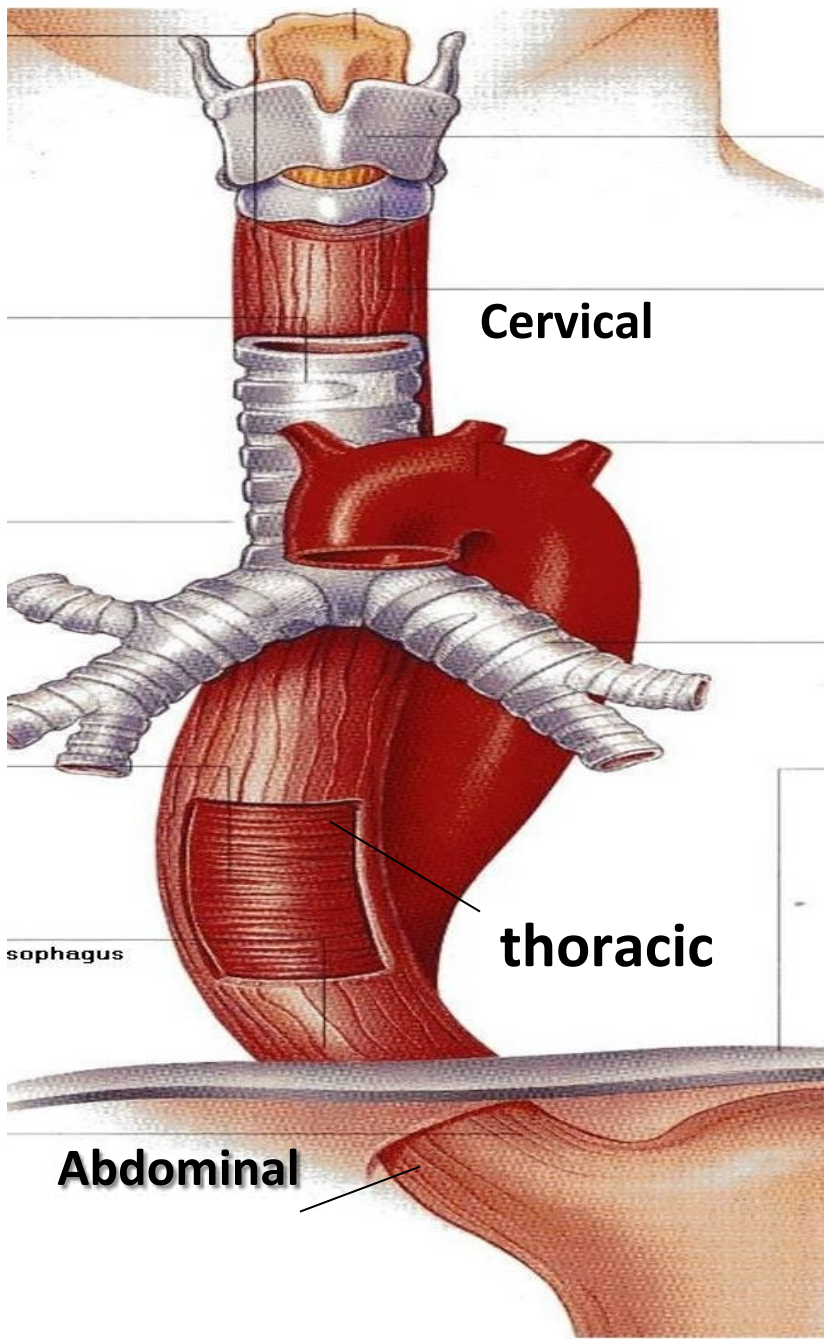
ESOPHAGUS

OBJECTIVES

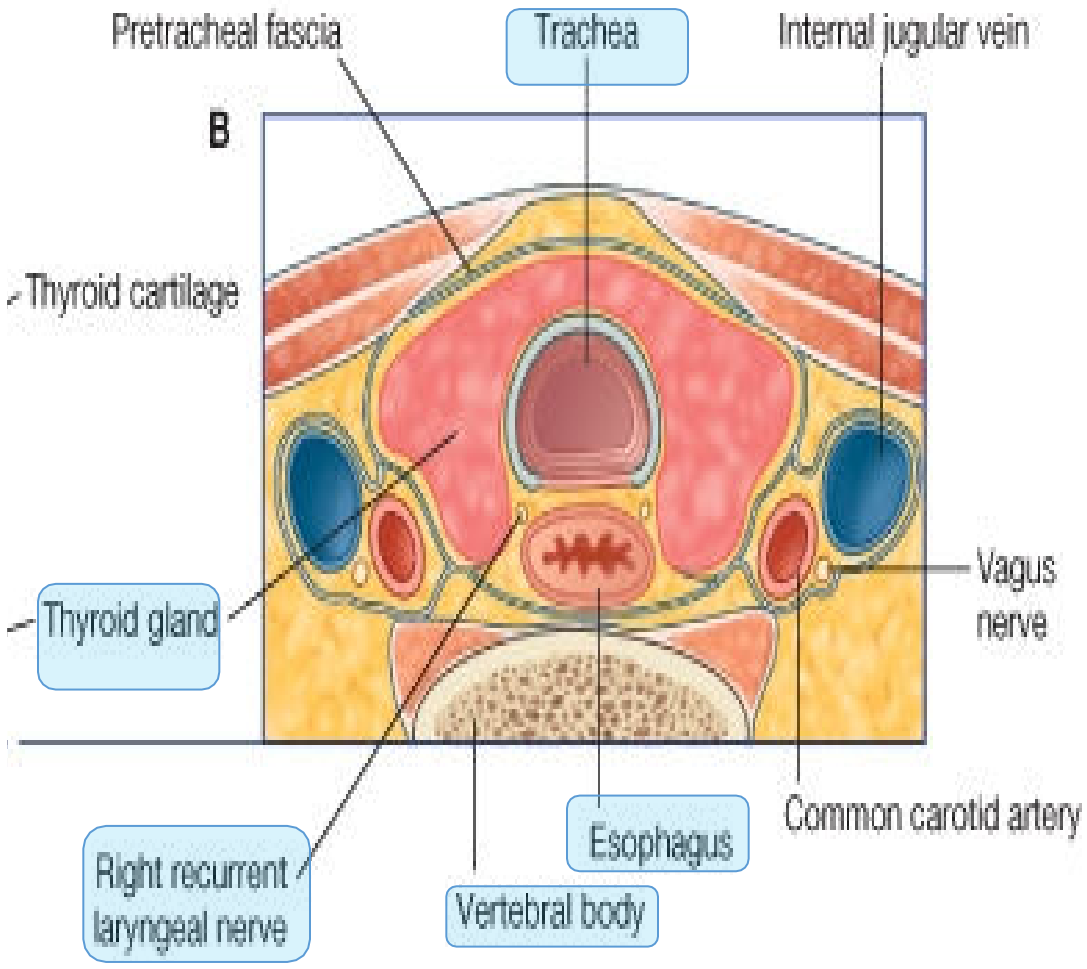
- Describe the anatomy of the **esophagus**: extent, length, parts, strictures, relations, blood supply, innervation and lymphatics.



ESOPHAGUS

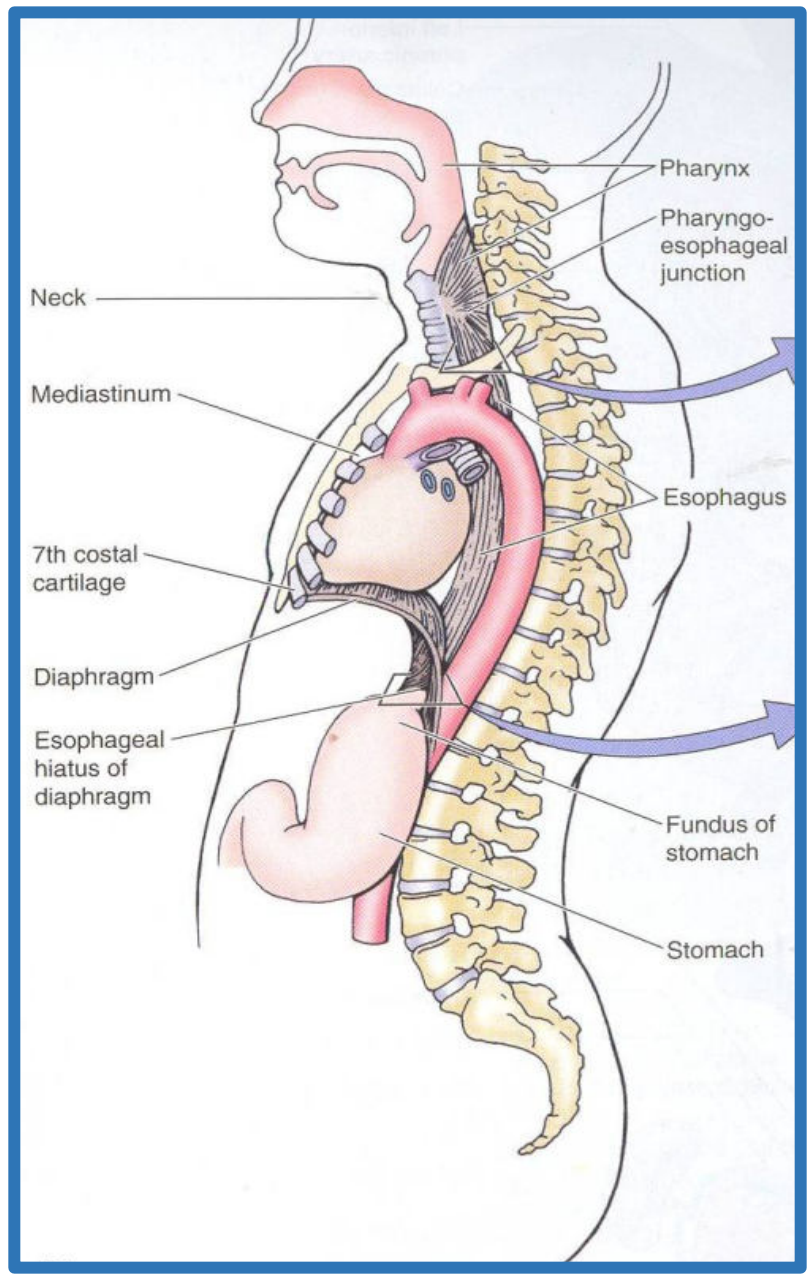
- Tubular structure about **25 cm** long.
- Begins at the level of C6.
- Pierces the diaphragm atT10.
- **<u>It is divided into 3 parts</u>:**
  - 1- **C**ervical.
  - 2- **T**horacic.
  - 3- **A**bdominal.
- **Proximal and distal- oncosurgery**

RELATIONS



CERVICAL PART

- Post: Vertebral column.
- Lat: Lobes of the thyroid gland.
- Ant: Trachea and the recurrent laryngeal nerves.



THORACIC PART

- In the thorax, it passes downward and to the **left** through superior then to posterior mediastinum
- At the level of the sternal angle, the **aortic arch** pushes the esophagus again to **the midline**

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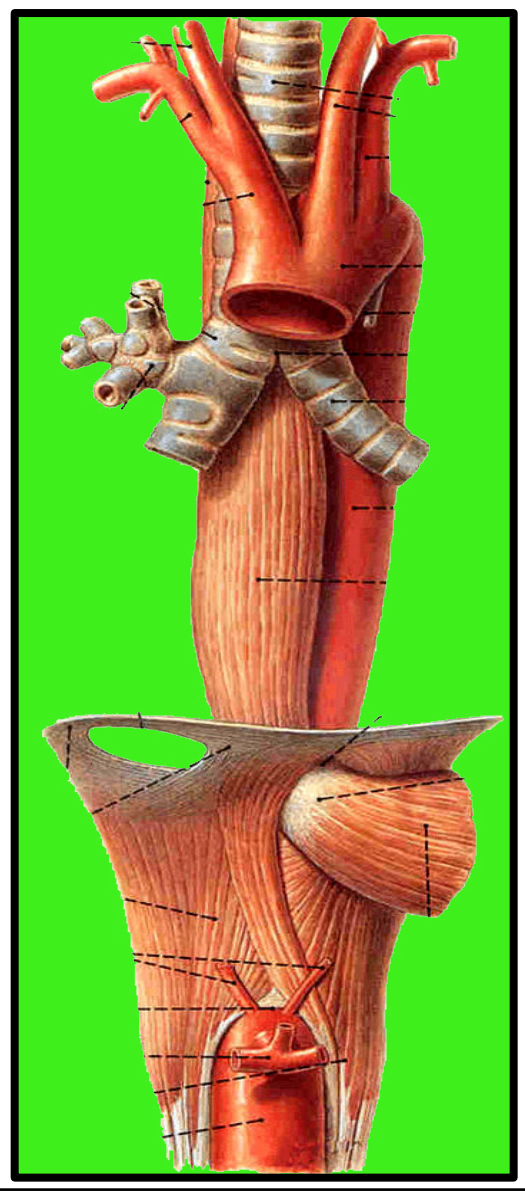
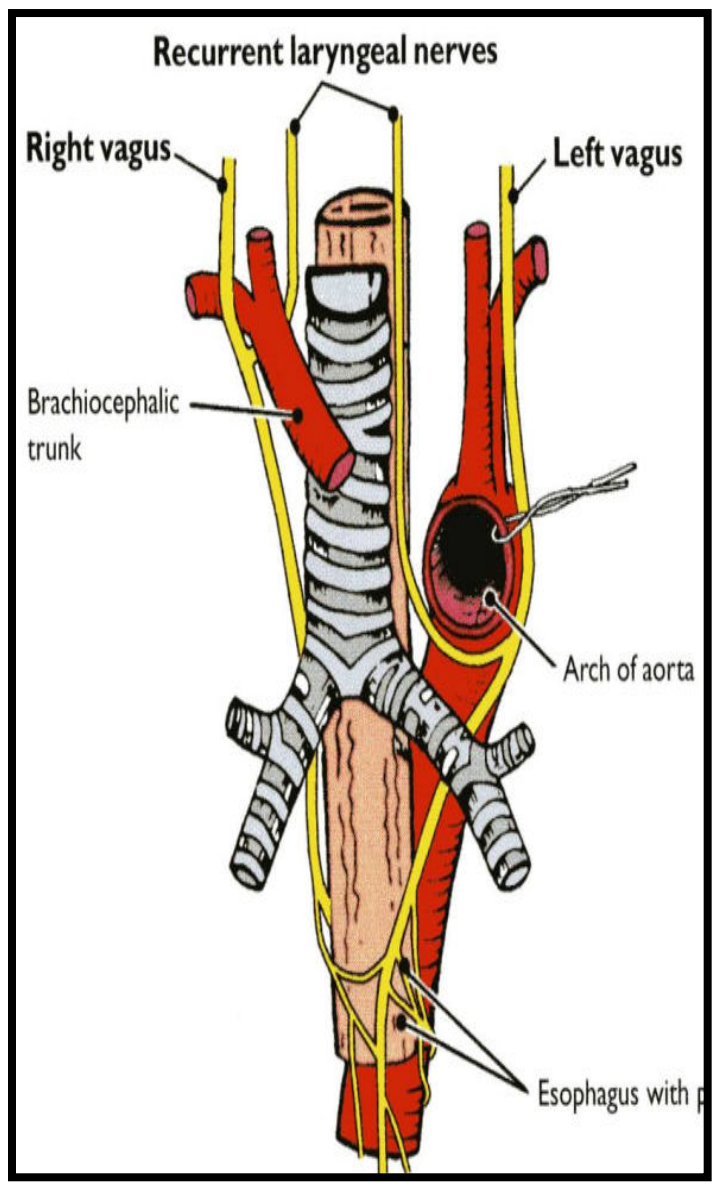


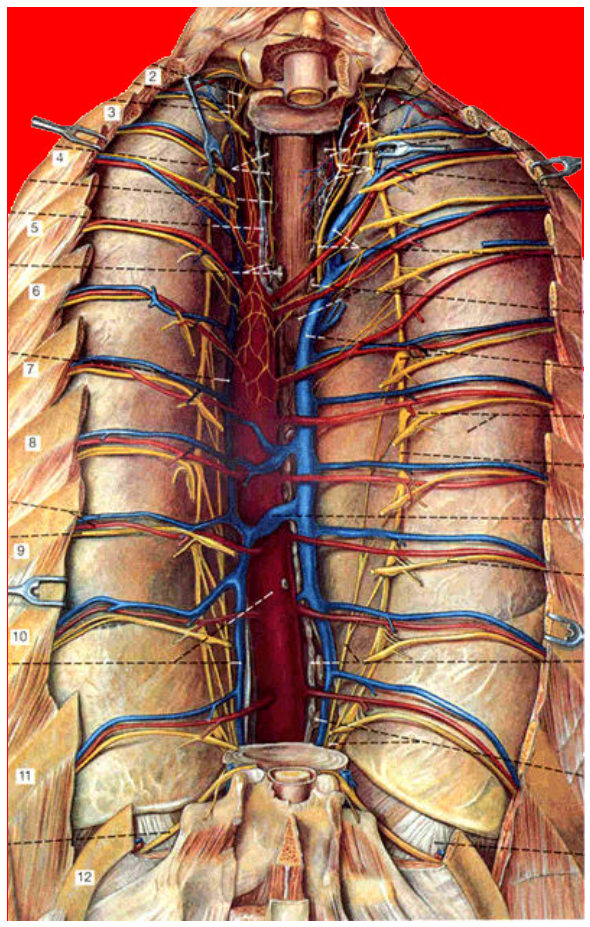


Thoracic part

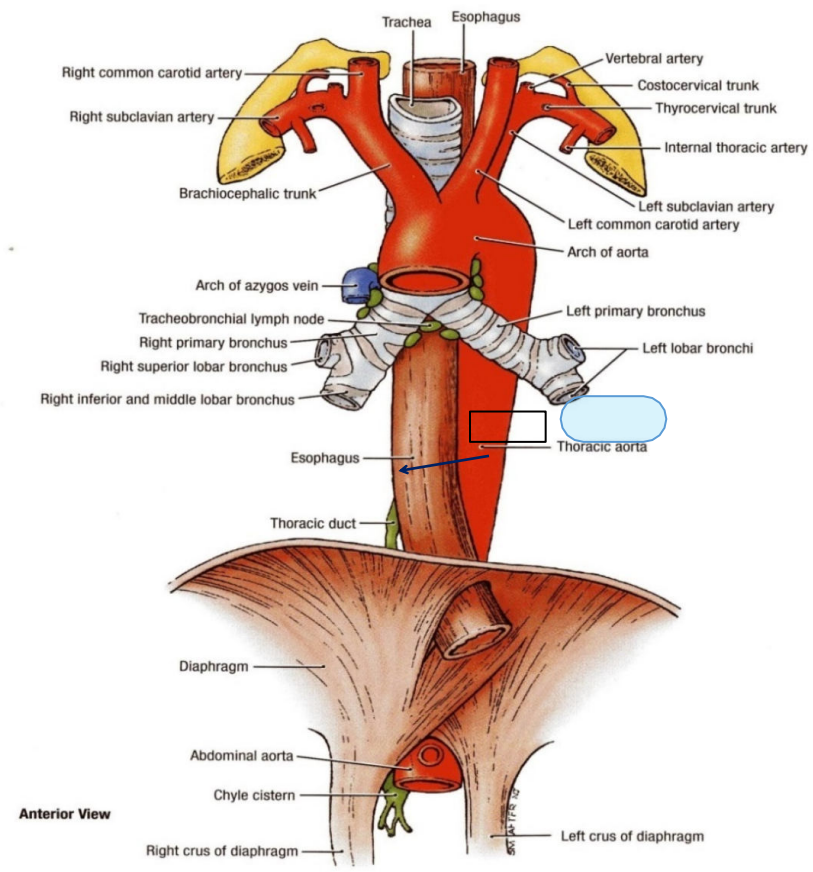
ANTERIOR RELATIONS

- Trachea
- Left recurrent laryngeal nerve
- Left principal bronchus
- Pericardium
- Left atrium

POSTERIOR RELATIONS – Thoracic duct



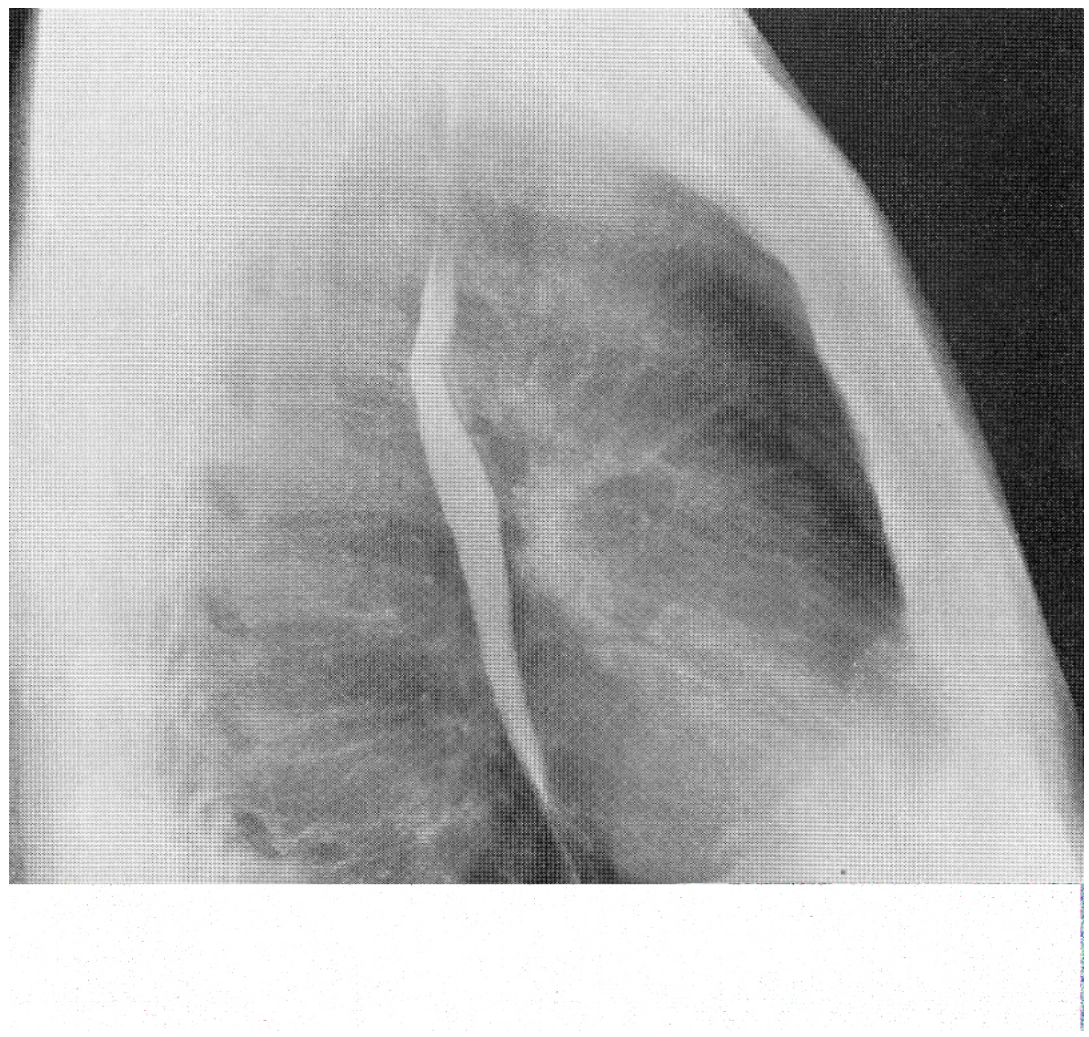
- **B**odies of the thoracic vertebrae
- **T**horacic duct
- Azygos vein
- **R**ight posterior intercostal arteries
- **D**escending thoracic aorta (at the lower end)



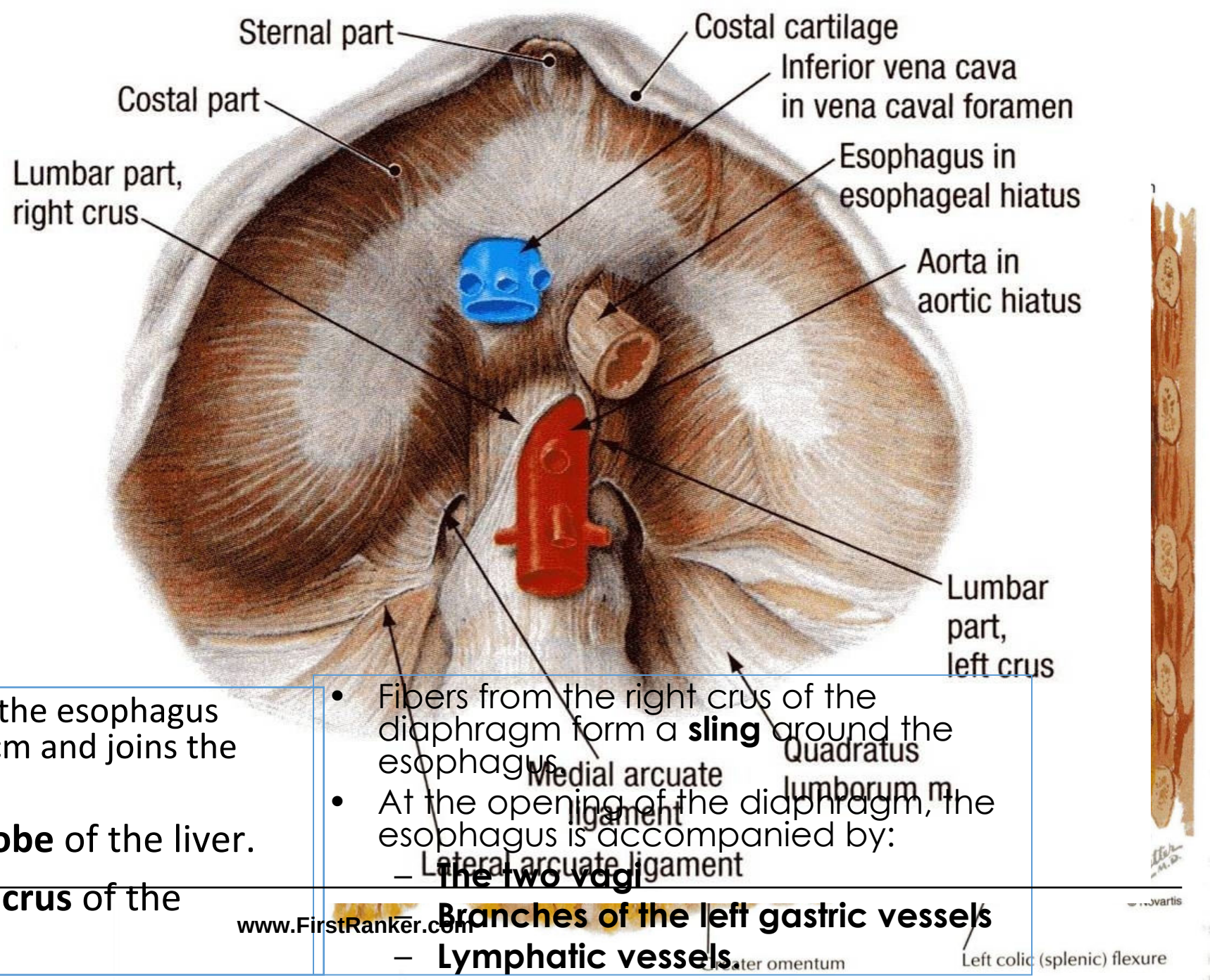
- **<u>On the Right side</u>:**
- Right mediastinal pleura
- Terminal part of the azygos vein.
- **<u>On the Left side</u>:**
- Left mediastinal pleura
- Left subclavian artery
- Aortic arch
- Thoracic duct

ESOPHAGUS AND LEFT ATRIUM

- close relationship
- **What is the clinical application?**
- A *barium swallow* will help the physician to **assess the size of the left atrium (dilation).**



RELATIONS IN T



- **In the Abdomen**, the esophagus descends for 1.3 cm and joins the stomach.
- **Anteriorly, left lobe** of the liver.
- **Posteriorly, left crus** of the diaphragm.

- 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.**

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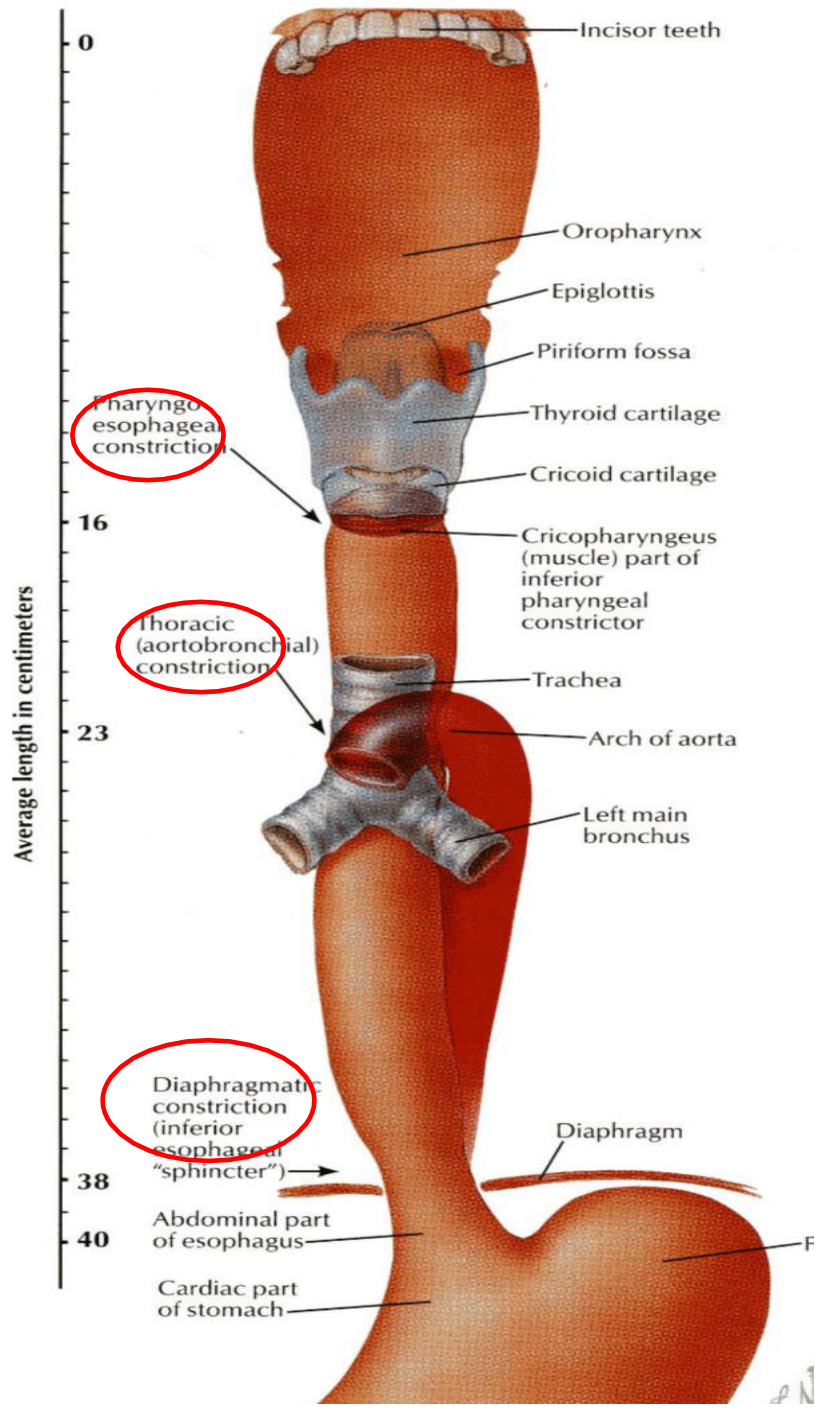
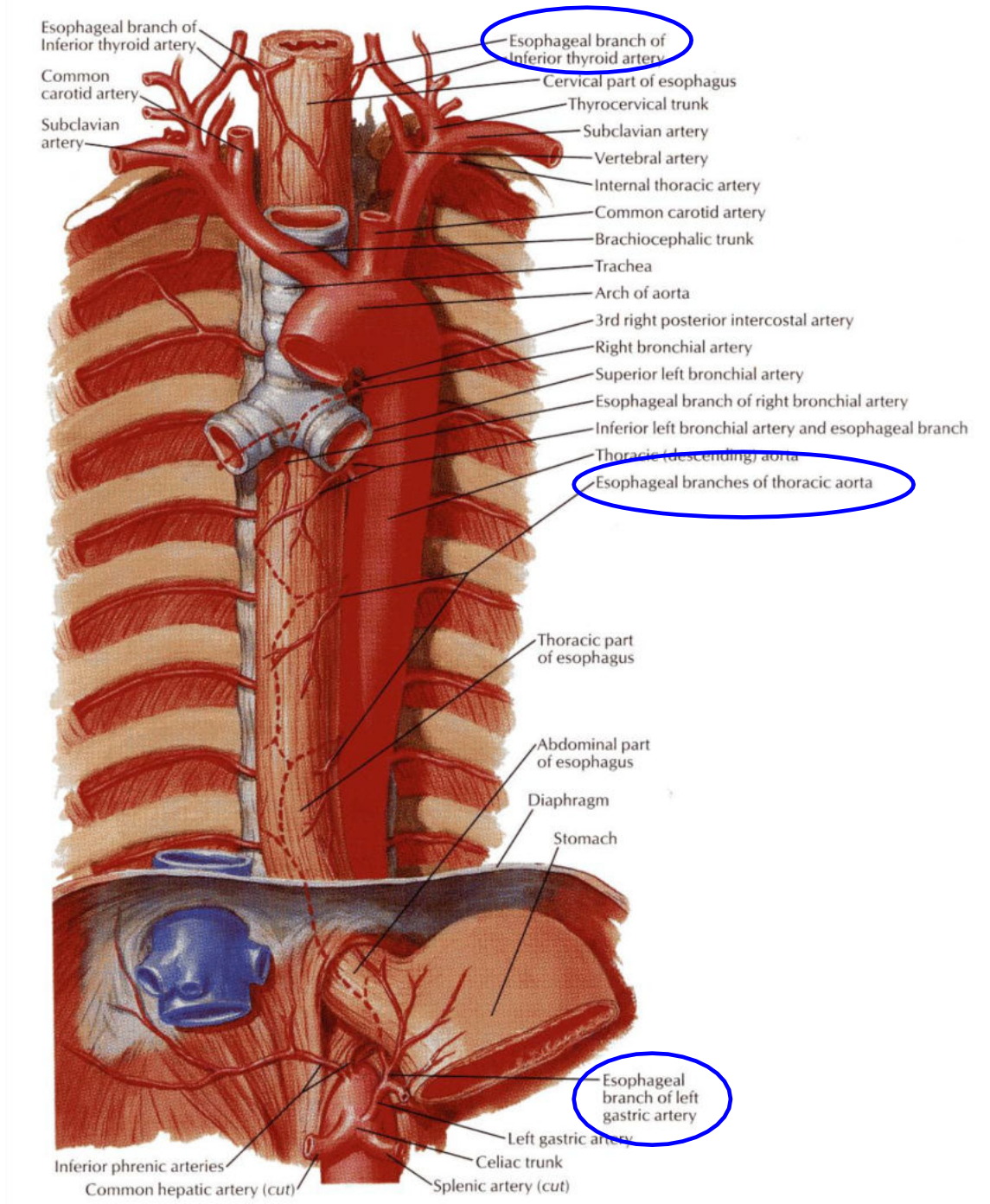
ESOPHAGEAL CONSTRICTIONS

- **The esophagus has 3 anatomic constrictions.**
- **The first** is at the junction with the pharynx(pharyngeoesophageal junction).
- **The second** is at the crossing with the aortic arch and the left main bronchus.
- **The third** is at the junction with the stomach.
- **They have a considerable clinical importance.**
- **Why?**



1. They may cause difficulties in passing an *endoscope.*
2. In case of swallowing of caustic liquids (mostly in children), this is where the burning is the worst and **strictures** develop.
3. The esophageal strictures are a common sites of the development of **esophageal carcinoma.**
4. ***In this picture what is the importance of the scale?***



ARTERIAL SUPPLY

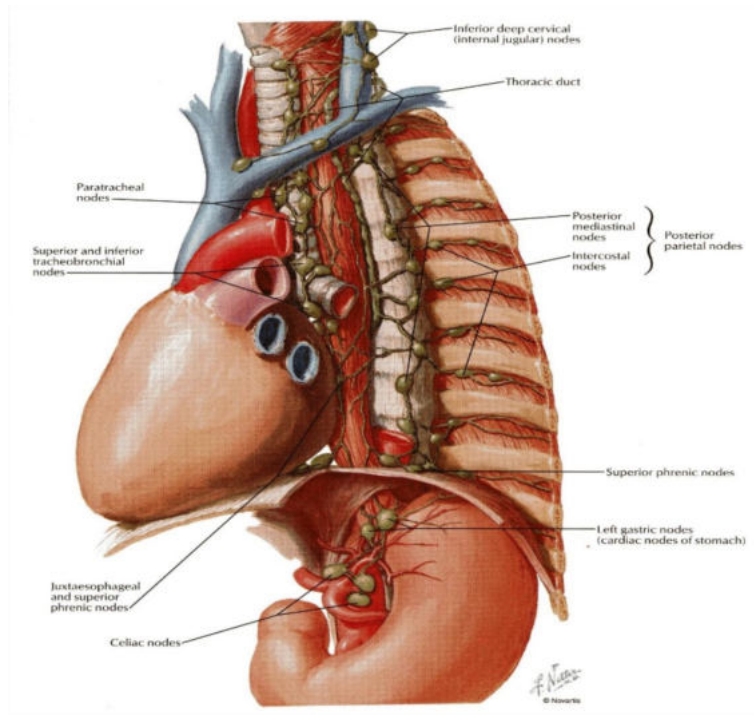
- Upper third by the **inferior thyroid artery**.
- The middle third by the **thoracic aorta**.
- The lower third by the **left gastric artery**.

VENOUS DRAINAGE

- The upper third drains in into the **inferior thyroid veins**.
- The middle third into the **azygos veins**.
- The lower third into the **left gastric vein, which is a tributary of the portal vein.**
- *NB. Esophageal varices.*

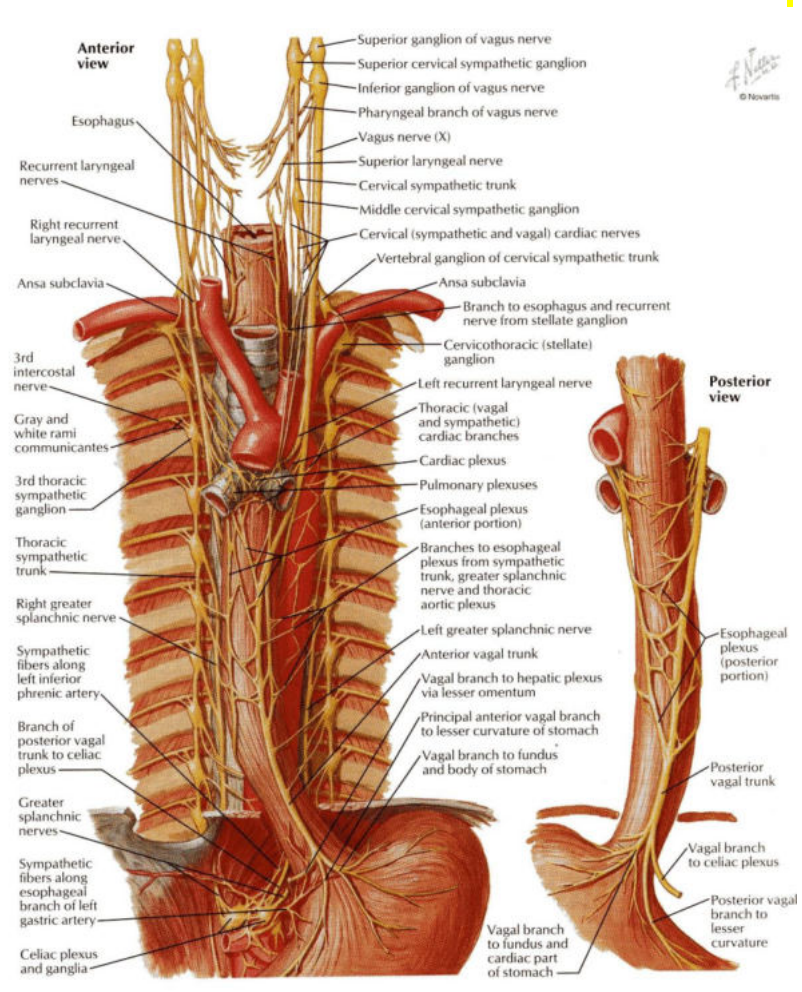
LYMPH DRAINAGE

- The upper third is drained into the **deep cervical nodes**.
- The middle third is drained into the **superior** and **inferior mediastinal nodes**.
- The lower third is drained in the **celiac** lymph nodes in the abdomen

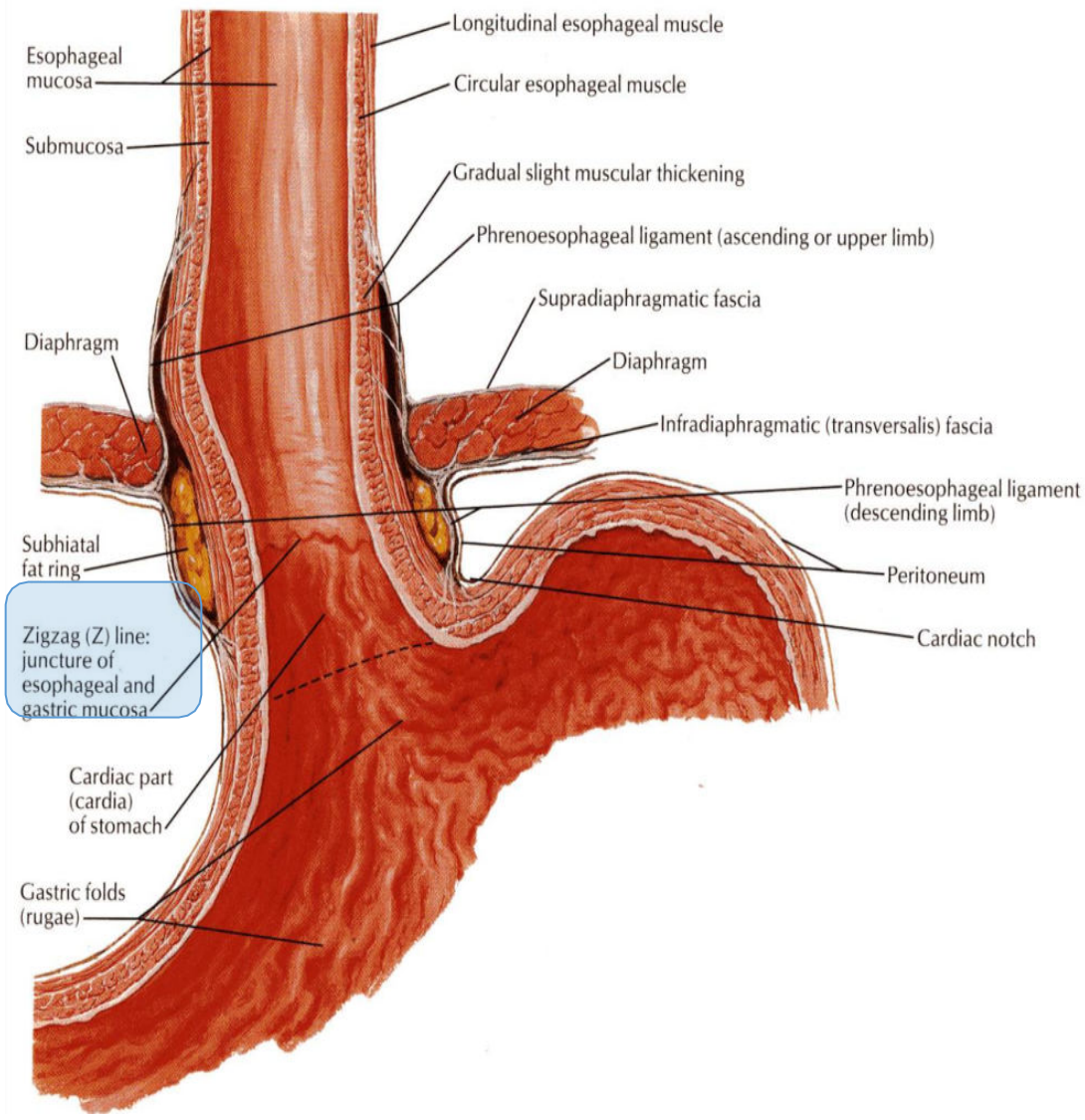


NERVE SUPPLY

- It is supplied by sympathetic fibers from the **sympathetic trunks**.
- The parasympathetic supply comes form the **vagus nerves**.
- Inferior to the roots of the lungs, the vagus nerves join the sympathetic nerves to form the **esophageal plexus**.
- The ***left*** vagus lies **anterior** to the esophagus.
- The ***right*** vagus lies **posterior** to it.



CARDIAC ORIFICE



- It is the site of the **gastro-esophageal sphincter.**
- It is a physiological rather than an anatomical, sphincter.
- Consists of a **circular layer** of smooth muscle **(under vagal and hormonal control**).
- ***Function:***
- Prevents regurgitation (reflux)
- **NB**. Notice the abrupt mucosal transition from esophagus to stomach (Z-line)

Microscopic anatomy

- 2 layers of muscles- longitudinal and circular.
- Lined by non keratinizing stratified squamous epithelium.
- Squamocolumnar jn.

Recap

- Length ?
- Parts?
- Arterial supply?
- Venous drainage?
- Constrictions ?
- Relation with lt atrium?
- Barett’s esophagus?

Stricture

- Causes can be grouped into:
  - Intrinsic – due to inflammation, fibrosis or neoplasia
  - Extrinsic – due to external compression
  - Disruption of peristalsis

Proximal and mid esophagus

- Caustic ingestion (acid or alkali)
- Malignancy
- Radiation therapy
- Infectious esophagitis - *Candida,* herpes simplex virus (HSV), cytomegalovirus (CMV), human immunodeficiency virus (HIV)
- AIDS and immunosuppressed patients
- Diseases of the skin - Pemphigus vulgaris, benign mucous membrane (cicatricial) pemphigoid, epidermolysis bullosa dystrophica
- Idiopathic eosinophilic esophagitis
- Extrinsic compression
- Squamous cell carcinoma

Distal esophagus

- Peptic stricture
- Adenocarcinoma
- Collagen vascular disease - Scleroderma, systemic lupus erythematosus (SLE), rheumatoid arthritis
- Extrinsic compression
- Alkaline reflux following gastric resection
- Sclerotherapy and prolonged nasogastric intubation

- Heartburn
- Dysphagia, odynophagia
- Food impaction
- Weight loss
- Chest pain
- Poor nutritional status
- Patients with collagen vascular diseases -- joint abnormalities, calcinosis, telangiectasias, sclerodactyly, or rashes
- Virchow node

Corrosive injury

- Accidental or suicidal.
- The type of agent, its concentration and the volume ingested determine the extent of damage.
- Pathophysiology:
  - Alkalis cause liquefaction that leads to fibrous scarring.
  - Acids cause coagulative necrosis with eschar formation, and this coagulum limit penetration to deeper layers.
  - Acids cause more gastric damage because of intense pylorospasm with pooling in the antrum.

Treatment

- Supportive
- Feeding jejunostomy until patient starts swallowing saliva.
- Repeated endoscopy and dilation.
- Esophageal replacement for very long or multiple strictures. Why not resection?

Corrosive injury- Key points

Skilled early endoscopy is mandatory

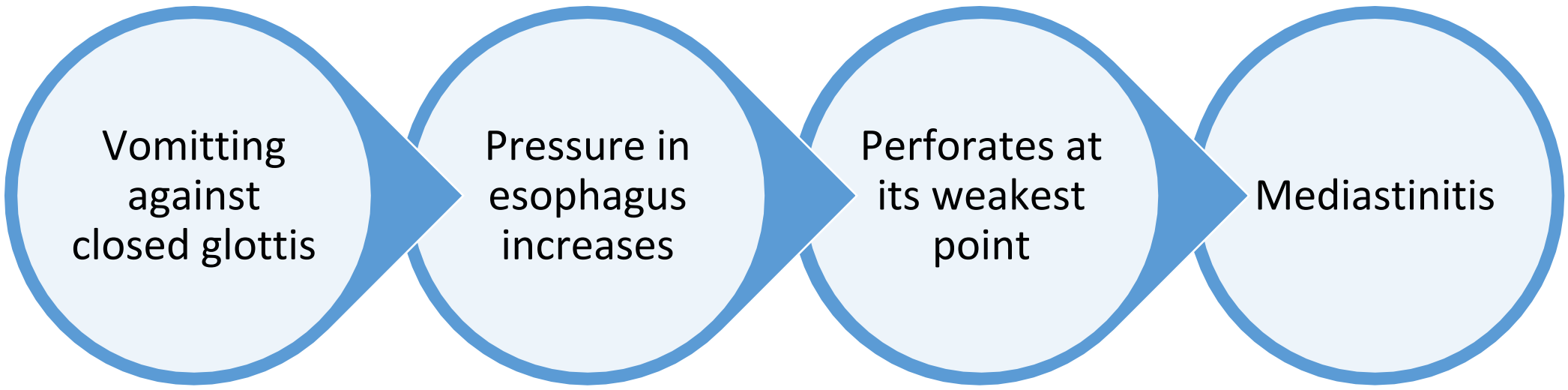
Esophageal perforation

- Usually iatrogenic or due to ‘barotrauma’.
- Spontaneous perforation is a life-threatening condition.
- Iatrogenic perforation can be managed conservatively.
- Can be pathological
- Due to penetrating injury or foreign body

Barotrauma (spontaneous perforation, Boerhaave syndrome)

- occurs classically when a person vomits against a closed glottis.
- The pressure in the oesophagus increases rapidly, and the
- oesophagus bursts at its weakest point in the lower third, sending
- a stream of material into the mediastinum and often the
- pleural cavity as well. The condition was first reported by
- Boerhaave, who reported the case of a grand admiral of the
- Dutch fleet who was a glutton and practised autoemesis.
- Boerhaave syndrome is the most serious type of perforation

Pathophysiology



Clinical presentation

- Severe pain in the chest or upper abdomen following a meal or a bout of drinking
- SOB
- Sometimes misdiagnosed as MI, perforated peptic ulcer or pancreatitis
- Rigidity of the upper abdomen
- Dec. breath sounds
- Dullness on percussion, subcutaneous emphysema
- In late cases sepsis is present

Investigations

- CXR - air in the mediastinum, pleura or peritoneum.
- Pleural effusion
- A barium swallow
- CECT

Iatrogenic injury

- Most common cause of esophageal perforation.
- Most common site is the cricopharyngeus.
- Factors associated with increased risk are including large anterior cervical osteophytes, the presence of a pharyngeal pouch and mechanical causes of obstruction
- It may follow biopsy
- Patients undergoing therapeutic endoscopy have a 10 times greater perforation risk than those undergoing diagnostic endoscopy.

Treatment

- Aim is to limit mediastinal contamination and infection
- The decision between operative and non-operative management rests on four factors:

  1 the site of the perforation (cervical vs. thoracoabdominal oesophagus)

  2 the event causing the perforation (spontaneous vs. instrumental)

  3 underlying pathology (benign or malignant)

  4 the status of the oesophagus before the perforation (fasted and empty vs. obstructed with a stagnant residue).

- Indications for non-operative management include:
  - pain that is readily controlled with opiates;
  - absence of crepitus, diffuse mediastinal gas, hydropneumothorax or pneumoperitoneum;
  - no evidence of widespread extravasation of contrast material;
  - no evidence of on-going luminal obstruction or a retained foreign body.
  - patients who have remained clinically stable despite diagnostic delay.
- The principles of non-operative management are hyperalimentation, nasogastric suction and broad-spectrum intravenous antibiotics.

- Surgical management is indicated when:
- Patients are unstable with sepsis or shock
- Have evidence of a heavily contaminated mediastinum, pleural space or peritoneum.
- Surgery can be a primary repair, creation of an external fistula or resection.

Key points

- Most perforations are iatrogenic.
- Surgical emphysema is pathognomonic.
- Complications are mediastinitis and sepsis.
- Treatment is both conservative or surgical but requires specialised care.