

Physiology of Gastrointestinal Disorders

■ Disorders of Swallowing and of the Esophagus:

- Paralysis of the Swallowing Mechanism :
- Damage to the ^{Trigeminal glossopharyngeal} Fifth, Ninth, or Tenth ^{Vagus} cranial nerve
- ^{شلل الأطفال} Poliomyelitis or encephalitis.
- Paralysis of the swallowing muscles, *muscle dystrophy* , *myasthenia gravis* or *botulism*.

شلل عن طريق البكتيريا الي بتفرز
ال Toxin الي اسمه ال botulism

- لو صار في paralysis of swallowing reflex، بتحصل نتيجة ايش؟
بنسوفها كثير في الحالات الي بيجهم جلطات (CBA (cerebrovascular accident)،
بتلاقي المريض اجاله جلطة في المخ وصارله paralysis لل last four cranial nerves،
فببطل يعرف يبلع، بصير يجي يشرب بشرق والمي بتدخل ع ال trachea وبصير يكح
فببطلوا يطعموه وبحطوله أنبوبة للمعدة مباشرة لغاية ما ترجع ال swallowing reflexes

■ When the swallowing mechanism is partially or totally paralyzed

- Swallowing cannot occur.
- Failure of the glottis to close food passes into the lungs instead of the esophagus .
- Failure of the soft palate and uvula to close the posterior nares so that food refluxes into the nose during swallowing.

ي لما الواحد ينتق لا إرادي كثير ويصير لخبطة في ال
swallowing reflexes هتلاقي الأكل طلع من أنفه

Aspiration under GA.(general anesthesia)

لأنه بنعطي شغللات بترخي العضلات، فال rima
glottidis فاتحة، فممكن الأكل تبع ال stomach يطلع
لفوق ويدخل ع ال trachea ويصير عنده aspiration
وممكن يموت، عشان هيك بنصوم المريض قبل العملية
لست ساعات

Achalasia and Mega esophagus

Definition: Aprestalsis of muscles of body of esophagus and failure of relaxation of lower esophageal sphincter .

- Food fails to pass from the esophagus into the stomach. بصير عنده dysphasia، وفي ال Achalasia بتكون لل liquids وال solids، غير عن واحد عنده ضيق في المريء نتيجة قرحة أو cancer يكون فيها الصعب هو ال solid food
- **Causes:** Damage of the Myenteric plexus in the lower two thirds of the esophagus.

Muscles remains spastically contracted loss receptive relaxation" of the G.E sphincter.

- Over long periods the esophagus becomes markedly enlarged until it often can hold as much as 1 liter of food, which becomes putridly infected during the long periods of esophageal stasis. The infection may also cause ulceration of the esophageal mucosa, severe substernal pain or even rupture and death

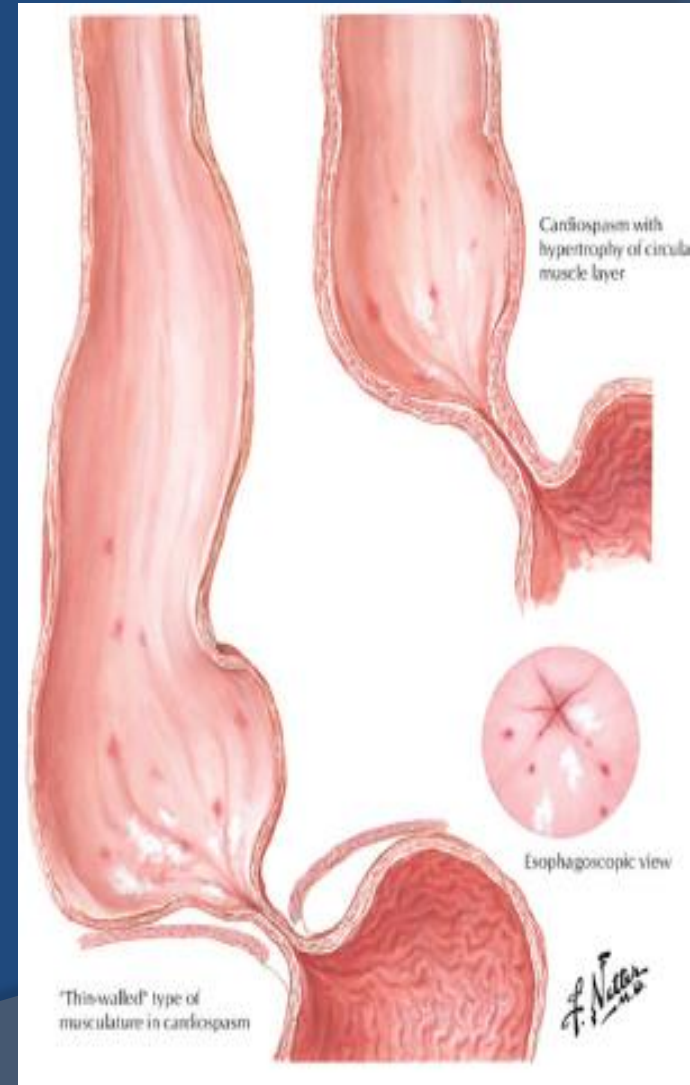
old food بتلاقيه مليون
وممكن يصيرله تخمر بداخله

Mega esophagus.



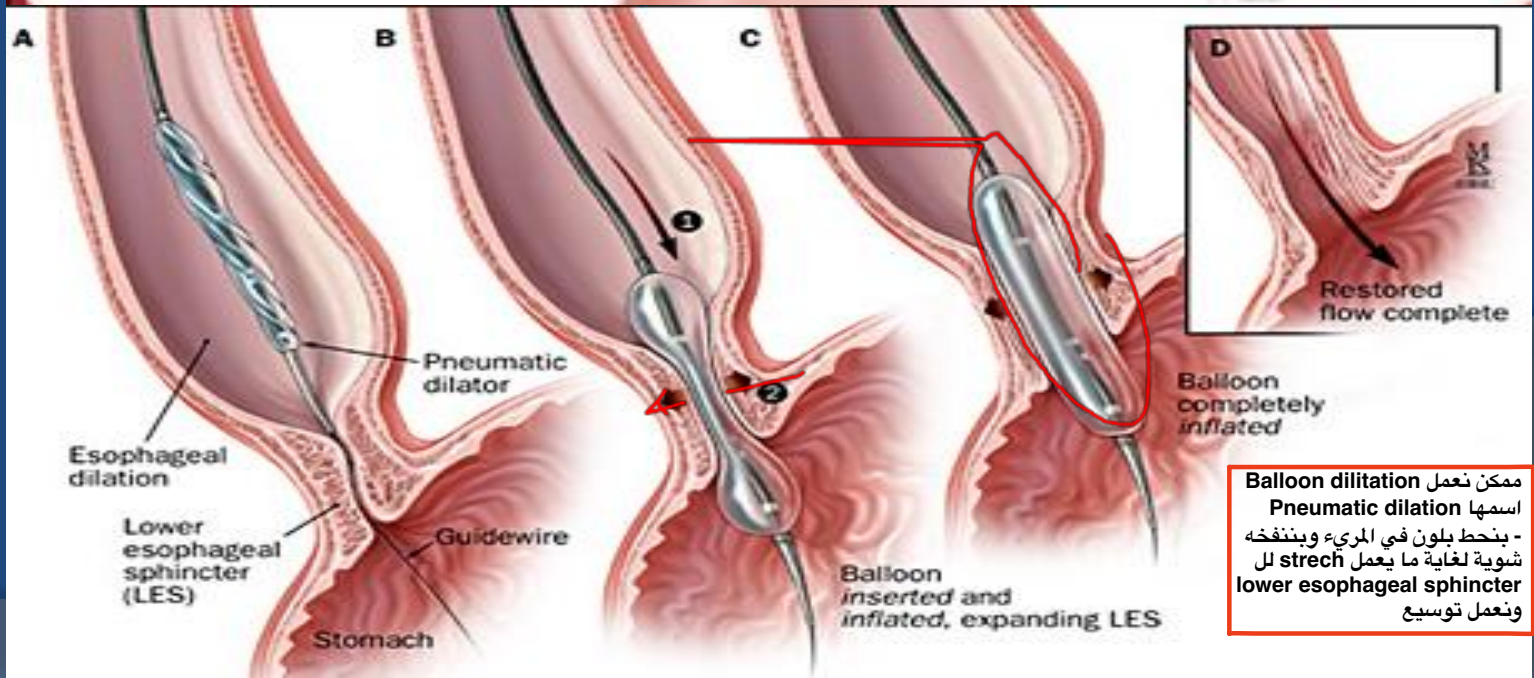
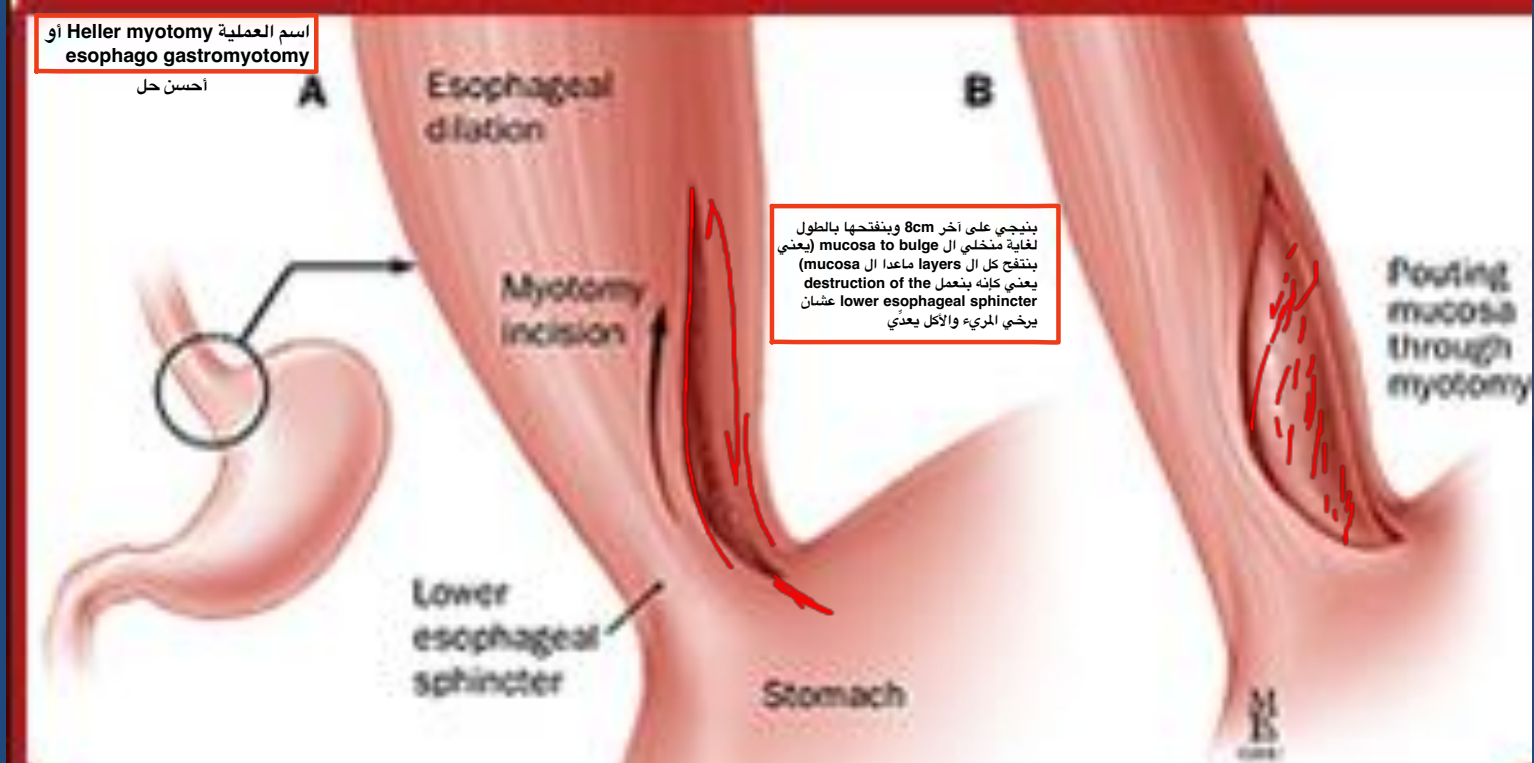
Achalasia

- Primary esophageal motility disorder. مع عدم ارتخاء الصمام الي تحت
- Peak incidence **20 -50 y.**
- Cause progressive dysphagia to solids and liquids.
- Regurgitation undigested food
- Chest pain.
- Loss of weight.
- Increase risk of esophageal cancer. لو طولت ممكن تؤدي ل
(Squamous cell carcinoma)



اسم العملية Heller myotomy أو
esophago gastromyotomy

احسن حل



Disorders of the Stomach

● Gastritis Inflammation of the Gastric Mucosa

- Gastritis is caused by chronic Bacterial infection of the gastric mucosa.

أهم سبب لل gastritis وال complication تبعثها، وال duodenal ulcer هو جرثومة المعدة (Helicobacter pylori)، ال Helicobacter pylori مسؤولة عن 95% من ال gastric ulcer و 75% من ال duodenal ulcer

- Damage to the protective gastric mucosal barrier by Alcohol, Aspirin , NSAIDS.

● Gastric Barrier and Its Penetration in Gastritis:

- low level of stomach absorption is mainly due to two specific features of the gastric mucosa:

(1) It is lined with highly resistant mucous cells that secrete viscid and adherent mucus.

اللي بتمنع اي اشى to penetrate
ماعد ال drugs وال alcohol

(2) It has tight junctions between the adjacent epithelial cells. "Gastric Barrier."

- الحاجة الوحيدة الي بصيرلها امتصاص بسرعة في المعدة هو ال alcohol، عشان هيك بقلك ما تشرب ع معدة فاضية، كل اشى او butter عشان ما يصير absorption بسرعة

- The gastric barrier normally is resistant enough to diffusion of highly concentrated hydrogen ions of the gastric juice.
- In gastritis, the permeability of the barrier is greatly increased. The H^+ diffuse into mucosa causing damage and atrophy.
- It also makes the mucosa susceptible to digestion by the peptic digestive enzymes, thus frequently resulting in a *Gastric ulcer.*

Chronic Gastritis Can Lead to Gastric Atrophy and Loss of Stomach Secretions

Achlorhydria (and Hypochlorhydria):

- ➔ **Achlorhydria:** means simply that the stomach fails to secrete hydrochloric acid; it is diagnosed when the pH of the gastric secretions fails to decrease below 6.5 after maximal stimulation.
- ➔ **Hypochlorhydria:** means diminished acid secretion. When acid is not secreted, pepsin also usually is not secreted; even when it is, the lack of acid prevents it from functioning because pepsin requires an acid medium for activity.

Gastric Atrophy May Cause Pernicious Anemia

- من ال chronic infection، من الالتهاب المزمن بصير Atrophy of gastric mucosa، يبقى
فش secretion of HCL ولا ال intrinsic factor، تخيل!
بس 1/50 من ال B12 بصيرله absorption بدون ال intrinsic factor

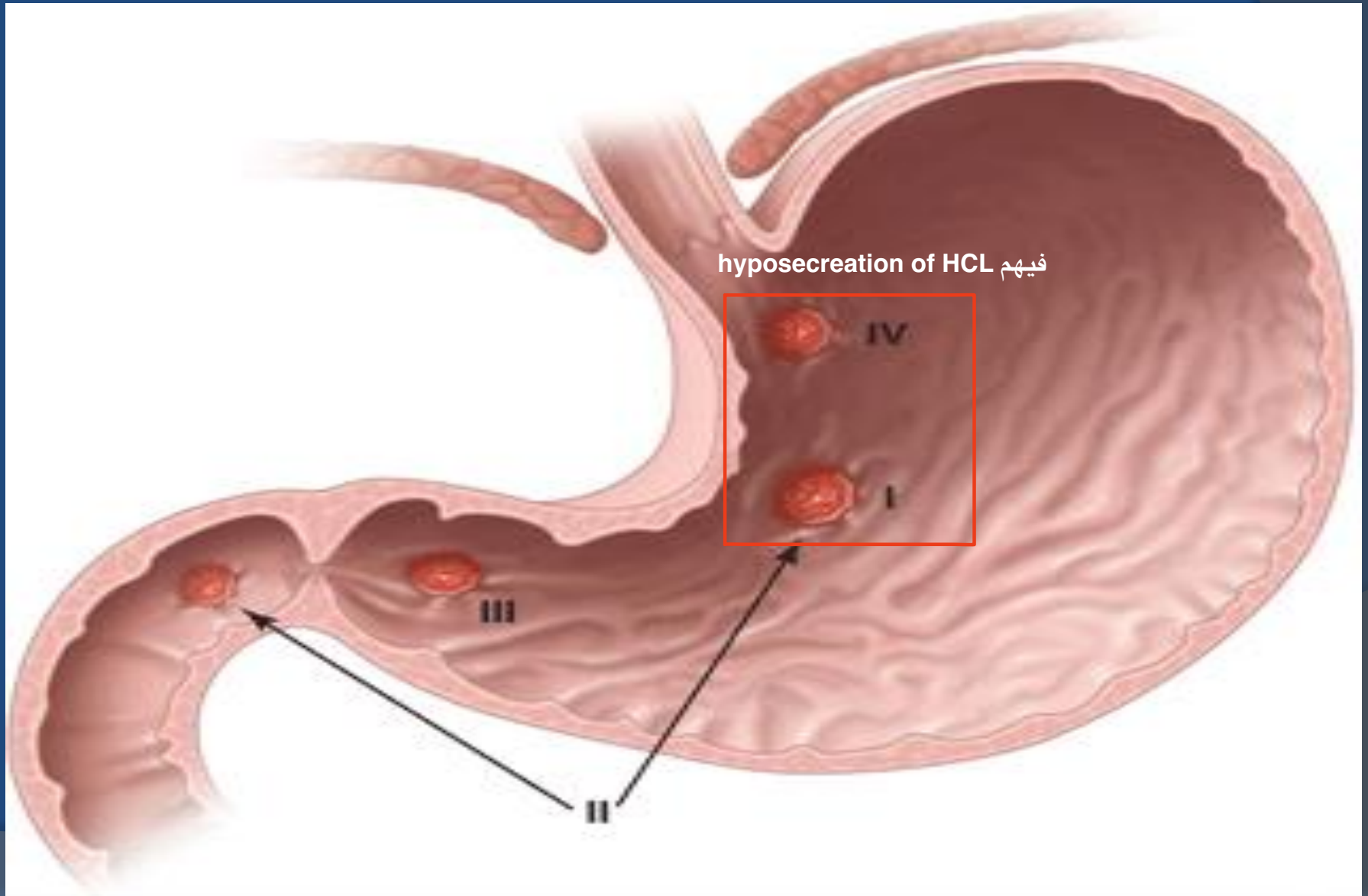
 In the absence of intrinsic factor, only about 1/50 of the vitamin B₁₂ is absorbed. And, without intrinsic factor, an adequate amount of vitamin B₁₂ is not made available from the foods to cause young, newly forming red blood cells to mature in the bone marrow. The result is

Pernicious Anemia.

فممکن تكون نتيجة هاد الكلام، أو انه ال complex
صار، بس المشكلة كانت في ال terminal ileum

نوع من أنواع ال Megaloblastic anemia
يعني ال RBCs حجمها بکبر

Types of gastric ulcers



Peptic Ulcer

وين بتصير؟
أي مكان في gastric mucosa
يمكن يصير فيه peptic ulcer

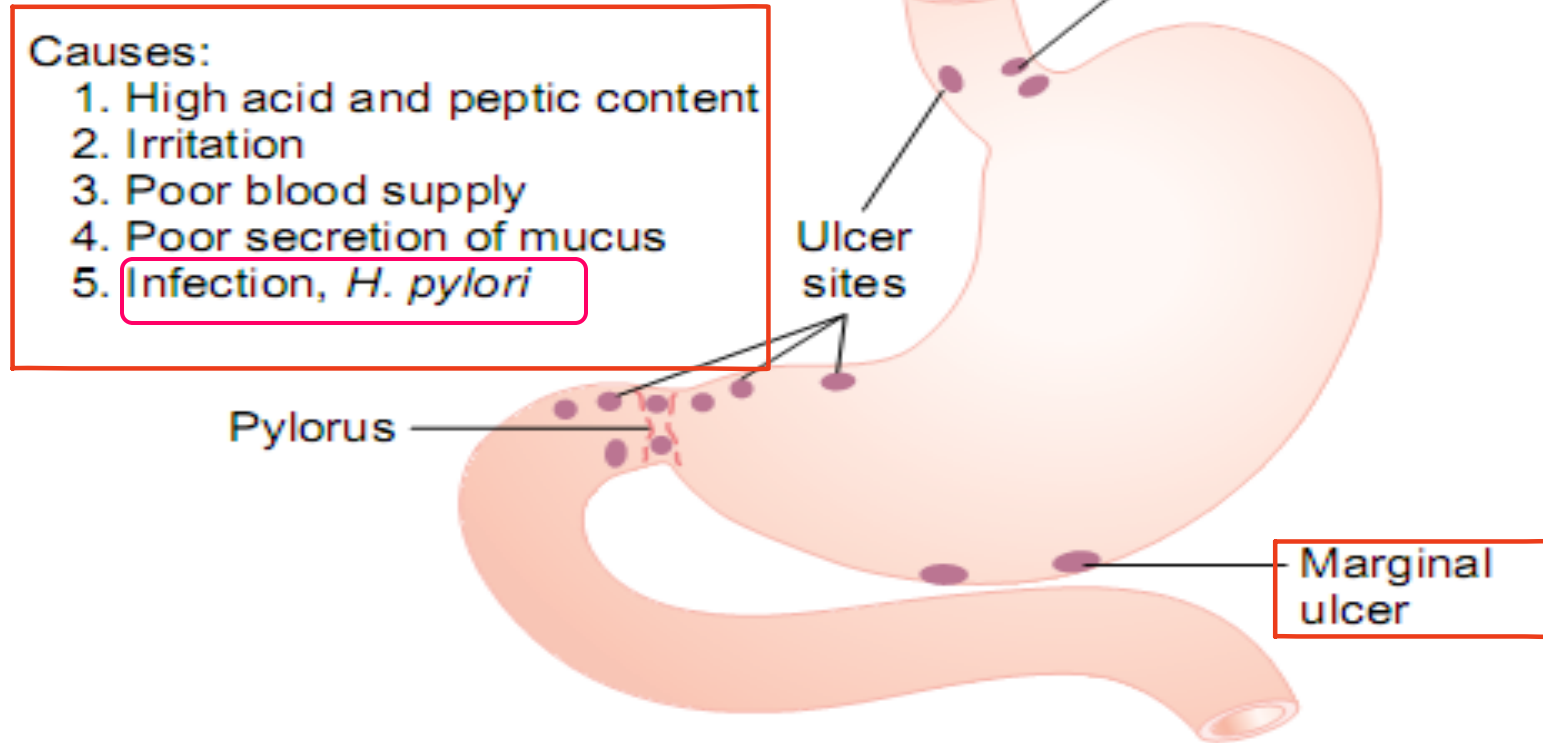


Figure 66-1

Peptic ulcer. *H. pylori*, *Helicobacter pylori*.

- **A Surface Breach** of mucosal lining of GIT (excoriated area of stomach or intestinal mucosa) occurring as a result of *acid and pepsin* attack.

■ **Sites:**

- Duodenum (DU) Four times more common than peptic ulcer
- Stomach (GU)
- Oesophagus
- Gastro-Enterostomy stoma ^{بنشيك المعدة بال jejunm} **(Marginal ulcer)**.
- Related to ectopic gastric mucosa (e.g. in Meckel's diverticulum).
- Acute peptic ulcer Like acute erosion but breaching muscularis mucosa.

■ Basic Cause of Peptic Ulceration

The usual cause of peptic ulceration is an ***Imbalance*** between the ***Rate of secretion of gastric juice and the Degree of protection afforded by***

- The gastro duodenal mucosal barrier .
- The neutralization of the gastric acid by duodenal juices.

MUCUS : all areas normally exposed to gastric juice are well supplied with mucus glands(compound mucous glands in the lower esophagus plus the mucous cell coating of the stomach mucosa, the mucous neck cells of the gastric glands, the deep pyloric glands that secrete mainly mucus, and, finally, the glands of **Brunner's of the upper Duodenum**, which secrete a highly alkaline mucus).

ALKALINE SECRETIONS

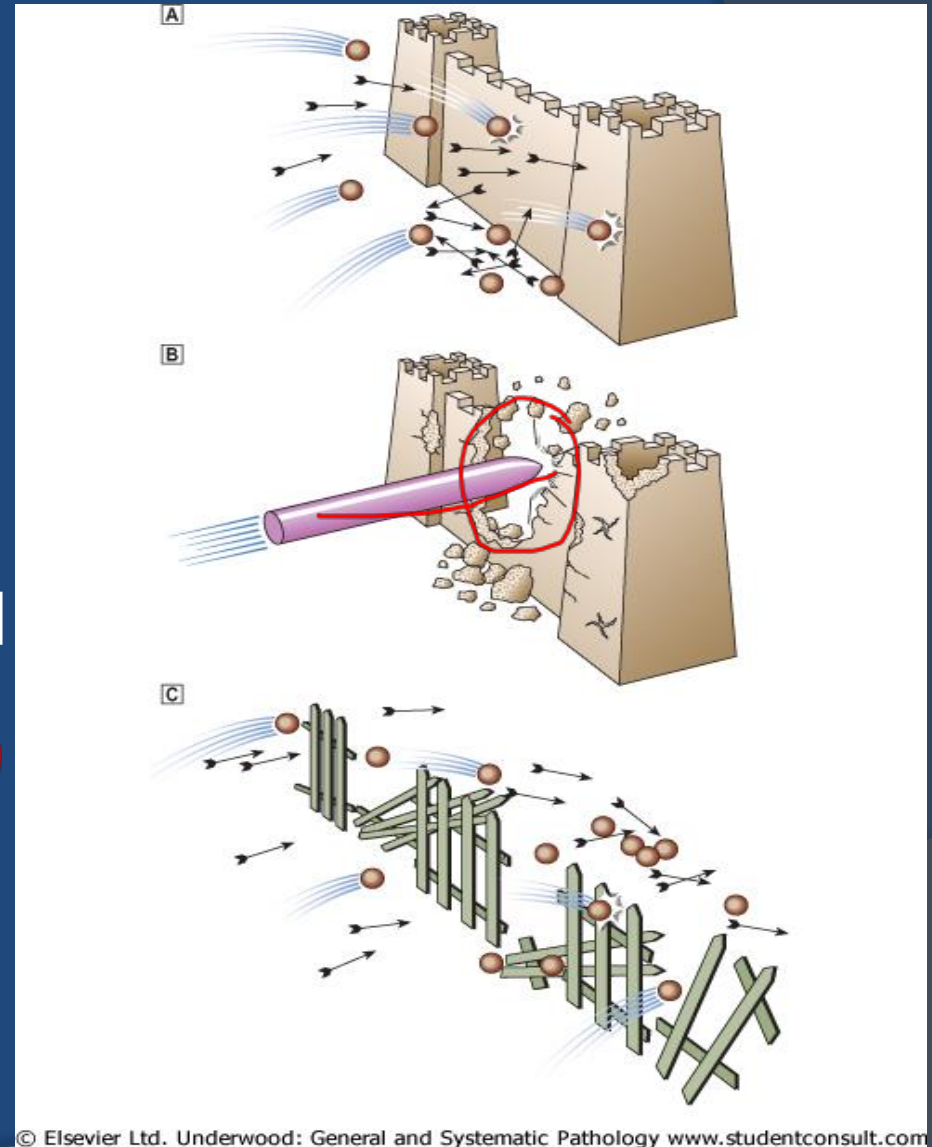
- The duodenum is protected by the Alkalinity of *small intestinal secretions*.
- Pancreatic secretion, which contains large quantities of NaHCO_3 that neutralize the HCl of the gastric juice, also Inactivating Pepsin and preventing digestion of the mucosa.
- In addition, large amounts of bicarbonate ions are provided in the secretions of the large Brunner's glands in the first few centimeters of the duodenal wall and In bile coming from the liver.

REFLEXES

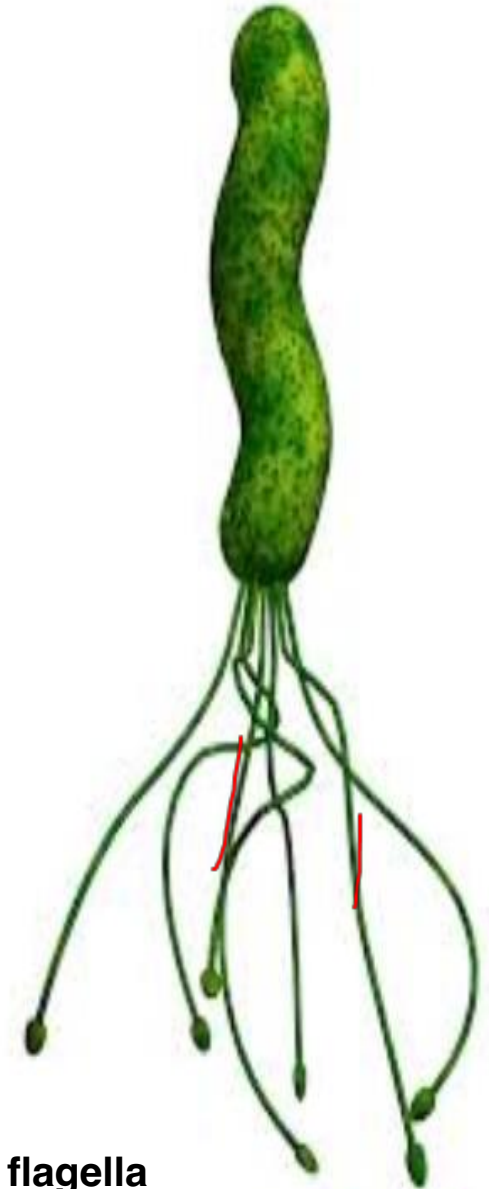
- ② Two feedback control mechanisms normally ensure that this neutralization of gastric juices is complete. - في inhibitory reflexes التي اسمه duodenogastric inhibitory reflexes، لما يدخل حامض كثير ع ال duodenum، بروح الحامض هاد عن طريق ال minibrain of the gut ويعمل inhibition
- When excess acid enters the duodenum, it inhibits gastric secretion and peristalsis in the stomach, both by nervous reflexes and by hormonal feedback from the duodenum, thereby decreasing the rate of gastric emptying.
- The presence of acid in the small intestine liberates Secretin from the intestinal mucosa, which then passes by way of the blood to the pancreas to promote rapid secretion of pancreatic juice.

Causes

- In normal acid/pepsin attack is balanced by mucosal defences
 - Increased attack by hyperacidity Weakened mucosal defence – the major factor *H. pylori* related
- أكثر مكان بتواجد فيه هو ال pylorus of the stomach



- Bacterial Infection by Helicobacter pylori Breaks Down the Gastro duodenal Mucosal Barrier and Stimulates Gastric Acid Secretion.
- At least 75 percent of peptic ulcer patients have been found to have chronic infection of the terminal portions of the gastric mucosa and initial portions of the duodenal mucosa, most often caused by the bacterium Helicobacter pylori
- In DU, the rate of gastric acid secretion is greater than normal, sometimes as much as twice normal.
- Excess secretion of gastric juices for any reason may cause peptic ulceration.



4-6 flagella

تعتبر Microaerophilic، يعني ما بتحب
الهواء، عشان هيك بتزق حالها جوا ال mucus

The Clinical Outcomes of *Helicobacter pylori* Infections



Asymptomatic
or chronic gastritis



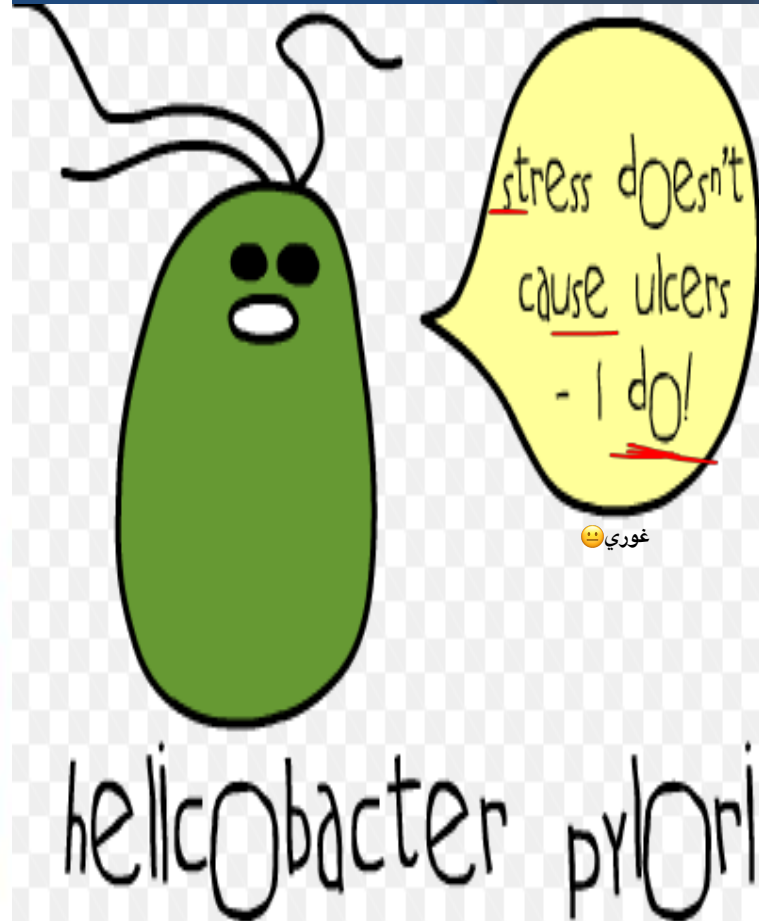
Pernicious Anemia التي ممكن تعمل
Chronic atrophic gastritis
Intestinal metaplasia



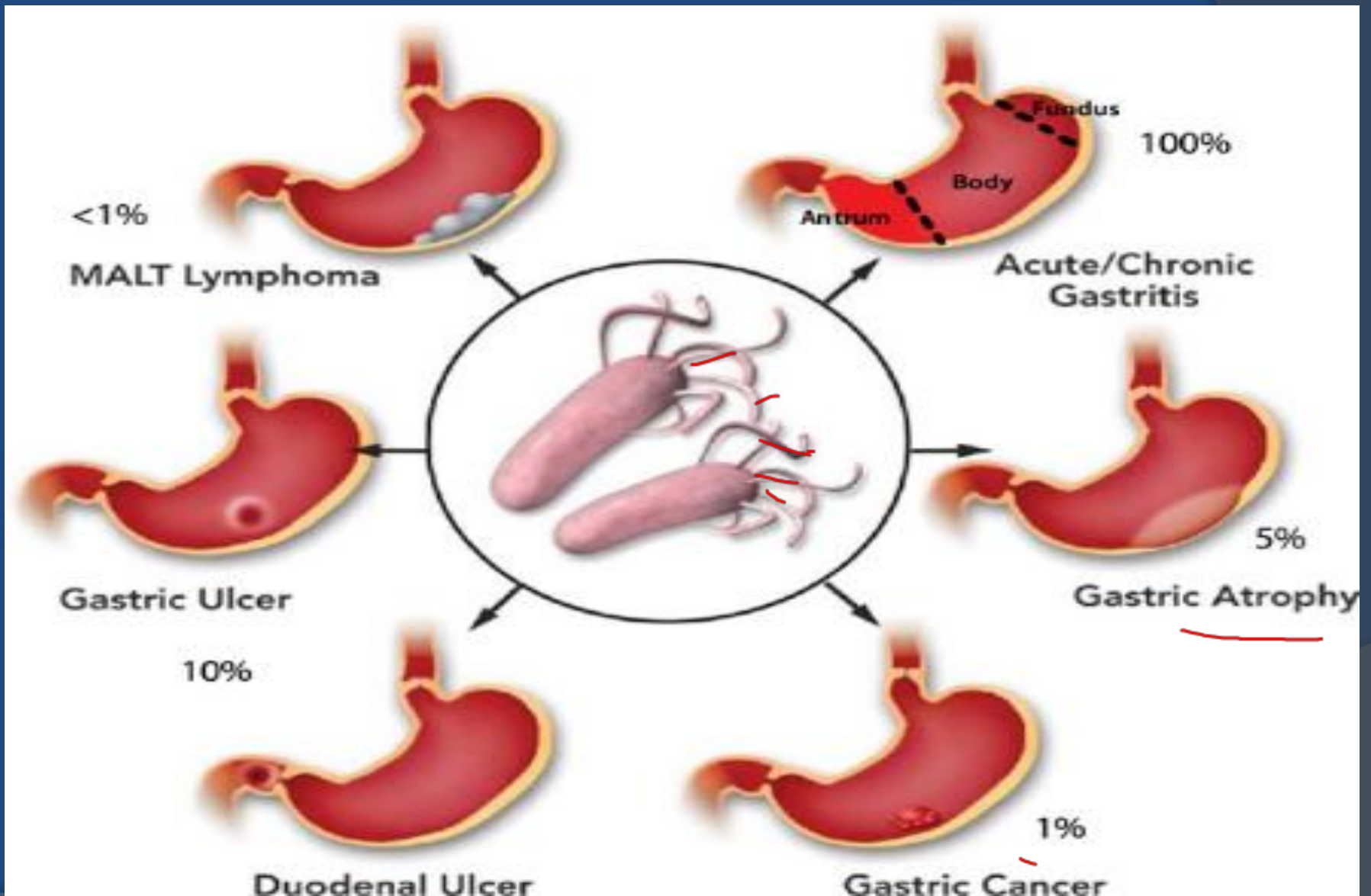
Gastric or
Duodenal ulcer



Gastric cancer
MALT lymphoma



HLO OTCOME



Other factors that predispose to ulcers include

■ **Smoking:** presumably because of increased nervous stimulation of the stomach Secretory glands.
اله مية طريقة، بزود ال HCL secretion، بضعف ال mucosa وبققل ال prostaglandin secretion

■ **Alcohol:** because it tends to break down the mucosal barrier.

■ **Aspirin and other NSAIDS:** drugs that also have a strong propensity for breaking down this barrier.

- برضو ال vinegar ممكن يعمل Ulcer

أكثر طريقة هي العلاج الثلاثي أو الرباعي، انه نعطى PPI مع Two antibiotics
وغالبا بنستخدم clarithromyfin مع Amoxicillin أو metronidazole

Physiology of Treatment

- Use of **Antibiotics** along with other agents to kill infectious bacteria.
- Proton pump inhibitors (**PPI**) are used now as their antacid effect is better and duration of action is longer e.g. **Omeprazole**. H2 receptor antagonist يمكن بديل ال omeprazole نعطى
- Administration of an acid-suppressant drug, especially *ranitidine*, an antihistaminic that blocks the stimulatory effect of histamine on gastric gland histamine₂ (**H₂ receptors antagonist**), thus reducing gastric acid secretion by 70 to 80 per cent.
- Triple Therapy is the recent approach in treatment of peptic ulcer. It includes 2 antibiotics (**Clarithromycin + Amoxicillin or metronidazole**) and an acid-suppressant (Omeprazole). ال antibiotics من اسبوع ل اسبوعين

- لو ضفنا Bismuth compound عشان يعمل protection أكثر لل mucosa هاد بصير اسمه رباعي

Duodenal Ulcer (DU)

Gastric Ulcer (GU)

ال ulcer يكون deep لأنه يكون مأخذ ال mucosa وال submucosa ويمكن يوصل لل muscle layer

