



Anatomy Team
MED 439

Revised & Approved



MED439
KING SAUD UNIVERSITY

Esophagus & Stomach

GNT Block

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Don't forget to check the [Editing File](#)

Color index:

Content
Male slides
Female slides
Important
Doctors notes

Extra information, explanation

Objectives

At the end of the lecture, students should be able to:

- Describe The Anatomical View Of The Esophagus

1. Extent
2. Length
3. Parts
4. Strictures
5. Relations
6. Blood & Nerve supply
7. Lymphatic drainage

- Describe The Anatomical View Of The Stomach

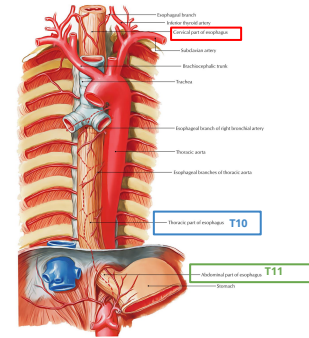
1. Location
2. Shape
3. Parts
4. Relations
5. Blood & Nerve supply
6. Lymphatic drainage



Definition

- 25 cm long, tubular structure.
- **Start** as a continuation of the pharynx at the level of the **C6**
- **pierces** the diaphragm at the level of the **T10** to join the stomach.

- **terminates** at level of **T11**
- **divided of 3 parts:**
Cervical, Thoracic & Abdominal



Relations of the parts

1

CERVICAL PART

Anterior:

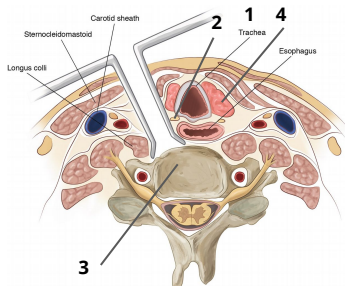
- Trachea (1)
- the recurrent laryngeal nerves. (2)

Posterior:

- Vertebral column. (3)

Lateral:

- lobes of the thyroid gland. (4)



2

THORACIC PART

- it passes downward and to the left through superior & posterior mediastinum
- At the level of the sternal angle (T4), the aortic arch pushes the esophagus again to the midline.

Anterior:

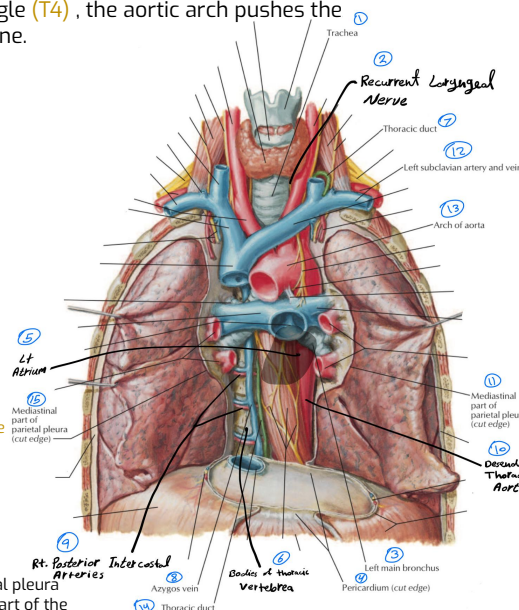
- 1) Trachea Left.
- 2) recurrent laryngeal nerve.
- 3) Left principal bronchus
- 4) Pericardium
- 5) Left atrium

Posterior:

- 6) Bodies of the thoracic vertebrae.
- 7) Thoracic duct
- 8) Azygos vein.
- 9) Right posterior intercostal arteries (because the esophagus at the right of thoracic aorta)
- 10) Descending thoracic aorta (at the lower end)

Lateral

- Left:**
- 11) Mediastinal pleura.
 - 12) Left subclavian artery.
 - 13) Aortic arch.
 - 14) Thoracic duct.
- Right:**
- 15) Mediastinal pleura
 - 16) Terminal part of the azygos vein. (Not clear in the picture because it's behind diaphragm at L1)



3

ABDOMINAL PART

Fibers from the right crus of the diaphragm form a sling around the Esophagus.

At the opening of the diaphragm, **the esophagus is accompanied by:**

- The two vagi
- Branches of the left gastric vessels
- Lymphatic vessels.

In the abdomen, the esophagus descends for 1.3 cm and joins the stomach.

Anterior Relations:

left lobe of the liver.

Posterior Relations:

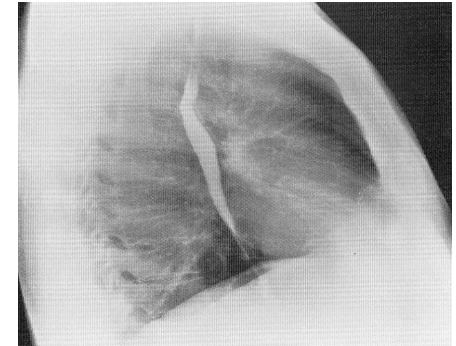
left crus of the diaphragm

Esophagus and Left Atrium of the Heart

- There is a close relationship between the left atrium of the heart and the esophagus.

What is the clinical application?

- A barium swallow in the esophagus will help the physician to assess the size of the left atrium (Dilation) as in case of a heart failure.



ESOPHAGEAL CONSTRICTION (Important)

There are 3 Anatomic constrictions:

1st (narrowest)

At the junction with the pharynx (15 cm from incisor teeth).

2nd

At the crossing with the aortic arch and the left main bronchus. (27 cm)

3rd

At the junction with the stomach. (38 cm)

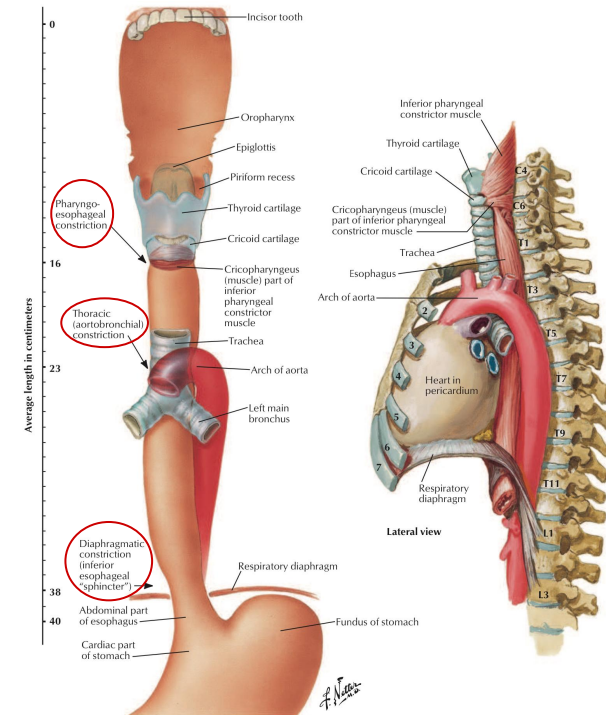
- Also when crossed by arch of aorta 22 cm

What is the Clinical importance?

They may cause difficulties in passing an esophagoscope. (when a doctor inserts the gastroscope, they can know where the levels of constriction are to move the gastroscope with caution)

In case of swallowing of caustic liquids (mostly in children), this is where the burning is the worst and strictures develop. (An ingested corrosive substance would move more slowly through a narrowed region, causing more damage at this site than elsewhere along the esophagus.)

The esophageal sphincters are a common places for the development of esophageal carcinoma.



What is the importance of the scale?

When a Dr inserts the gastroscope, they can know where the levels of constriction is so they can move the gastroscope with caution

Esophagus Supply

Arterial Supply

Upper Third: inferior thyroid artery. **From subclavian artery**

Middle third: thoracic aorta. **Esophageal branches.**

Lower third: left gastric artery.

Venous drainage

Upper Third: Inferior thyroid vein. **Drains into IJV then SVC**

Middle third: azygos vein. **Drains into SVC**

Lower third: Left gastric vein (which is a tributary of the portal vein)
lower third of the esophagus has porto systemic anastomosis

Lymph Drainage

Upper third: deep cervical nodes

Middle third: superior and inferior mediastinal nodes

Lower third: Celiac lymph nodes on the abdomen

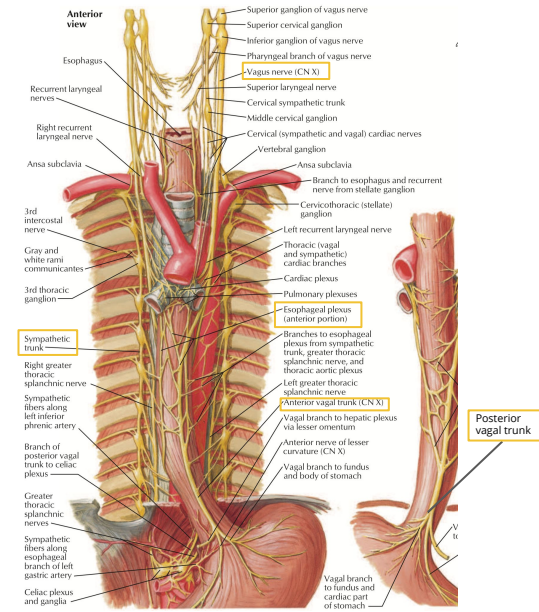
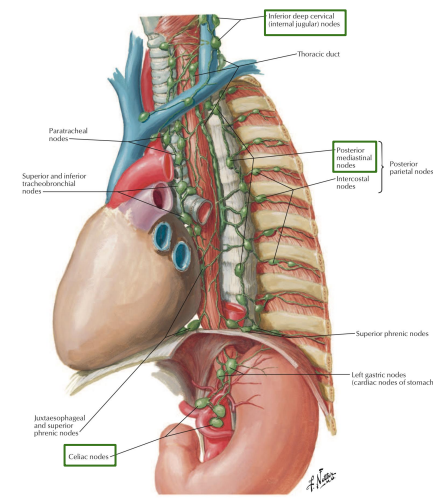
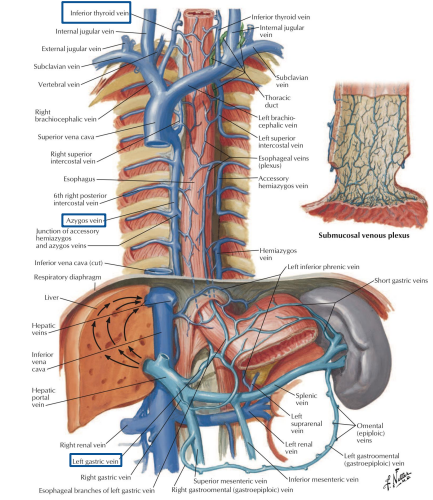
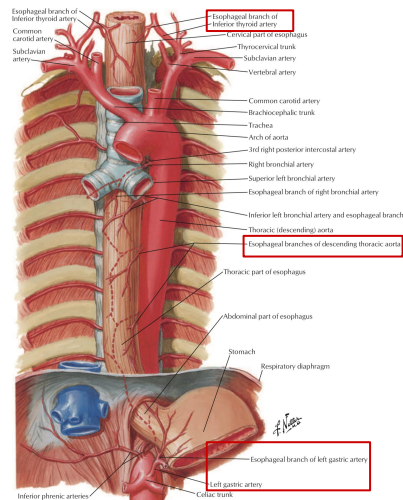
Nerve Supply

The sympathetic supply comes from the **sympathetic trunks**. The parasympathetic supply comes from the **vagus nerves**.

The left vagus lies **anterior** to the esophagus. (called **anterior gastric nerve**) The right vagus lies **posterior** to it. (called **posterior gastric nerve**)

Inferior to the roots of the lungs, the vagus nerves join the sympathetic nerves to form the **esophageal plexus**.

*notice how the lower third follows the stomach in some aspects

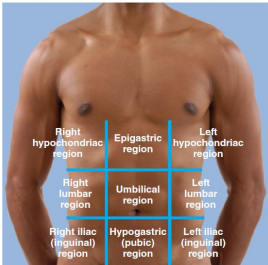


Stomach

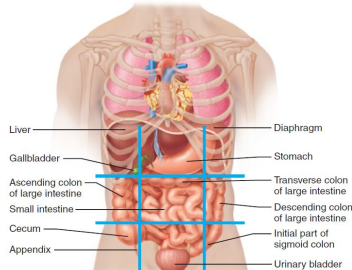
★ Dr.Jamila: focus on the surface anatomy (look for the stars in this slide & the next one)

Location:

- The stomach is the most dilated part of the alimentary canal.
- It is located in the upper part of the abdomen.
- It extends from beneath the left costal region (**left hypochondrium**) into the epigastric and umbilical regions.
- Much of the stomach is protected by the lower ribs.
- It is roughly J-shaped



(a) Nine regions delineated by four planes



(b) Anterior view of the nine regions showing the superficial organs

Parts:

2 Orifices:

- Cardiac orifice
- Pyloric orifice (a junction of the stomach with the small intestine)

2 Surfaces:

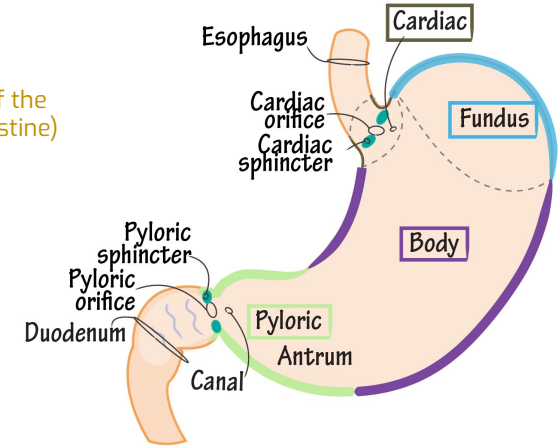
- Anterior surface
- Posterior surface

2 Borders:

- Greater curvature
- Lesser curvature

3 Parts:

- **Fundus**
- **Body**
- **Pylorus:** (Pyloric antrum, Pyloric canal & Pyloric sphincter)



Fundus

- Dome-shaped.
- Located to the left of the cardiac orifice.
- Usually full of gases.

It reaches to the **left fifth intercostal space** a little below the apex of the heart.

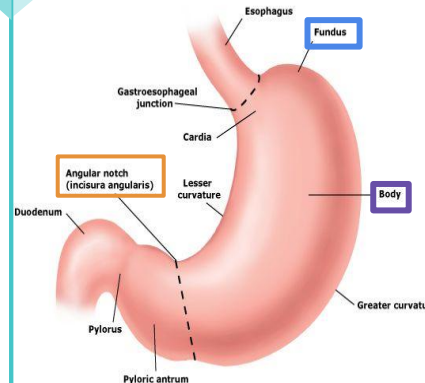
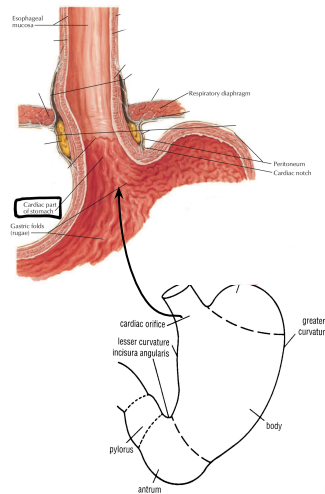
Body

Extends from:

- The level of the fundus, to the level of **Incisura angularis**.
- **Incisura angularis** (a constant notch on the lesser curvature) a vein extending from it helps the surgeon in identifying parts of the stomach

Cardiac Orifice:

- It is the site of the **gastroesophageal sphincter**.
- It is a physiological sphincter rather than an anatomical sphincter. **Not a strong muscle that contracts like the pyloric sphincter**
- Consists of circular layer of smooth muscle (under vagal and hormonal control).
- lies opposite the **left 7th costal cartilage** 2.5 cm from the sternum (**T10**).
- Function: Prevents esophageal regurgitation (reflux).



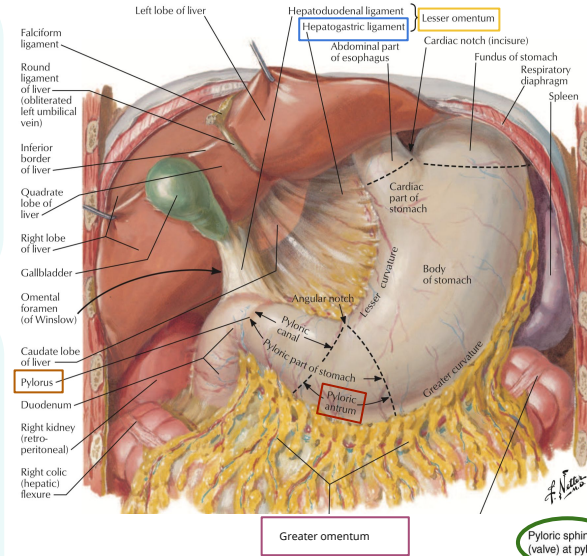
Curvatures, Pylorus and Relations of the Stomach

Lesser Curvature:

- **Forms** the right border of the stomach.
- **Extends** from the cardiac orifice to the pylorus.
- **Attached** to the liver by **lesser omentum (Gastrohepatic ligament)**. Peritoneal ligaments consist of two layers of peritoneum that connect two organs to each other or attach an organ to the body wall, and may form part of an omentum. They contain fat, vessels, nerves, and lymphatic.

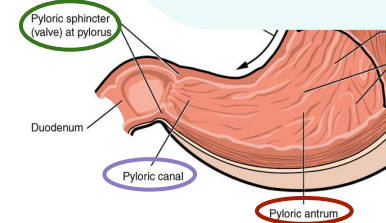
Greater Curvature:

- **Forms** the left border of the stomach.
- **Extends** from the cardiac orifice to the pylorus.
- Its upper part is **attached** to the spleen by Gastrosplenic ligament and lower part attached to the transverse colon by the **Greater omentum**.



Pyloric antrum and Pylorus:

- The **Pyloric Antrum** extends from incisura angularis to the **Pylorus**.
- The **Pylorus** is a tubular part of the stomach.
- It lies in the transpyloric plane (L1), 1 cm to the right of the midline.
- It has a thick muscular end called **pyloric sphincter**.
- The cavity of the **pylorus** is the **pyloric canal**.



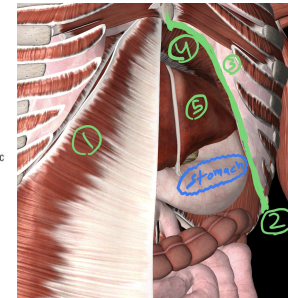
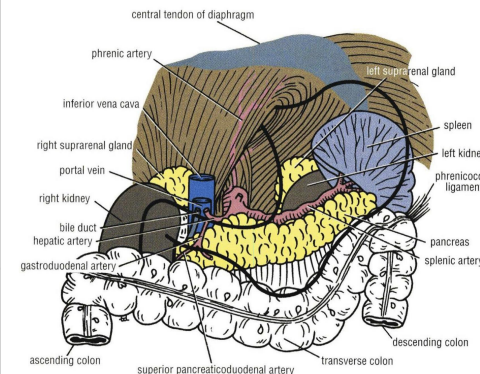
Anterior Relations

1. Anterior abdominal wall.
2. Left costal margin
3. Left pleura and lung
4. Diaphragm
5. Left lobe of the liver

Posterior Relations (STOMACH BED)

- 1) Left crus of diaphragm
 - 2) Left suprarenal gland
 - 3) Part of the left kidney
 - 4) Spleen.
 - 5) Splenic artery
 - 6) Pancreas.
 - 7) Transverse mesocolon
 - 8) Transverse colon
 - 9) Lesser sac smaller subdivision of peritoneal cavity
- All these structures form the stomach bed.

And all are separated from the stomach by peritoneum of lesser sac except the spleen by greater sac



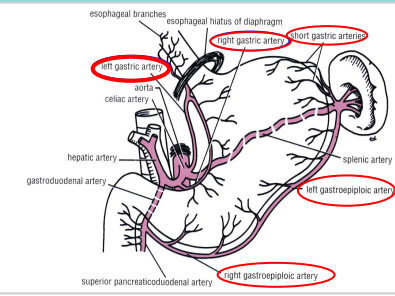
Anterior relations

Supply and Innervation of the Stomach

Arteries

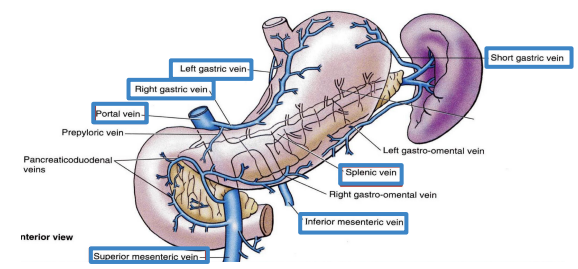
5 arteries:

- 1- **Left gastric artery:** (its a branch of celiac artery) Ascends along the lesser curvature.
- 2- **Right gastric artery:** (from the hepatic artery of celiac) Runs to the left along the lesser curvature.
- 3- **Short gastric artery:**(arise from the splenic artery) Pass in the gastrosplenic ligament.
- 4- **Left gastroepiploic artery:**(from the splenic artery) Pass in the gastrosplenic ligament.
- 5- **Right gastroepiploic artery:**(from the gastroduodenal artery of hepatic) Pass to the left along the greater curvature



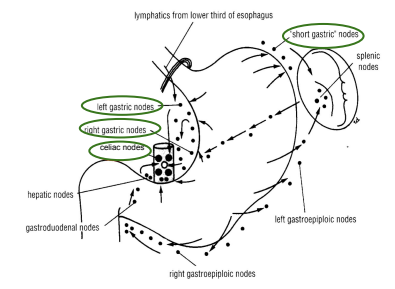
Veins

- All drain into the **portal circulation.**
- The Right and Left gastric drain **Directly in the portal vein.**
- The Short gastric veins and the gastroepiploic vein join the **splenic vein.**
- The Right gastroepiploic vein drain in the **superior mesenteric vein.**



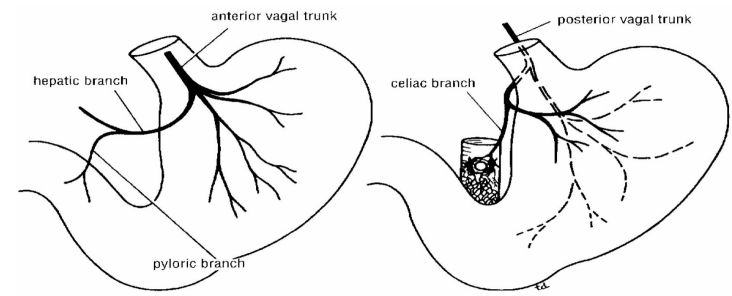
Lymph Drainage

- The lymph vessels follow the arteries, they First drain to the:
 - 1- Left and right gastric nodes
 - 2- left and right gastroepiploic nodes
 - 3- short gastric nodes
- Ultimately all the lymph from stomach is collected at the **celiac nodes.**



Nerve supply

- ❖ Sympathetic fibers are derived from the celiac plexuses
- ❖ Parasympathetic fibers are both vagi
 - **Anterior vagal trunk:**
 - Formed from the **Left** vagus
 - Supply the **anterior** surface of the stomach
 - Gives off a hepatic branch and from it a branch to the pylorus
 - **Posterior vagal trunk:**
 - Formed from the **Right** vagus
 - Supply **posterior** surface of the stomach
 - Gives off a large branch to the celiac and the superior mesenteric plexuses.



MCQ

Q1: The esophagus pierces through the diaphragm at which level ?

A: T10

B: T11

C: T12

D: T8

Q2: One of the posterior relations of the esophagus in the middle part ?

A: Left recurrent laryngeal

B: Aortic arch

C: thymus

D: Azygos vein

Q3: Where does the 2nd constriction of the esophagus occur ?

A: Junction with the stomach

B: junction with the pharynx

C: crossing of the aorta and left bronchus

D: crossing of aorta and right bronchus

Q4: Nerve supply of the esophagus anterior part ?

A: Right vagus

B: Left vagus

C: esophageal plexus

D: recurrent laryngeal

Q5: Lymph drainage of the lower part of esophagus ?

A: Superior mediastinal

B: inferior mediastinal

C: thoracic duct

D: Celiac nodes

Q6: What are the relations of the esophagus at the abdominal level ?

A: left lobe of the liver

B: Right crus of the diaphragm

C: thoracic duct

D: All of them

Answer key:
1 (A) , 2 (D) , 3 (C) , 4 (B) , 5 (D) , 6 (A)

MCQ

Q7:where does the cardiac orifice is located ?

A: 7th left costal

B: 8th left costal

C: 7th right costal

D: 5th intercostal

Q8:Incisure angularis is located in ?

A:greater curvature

B:Cardiac orifice

C: Greater omentum

D: Lesser curvature

Q9:Which of the following is related anteriorly to the stomach?

A:Splenic artery

B:Left lung and pleura

C:Transverse mesocolon

D:Pancreas

Q10:Which of the following drain directly into the Portal vein?

A:Short gastric

B:Right gastroepiploic

C:Left gastric

D:Left Gastroepiploic

Q11:The lesser curvature is attached to.....by.....

A:Spleen, Gastrosplenic ligament

B:Liver, Greater omentum

C:Transverse colon, Lesser omentum

D:Liver ,Lesser omentum

Q12:Which of the following is false about the arterial origin?

A:Left gastric artery, a branch of celiac artery

B:Left gastroepiploic artery, a branch of splenic artery

C:Short gastric artery, a branch of splenic artery

D:Right gastric artery, a branch of the celiac

Answer key:
7(A) , 8(D) , 9(B) , 10(C) , 11(D) , 12(D)

SAQ

Q1: List the posterior relations of the esophagus thoracic part ?

Q2: The Arterial Supply of the esophagus ?

Q3: Where do all the lymph eventually get collected?

Q4: Mention the origin of anterior and posterior vagal trunks, their supply?

Answers

1 : Bodies of the thoracic vertebrae & Thoracic duct
Azygos vein & Right posterior intercostal arteries
Descending thoracic aorta (at the lower end)

2 : Upper Third: inferior thyroid artery Middle third : thoracic artery . Lower third: left gastric artery .

3 : Celiac Nodes

4: Anterior vagal trunk: from the left vagus, supply anterior surface of the stomach
Posterior vagal trunk: from the right vagus, supply posterior surface of the stomach

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