



Doctor 021

GI PATHOLOGY

#1

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Diseases of the esophagus 1

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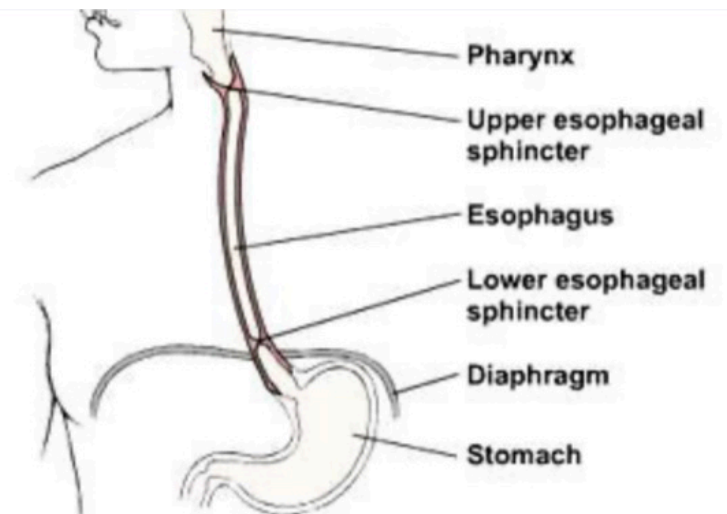
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Hello everyone and welcome back to a new system in our bodies, the gastrointestinal system.

In today's lecture we will focus on the diseases that affect one portion of the gastrointestinal tract, esophagus, before we proceed let's have a brief idea about the anatomy of esophagus, hope that help you to understand what is written next.

The esophagus is a hollow distensible (قابل للنفخ) muscular tube that extend from the epiglottis to the stomach at the gastroesophageal junction, just above the diaphragm. It is lined by nonkeratinized stratified squamous epithelium.

The function is to transport the food from the mouth to the stomach.



Diseases that affect the esophagus

- ▶ 1. Obstruction: mechanical or functional.
- ▶ 2. vascular diseases: varices.
- ▶ 3. Inflammation: esophagitis.
- ▶ 4. Tumours.

The obstruction (انسداد) could be partially or complete , a blockage to the flow of food through the esophagus , as I said at the intro the esophagus allow the the movement of food from mouth to the stomach in a peristaltic manner . The gastroesophageal sphincters allow this movement in one direction , after the food pass, the sphincter firmly closes and prevents food regurgitation.

Mechanical Obstruction

- ▶ Congenital or acquired.

- ▶ Examples:

- ▶ **Atresia**

- ▶ **Fistulas** Usually associated with atresia

- ▶ **Duplications**

- ▶ **Agenesis (v rare)**

- ▶ **Stenosis. (Acquired and the most common of all)**

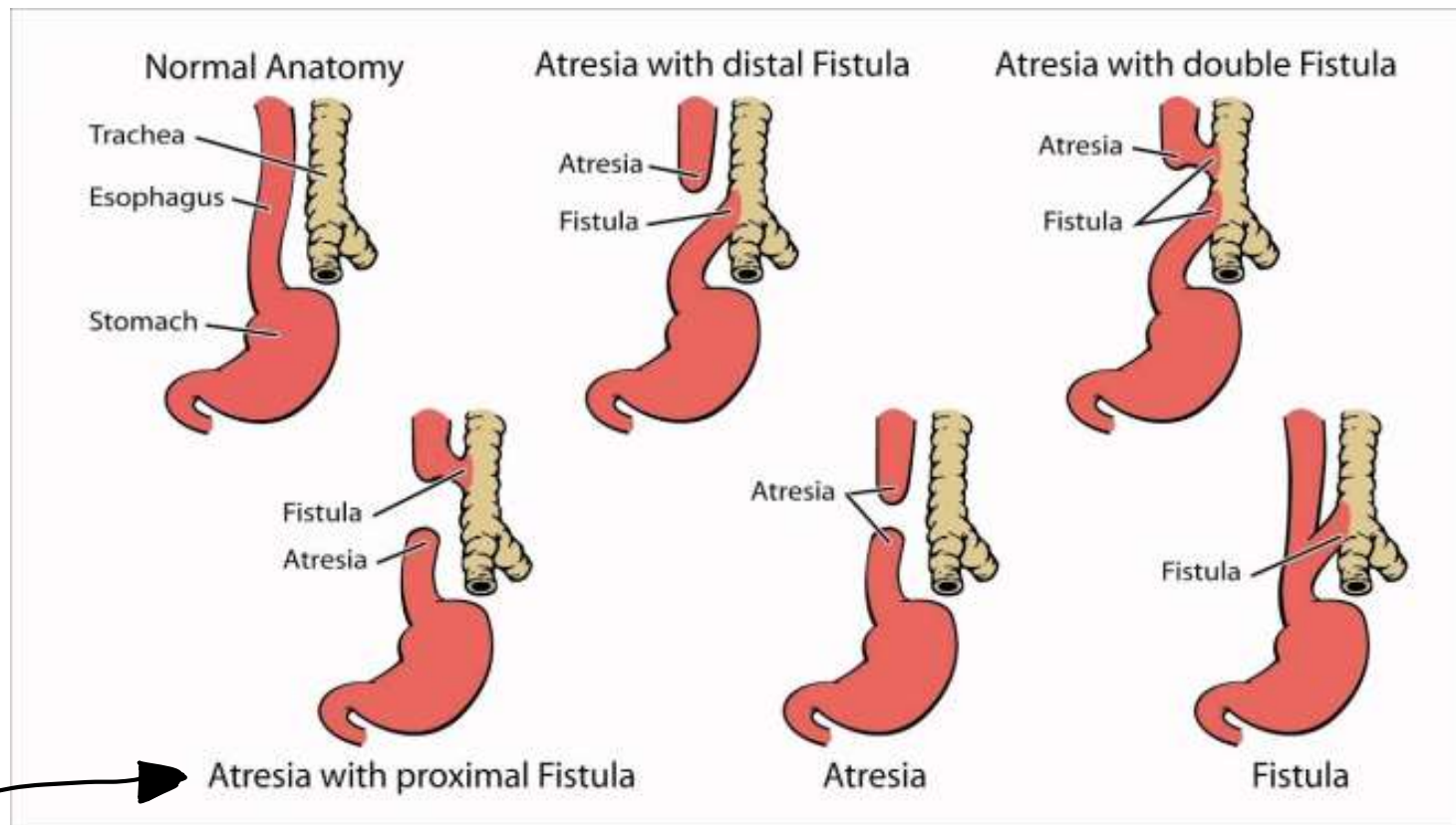
Congenital

Atresia

No lumen in a specific part of the esophagus, not all the esophagus is closed.

- ▶ Thin, noncanalized cord replaces a segment of esophagus.
- ▶ Most common location: at or near the tracheal bifurcation
- ▶ +/- fistula (upper or lower esophageal pouches to a bronchus or trachea).

Fistula: an abnormal passage between 2 hollow or tubular organs.
Here in our topic we mean between the esophagus & trachea.



In this type unfortunately, the food could pass to the trachea → to bronchial tree → to the lung and causes suffocation 🤢 , aspiration pneumonia.

Clinical presentation:

- ▶ Shortly after birth: regurgitation during feeding
- ▶ Needs prompt surgical correction (rejoin).



Something like anastomosis
(التحام) in the area of atresia.

- ▶ **Complications if w/ fistula:**
- ▶ Aspiration
- ▶ Suffocation
- ▶ Pneumonia
- ▶ Severe fluid and electrolyte imbalances.

As a result of food doesn't reach the stomach, The baby isn't actually eating or drinking , so dehydration could happen, and fluid & electrolytes imbalance.

Esophageal stenosis (تضيّق)

The lumen isn't completely lost in a specific part, in fact it is narrower than normal.

- ▶ Acquired >>> Congenital.
- ▶ Fibrous thickening of the submucosa & atrophy of the muscularis propria.
- ▶ Due to inflammation and scarring

Usually preceded by an injury to the esophagus like esophagitis or chemical injury, this will trigger the inflammation and repair, fibrosis, so this fibrous thickening may lead to stenosis.

▶ Causes:

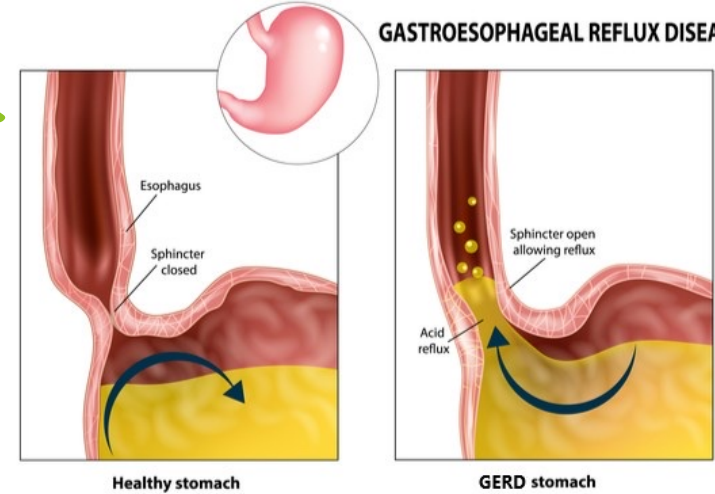
- ▶ Chronic GERD.
- ▶ Irradiation Ex; radiotherapy ☸ for cancer patient
- ▶ Ingestion of caustic agents (مواد حارقة)

Acid or alkaline material either for suicide (بدو ينتحر) or an accident.

Gastroesophageal reflux disease 🦠

➡ scarring, fibrosis ➡ narrowing.

Clinical presentation



- ▶ Progressive dysphagia
- ▶ Difficulty eating solids that progresses to problems with liquids.

(Difficulty in swallowing), at the beginning for solid , after that for liquid as the the narrowing continues.

The second type of obstruction ;

Functional Obstruction

- ▶ Efficient delivery of food and fluids to the stomach requires coordinated waves of peristaltic contractions.
- ▶ Esophageal dysmotility: discoordinated peristalsis or spasm of the muscularis.
- ▶ **Achalasia: the most important cause.**

Achalasia

In normal situation, when the food reach the esophageal sphincter it must relax to allow the food for entering , but in achalasia what is happen to the sphincter is incomplete relaxation, stays partially closed.

- ▶ **Triad:**
- ▶ Incomplete LES relaxation
- ▶ Increased LES tone The sphincter is contracted
- ▶ Esophageal aperistalsis. No peristalsis movement

Idiopathic (unknown origin)

- ▶ **Primary** >>>secondary.

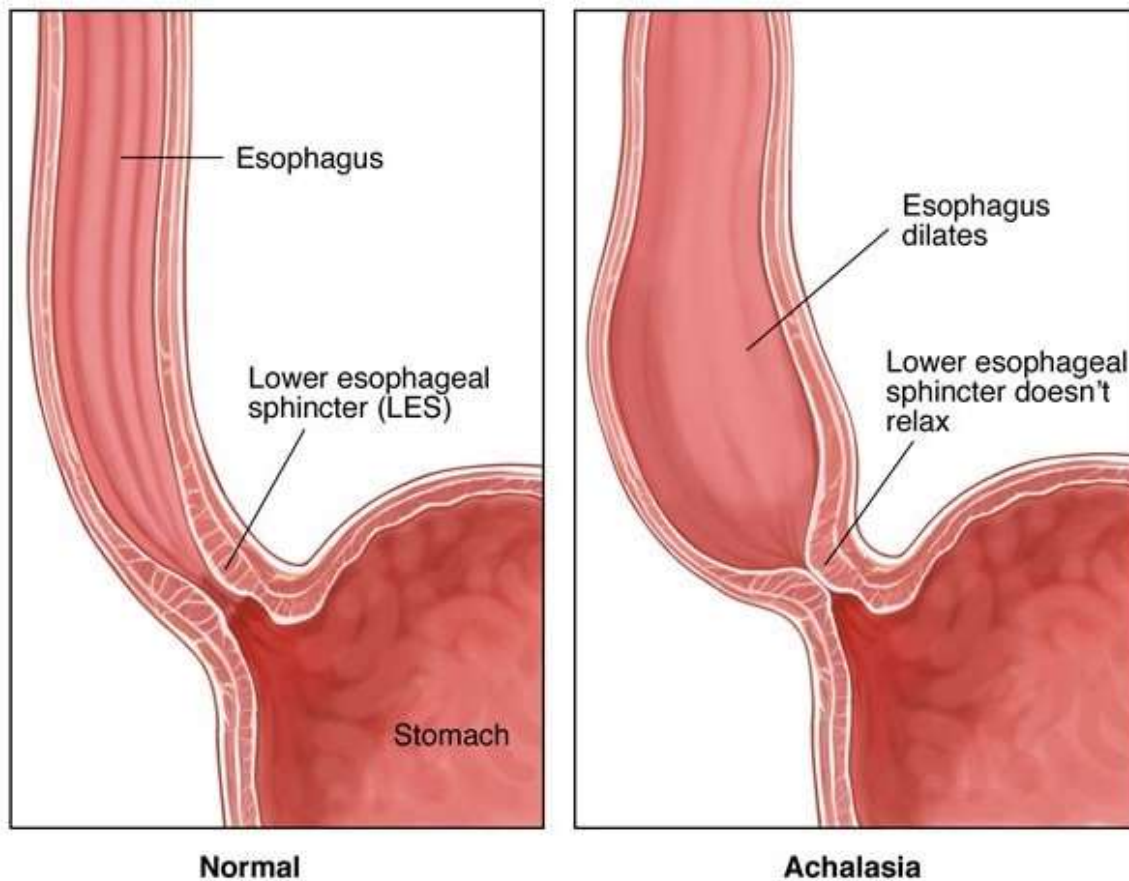
LES; lower esophageal sphincter

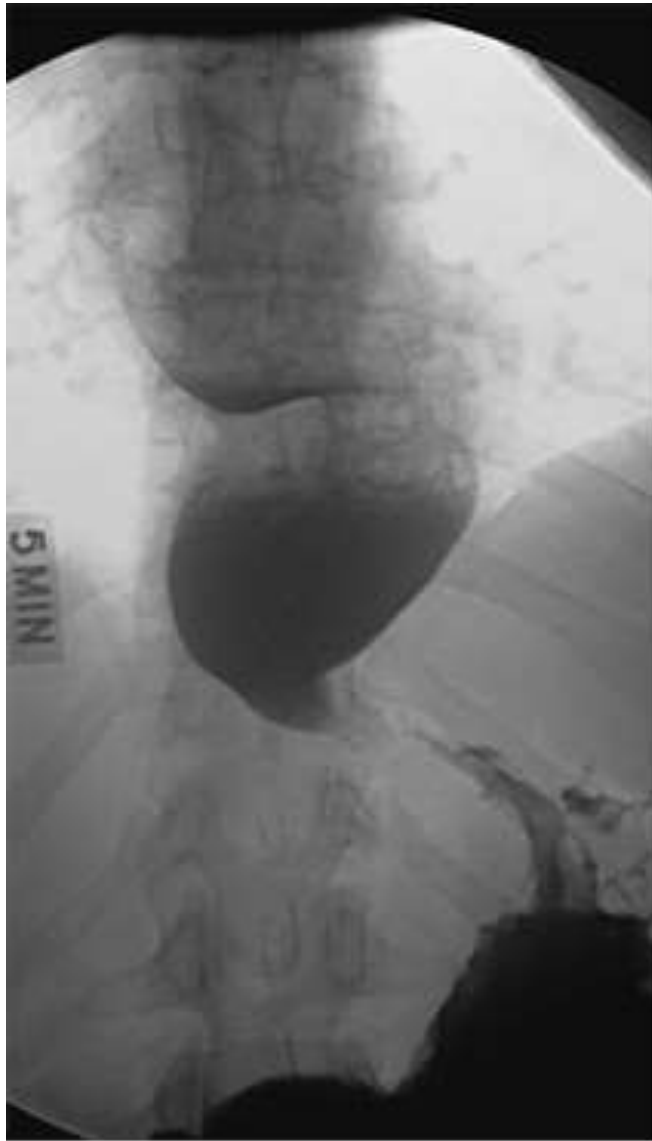
Due to incomplete relaxation of LES the food accumulates (build up) in the esophagus leading to the dilation of that area
➡ large distended esophagus .

Then the contents could pass to the respiratory tract causing aspiration . Meaning that accumulation of food could lead to fistula formation .

What is fistula again:

Fistula: an abnormal passage between 2 hollow or tubular organs.
Here in our topic we mean between the esophagus & trachea.





Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

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Primary achalasia

- ▶ Failure of distal esophageal inhibitory neurons.
- ▶ Idiopathic Loss of innervation → sphincter remains contracted.
- ▶ Most common

We don't know the cause of Innervation loss **!?**

Secondary achalasia

GI tract has its own nervous system (Enteric nervous system), nervous plexus in submucosa and muscularis layers, any damage in this plexus → no peristaltic movement.


▶ Degenerative changes in neural innervation

▶ **Intrinsic**

▶ **Vagus nerve**

The cause of loss of innervation is **DAMAGE** to enteric nervous system or vagus nerve.

▶ **Chagas disease**, *Trypanosoma cruzi* infection >> destruction of the myenteric plexus >> failure of LES relaxation >> esophageal dilatation. ↖

An infection by a parasite  called *Trypanosoma cruzi*.

Here there is an obvious reason so it is secondary achalasia.

Clinical presentation

- ▶ Difficulty in swallowing
- ▶ Regurgitation
- ▶ Sometimes chest pain.

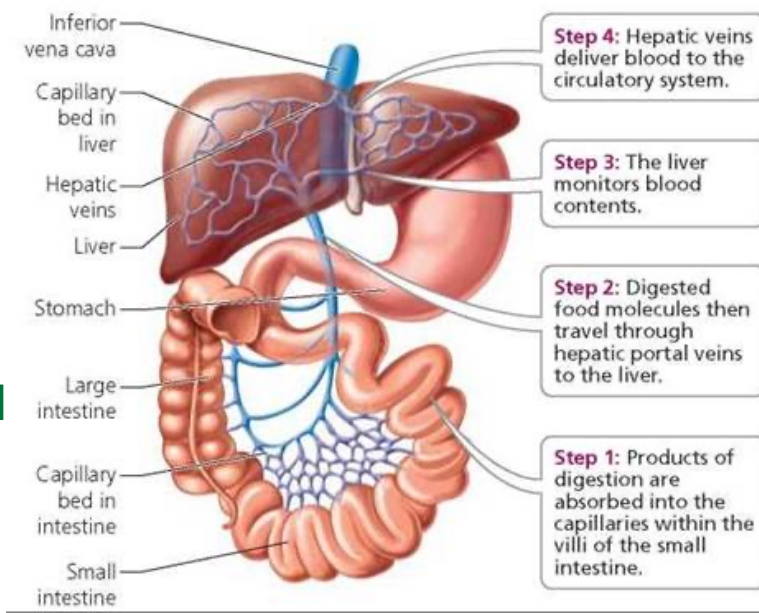
Vascular diseases: Esophageal Varices

- ▶ Tortuous dilated veins within the submucosa of the distal esophagus and proximal stomach.
- ▶ Diagnosis by: endoscopy or angiography.

You remember the hepatic portal circulation, right? Any disease impedes the portal blood flow causes hypertension which can lead to esophageal varices, life-threatening bleeding.

Hypertension → Dilated blood vessels, mostly veins that easily can be damaged or ruptured and cause severe bleeding inside the esophagus (intraluminal), because these veins are located in submucosa of esophagus, meaning that it is so close to the mucosal surface.

The risk is that bleeding is unpredictable in term of time.



Distal esophagus.
These blackish vessels are dilated veins.
Why black? Because they contain
deoxygenated blood (dark)



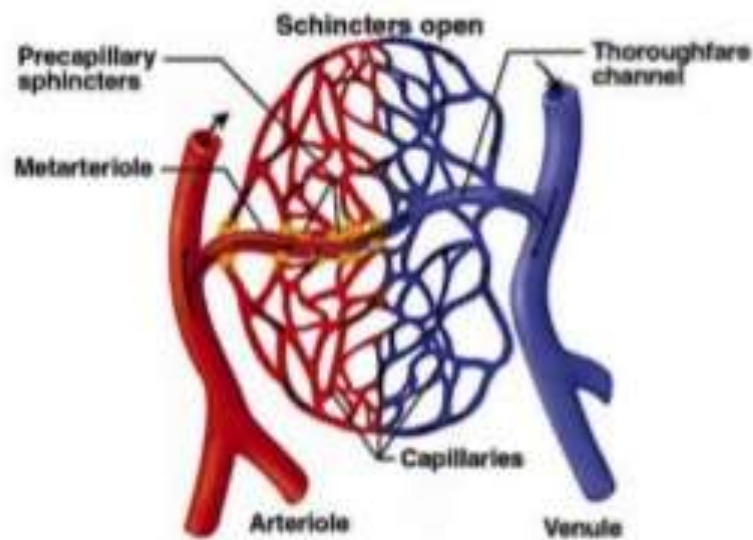
Pathogenesis:

As I said before, any problem (like; liver cirrhosis) in portal circulation can lead to portal hypertension, increased the blood pressure in liver for example, as a result the blood goes to Porto-systemic Anastomosis (an alternative route for the blood to reach the systemic circulation when there is portal veins blockage or hypertension). So they appear as a collateral communication between portal and systemic circulations

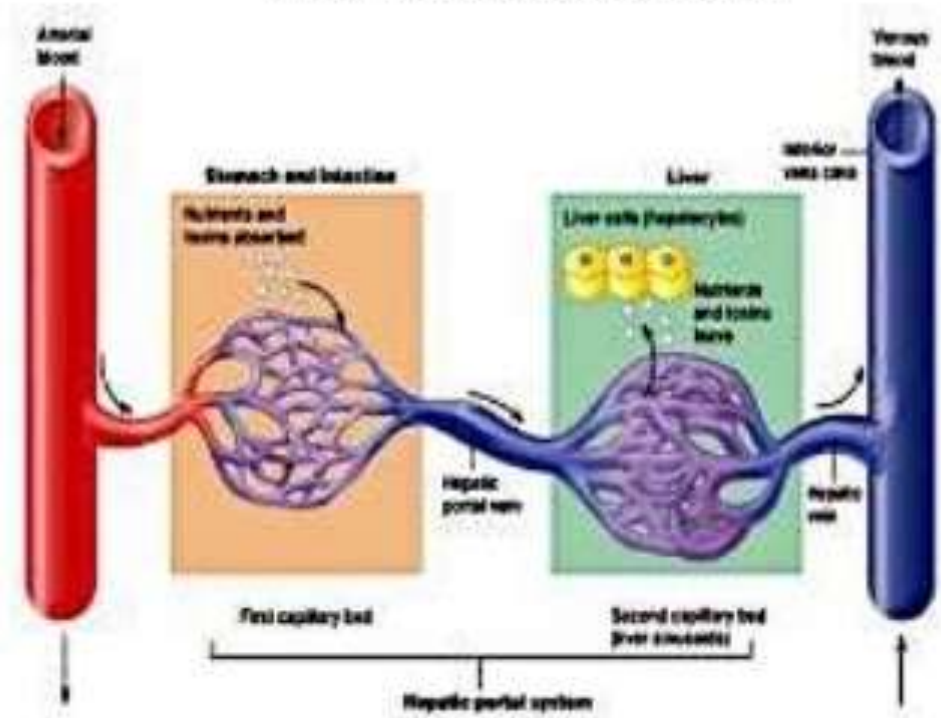
- ▶ **Portal circulation:** blood from GIT>>portal vein>>liver (detoxification)>>inferior vena cava.
- ▶ Diseases that impede portal blood flow >> portal hypertension >>esophageal varices.
- ▶ Distal esophagus : site of Porto-systemic anastomosis.
- ▶ **Portal hypertension**>>collateral channels in distal esophagus>>shunt of blood from portal to systemic circulation>>dilated collaterals in distal esophagus>>varices

Portal system

Usual circulation



Portal circulation



Causes of portal hypertension

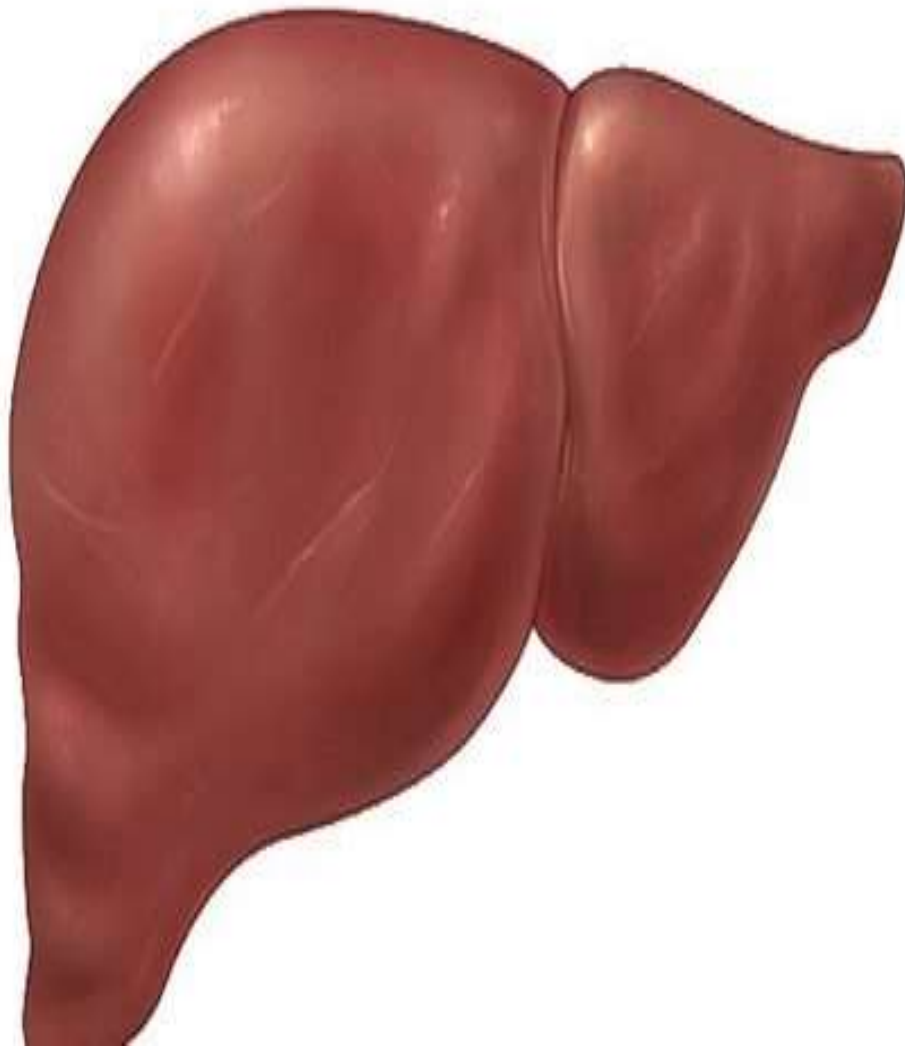
- ▶ Cirrhosis is most common

Alcoholic liver disease.

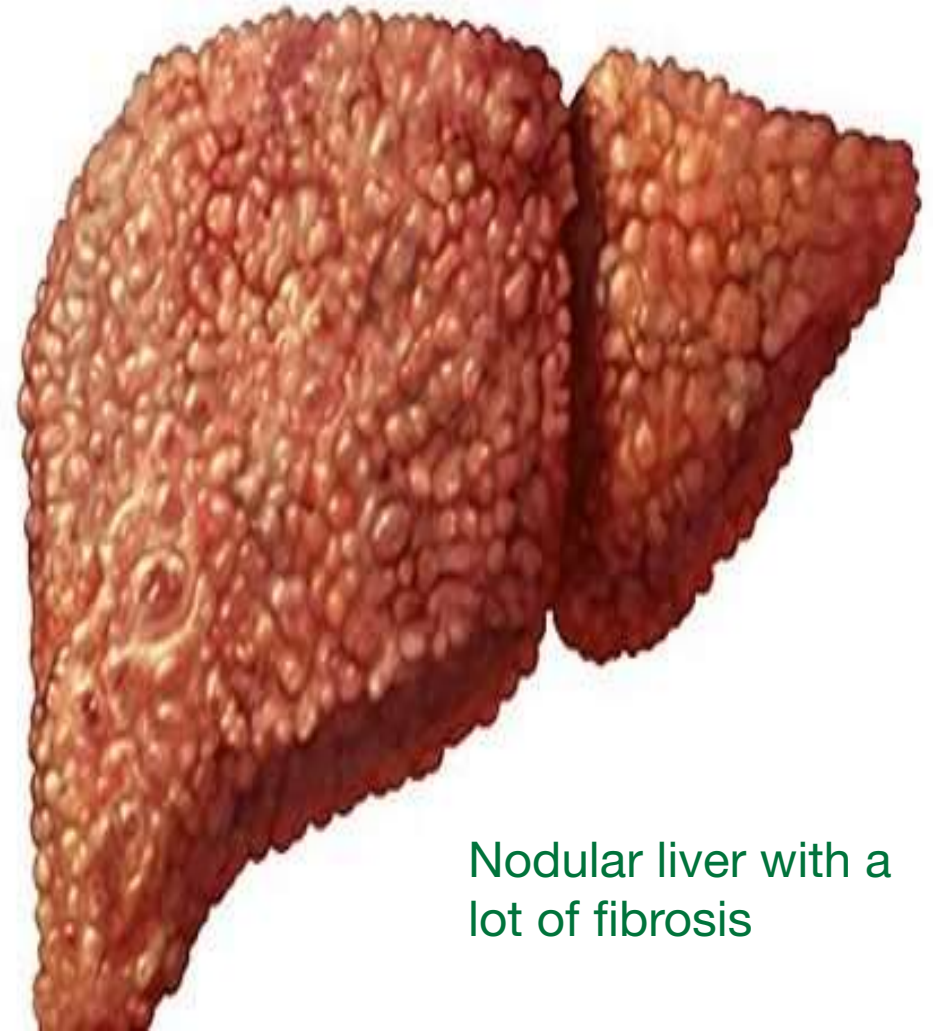
- ▶ Hepatic schistosomiasis 2nd most common worldwide.

Parasitic infection

Normal Liver



Liver with Cirrhosis



Nodular liver with a lot of fibrosis

Clinical Features

- ▶ Often asymptomatic. Vomiting of blood
- ▶ Rupture leads to **massive hematemesis and death.**
- ▶ 50% of patients die from the first bleed despite interventions.
- ▶ Death due to: hemorrhage, hepatic come, and hypovolemic shock
- ▶ Rebleeding in 20%.

Recommended procedure : surveillance endoscopy.

ESOPHAGITIS


Inflammation

Most common cause of esophagitis is
Reflux esophagitis.

- ▶ Esophageal Lacerations.
- ▶ Mucosal Injury
- ▶ Infections
- ▶ Reflux Esophagitis
- ▶ Eosinophilic Esophagitis

Esophageal Lacerations

Small tear / wound (جرح)
around or through the
gastroesophageal
sphincter.

- ▶ **Mallory weiss tears are most common** 
- ▶ Due to : severe retching or forceful prolonged vomiting
- ▶ Present with hematemesis. Vomiting with blood
- ▶ vomiting>>stretching>>>tear.

No need for treatment if it is only a sudden forceful vomiting with streaks of blood, no other signs, no background history, just you can reassure the patient.

Since the regeneration capacity in GI tract is very high 
immediate healing without any medical intervention.

- ▶ Linear lacerations
- ▶ longitudinally oriented
- ▶ Cross the GEJ.
- ▶ Superficial
- ▶ Heal quickly , no surgical intervention



Chemical Esophagitis

- ▶ **Damage to esophageal mucosa by irritants**

- ▶ Alcohol,

- ▶ Corrosive acids or alkalis سواء بدو ينتحر أو بالغلط

- ▶ Excessively hot fluids

- ▶ Heavy smoking

Especially, large in size drugs which can cause irritation (pills esophagitis)

- ▶ Medicinal pills (doxycycline and bisphosphonates) 

- ▶ Iatrogenic (chemotx, radiotx , GVHD)


Graft vs host disease (a immune-mediated complication may occur after organ transplantation)

Clinical symptoms & morphology

- ▶ Ulceration and acute inflammation.

Dysphasia; difficulty with swallowing
Odynophagia; dysphasia + pain

- ▶ Only self-limited pain, odynophagia (pain with swallowing).
- ▶ Hemorrhage, stricture, or perforation in severe cases

Can be complicated with stenosis

Infectious esophagitis

Rare and only occur in immune compromised patients not healthy people.

HIV, Cancer,
Diabetes patients

- ▶ Mostly in debilitated or immunosuppressed.
- ▶ Viral (HSV, CMV) Any ulcer in esophagus I try to rule out viral infection
- ▶ Fungal (candida >>> mucormycosis & aspergillosis)
- ▶ Bacterial: 10%. meaning that when you see an ulcer in the esophagus endoscopically , first cause you must think about is a viral infection (HSV, CMV), so you make a serology test for ex. to know whether the patient is really affected by a virus or not. If he's not, you exclude that cause and think about something else.

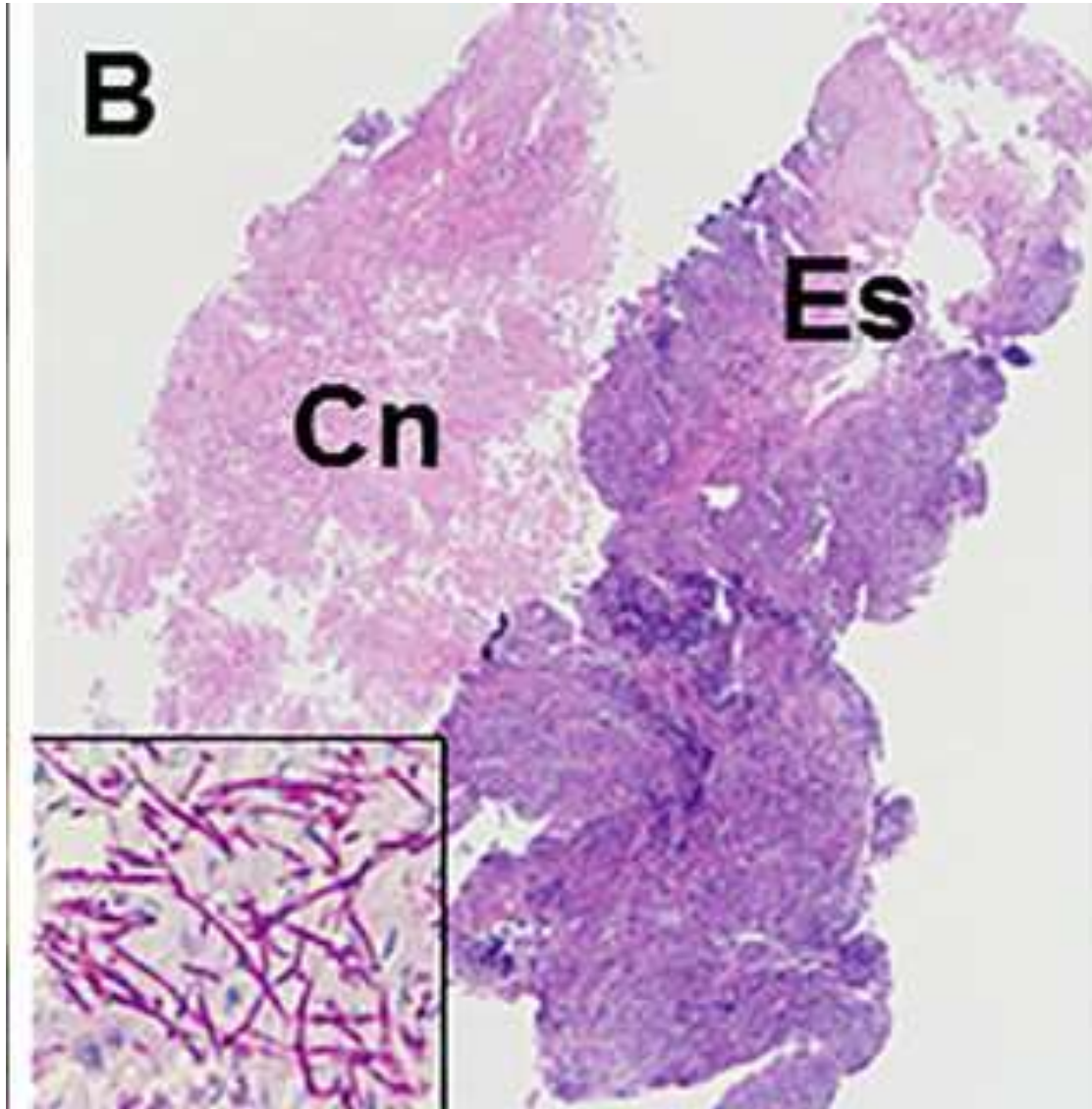
- ▶ **Candidiasis :**
- ▶ Adherent.
- ▶ Gray-white pseudomembranes
- ▶ Composed of matted fungal hyphae and inflammatory cells



white-yellowish
patchy distribution

Esophageal Candidiasis

<https://www.pinterest.com/pin/374291419013418659/>



www.researchgate.net/publication/285369734_Esophageal_Candidiasis_as_the_Initial_Manifestation_of_Acute_Myeloid_Leukemia

- ▶ **Herpes viruses**
- ▶ Punched-out ulcers حَفَّتْهَا عَالِيَةٌ
- ▶ Histopathologic:
- ▶ Nuclear viral inclusions
- ▶ Degenerating epithelial cells ulcer edge
- ▶ Multinucleated epithelial cells.

Multiple ulcers

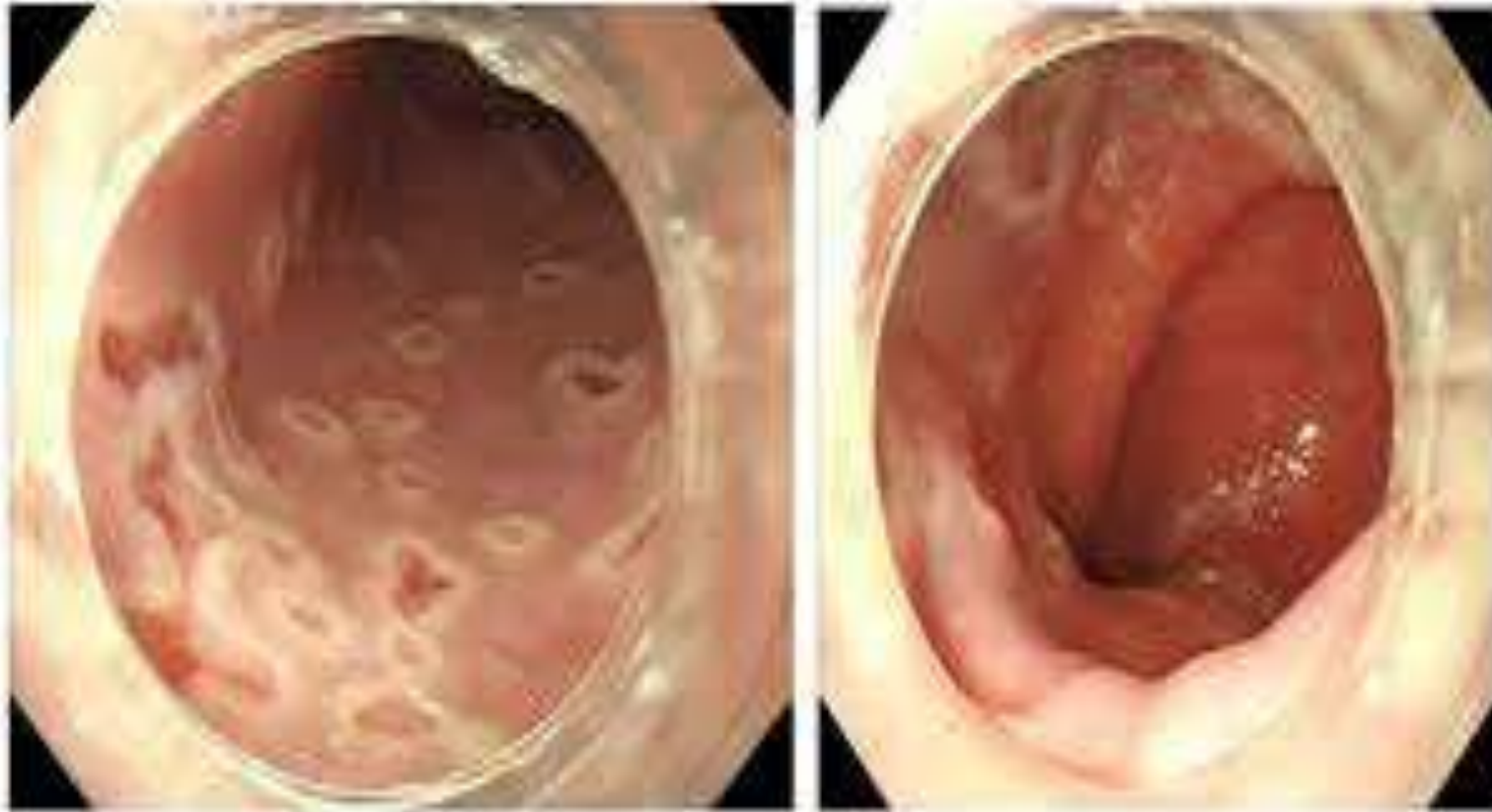
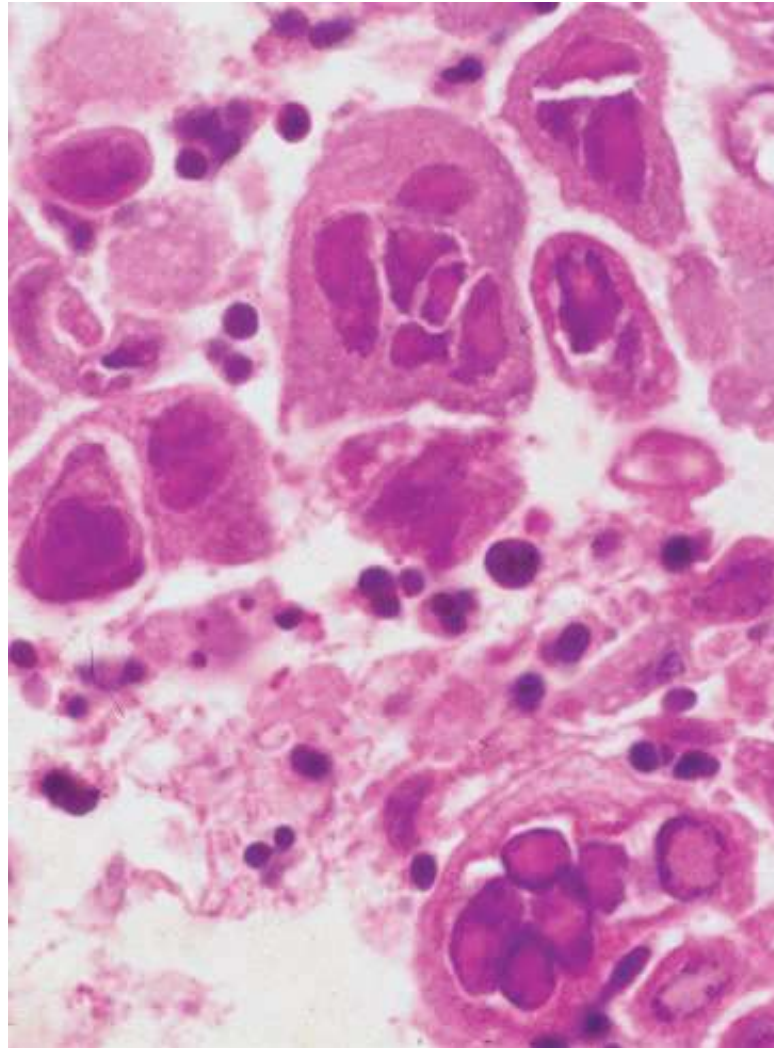


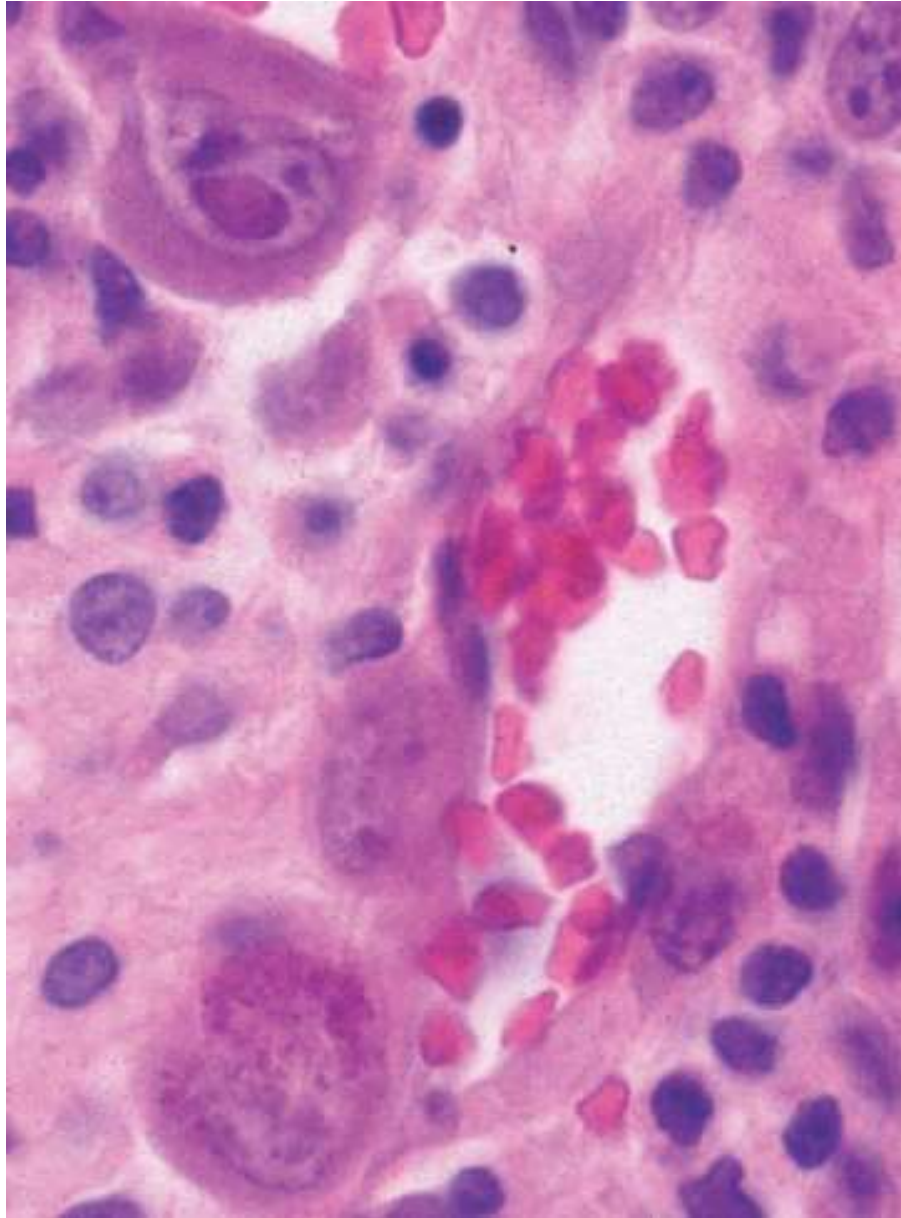
Figure 4. Gastroendoscopy findings revealed the presence of multiple

HSV histologically, cause viral inclusion, multinucleated giant cells



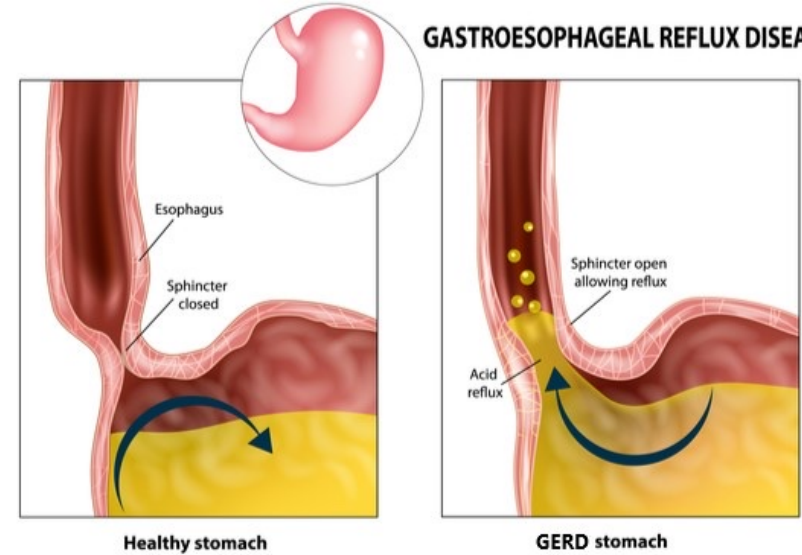
- ▶ **CMV :**
- ▶ Shallower ulcerations. حفّتها مش عالية
- ▶ Biopsy: nuclear and cytoplasmic inclusions in capillary endothelium and stromal cells. Megalo. cells

Cytoplasmic and nuclear inclusion
Cells are large.



Reflux Esophagitis

Most common cause of esophagitis.



- ▶ Reflux of gastric contents into the lower esophagus
- ▶ Most frequent cause of esophagitis
- ▶ Most common complaint by patients
- ▶ Gastroesophageal reflux disease, GERD

- ▶ Squamous epithelium is sensitive to acids
- ▶ **Protective forces:** mucin and bicarbonate, high LES tone

Can be followed by **metaplasia** in chronic cases with low percentage, Because squamous epithelium is highly sensitive to gasteric acid, so it's replaced by more resistant type of cells .

Pathogenesis

- ▶ Decreased lower esophageal sphincter tone
(alcohol, tobacco, CNS depressants)
- ▶ Increase abdominal pressure
(obesity,, pregnancy, hiatal hernia, delayed gastric emptying, and increased gastric volume)
- ▶ Idiopathic!!

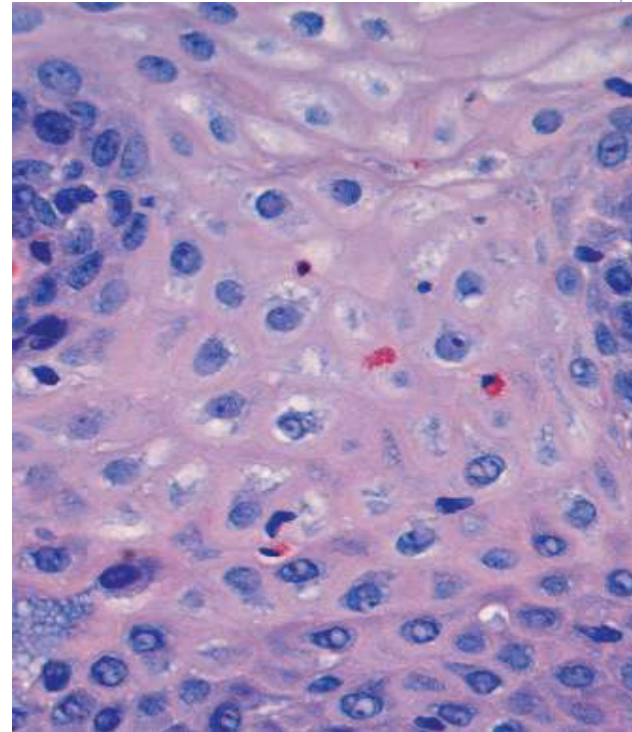
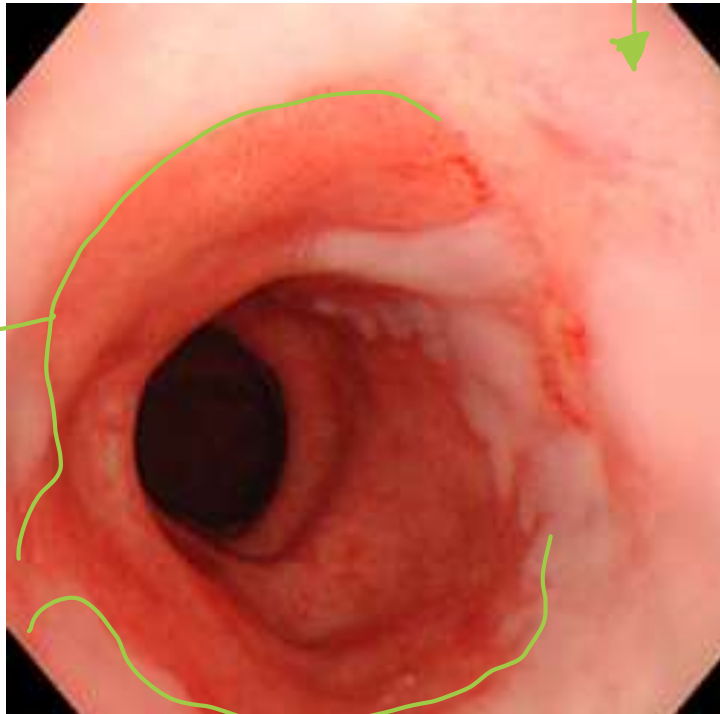
Anything causes relaxation of LES; medications like antidepressants, alcohol, smoking

MORPHOLOGY

- ▶ **Macroscopy (endoscopy)** Redness
Sometimes it appears normal , but the taken biopsy may present reflux
- ▶ Depends on severity (Unremarkable, Simple hyperemia (red))
- ▶ **Microscopic:** Presence of inflammatory cells in coordinated steps :
 - 1 Eosinophils infiltration
 - 2 Followed by neutrophils (more severe).
 - 3 Basal zone hyperplasia
 - 4 Elongation of lamina propria papillae

Normal esophagus color is pink

This redness is due to reflux



[nature.com](https://www.nature.com)

Robbins Basic Pathology 10th edition

Clinical Features

- ▶ Most common over 40 years. Can occur at any age
- ▶ May occur in infants and children
- ▶ Heartburn , dysphagia,
- ▶ Regurgitation of sour-tasting gastric contents
- ▶ Rarely: Severe chest pain, mistaken for heart disease
Can mimic an angina or cardiac chest pain
- ▶ Tx: proton pump inhibitors
Or H2 antagonists that reduce amount of acid in stomach

Complications

- ▶ Esophageal ulceration
- ▶ Hematemesis
- ▶ Melena ;black or tarry stools due to upper GI bleeding.
- ▶ Strictures
- ▶ Barrett esophagus (precursor of Ca.)

Eosinophilic Esophagitis

- ▶ Chronic immune mediated disorder

It is like an allergy in esophagus , not associated with gastric acid

- ▶ **Symptoms:**

- ▶ Food impaction and dysphagia in adults
- ▶ Feeding intolerance or GERD-like symptoms in children

- ▶ **Endoscopy:**

- ▶ Rings in the upper and mid esophagus.

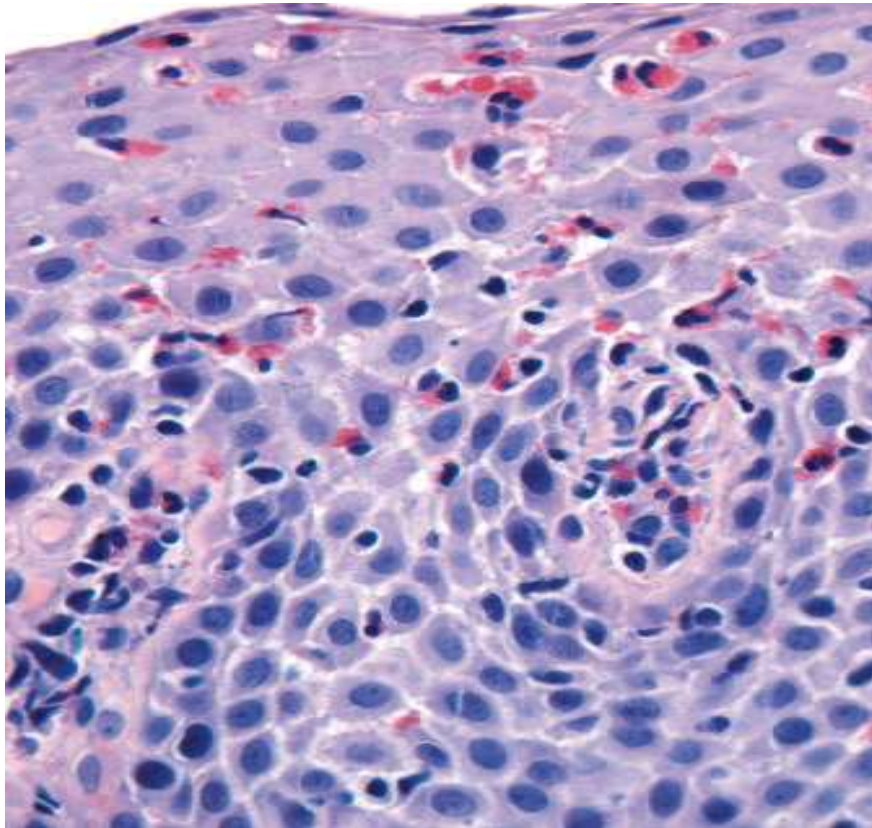
- ▶ **Microscopic:**

- ▶ Numerous eosinophils w/n epithelium
- ▶ Far from the GEJ.

These changes occur in proximal and middle esophagus

Sometimes it is very difficult to differentiate between reflux and eosinophilic esophagitis especially in the lower and mid esophagus in severe regurgitation, since both can represent eosinophils **!?**




Actually it is a correlation, when the patient has high eosinophils (too much) , the patient respond to corticosteroids , has another allergies → eosinophilic esophagitis



- ▶ Most patients are: atopic (atopic dermatitis, allergic rhinitis, asthma) or modest peripheral eosinophilia.
- ▶ Tx:
- ▶ Dietary restrictions(cow milk and soy products)
- ▶ Topical or systemic corticosteroids.
- ▶ Refractory to PPIs.

The best medication is corticosteroid rather than PPI .

Special thanks to:

-  Robbins Basic Pathology textbook.
-  Zaid Al Taweel (for recording the lecture).
-  Mr.Google (for some photos).

V2

I added a short explanation at page 30 ; ‘meaning that when you see an ulcer in the esophagus endoscopically , first cause you must think about is a viral infection (HSV, CMV), so you make a serology test for ex. to know whether the patient is really affected by a virus or not. If he’s not, you exclude that cause and think about something else” .