Revised & Approved

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02

Any future corrections will be in the editing file , Click

GNT pathology cases file
Don't forget to check it frequently Click

Pathology

Peptic Ulcer

439

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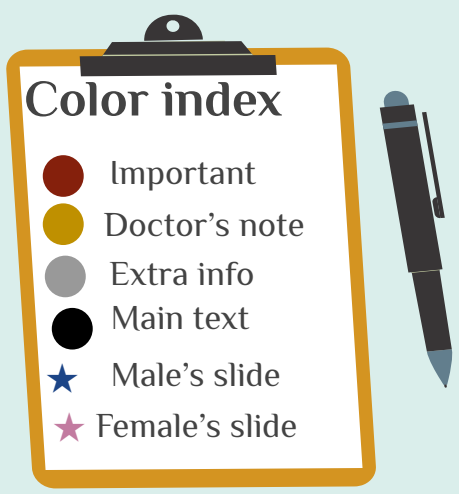


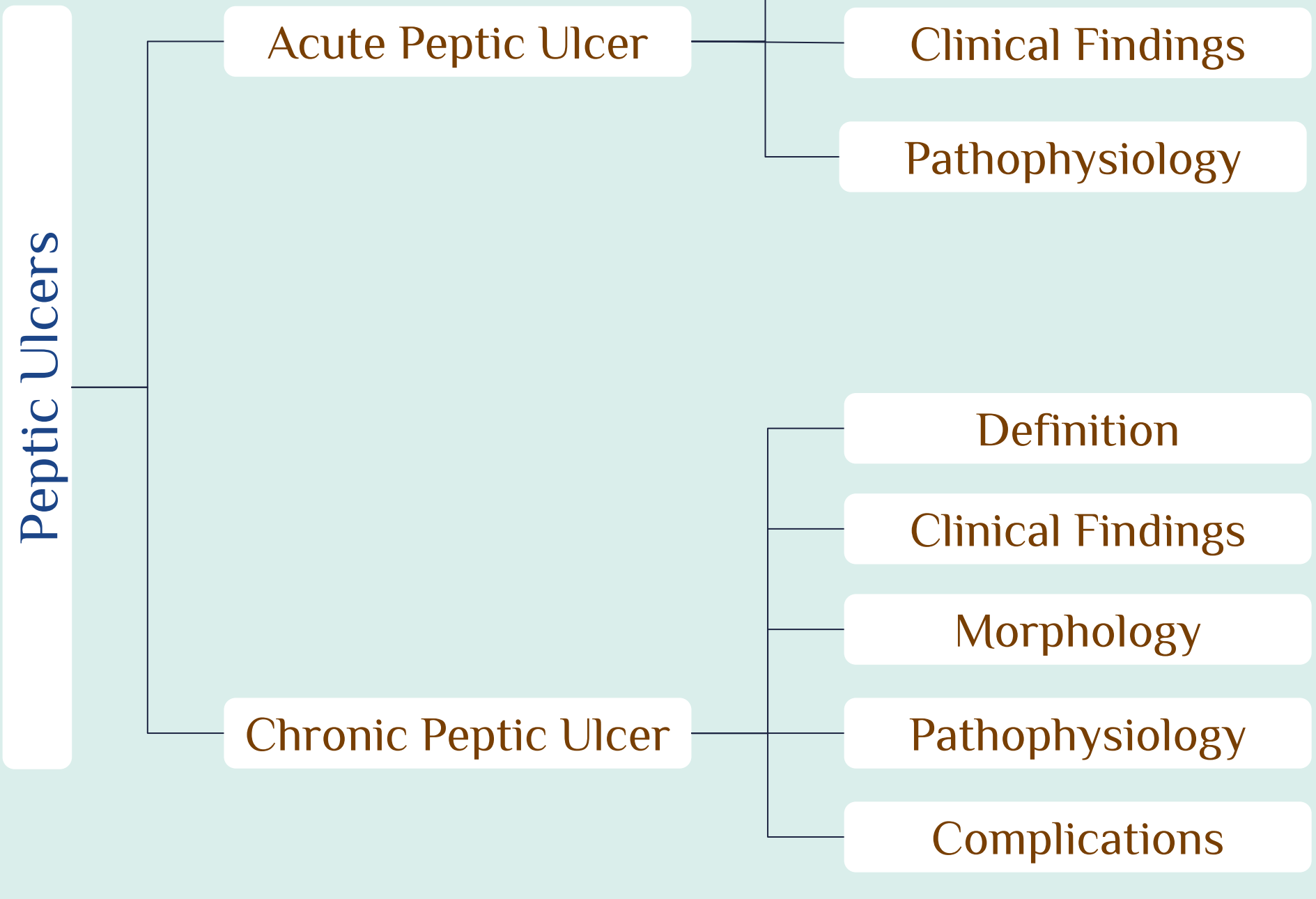
Objective

01 Define ulcer and erosion

02 Describe the pathogenesis, pathology and clinical features of acute gastric ulcers

03 Describe the pathogenesis (H pylori, NSAID, Z-E syndrome), clinical features, pathology (gross and microscopic features) and complications (bleeding, perforation, obstruction) of chronic peptic ulcers

Overview



Peptic ulcers

What are the difference between ulcer and erosion?

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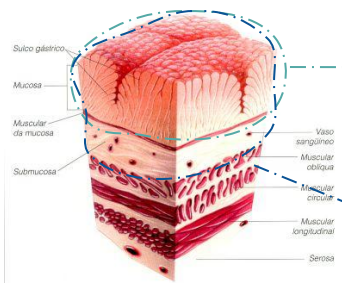

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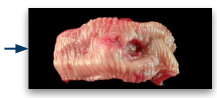
Erosion is a breach in the epithelium of the mucosa only.

Ulcer a breach in the mucosa of the alimentary tract extending through muscularis mucosa into submucosa or deeper causes damage to the BM and heals by fibrosis

Types of peptic ulcers

- Chronic peptic ulcers (more common)



- Acute peptic ulcers (Stress ulcers)

Acute peptic ulcers

This part was only found in the girl's slides

Definition

Acutely developing gastric mucosal defects that may appear after **severe stress**

Location

found anywhere in the stomach

Clinical findings

a. Hematemesis

b. Melena

c. Iron deficiency

Morphology

They range in depth from very superficial lesions (erosion) to deeper lesions that involve the entire mucosal thickness (true ulceration)

Prognosis

The gastric mucosa can recover completely if the person does not die from the primary disease. It depends on the primary cause except if it was severe ulcer with bleeding ➔ the patient may die because of hypovolemia

Pathophysiology

As part of an acute gastritis

- acute response to an irritant 'chemical' injury by drugs e.g. NSAID or alcohol

As a complication of a severe stress response

- severe burns (Curling's ulcer)
- major trauma (Stress ulcer)
- cerebrovascular accidents (Cushing ulcer)

As a result of extreme hyperacidity

- Zollinger-Ellison syndrome
  - Tumor in the gastrin producing cells ➔ large amounts of gastrin ➔ ↑HCl ➔ severe acidity ➔ ulceration of the stomach

Chronic peptic ulcers

Definition

Peptic ulcers are chronic, recurring lesions that occur most often in middle-aged to older adults without obvious precipitating conditions, other than chronic gastritis. They are most often solitary .
More common, we refer them when we say peptic ulcer.

Therapy

Current therapies for PUD are aimed at

I. ***H. pylori* eradication : Antibiotic**

II. **Acid suppression**

a) **Proton pump inhibitors**

b) **H2 blockers**

Clinical features

- Epigastric (upper abdominal) pain :

- The most common symptom
- Gnawing or burning sensation
- Occurs 2-3 hours after meals
- Relieved by food (milk) or antacids
- Patient awakens with pain at night

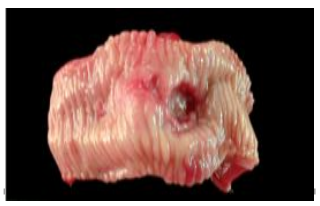
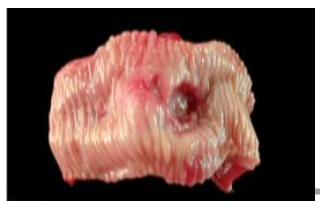
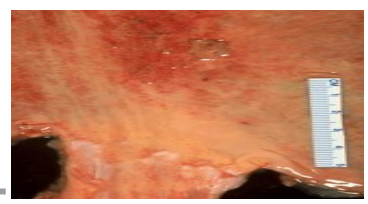
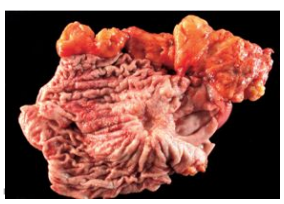
complications

- Some present with such as iron deficiency anemia due to bleeding, frank hemorrhage, or perforation.
- **Hemorrhage**.
- **Penetration**. The ulcer penetrates the full thickness of the stomach or duodenal wall, progressing into adherent underlying tissue, e.g. the pancreas or liver.
- **Perforation**. This leads to peritonitis.
- **Fibrous stricture**. In the stomach, ulcers may cause pyloric stenosis ➔ frequent vomiting
- **Malignant change**. This is extremely uncommon.

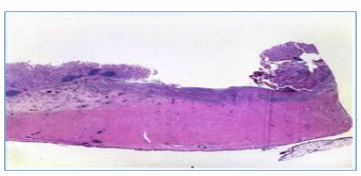
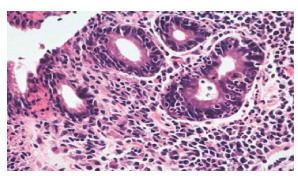
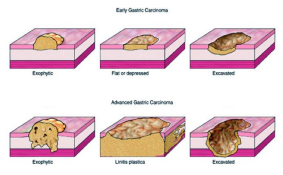
Morphology

Grossly

Gross, usually less than 20 mm in diameter but they may > 100 mm in diameter.

Duodenal ulcers	Benign peptic ulcer	Gastric peptic ulcers	Malignant peptic ulcer
-Usually occur within a few centimeters of the pyloric valve at the anterior duodenal wall. -Are **never** malignant (reason for not taking a biopsy)	Round to oval shallow, clean, **sharply demarcated punched out defect** with straight walls, surrounded by hyperemia	Are predominantly located near the interface of the body and antrum at lesser curvature -Most gastric ulcers are benign, but Small percentage may be malignant, reason for biopsy	In contrast, **heaped-up margins** are more characteristic of cancers
			

Microscopic

The area below the ulcer	The area around the ulcer	Gastric carcinoma
The base consists of necrotic tissue and polymorph exudate overlying inflamed granulation tissue which merges with mature fibrous (scar) tissue.	The presence of neutrophils within the gastric glands signifies active inflammation and, most of the time, the presence of *H pylori.*	Infiltration by irregular glands lined by dysplastic / malignant cells This part was only found in the girl's slides
		

Chronic peptic ulcers

Pathophysiology

- it's due to an imbalance between aggressive and defensive factors

Aggressive factors	Defensive factors
❖ H. pylori ❖ NSAIDs ❖ Acid ⇢ Normal/ physiological ❖ Pepsin ⇢ Normal/ physiological ❖ Bile salts from duodenum	❖ Mucus ❖ Bicarbonate ❖ Good blood flow and cell renewal ❖ PGs (Prostaglandins) ❖ Phospholipids

Helicobacter pylori infection

❖ H. pylori infection of gastric mucosa is present in 100% of patients with duodenal ulcer and 70% of those with gastric ulcer. H pylori infection is a major factor in the pathogenesis of peptic ulcer.

❖ Which means gastric ulcer can be due to other factors than H.pylori (NSAIDs) but duodenal ulcers only due to H.pylori

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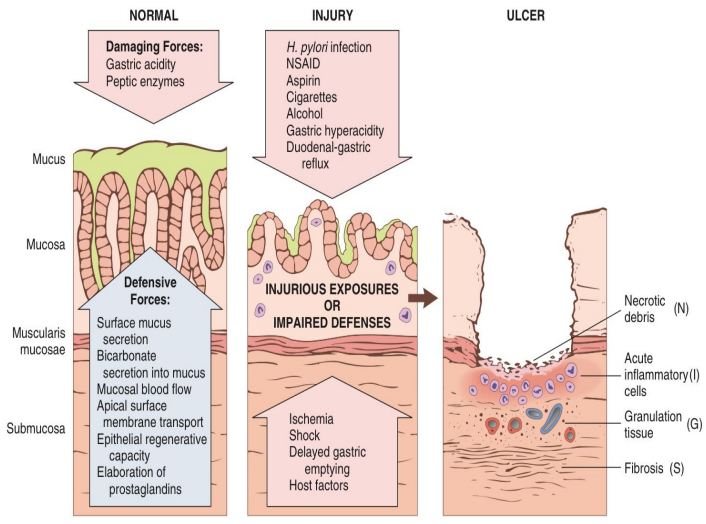
❖ H. pylori induces an intense inflammatory and immune response and increased production of **proinflammatory cytokines** [1].



❖ H. pylori secretes a **urease** that breaks down urea to form toxic compounds such as ammonium chloride and monochloramine. **Thrombotic occlusion of surface capillaries** is promoted by a bacterial platelet-activating factor. Other antigens, **including lipopolysaccharides**, recruit inflammatory cells to the mucosa. The chronically inflamed mucosa is more susceptible to acid- peptic injury and peptic ulceration.

❖ H pylori infection of the pyloric antrum is present in nearly all patients with chronic duodenal ulcer and approximately 75% of patients with chronic gastric ulcer.

❖ Although more than 70% of individuals with PUD are infected by H. pylori, fewer than 20% of H. pylori–infected individuals develop peptic ulcer.

❖ In addition, chronic inflammation of the mucosa is possibly important in the pathogenesis of gastric carcinoma and a low-grade gastric lymphoma, also known as MALToma (MALT: Mucosa-Associated Lymphoid Tissue)

❖ In conclusion, H.pylori causes: 1) Chronic gastritis 2) Peptic ulcer
3) Dysplasia ➔ gastric carcinoma 4) Low-grade lymphoma

1: interleukin-1, interleukin-6, interleukin-8 and tumor necrosis factor

Chronic peptic ulcers

Other causes

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NSAID and aspirin

stop prostaglandin synthesis. The protective effects of prostaglandins: enhanced bicarbonate secretion and increased vascular perfusion.

High-dose corticosteroids, which suppress prostaglandin synthesis and impair healing. A common inhibitor of arachidonic acid pathway

Cigarette smoking:

impairs mucosal blood flow and healing

Psychological stress

can increase gastric acid secretion

Chronic renal failure, and hyperparathyroidism:

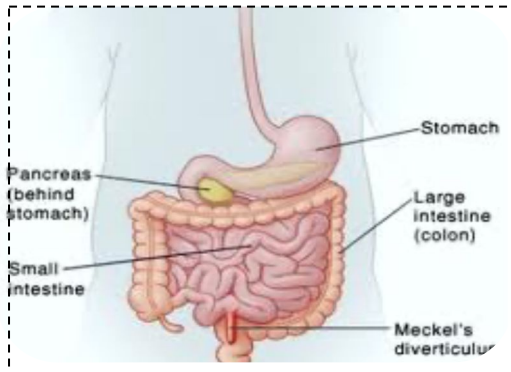
associated with hypercalcemia: stimulates gastrin production and therefore increases acid secretion. Related with abdominal pain

Peptic ulcer Location

- May occur in any portion of the GI tract exposed to acidic gastric juices
- 98% located in first portion of duodenum or stomach, ratio duodenum to stomach = 4:1

Other locations

- Esophagus as a result of GERD or acid secretion by ectopic gastric mucosa
- Gastric mucosa within a **Meckel diverticulum** can result in peptic ulceration of adjacent mucosa.
- In **Zollinger-Ellison syndrome**: multiple peptic ulcerations in the stomach, duodenum, and even the jejunum.



Meckel diverticulum: most common congenital abnormality of the small intestine caused by an incomplete obliteration of the vitelline duct

Gastric ulcers

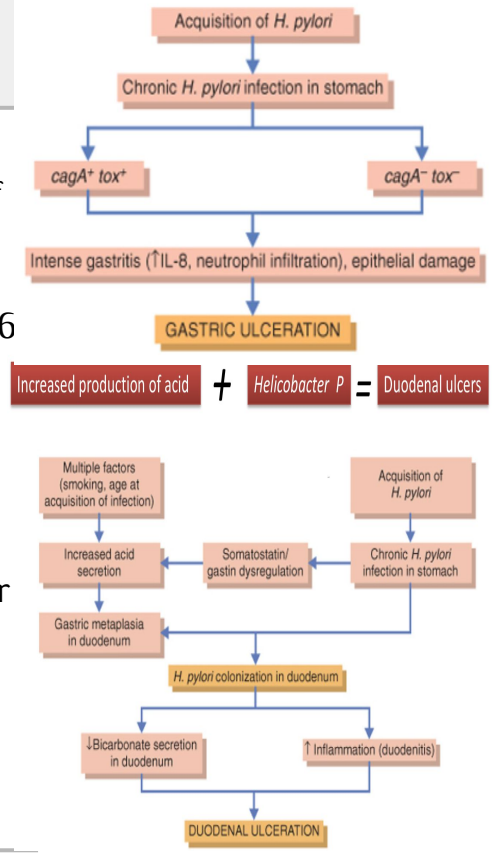
The mucosal defense against acid attack consist of:

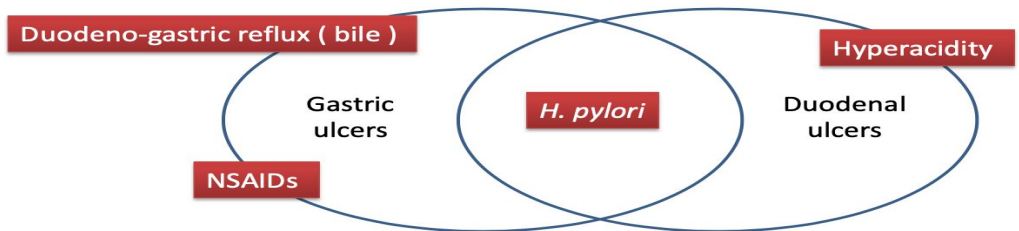
- Mucus-bicarbonate barrier
  - Duodeno-gastric reflux (bile)
- The surface epithelium 'has the power to generate immediately"
  - NSAIDs (blocking PGs synthesis)
  - H. Pylori infection, (cytotoxin and ammonia)

In Peptic ulcers of the stomach, breakdown of mucosal defence is much more important than excessive acid production.

Duodenal ulcers

- Increased production of acid assumes more importance in the pathogenesis of duodenal ulceration
- H. pylori-infected individuals secrete 2-6 times as much acid as non-infected controls.
- Helicobacter Pylori does not colonise normal duodenal epithelium because it doesn't like alkaline media. Helicobacter is involved in duodenal ulceration because there is gastric metaplasia in response to excess acid. Gastric metaplasia paves the way for colonisation by Helicobacter





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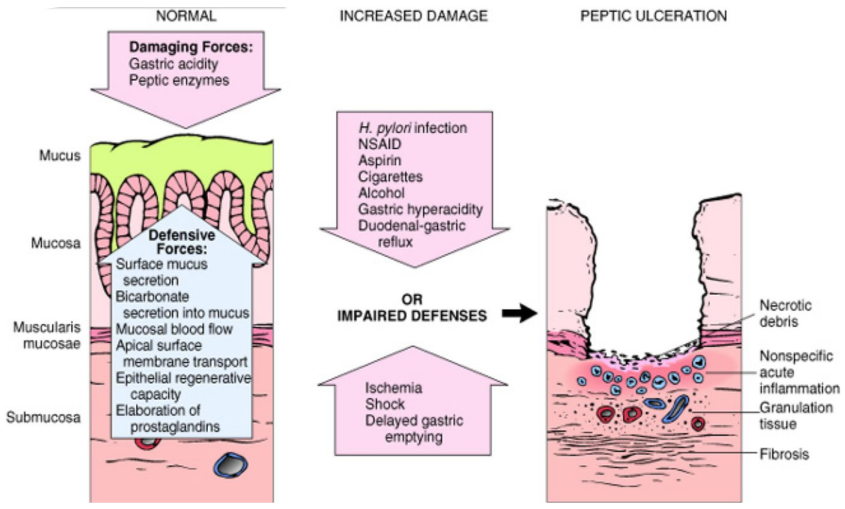
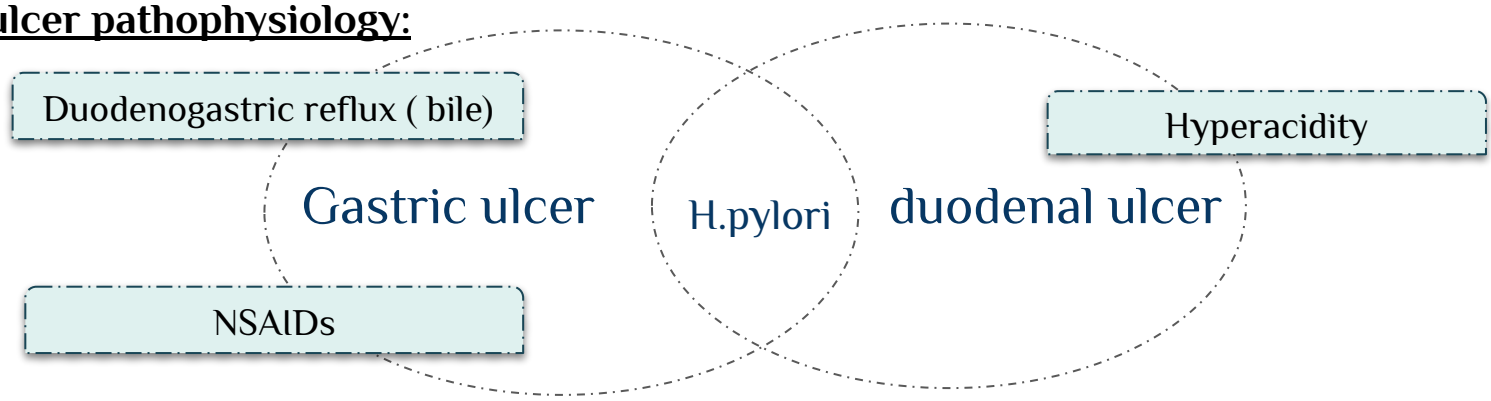
Notes & extra info

- Acute gastritis lead to acute ulcer
- Acute peptic ulcers mediate the release of **cortisone** which will inhibit prostaglandins which have a gastro-protective effect. Prostaglandins causes vasodilation which improves blood supply to the stomach and washes out excess acid and help with cell renewal
- A tumor in duodenum or pancreas produce gastrin hormone which stimulate parietal cells in stomach to secrete high amounts of acid. It's a tumor in the gastrin producing cells which will cause an increased production of HCL and causes hyperacidity.

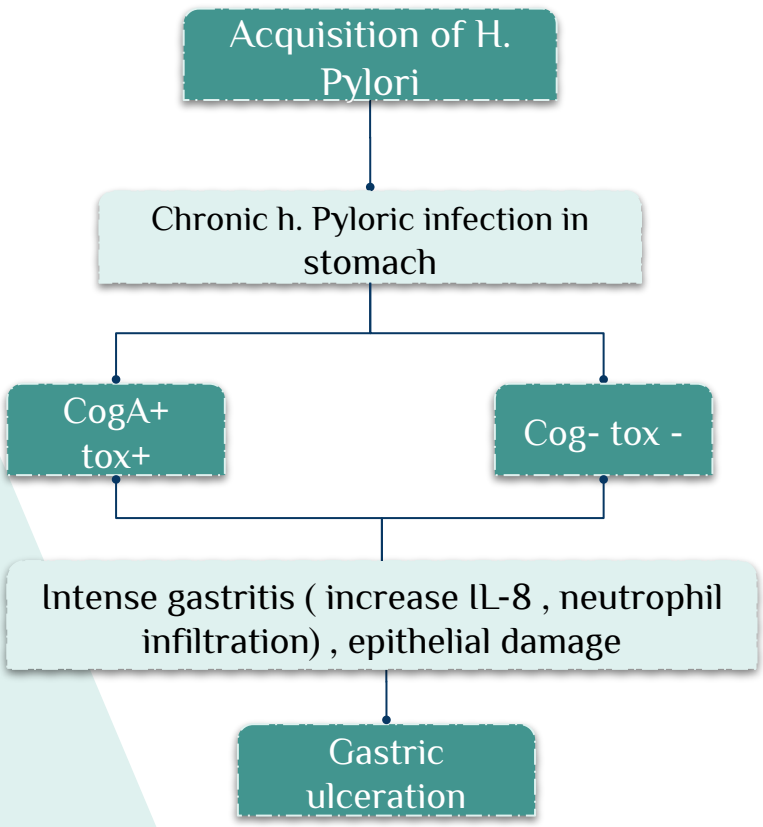


- Normally defensive factors (epithelial regenerative power, bicarbonate secretion..etc) work against aggressive factors (gastric acidity, peptic enzymes) to prevent injury to the epithelium .
- There might be abnormal/pathological conditions increase the damage of the epithelium (such as : smoking, NSAIDs , H.pylori, gastric hyperacidity) leading to extra injury . Or the person could have problems in the stomach such as reduced defensive factors due to reduced blood supply (ischemia, shock) And delayed gastric emptying (food stay in the stomach) which All result in the development of **chronic peptic ulcer .**

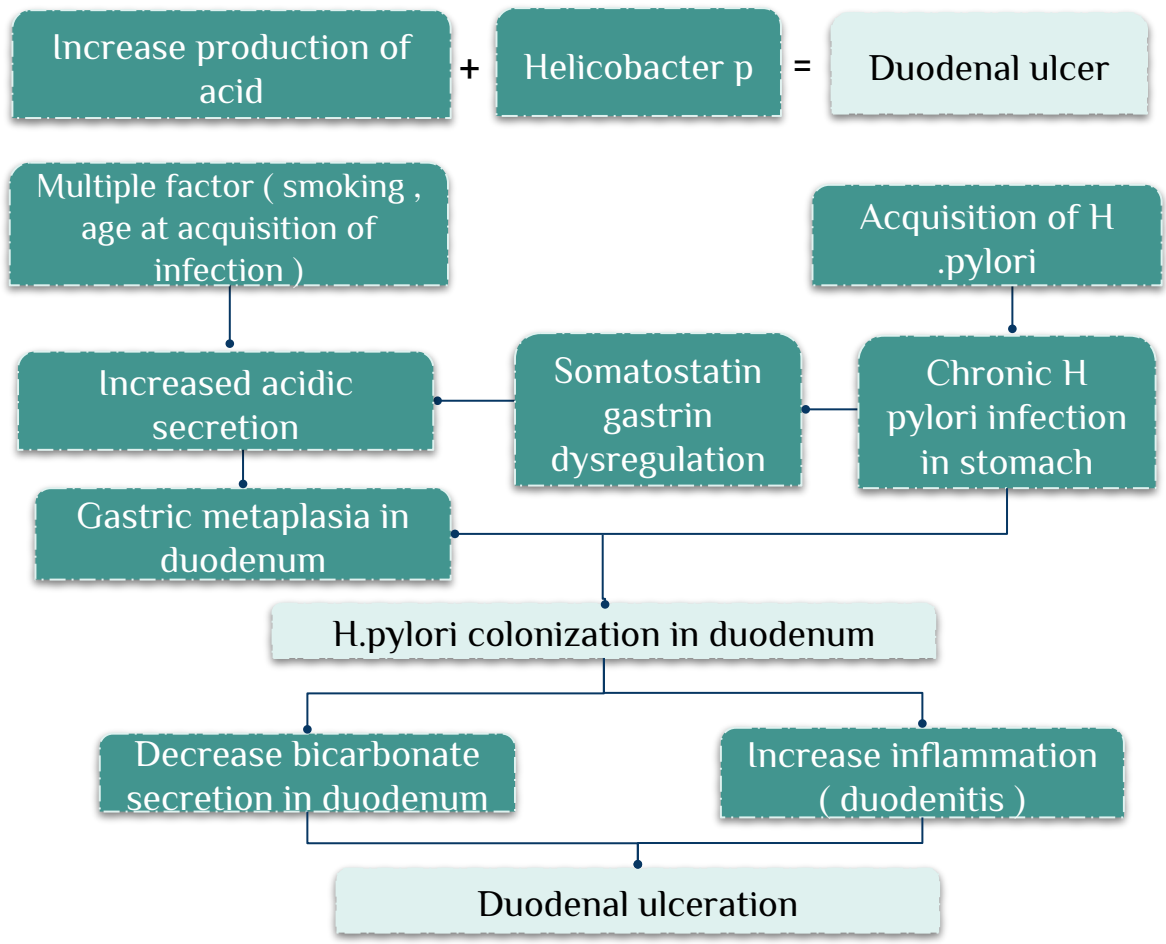
Chronic peptic ulcer pathophysiology:



Pathophysiology of Chronic peptic ulcers in STOMACH



Pathophysiology of Chronic peptic ulcers in DUODENUM



QUIZ!

MCQs

01 | Imbalance between aggressive and defensive factors cause			
A) Peptic ulcer	B) GERD	C) Gastric cancer	D) Duodenal cancer
02 | MALToma is related to			
A) Acute peptic ulcer	B) GERD	C) Gastric cancer	D) Chronic peptic ulcer
03 | Zollinger-Ellison syndrome is caused by			
A) Severe stress response	B) Part of acute gastritis	C) Hyperacidity	D) Esophageal cancer
04 | 34 years old present to outpatient clinic with 3 months history of upper abdominal burning pain which was relieved by the food but it continues for 2 hours after the food and she mentioned her inability to sleep well , what is the possible diagnosis?			
A) duodenal peptic ulcer	B) GERD	C) Gastric peptic ulcer	D) Chronic peptic ulcer
05 | 25 years old present to the hospital with epigastric pain has developed microcytic hypochromic anemia , a stool sample send to the lab has showed gram -ev spiral bacillus, what's the possible diagnosis?			
A) Acute peptic ulcer	B) GERD	C) Gastric cancer	D)infected with H.pyloria
06 | The most common cause of chronic gastritis is :			
A) H.pylori	B) NSAIDs	C) Cigarette smoking	D) Both A & B

MCQs Answer key	01	02	03	04	05	06
	A	D	C	A	D	A

Summary

Acute peptic (STRESS) ulcer	
Definition	Acute peptic ulcers or **stress ulcers** are **multiple, small mucosal** erosions, seen most commonly in the **stomach** but occasionally involving the duodenum.
Etiology	-As part of an acute gastritis : drugs e.g. NSAID or alcohol -complication of a severe stress response : (Curling's ulcers) , (Cushing's ulcers) , (Stress ulcer) -As a result of extreme hyperacidity : Zollinger-Ellison syndrome
Clinical feature	-Hematemesis -Melena -Iron deficiency
Pathogenesis	-gastric acid hypersecretion -systemic acidosis -vagaries stimulation -gastric mucosal hypoxia

Summary

Chronic peptic ulcer

Definition	-chronic most often **solitary**, lesions that can accrue in any part of GIT exposed to aggressive action of acid peptic juices -May occur in any portion of the GI tract exposed to acidic gastric juices	
Location	-May occur in any portion of the GI tract exposed to acidic gastric juices -98% located in first portion of duodenum or stomach -**Duodenal ulcer** is almost four times more common than gastric ulcer -lower third of **esophagus**, **meckel's diverticulum**	
Etiology	High Risk factor -infection : chronic gastritis caused by **Helicobacter pylori** or chronic gastritis of other etiology -drug intake: long term use of NSAIDs , High-dose corticosteroids -local irrigation : Cigarette smoking -Psychological factors : Psychological stress Rare risk factor -disease: Chronic renal failure, and hyperparathyroidism -Hormonal factors (tumur) : ex.Zollinger-Ellison syndrome	
Type	Gastric ulcer	Duodenal ulcer
	-majer cases: decreased mucosal resistance against acid , pepsin -H.pylori present in 70 %	-majer cause : exposure of mucosa to excessive amounts of acid , pepsin -H.pylori present in all cases
Pathophysiology	arises because of decreased mucosal protection against gastric acid	arises because of increased gastric acid and pepsin secretion in combination with decreased mucosal protection.
Clinical feature	-Pain increases shortly after eating (Within 30 min) , no relieved by eating → weight loss -nocturnal pain : 30–40% of patients	-Pain increases 2–5 hours after eating Pain on an empty stomach (hunger pain) that is relieved with food intake → weight gain -nocturnal pain : 50–80% of patients
Morphology	Gross: Mucosal defect with clean, punched-out margins occurring in antral and prepyloric regions (G) or in duodenum (usually the first part) (D) Microscopic: Varies depending on stage of ulcer; active ulcers demonstrate necrotic fibrinous debris with neutrophilic infiltrate and eventually granulation tissue	
Complication	-Hemorrhage → iron deficiency anemia -Penetration -Perforation → peritonitis -Fibrous stricture -Malignant change	

" اللهم علمنا ماينفعنا ، وانفعنا بما علمتنا وزدنا علما يارب العالمين "

Team leaders

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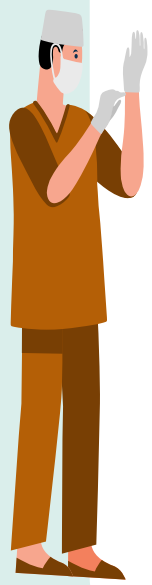

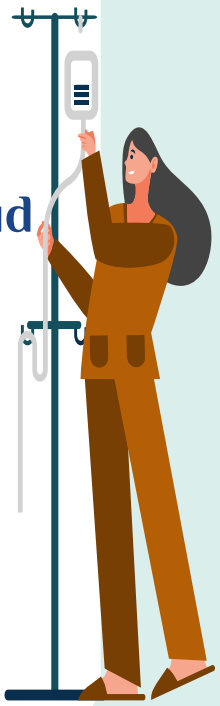

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- Member
- Note taker
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