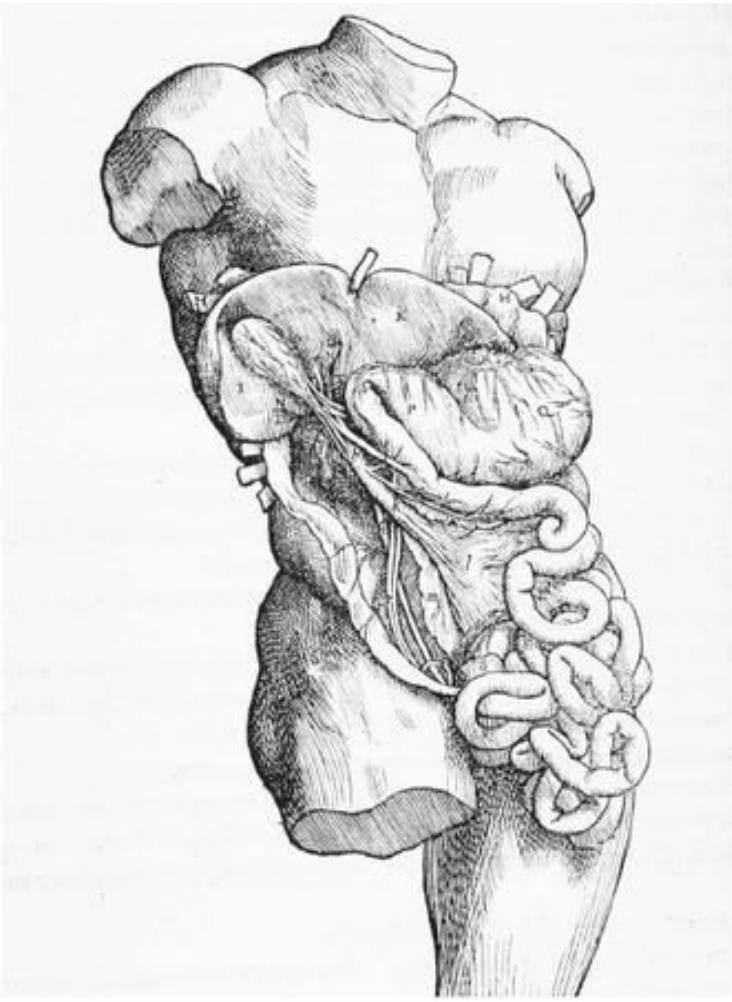
GastroEsophageal Reflux Disease (GERD)



Objectives:

- Understand the Pathophysiology of reflux esophagitis.
- Know clinical features of reflux esophagitis.
- Describe the pathology (gross and microscopic features) of reflux esophagitis.
- Know the complications of reflux esophagitis.

Important note: **Please check out this link before viewing the file to know if there are any additions or changes. The same link will be used for all of our work: Pathology Edit.**

Introduction

Lower esophageal sphincter (LES):

Anatomy:

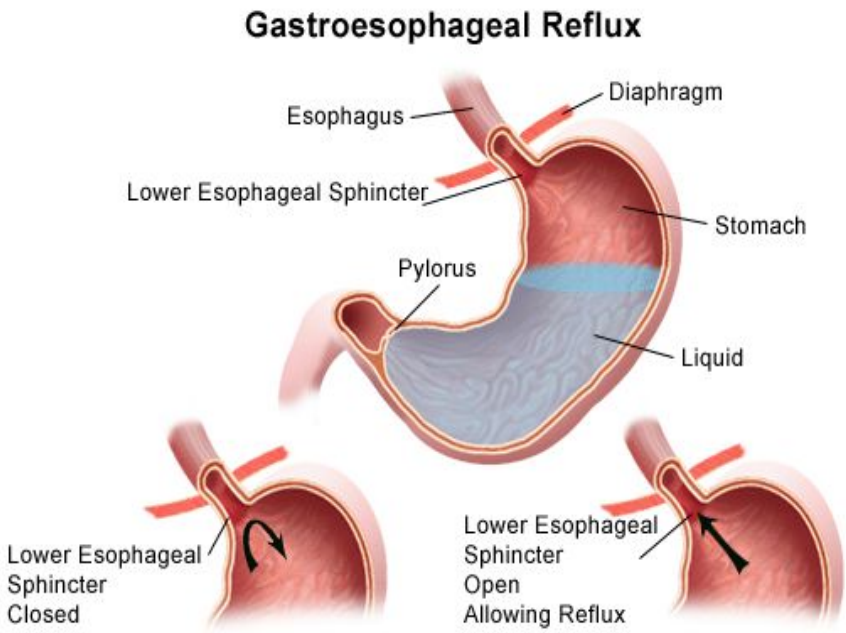
The LES (abdominal part) is a bundle of muscles at the low end of the esophagus, where it meets the stomach and maintains the tonic contraction.

Physiology:

- Primary barrier to gastroesophageal reflux is the lower esophageal sphincter.
- LES normally works in conjunction with the diaphragm.
- If barrier disrupted, acid goes from stomach to esophagus.
- Stratified squamous epithelium (in esophagus) is resistant to abrasion[1] of the foods and sensitive to acid.
- Submucosal glands contribute the mucosal (acid) protection by secreting both mucin and bicarbonate.
- LES tone prevents the acidic gastric reflux under positive pressure.

Gastroesophageal reflux:

Is a normal physiologic phenomenon experienced intermittently by most people, particularly after a meal.



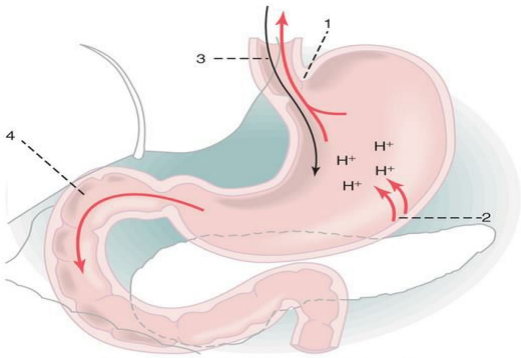
[1] The process of scraping or wearing away.

Gastroesophageal Reflux Disease (GERD):(حرقان)

Definition: Occurs when the amount of gastric juice that refluxes into the esophagus exceeds the normal limit, causing symptoms with or without associated esophageal mucosal injury.

Pathophysiology:

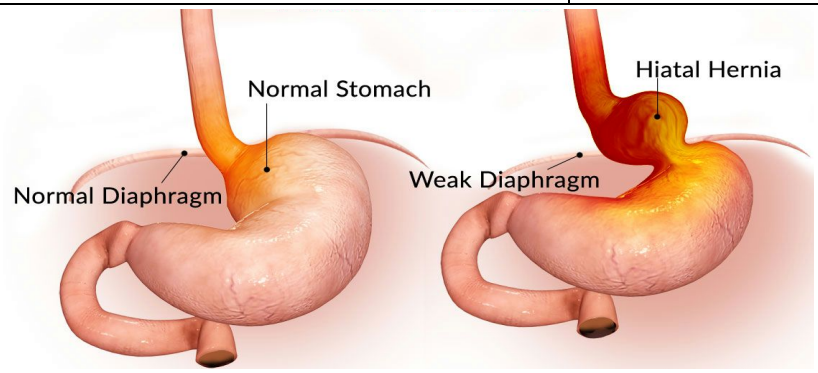
1. Impaired lower esophageal sphincter (low pressures → hypotonia → relaxation).
2. Hypersecretion of acid.
3. Decreased acid clearance resulting from impaired peristalsis or abnormal saliva production.
4. Delayed gastric emptying and duodenogastric reflux of bile[2].
5. Salts and pancreatic enzymes.



These caused by two mechanisms:

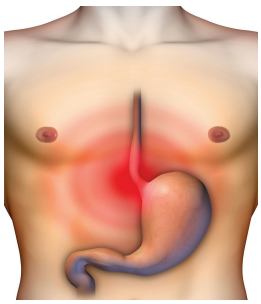
1. Decrease in LES tone.
2. Increase abdominal pressure.

Abnormal lower esophageal sphincter (Decrease in LES tone)	Increase abdominal pressure
The most common causes: ● Functional (frequent transient LES relaxation) ● Mechanical (hypotensive LES) Decrease the tone of LES: ● Foods (eg, coffee, alcohol, Tobacco), ● Medications (Central nervous system depressants eg, calcium channel blockers, alpha and beta blockers, anticholinergic, antipsychotic ...etc), Location: **hiatal hernia**[3]	Obesity. Pregnancy. Increased gastric volume (e.g by suddenly eating too much food). Delayed gastric emptying.



[2] Occurs when bile flows upward from the small intestine into the stomach. Bile reflux is caused by damage to the pyloric valve.
[3] Hiatal hernia is characterized by separation of the right and left crus of the diaphragm and protrusion of the stomach into the thorax through the resulting gap.

Clinical Manifestations:



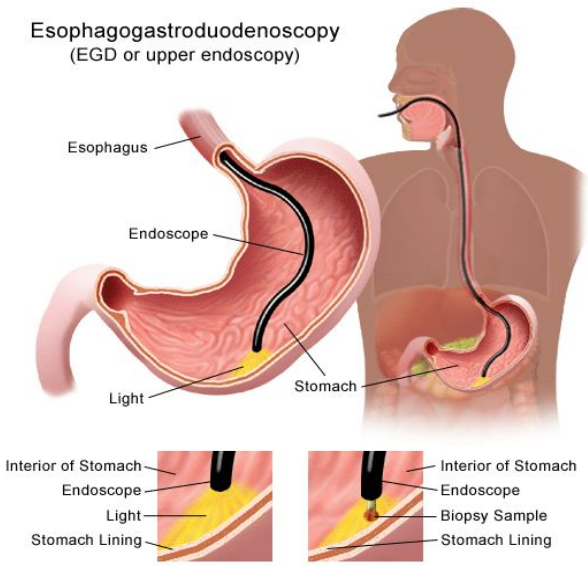
- **Typical symptoms** (Most common)
- **Heartburn**: retrosternal burning discomfort (more frequent).
- **Regurgitation**: effortless return of gastric contents into the pharynx without nausea, retching[4], or abdominal contractions.
- **Dysphagia:** (more frequent).
- **Atypical symptoms:**
- Coughing, chest pain, and wheezing hoarseness/laryngitis.
- **Extraesophageal manifestations:**
- Otolaryngol**:** hoarseness and laryngitis. oto=ear: these symptoms are due the connection between the ear and the pharynx (eustachian tube).
- **Other:** Non-cardiac chest pain (mimics cardiac chest pain). (not every chest pain is angina)

Diagnostic Evaluation:

If classic symptoms of heartburn and regurgitation exist in the absence of "**alarm symptoms**[5]" the diagnosis of GERD can be made clinically and treatment can be initiated.

1- Esophagogastroduodenoscopy[6]:

*Device with 2 arms: one for camera other biopsy handle. When doctor sees an area not looking good (bleeding,ulcer,polyp) take biopsy and send it to lab.



Endoscopy with biopsy is needed:

- In patients with alarm signs/symptoms.
- Those who fail a medication trial.
- Those who require long-term treatment.

Allows the detection, and management of esophageal injury or complications of GERD.

The procedure lacks sensitivity for identifying pathologic reflux

and absence of endoscopic features does not exclude a GERD diagnosis.

If you find nothing with the endoscopy you go with the pH procedure.

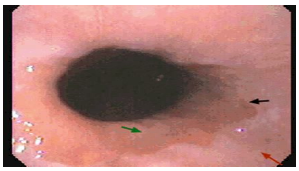
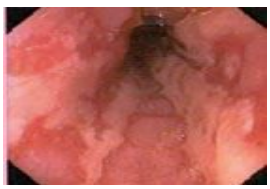
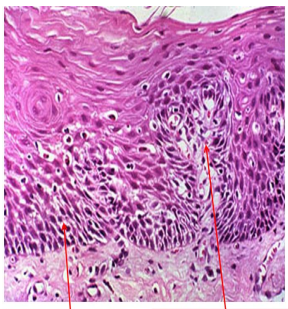
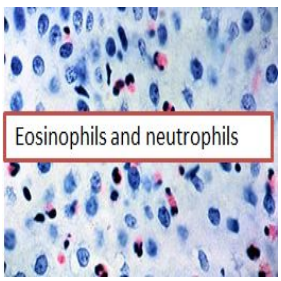
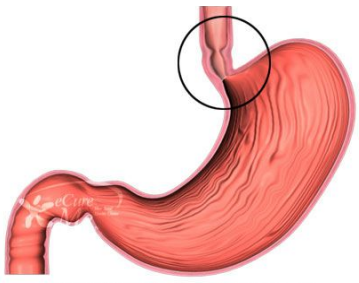
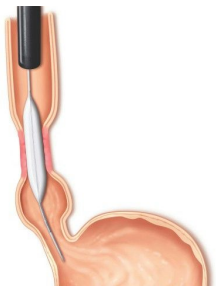
2- pH: pass tube through nose→ put a machine→ for 24h→ check PH.

- 24-hour pH monitoring.
- Transnasal catheter or a wireless, capsule shaped device. used for establishing or excluding presence of GERD for those patients who do not have mucosal changes.

[4] e.g Gagging (repeated unsuccessful attempts to vomit).
[5] Alarm symptoms include: dysphagia, odynophagia (painful swallowing), bleeding, anemia and weight loss.
[6] Endoscopic examination of the upper alimentary tract using a video instrument.

Complications:

1. Erosive[7] esophagitis: Inflammation of the esophagus.
2. Stricture: Caused by inflammation → fibrosis → esophagus becomes narrow → increase risk of choking with food.
3. **Barrett's esophagus:**

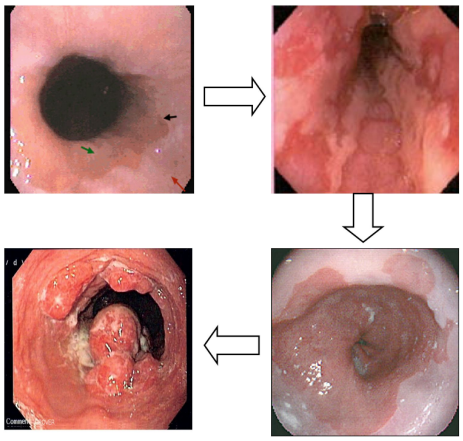
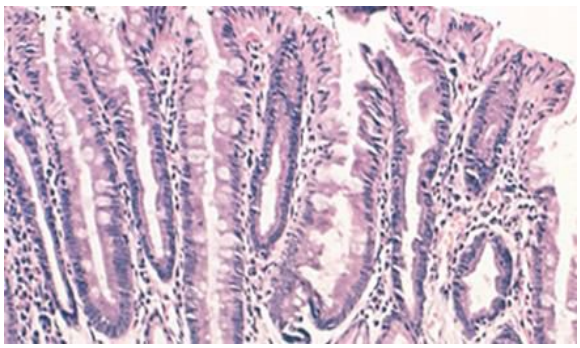
Erosive esophagitis	Esophageal stricture	Barrett's Esophagus (main risk factors)
– Responsible for 40-60% of GERD symptoms – Severity of symptoms often fail to match severity of erosive esophagitis.     **Microscopic shows:** 1. **elongation of lamina propria papilia.** 2. **basal zone hyperplasia.** 3. **eosinophils and neutrophils .**	Result of healing of erosive esophagitis.  May need dilation (procedure). 	Intestinal metaplasia of the esophageal mucosa from stratified squamous epithelium changes into non ciliated columnar epithelium with goblet cells (it can be premalignant). Associated with the development of adenocarcinoma. **Risk factors:** male, smoker, age, obese.

Pathophysiology of Barrett's Esophagus:

- Acid damages lining of esophagus and causes chronic esophagitis.
- Damaged area tries to heal in a metaplastic process and **damaged squamous cells are replaced by metaplastic columnar cells** defined by the presence of **goblet cells** (intestinal metaplasia).
- This specialized intestinal metaplasia can progress to dysplasia and adenocarcinoma (Columnar can handle acidity but stratified squamous can't so it gets converted to columnar).

[7] تآكل

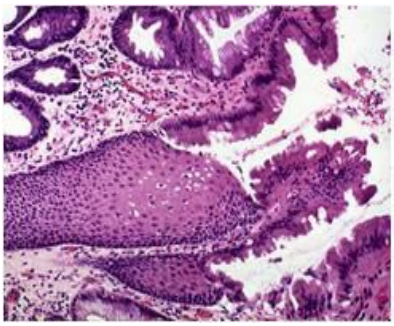
- Many patients with Barrett's are asymptomatic.

Gross	Microscopic
	

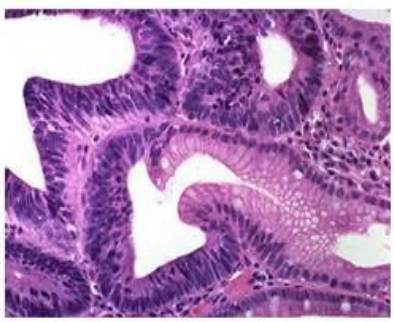
- The risk of cancer in Barrett's esophagus is estimated to be 40 to 100 times. Not everyone develops cancer.
- **Endoscopic surveillance**[8] is recommended for all patients with Barrett's esophagus.
- Endoscopy is performed every 2 years, and biopsies are taken from the area of abnormal mucosa.

If the biopsies reveal:

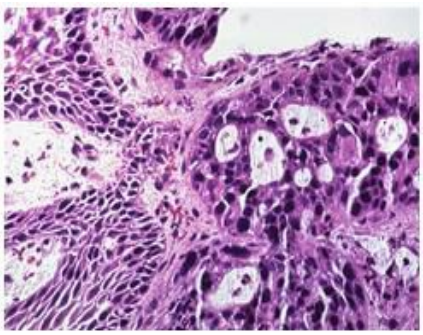
- Low-grade dysplasia → The frequency of endoscopies is increased. Check every six months to see if the patient developed a higher grade.
- High-grade dysplastic changes are seen → Then the risk of subsequent adenocarcinoma is greater than 25%, and surgical resection should be considered.



Barrett's esophagus



Dysplasia

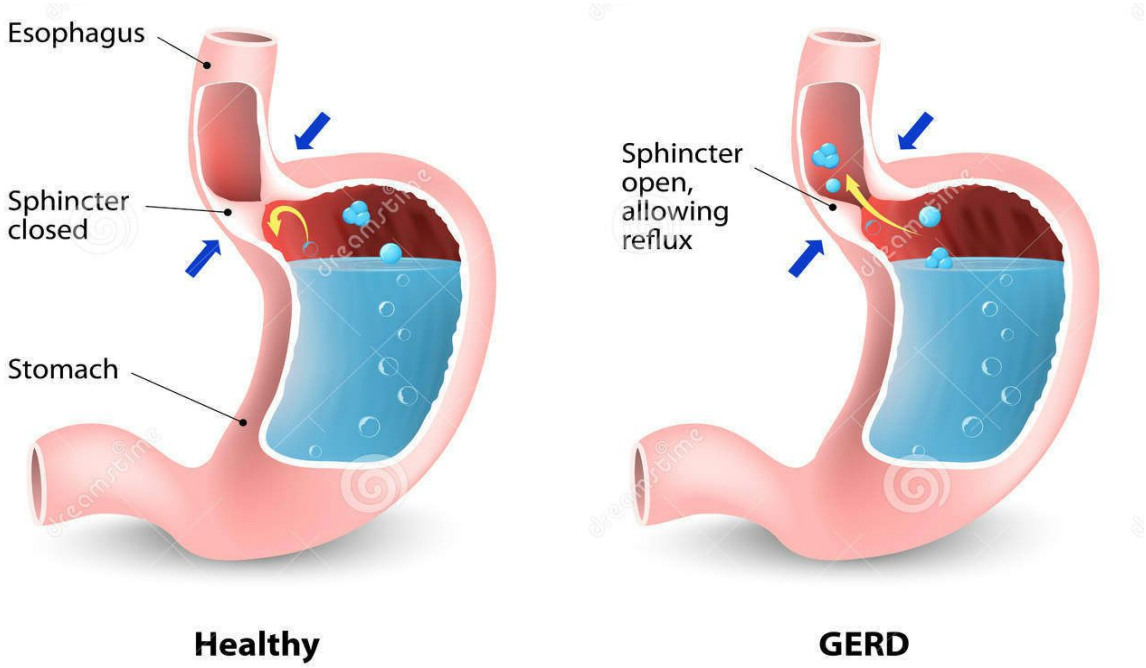


adenocarcinoma

[8] مراقبة

Difference between Physiologic and Pathologic GER:

Physiologic GER	Pathologic GERD
Asymptomatic. Postprandial (after meal). Short lived (for a period of time). No nocturnal symptoms.	Symptoms Mucosal injury Nocturnal symptoms (problems while sleeping at night)

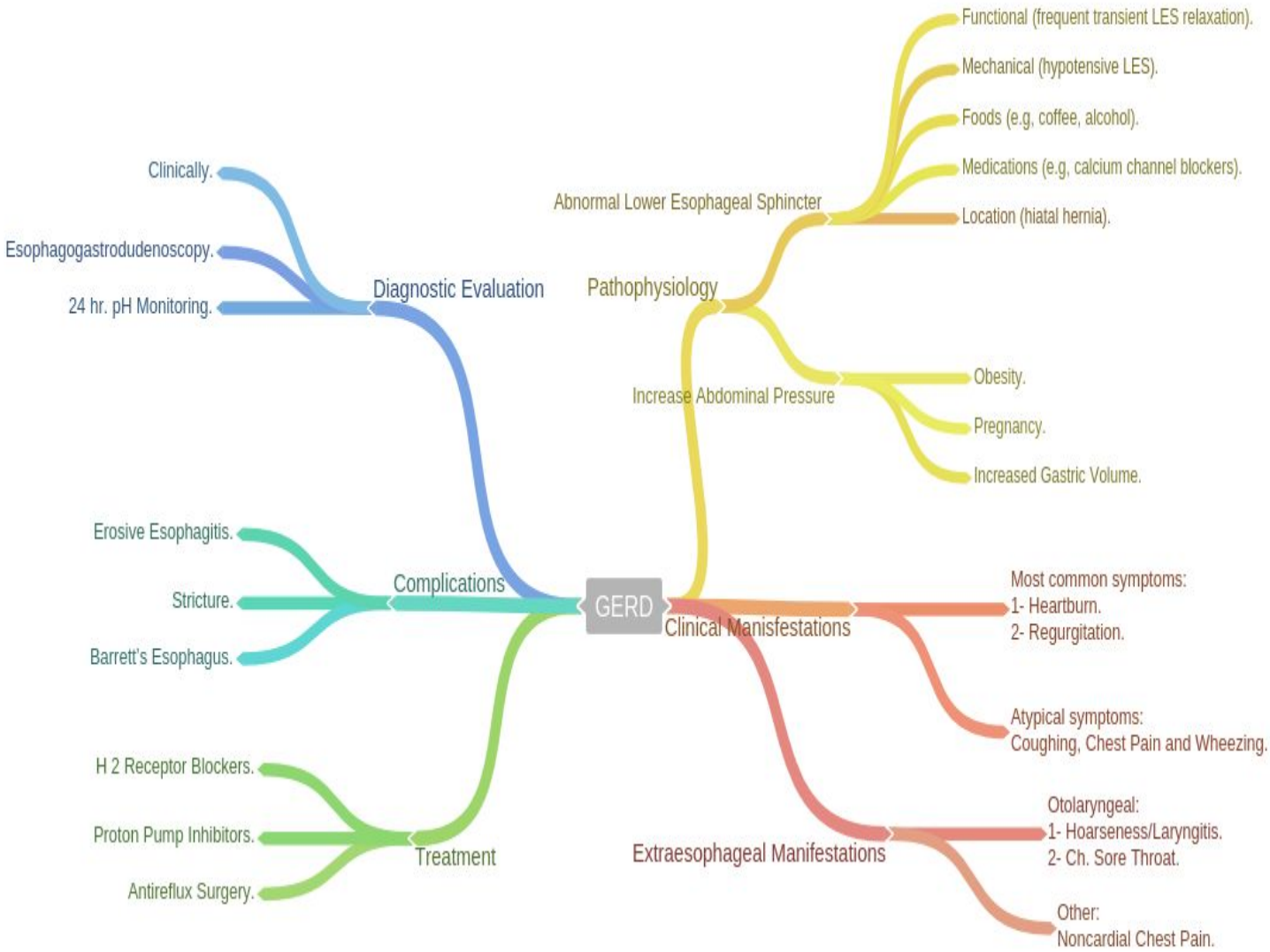


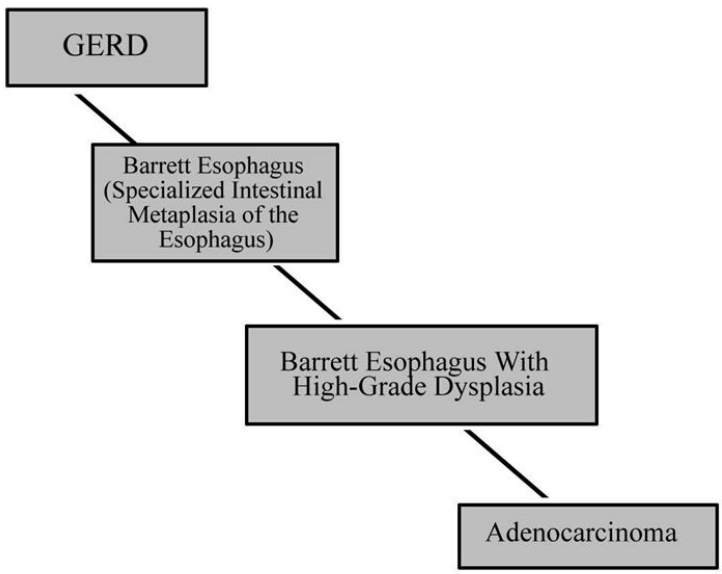
Treatment:

- H2 receptor Blockers.
- Proton pump inhibitors.
- Antireflux surgery.

Will be discussed more in details in the pharmacology lecture.

Summary:


GERD
Pathophysiology
Abnormal Lower Esophageal Sphincter
Functional (frequent transient LES relaxation).
Mechanical (hypotensive LES).
Foods (e.g, coffee, alcohol).
Medications (e.g, calcium channel blockers).
Location (hiatal hernia).
Increase Abdominal Pressure
Obesity.
Pregnancy.
Increased Gastric Volume.
Diagnostic Evaluation
Clinically.
Esophagogastrodudenoscopy.
24 hr. pH Monitoring.
Complications
Erosive Esophagitis.
Stricture.
Barrett's Esophagus.
Treatment
H 2 Receptor Blockers.
Proton Pump Inhibitors.
Antireflux Surgery.
Clinical Manisfestations
Most common symptoms:
1- Heartburn.
2- Regurgitation.
Atypical symptoms:
Coughing, Chest Pain and Wheezing.
Extraesophageal Manifestations
Otolaryngeal:
1- Hoarseness/Laryngitis.
2- Ch. Sore Throat.
Other:
Noncardial Chest Pain.


GERD
Barrett Esophagus (Specialized Intestinal Metaplasia of the Esophagus)
Barrett Esophagus With High-Grade Dysplasia
Adenocarcinoma

MCQ's

1- A 55 years old male known to have sever migraine presented to his physician with frequent cough, and difficulty in eating, and recently he noticed some changes in his voice.
What is the most likely cause of his condition?

A. Obesity
B. Ranitidine (H2 blocker)
C. Diclofenac sodium (NSAIDs)
D. Helicobacter pylori

2- A pregnant woman presented with difficulty in swallowing and a night waking heartburn. What is the most likely cause of her condition?

A. Analgesics
B. H.pylori
C. Hiatal hernia
D. Antidepressants

3- A 50 years old woman complaining of heartburn and regurgitation was diagnosed with GERD, what is the first step management for her?

A. Endoscopy
B. pH monitoring
C. Antacid medications (no alarm symptoms)
D. Antireflux surgery

4- A 60 years old salesman noticed to have a cancer of his lower esophagus. He is a nonsmoker and occasionally drinks alcohol. Which of the following is most likely cell type?

A. Sarcoma
B. Adenocarcinoma
C. Squamous cell carcinoma
D. Metastasis

5- A 58 year-old man presents with dysphagia for solids for three months. He complains of weight loss and loss of appetite. There is no other relevant medical history apart from indigestion symptoms and heartburn for the previous five years. He has endoscopy which shows an esophageal stricture which indicates:

A. Peptic ulcers
B. Esophagitis
C. Intestinal metaplasia
D. Dysplasia

6- Which is not a predisposing factor for GERD?

A. High fatty food intake
B. Cholinergic drugs
C. Caffeine
D. Nicotine
E. Gastric outlet obstruction

Answers: 1-C , 2-C , 3-C , 4-B , 5-B , 6-B.

SAQ's

A 42-year-old policeman has been seen by his family physician for a 5 years history of "heartburn", he has been intermittently taking Ranitidine – a H2 blocking agent – with some relief.
An upper endoscopic examination that was performed recently revealed some reddish discoloration and friability of the lower esophageal region. A biopsy was performed, and the microscopic examination revealed Columnar cells containing goblet cells.

Q1. What is the most likely diagnosis?
Barrett's esophagus
- Intestinal metaplasia -
Q2.What is a long term complication of this process?
Adenocarcinoma.
Q3. What are the risk factors of Barrett's esophagus?
Male gender – Smoking – Age – obesity – family history - GERD.
Q4. What is the most likely mechanism of this process?
Repeated acid reflux (GERD) from the stomach to the lower esophagus leading to metaplasia of the normal squamous epithelium into columnar epithelium.
Q5. What are the other complications of GERD?
Odynophagia - dysphagia - GI bleeding – Anemia – vomiting - weight loss - Erosive esophagitis –Strictures.

Online Quizzes:

http://patient.info/education/gastro-oesophageal-reflux-disease-gord/mcq
http://www.medicinenet.com/gerd_gastroesophageal_reflux_disease_quiz/quiz.htm

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For any suggestions or questions please don't hesitate to contact us on: Pathology434@gmail.com
Twitter: @Pathology434
Ask us: www.ask.fm/Pathology434

Good Luck! :)

ريما الناصر
مها الربيعة
أميرة بن زعير
ملاك الخثلان
أشواق المطيري

حسين الكاف
محمد المحمود
فيصل أبو نهية
نورة الهلالي
منى القحطاني