **Its shape undergoes considerable variation in the same person and depends on:** The volume of its contents, The position of the body, and The phase of respiration.

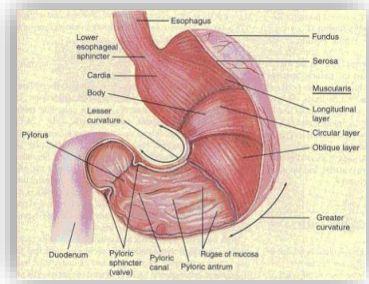
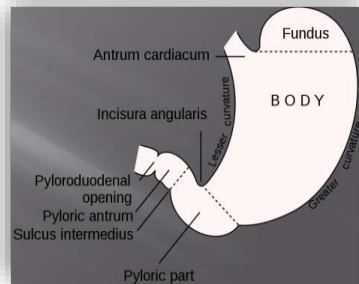
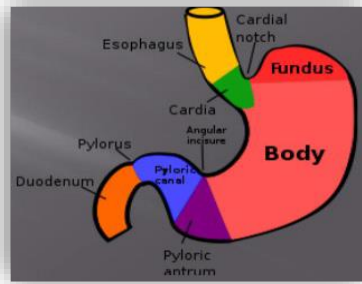
❖ Function of the Stomach:

- 1-It stores food (in the adult it has a capacity of about 1500 mL).
- 2-It mixes the food with gastric secretions to form a semifluid chyme.
- 3-It controls the rate of delivery of the chyme to the small intestine by hormones, vagus and sympathetic fibers so that efficient digestion and absorption can take place.

All the food we eat remain 4 hours in the stomach for digestion but evacuation start after 2 hours.

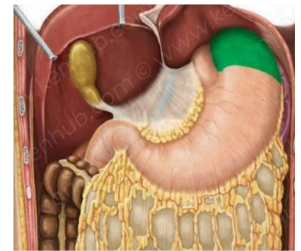
After digestion → semifluid chyme → evacuation to duodenum

❖ Parts of the stomach:



1- Fundus:

- Dome-shaped.
- Projects upward and to the left of the cardiac orifice.
- It is usually full of gas so appears in X-ray as dark spot.



2- Body:

- ◆ Extends from the level of the cardiac orifice to the level of the incisura angularis (a constant notch in the lower part of the lesser curvature which separates the body and pyloric region).



3- Pyloric region:

- ◆ Divided into:

A- **Pyloric antrum:** This extends from the incisura angularis to the pylorus.

B- **Pylorus (pyloric canal)** : The most tubular part of the stomach. It is 1 inch tall.

- The thick muscular wall is called the pyloric sphincter



❖ Orifices of the stomach:

1- Cardiac orifice:

-The cardiac orifice is where the esophagus enters the stomach

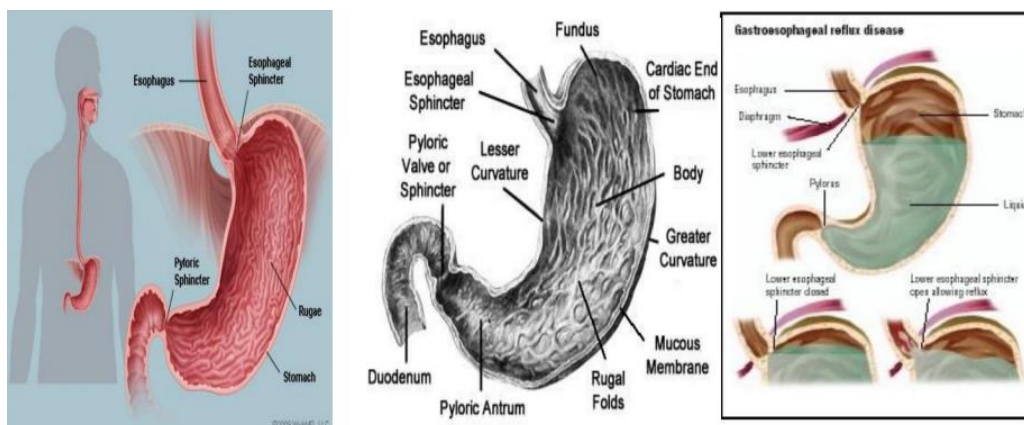
-No anatomic sphincter can be demonstrated here

- A physiological sphincter → physiological mechanism exists that prevents regurgitation of stomach contents into the esophagus

Location:

- 7 th Lt. costal cartilage
- 1 inch to Lt. of midline
- 45 cm from incisors in the oral cavity.
- 10 cm from ant. abdominal wall

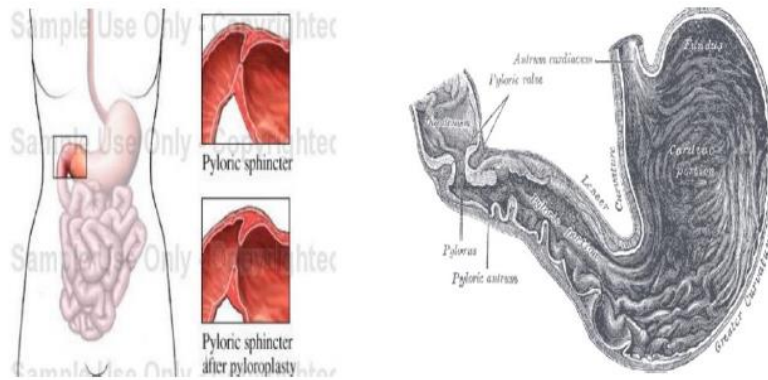
Anatomical sphincters have a thickening inner circular smooth muscle which gives them a sphincters action BUT Physiological sphincters don't have in muscles and achieve their sphincteric action through muscle contraction.



2- Pyloric Orifice:

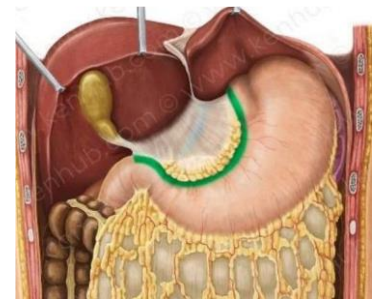
- ◆ Present at end of the pyloric canal, at the level of L1 (Transpyloric plane), 1in. to the right of the midline. **It is an anatomical sphincter.**
- ◆ Its position can be recognized by a slight constriction on the surface of the stomach (The pylorus lies on the transpyloric plane) and by vein of mayo which cross the anterior surface.
- ◆ The sphincter receives motor fibers from the sympathetic system which contracts the sphincter and parasympathetic (inhibitory fibers) from the vagus nerve which relaxes the sphincter so it will drainage of stomach contents to the duodenum.
- ◆ The pyloric sphincter controls the outflow of gastric contents into the duodenum and this controls by:
 - 1. Hormonal influences** from stomach & duodenum such as gastrin hormone.
 - 2. Nerve fibers:** the stretching of the stomach (duo to filling) will stimulate the myenteric nerve plexus which leads to the relaxation of the sphincter.

- ◆ The circular muscle coat of the stomach is much thicker here and forms the anatomic and physiologic pyloric sphincter.

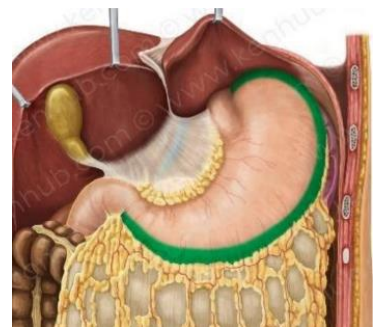


❖ Curvatures of the stomach:

1- lesser curvature: is short and concave, it forms the right border of the stomach and extends from the cardiac orifice (opening) to the pylorus and it is suspended from the liver by the lesser omentum, it contains a small notch called the **angular incisure**, **on the free edge:** hepatic artery, portal vein, common bile duct, and epiploic foramen.



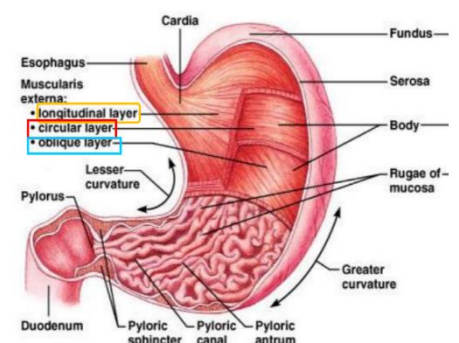
2- Greater curvature: is convex and much longer than the lesser curvature, it extends from the left of the cardiac orifice, over the dome of the fundus, and along the left border of the stomach to the pylorus. The greater omentum extends from the lower part of the greater curvature to the transverse colon.



❖ Histology of the stomach:

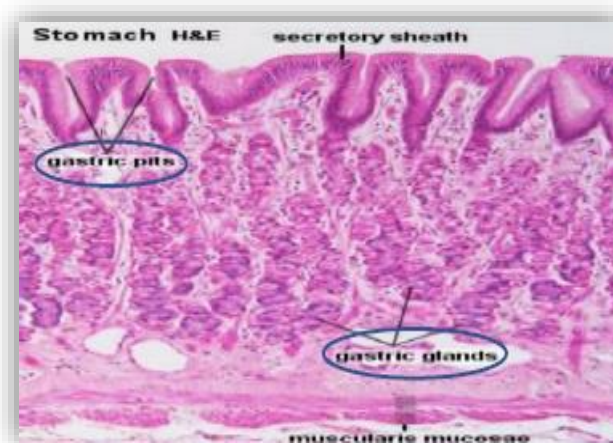
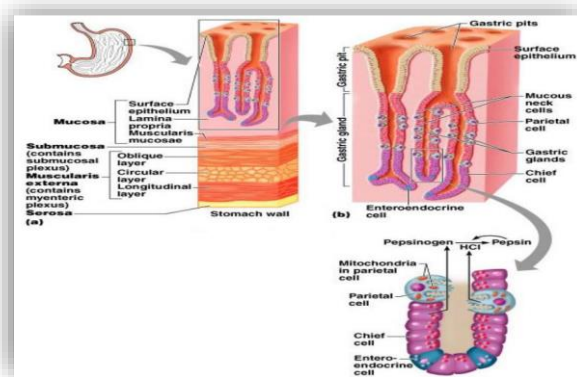
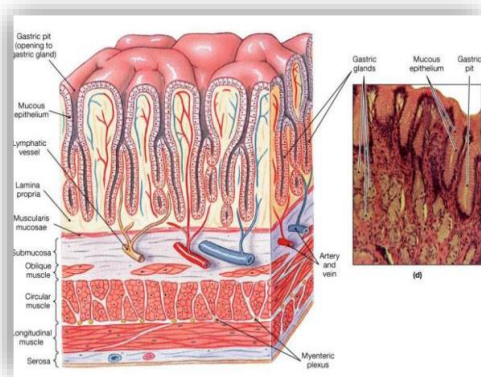
☀ The stomach consists of four histological layers called, from interior to exterior, mucosa, submucosa, muscularis externa, and serosa.

☀ In this figure, we can see **the muscular layers of the wall of stomach from outside to inside which contains longitudinal fibers (outer surface), circular fibers (inner surface), and oblique fibers (most inner layer, absent in pyloric region so the circular fibers form the**



sphincter). With myenteric (enteric) plexus in between the outer and inner which is mainly parasympathetic.

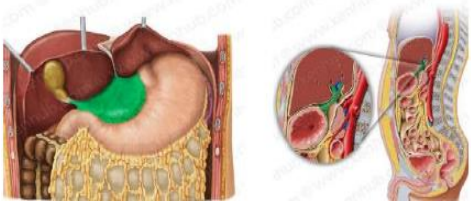
- ☀ Stomach is lining by simple columnar epithelium without goblet cell and form a **gastric pits** (opening to gastric glands in order for the secretion to reach the surface. **Mucous mainly for neutralization of acidity**).
- ☀ **Gastric glands** are simple or branched tubular gland in lamina propria and also lined by simple columnar epithelium without goblet cell and have different type of cells according to its location; **the mucous neck cells & parietal cells (HCl)** (acidophilic) found in the Neck but the chief cells (**pepsinogen**) (basophilic) & neuroendocrine cells (**Gastrin**) found in the Base.
- ☀ The mucous membrane of the stomach is thick and vascular and has a wrinkled aspect, consisting of ridges called gastric folds, or **rugae** (It's an invagination of submucosa to mucosa that increase the surface area of mucosa for digestion) **mainly longitudinal in direction**. During distension of the organ, the gastric folds disappear (flatten out).
- ☀ Submucosa has blood vessels and lymphatics **and smooth muscles but no gland**.



❖ Peritoneum of the stomach:



- The peritoneum (visceral peritoneum) completely surrounds the stomach.



- It leaves the lesser curvature as the lesser omentum.

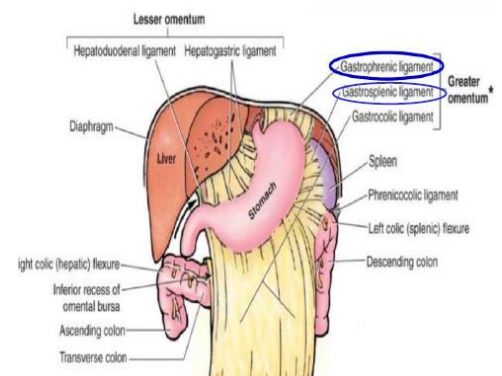


- It leaves the greater curvature as the gastrosplenic ligament and the greater omentum.

- **The gastrosplenic ligament** extends from the upper part of the greater curvature to the spleen, and the greater omentum extends from the lower part of the greater curvature to the transverse colon.

- **Gastrophrenic ligament** between the fundus and the diaphragm.

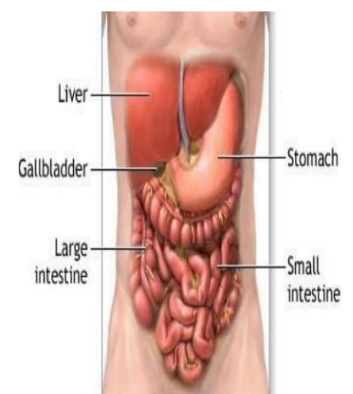
- The lesser curvature is suspended from the liver by the lesser omentum.



❖ Relations of stomach:

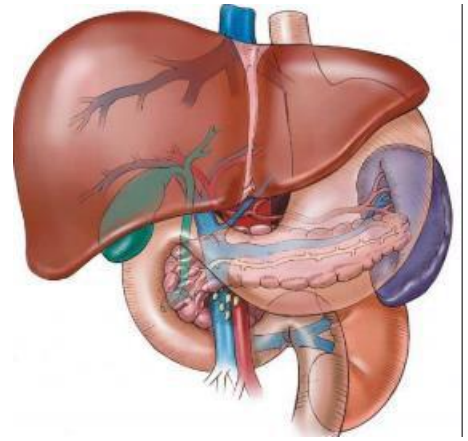
Anterior- superior:

- The anterior abdominal wall
- the left costal margin
- the left pleura and lung
- the diaphragm
- the left lobe of the liver



Posteriorly = stomach bed: (veryyyy important)

- The lesser sac
- the Lt. crus of diaphragm
- the spleen
- the left suprarenal gland
- the upper part of the left kidney
- the splenic artery (**Tortuous**).
- the body of pancreas - the transverse mesocolon - the transverse colon



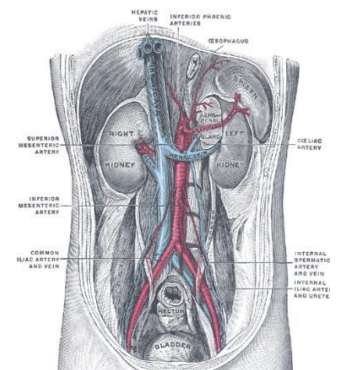
❖ Blood supply for the stomach:

The GI tract (according to embryology) is divided into 3 parts:

1) **Foregut:** takes blood supply from the celiac trunk, it extends from the lower third of the esophagus, the stomach, until the middle half of the second part of the duodenum.

2) **Midgut**

3) **Hindgut**



celiac trunk:

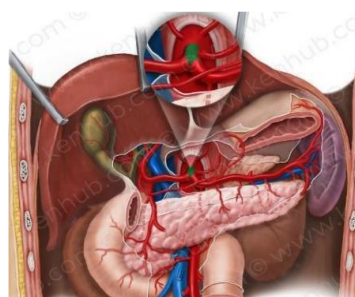
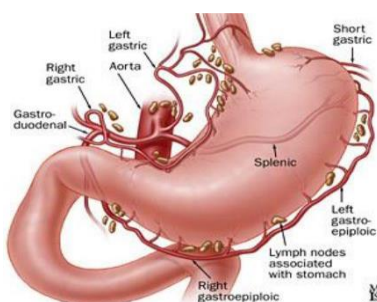
It arises from the front of the abdominal aorta and its located at the level of T12 to L1 above the pancreas, its 1 cm long, all arteries are derived from the branches of it.

➤ Relations of celiac artery:

1- On each side: celiac ganglia (Sympathatic) + lymphatic nodes (celiac lymph node).

2- Crus of diaphragm and lumbar nerves.

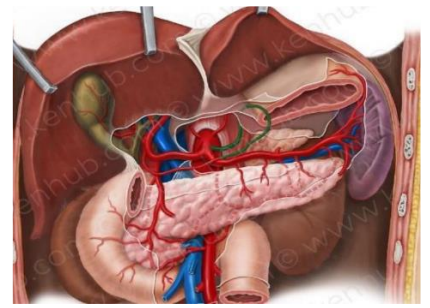
3- Its Branches for foregut.



It gives off 3 main arteries:

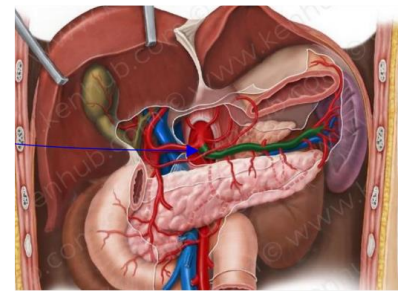
1-Left Gastric Artery:

- ◆ Arises from the celiac artery
- ◆ It passes upward and to the left to reach the esophagus, then descends along the lesser curvature of the stomach
- ◆ It supplies the lower third of the esophagus and the anterior & posterior of the upper right part of the stomach



2-Splenic Artery (Tortuous Artery):

- ◆ Tortuous behind the stomach.
- ◆ It moves behind the stomach, then on the upper border of the pancreas and gives blood supply to the stomach.
- ◆ It gives 2 branches:



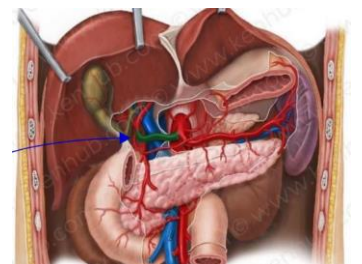
A-The short gastric arteries: Arise from the splenic artery (5-7 arteries) in the gastrosplenic ligament, pass upward in the gastrosplenic to supply the fundus.

B-The left gastroepiploic artery: Arises from the splenic artery before the hilum of the spleen, passes forward in the gastrosplenic (ligament) and supply the stomach along the upper part of the greater curvature in the greater omentum.

3- Hepatic Artery:

- ◆ It moves towards the liver.
- ◆ It gives 3 branches:

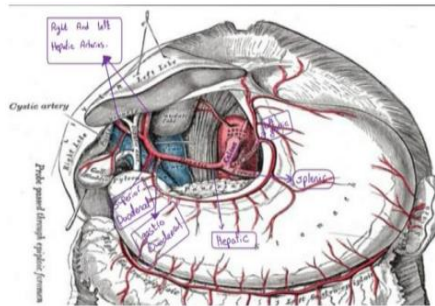
A- Right gastric artery: Arises from the hepatic artery at the upper border of the pylorus, runs to the left along the lesser curvature. It supplies the lower right part of the stomach.



B- Gastro-duodenal artery: Passes behind the first part of the duodenum and between the layers of greater omentum gives a branch called **the right gastroepiploic artery:** it passes to the left and supplies the

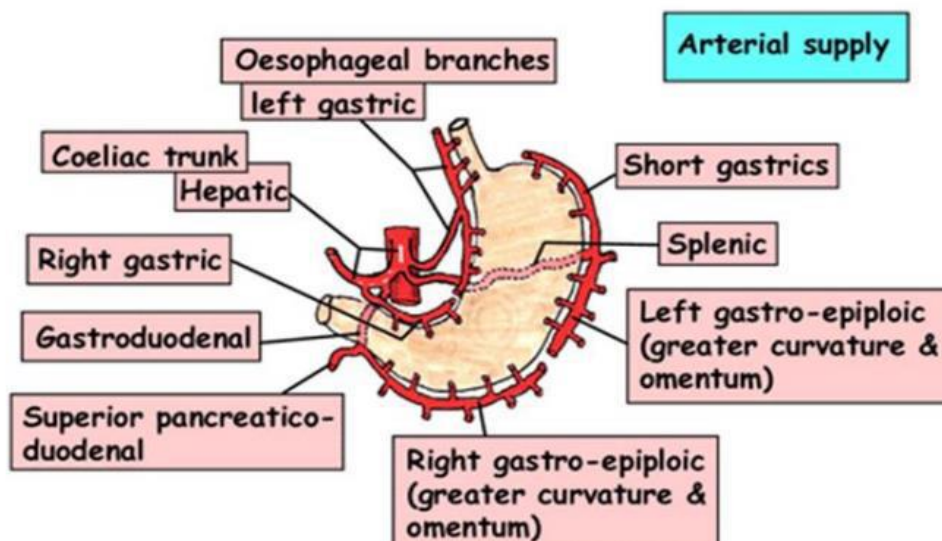
stomach along the lower part of the greater curvature in the greater omentum. Also, it gives the superior pancreaticoduodenal artery that supplies the duodenum and pancreas.

C- Hepatic Artery Proper: It branches into the right and left hepatic arteries, which supply the corresponding lobes of the liver. The cystic artery originates from the right hepatic artery.



SUMMARY OF THE BLOOD SUPPLY FOR THE STOMACH:

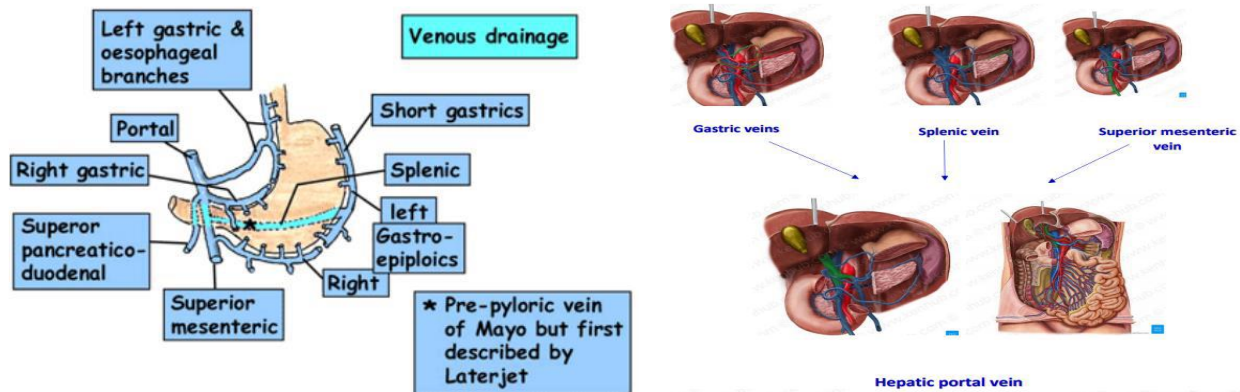
Artery	Branch from	Supplied parts
Left gastric artery	Celiac artery	lower third part of the esophagus and the upper right part of the stomach.
Right gastric artery	Hepatic artery	lower right part of the stomach
short gastric artery	Splenic artery	Fundus of the stomach
left gastroepiploic artery	Splenic artery	The stomach along the upper part of the greater curvature
The right gastroepiploic artery	The gastroduodenal branch of the hepatic artery	The stomach along the lower part of the greater curvature



❖ Venous Drainage for the stomach:

The stomach veins drain either directly or indirectly into the portal circulation as follows:

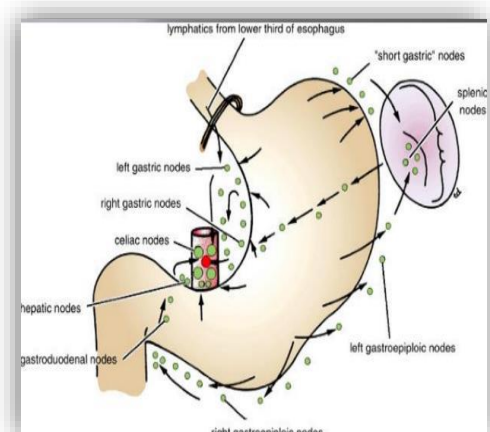
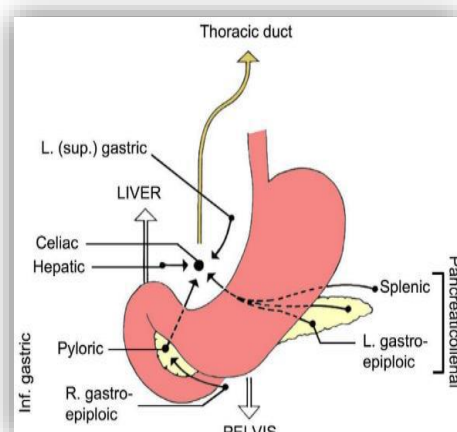
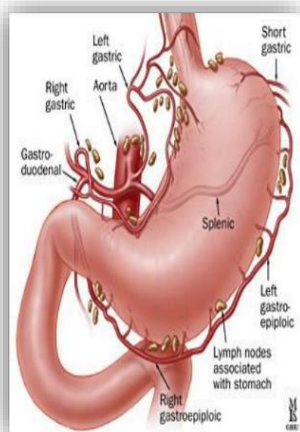
- 1-The left and right gastric veins drain directly into the portal vein
- 2-The short gastric veins and the left gastroepiploic veins join the splenic vein
- 3-The right gastroepiploic vein joins the superior mesenteric vein(which meet the splenic vein behind the neck of pancreas to form the portal vein)

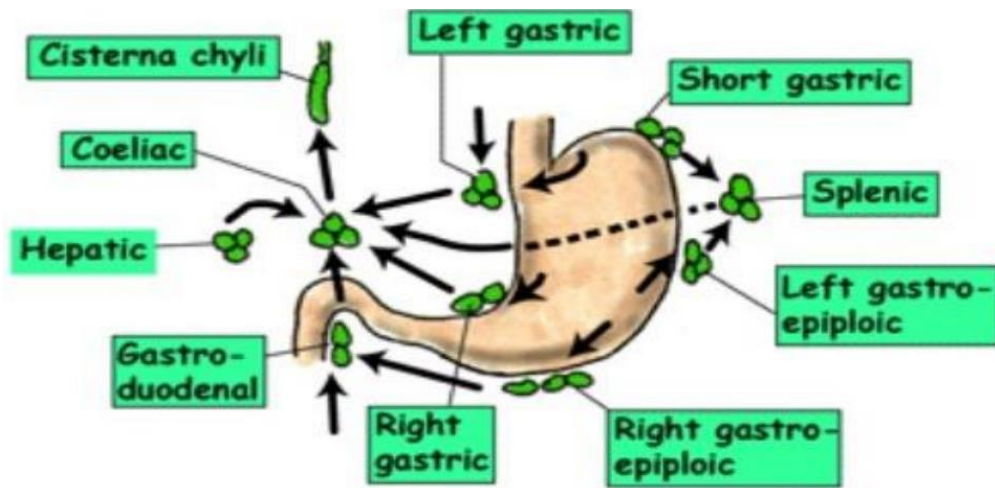


❖ Lymphatic drainage for the stomach:

Follow the arteries of stomach;

- ✓ The left and right gastric nodes
- ✓ The left and right gastroepiploic nodes
- ✓ The short gastric nodes
- All lymph from the stomach eventually passes to the celiac nodes, located around the root of the celiac artery on the posterior abdominal wall. In the end, celiac lymph nodes drain into the cisterna chyli (sac of lymph in the opening of abdomen).





❖ Nerve Supply for the Stomach:

X We have **sympathetic fibers (post ganglionic)** derived from **celiac plexus** around the celiac trunk (branch of abdominal aorta). **The sympathetic fibers** mainly go towards the sphincters for contraction (such as the pyloric sphincter), and they also carry pain sensation.

X We also have **parasympathetic fibers (preganglionic)** derived from the **right and left vagus nerves**. The parasympathetic fibers are mainly secretomotor for the gastric glands, and motor to the muscular wall of the stomach (smooth muscles), so they are responsible for peristaltic movement as well as relaxation of the pyloric sphincter by inhibitory fibers (from the vagus n.) so the passing of chyme from stomach to duodenum.

The anterior vagal trunk:

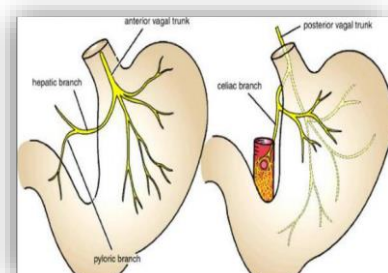
-Mainly from the left vagus nerve, innervates:

- 1) The anterior wall of the stomach.
- 2) Gives a hepatic branch that goes to the liver and gallbladder.
- 3) Gives another branch called **anterior nerve of Latarjet** that goes towards the pylorus. (It functions by increasing peristalsis and relaxing the sphincter, thus draining the contents of the stomach into the first part of duodenum)

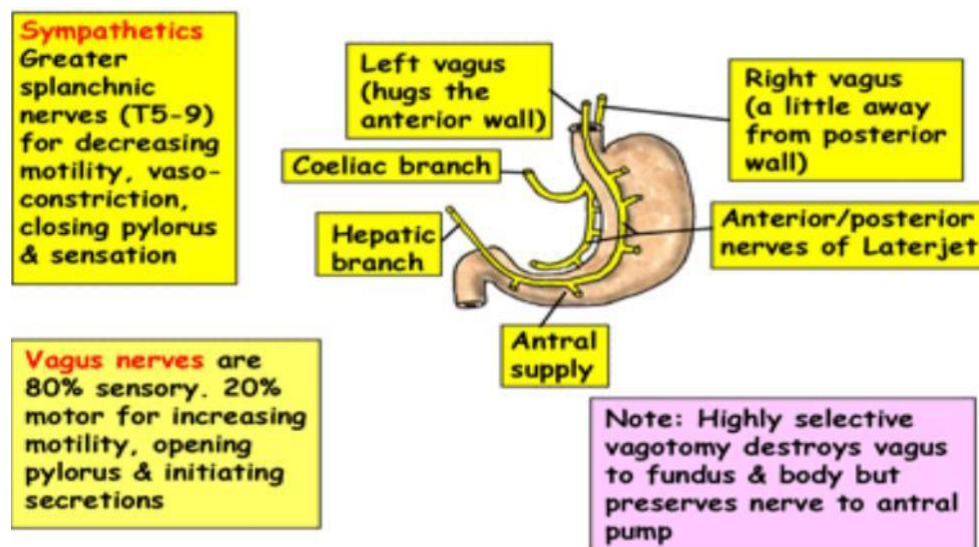
The posterior vagal trunk:

- Mainly from the right vagus nerve, innervates:

- 1) Mainly the posterior wall of the stomach.
- 2) Anterior wall of body of stomach.
- 3) Posterior nerve of Latarjet to the pylorus.



4) Celiac branch which innervates the small intestines + as far as to splenic flexure + pancreas and the proximal two thirds of the transverse colon but the lateral third supplied by S2-4 Sacral nerves.



❖ Clinical Notes:

◆ **Gastric Ulcer:** the most common site in stomach: anterior and posterior walls of lesser curvature. **The gastric ulcer is considered malignant until proven that it is not malignant.** So, a biopsy needs to be taken to prove malignancy.

◆ **Peptic Ulcer (duodenal ulcer):** the most common site for peptic ulcer is the first part of the duodenum especially in the first inch, since it receives **gastric acidity from stomach** which may result in irritation ulcer especially in post. Surface.

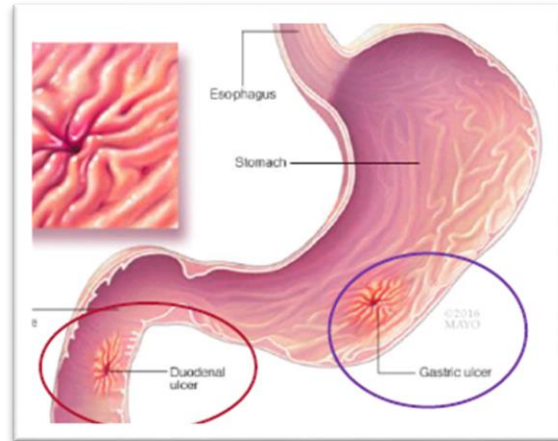
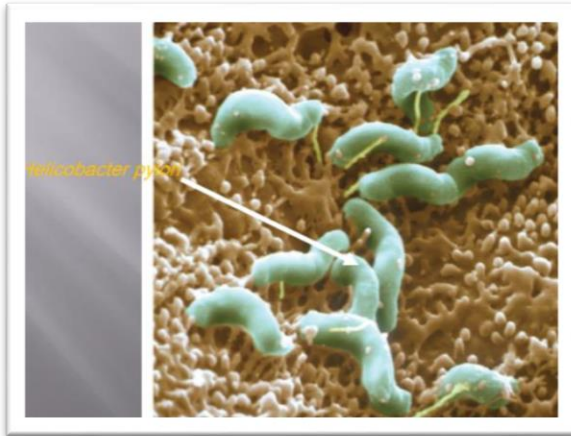
◆ **Trunkal Vagotomy** the rule said that hyperacidity meant peptic ulcer, and its treatment was surgery to the vagus nerve. **We used to cut the vagus nerve below the diaphragm around the esophagus**, so the stomach stopped receiving parasympathetic innervations, which resulted in bad drainage.

◆ Now, we perform a **highly selective vagotomy** where we cut all branches of vagi except the nerve of Latarjet (pylorus) so no secretion in body of stomach but we have evacuation of stomach contents to duodenum.

◆ Now, it has changed completely. **The real cause of peptic ulcer is a bacterium known as Helicobacter pylori.** Its treatment by antibiotics and antiacidity.

◆ **Gastroscopy**: where we enter an endoscope into the oral cavity until the second part of the duodenum to take biopsy and sometimes treatment.

◆ We can **drainage** of the stomach contents through the pyloric sphincter by **gastro-jejunostomy** which is a surgical procedure in which an anastomosis is created between the stomach and the jejunum or by pyloroplasty which is surgery to dilate the sphincter.



THANK YOU & GOOD LUCK

V2


(1) Anything written in pink in pages: 9-17, 19 ,23 (not a lot but important).


(2) Anything that has beside it → it is written here.


- if you already studied this sheet: write (1) and take this page for (2).

 **Page 10: why the left recurrent laryngeal nerve not the right?**

Because the left descends to the chest but the right doesn't (stay at the root of the neck).

 **Page 16: regarding the picture:** some babies have hypertrophy of the pyloric sphincter, when the mom breastfeeds the baby (eats), the baby gives projectile vomiting (بغرق وجه امه). It is treated surgically by pyloroplasty.

 **Page 16: the longitudinal fibers are close to the lesser curvature, why?**
Because fluids we take descend rapidly through the longitudinal folds to duodenum.

 **Page 17: regarding the picture:** on stomach there is 3 layers of muscles, but the most inner one is the oblique muscle, except the sphincter → inner circular smooth muscles.

 **Page 19: The spleen:**

➤ it has a hilum which makes it curve so it is anterior and posterior but most of it is posterior.

➤ It is the most lateral organ, so in surgery ما بصيبوه.

 **Page 19:**

Midgut → lower half of duodenum, small intestine and large intestine until the lateral 3rd of transverse colon. (superior mesenteric artery).

Hindgut → lateral 3rd of transverse colon, descending colon, sigmoid colon, rectum, and upper half of anal canal. (Inferior mesenteric artery).

 **Page 19:** celiac ganglia are only sympathetic.

V3

Page 10 : because most of it in the chest and part in the neck. 1.3 cm of it below the diaphragm covered by serosum

Page 15: (Transpyloric plane).