PEPTIC ULCER

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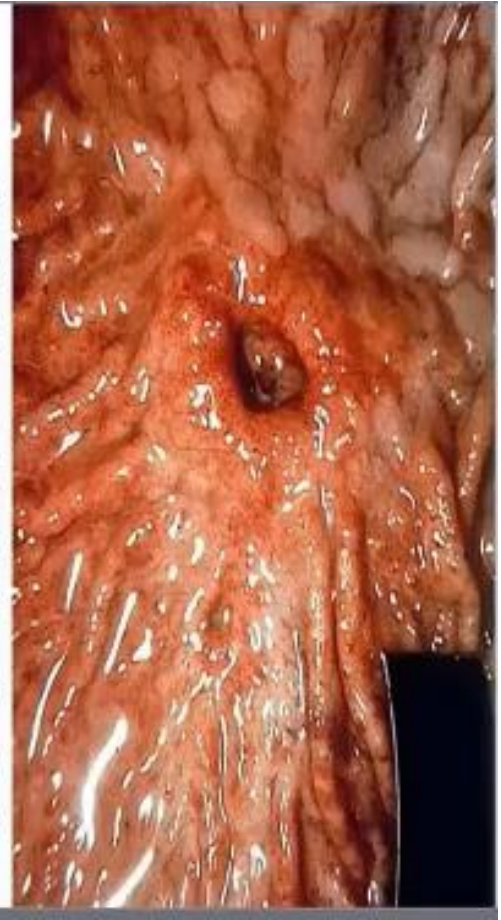
Lecture ILOs

- By end of this lecture the student will be able to:
  - Describe the etiology and clinical manifestations of peptic ulcer in order to plan the effective management (Knowledge).
  - Analyze the clinical features of peptic ulcer in order to reach an appropriate diagnosis.
  - Correlate the clinical features with diagnostic tests results to reach definite diagnosis and plan management of the patients(Cognitive).

Peptic ulceration and related disorders

Peptic ulcer disease encompasses disorders of the oesophagus, stomach and duodenum. The conditions share the symptom of epigastric pain and all have the common aetiology of mucosal inflammation associated, to a greater or lesser extent, with gastric acid-pepsin secretions. Recent work has demonstrated that perhaps the most important aetiological factor in gastric and duodenal ulcer disease is chronic mucosal infection with the bacterium *Helicobacter pylori*. Peptic disorders, together with gallstone disease, are the most common causes of organic upper abdominal pain.



Peptic ulcer disease increase with obesity because of increased inta-abdomenal pressure + internal organs of the abdomen compress the stomach and hiatal orifice causing the acids to ascend to the esophagus

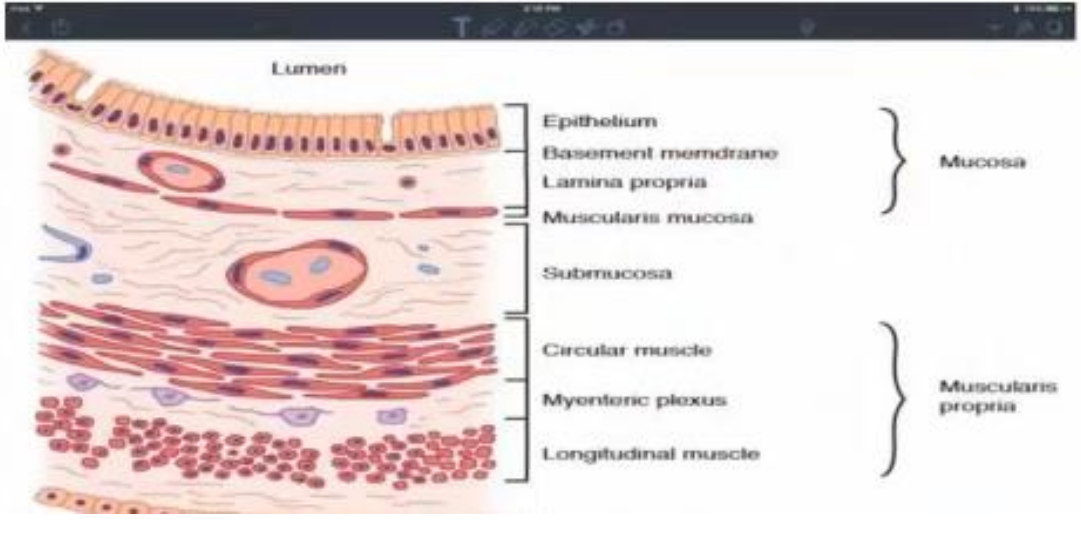
PEPTIC ULCER_Role of surgery

- Over the last 2 decades, despite the advances in medical therapy to inhibit acid secretion and to eradicate H. pylori surgery is important in managing these patients. There is an increase in emergency operations for complicated peptic ulcer while the number of elective operations has been decreased markedly.

The elective treatment of peptic ulcer disease is medical treatment.

ULCER - EROSION

An ulcer extends through the muscularis mucosa in contrast to an erosion, which is superficial to muscularis mucosa. It is only an erosion of the mucosa



Why is it important to know about the blood supply? Sometimes the peptic ulcer affects the mucosa and reaches to blood vessels so the patient will start bleeding (upper GI bleeding)

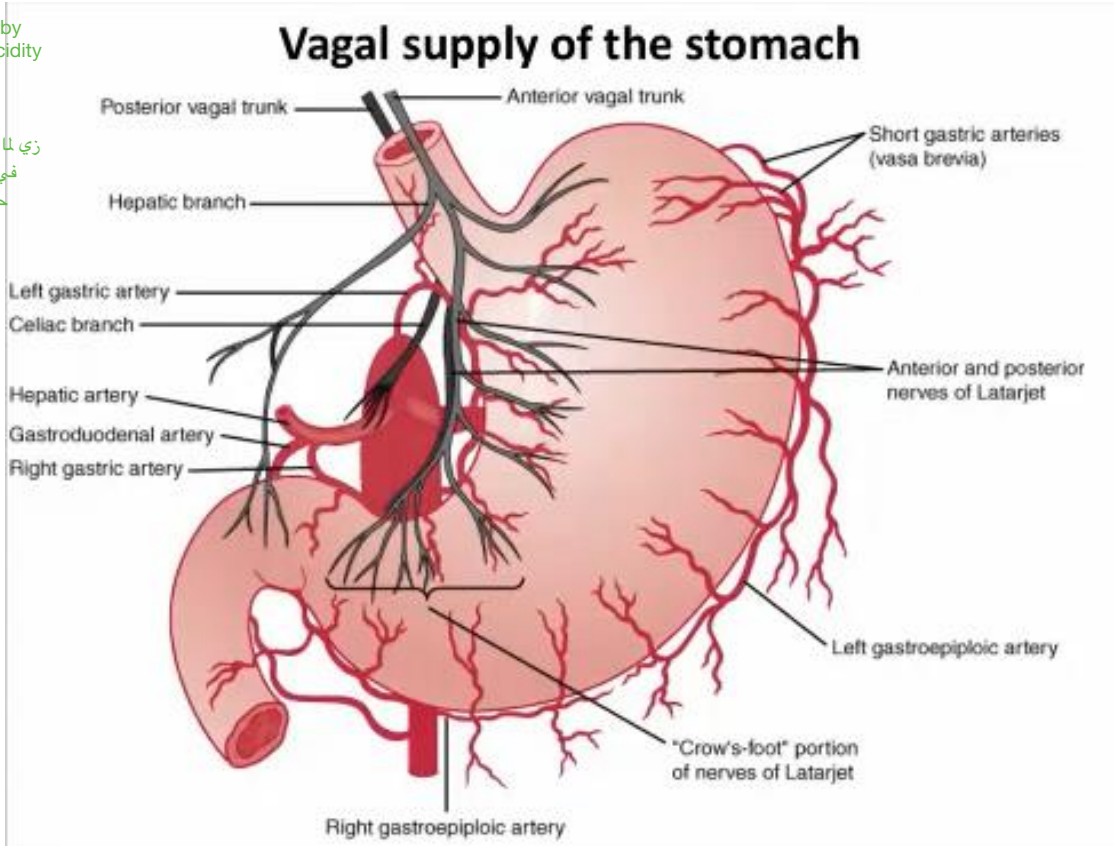
Blood supply of the stomach

On the lesser curve, **left gastric artery (**of coeliac axis) anastomoses with **right gastric artery** (of common hepatic artery).**Gastroduodenal artery (**of common hepatic artery) passes behind the first part of the duodenum(highly relevant to bleeding duodenal ulcer), Here it divides into **superior pancreatico-duodenal artery** and **right gastroepiploic artery**. **Superior pancreatico-duodenal artery** supplies the duodenum and pancreatic head and anastomoses with **Inferior pancreatico-duodenal artery,(**of superior mesenteric). **Right gastroepiploic artery** runs along the greater curvature of the stomach, anastomoses with **Left gastroepiploic artery (**of splenic artery).**Short gastric arteries (**of splenic artery) supply the fundus.

The stomach is a rich organ of blood supply so if the patient has ulcer he will have bleeding if it affects any artery and the most common artery to be affected is **posterior gastroduodenal artery (GDA)**

Sometime vagal nerve by itself can cause high acidity so sometimes we do vagotomy.

زي لما العصب يسبب لي زياده تعرق في اليدين هنا العصب يسبب لي حموضه عن طريق الفيقال نيرف



Investigations of gastric disorders

هذا ممكن يجي سؤال
Patient with heartburn, abdominal pain and even bleeding. What is the best investigation.

Upper endoscopy

- **Flexible endoscopy** is the most sensitive one .
- CT scan, useful in staging gastric cancer.
- PET scan: useful in diagnosis, staging gastric cancer
- Endoscopic ultrasound is the most sensitive in T staging of gastric and duodenal tumors
- Laparoscopy for peritoneal, lymph nodes and liver spread.

Sometimes cancer causes high acidity and peptic ulcer disease

احيان ممكن يجيكم سؤال في هيئه التخصصات الصحيه

Patient with lower GI bleeding (through the rectum). What is the first step to do?

We do local examination. If normal do we do endoscopy or colonoscopy?

We do endoscopy because upper GI bleeding is more common than lower GI bleeding and one of the main causes is peptic ulcer disease

According to the general guidelines we always do endoscopy before colonoscopy in lower GI bleeding if this is the patient's first presentation (first visit and no lower GI disorder is known for this patient). Especially in melena (black stool) which means blood got digested in the GI track and went down to the lower GI so this upper GI bleeding until proven otherwise.

If endoscopy is normal what is the next step? Colonoscopy

If colonoscopy is normal what is the next step? CT angio

If CT angio is normal what is the next step? Capsule

Endoscopy > colonoscopy > CT angio

طبعا حنا نتكلم عن لما البيشنت صار ستيبل سوياله ريسستيشن واموره كويسه وما فيه خوف على حياته

في ناس تقول بدال ما اتعب المريض واسوي اندوسكوبي قبل الكولونوسكوبي احط نيزو قاستريك تيوب واسحب بالسيرنج واشوف اذا سحبت وطلع معي دم يعني ابر جي اي بالتحديد من الستوميك واذا ما طلع معي شي معناته الستوميك نورمال بس النيزو قاستريك تيوب ما يوريني الديودينام اما الاندوسكوبي يوريني الى بدايه الجيوجنم فيوريني كل الديودنم، وكلها تمشي سواء اندوسكوبي او نيزو قاسترك تيوب لكن الجنرال قايدلان تقول اندوسكوبي.

Etiology of Duodenal ulcer

- Increased secretion of acid and pepsin(mucolytic) in conjunction with H. pylori infection(duodenal ulcers 90% and gastric ulcers 75%) or ingestion of NSAIDs.
- Genetic factors, social stress(blood group O is the most common blood type in patients with duodenal ulcer/ patients who have bled from a duodenal ulcer. May be due to increased parietal cell mass???).
- Cigarette smoking predisposes to peptic ulcer, causes relapse after treatment.

Pathology

Duodenal ulcer

- Due to increased gastric acid secretion.
- A chronic ulcer penetrates the mucosa into the muscle coat, leading to fibrosis.
- Fibrosis causes deformities as pyloric stenosis.
- When an ulcer heals, a scar can be observed. معناته لما اسوي اندوسكوبي اقدر اشوف السكار
- Presence of Posterior and anterior duodenal ulcers is referred to as 'kissing ulcers'. يعني مقابلين بعض
- Anterior duodenal ulcers tend to perforate.
- posterior duodenal ulcers tend to bleed by eroding gastroduodenal artery.

Important points (always come in the exam):

- **Why does anterior duodenal ulcer tend to perforate ?**

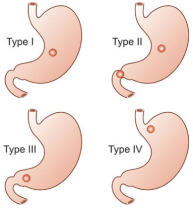
In front of the anterior part of the duodenum there are thin layer of peritoneum (much much thinner than duodenal wall) and the intraperitoneal cavity. If any perforation happens, the duodenum will start to evacuate into intraperitoeum and the patient will start to have severe abdominal pain, rigidity and air under diaphragm on x-ray.

While behind the posterior duodenum there are retroperitoneal space/tissue (not a real space) then GDA then fat and lymph nods, so even if it got perforated, it rarely evacuate but sometimes if there was too much evacuation, air and some fluids will get out (from the duodenum) into under the right diaphragm or it will go down to the retroperitoneal around the appendix and give presentation of appendicitis.

- The most common presentation of anterior wall perforation in duodenal ulcer is **severe abdominal pain, rigidity** and patient **looks septic** and the treatment is **Graham patch surgery (laparotomy)** then **treatment of the underlying cause** (high acidity, drugs, smoking...)

Graham patch surgery: We sew the perforation site and cover it with fat from the omentum (to support the first layer of repair to prevent recurrence) and then we sew another layer.

- In posterior wall perforation, patient will present with melena or vomiting blood and heartburn. We think about ulcer and will confirm by endoscope after resuscitating the patient. If patient has melena, this means he is losing large amount of blood because small amount of blood doesn't cause melena. Patient may also come with same presentations as appendicitis (if retroperitoneal).



Types and etiology of gastric ulcers

Type I (on the lesser curve- body)

Types II (GU+DU). 2 ulcers one in the stomach and one in the duodenum

Type III (pyloric antrum or canal).

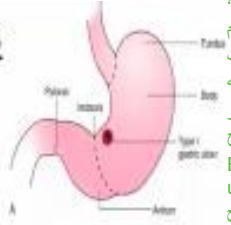
Type IV (paracardiac) Near to the GE

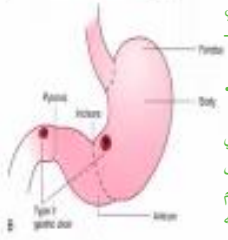
- **gastric ulcers 1,2 are defects in mucosal protection. type 3(due to acid hypersecretion and behave like DU).** لان الانترم على طول جمب الديوديتم
- **Gastric ulcer? turn malignant (DU not).**

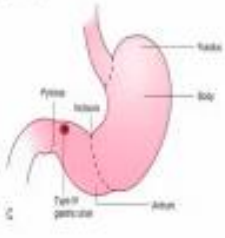
Peptic ulcer: ulcer in the duodenum or the stomach (whatever)
Duodenal ulcer: in the duodenum
Gastric ulcer: in the stomach

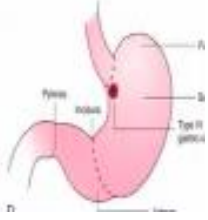
We are always afraid from type 4 ulcer because it could be cancer

في النوع الثالث: افهموها بالفيزيا المريض يكون جالس والاسيد يتجمع تحت









افتراضا جينا اندوسكوبي او لابروسكوبي ودخلنا، اول ما نشوف الالسر بالستوميك قبل لا نصلحها لازم لازم ناخذ بايوبسي عشان يمكن يكون كانسر مسبب لي السر لان الالسر في الستوميك ممكن يكون سببه كانسر بينما في الديودينم نادرا يكون سببه كانسر فلما اشوف السر بالديودينم ارتاح

Because the main cause of duodenal ulcer is low protection or high acidity

في سؤال دايم يجي بالبورد انك دخلت تصلح قاسترك السر ايش تسوي ؟

Take biopsy and repair the ulcer

- All types of gastric ulcer can be caused by malignant cancer.

عشان كذا اي مريض يجي يقولك حصلو السر في الستوميك لازم تساله اذا اخذو خزعه منها او لا وايش طلعت النتيجه اما الديودنال السر فغالبا ما نسالهم عن الخزعه

Gastric ulcers

- Due to decreased gastric protection (Cytoprotection) (bicarbonate and mucus layer)(HCL is normal or low).
- Fibrosis, may result in rarely seen **hourglass stomach**.
- Large chronic ulcers may penetrate posteriorly through the pancreas or major vessel as the splenic artery.
- Less commonly, they may erode transverse colon.
- Chronic gastric ulcers are much more common on the lesser curve(especially the incisura angularis) than the greater curve.
- It is fundamental that any gastric ulcer may be malignant, so multiple biopsies should be taken

يقصد هنا ان مكان الالسر يأثر على الاماكن اللي جمبه اذا كان ورا فيكون وراه البنكرياس او السبلنك ارتري واذا كان لاترال فجمبه السبيلن، فكل السر يأثر على المنطقه اللي حوله ويعطيني برزنتيشن له

Other Gastric Ulcers

Carcinoma

Lymphoma

Lieomyoma

Sarcoma

Crohns

TB

Behjete

All can cause but not always

Clinical Manifestations

- Young and middle age patients
- Pain or one of the complications:

❑ **Perforation.**

❑ **Bleeding.**

❑ **Obstruction (**pyloric obstruction, hour glass stomach).

❑ **Penetration.**

❑ **Malignant transformation** in gastric ulcer

Gastric ulcer with time can transform into malignancy

Abdominal pain

The most common symptom is epigastric pain: well localized /tolerable/frequently relieved by food(DU) but in GU food brings more pain. pain may be episodic, seasonal in spring, autumn (periodicity),may relapse due to stresses as work, worry, weather.

For these reasons and because it is relieved, many patients seek medical advice late.

Constant pain, referred to the back= deeper penetration of the ulcer (penetration into the pancreas).

perforation….peritonitis.

1. Perforation

- Acute/chronic(penetration)
- **Pathology 3 Stages:** Not important

A. **Chemical peritonitis** (peritonism as HCL sterilizes gastroduodenal contents) **THEN**

B. **Delusion (masked peritonitis)**(6-12 hours due to neutralizing peritoneal exudate) **THEN**

C. **Septic (bacterial)peritonitis**

- NSAIDs is a possible cause.
- 80% of pts have peptic dyspepsia. 20% perforation of silent ulcer

Of perforation

- **Clinical features:** patient with a history of peptic ulcer, develops sudden sever abdominal pain/nausea/vomiting.
- The Patient is feverish/tachycardic/dehydrated with ileus.
- Abdominal examination reveals peritonitis(R/T/RT).
- A hallmark: free air under the diaphragm on upright chest radiograph (70-75%). يمكن في البدايه ما نشوفها زين او يكون هوا خفيف مره
- **Treatment**: emergency surgery after resuscitation(fluid and electrolyte repletion+ anitbiotics).Choice of surgery is guided by comorbid diseases, and hemodynamic stability during the operation.

Resuscitation doesn't take time (only 3 to 1 hour) and sometimes we can take the patient to the OR and resuscitate while we operate

Emergency surgery is done by laparoscopy. If it failed we do laparotomy.

DU= Omental patch (Graham patch)(will not prevent recurrence) followed by medical treatment? (may be vagotomy+ pyloroplasty in hemodynamically stable patients with less contamination).

We do omental patch fo both gastric and duodenal. The difference is in gastric we take biopsy and sometimes we trim the edges but in duodenal we don't play with it.

GU= Omental patch + biopsy+ H pylori test and treatment if positive. (may be Billroth I gastrectomy in hemodynamically stable patients with less contamination).

2. Bleeding

- 20% of patients with PUD develop bleeding.
- The most common cause of death in patients with peptic ulcer is bleeding in patients with major medical problems or older than 65 years.
- Peptic ulcer disease is the most common cause of UGI bleeding. 80% of bleeding ulcers will stop with conservative measures (self-limited). Duodenum has abundant blood supply and gastroduodenal artery lies directly behind the first part duodenum.
- Hematemesis/melena.
- **The Initial step in the management is resuscitation followed by endoscopy=** tool of choice for UGI bleeding (diagnostic /therapeutic). **Important for all exams (surgery, SMLE, board)**

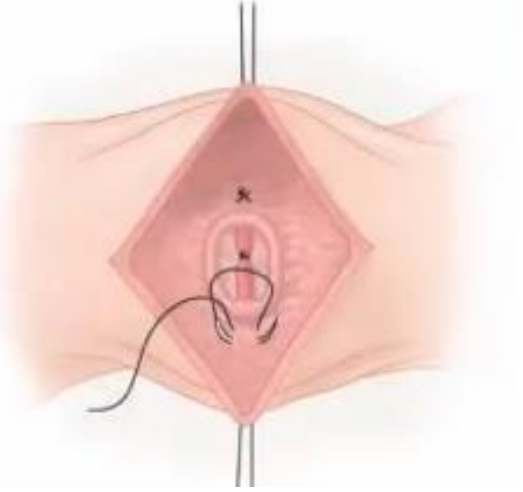
لانه بيكون ميكوزا بس بالبدايه فمن يوم تعطيه الدوا بيتعالج من نفسه

النيزو قاستريك تيوب صح زي ما قلنا لكن لا تعتمدون عليه دايم لانه ما يوصل الديوديتم

- **Mortality** increases with age/severity of initial bleeding/ presence of shock/higher transfusion requirement/bright red blood in NG tube or in the stool/Recurrent bleeding /concomitant disease/Visible vessel seen at the base of the ulcer during endoscopy even intact(55% risk of re-bleeding) /spurter. Spurter: ارتري ينزف ويوقف ينزف ويوقف
- When bleeding is controlled, long-term medical therapy includes PPIs + H. pylori test and treatment if positive.
- If bleeding continues or recurs= surgery(over sewing the ulcer +/- truncal vagotomy+ pyloroplasty)(parietal cell vagotomy is time consuming).
- **For bleeding gastric ulcers, Billroth I gastrectomy is usually performed.** اعتبرو انكم ما قريتوها لان ما نسويها الا اذا مرره ما عرفنا نوقف البليدنق

In case of bleeding, we manage only by endoscope without the need of surgery or laparoscopy or laparotomy except if there are complications like peritonitis. Even in cases of GDA bleeding we can manage by clip (زي الدباسه) and we can cauterize through endoscope. We can do many things through endoscope. So the endoscope is the choice of management in upper GI bleeding and ulcers.

In general, surgery for peptic ulcer bleeding is indicated earlier in older patients because vessels are atherosclerotic (less likely to stop bleeding spontaneously)+ diminished perfusion of the heart, brain and kidneys is less well tolerated
At surgery, the gastroduodenal artery is oversewn+ vagotomy and drainage procedure.



This is a surgical approach you don't need it.
For example, we enter by endoscope and found bleeding in GDA behind the first part of the duodenum and we tried multiple ways to stop the bleeding and all failed so we decided at the end to take the patient to the OR. We open the anterior wall of duodenum then we can see the perforation in the posterior wall and we oversew it.

Usually obstruction happens in pyloric ulcers (because it is narrow), large size ulcers, fibrosed ulcers or malignant ulcers.

3. Obstruction

- Gastric outlet obstruction is manifested by delayed gastric emptying, anorexia, nausea and vomiting.
- Patients are dehydrated+ hypochloremic, hypokalemic metabolic alkalosis. Fluid resuscitation(replacement of chloride and potassium deficiencies)+ nasogastric suction to relieve obstructed stomach.
- Gastric outlet obstruction may be **functional** (acute inflammatory edema) or **organic** (chronic inflammation+ fibrosis and scarring with narrowing of the lumen).
- Stomach becomes massively dilated, rapidly loses its muscular tone. Marked weight loss, malnutrition are also common.

Vomitus: foul/frothy/not bile stained/at the end of the day /not relieving the pain/contain undigested food).

Treatment:

- categorize the patient as acutely or chronically obstructed.
- **Acute obstruction=** treat non-operatively with NGT /IVF /nutritional support/acid suppressive therapy/test and treat H. pylori.
- **Chronic obstruction=** surgery.

Rare

Preoperative: NGT/Correct fluid, electrolyte imbalance/ Anti-secretory therapy/Endoscopy, biopsy.

ما يهم نوع السيرجري
كل سيرجن له طريقته
وفيه خيارات كثيره

Operative: Gastrectomy(**Billroth 1 OR 2?**can be done if easy, Alternatively: truncal vagotomy+ gastrojejunostomy

Gastric emptying

- **Delayed:** truncal vagotomy/diabetes/myxedema/ mechanical gastric outlet obstruction/hypokalemia/ anti-cholinergic or opiate drugs.
- **Rapid:** ZES/retained gastric antrum syndrome/ steatorrhea /massive small bowel resection where there is impaired ability to reduce HCL secretion. Failure of switch-off mechanism to inhibit acid secretion also results in rapid gastric emptying.
- **Acute gastric dilatation** may result in a vasovagal response characterized by marked gastric and abdominal distension. These are clearly demonstrable in an awake patient, But may occur in anaesthetic patient and thus go unrecognized.
- Vomiting, aspiration, hypoxia, or bleeding from erosive stress gastritis may occur.

Zollinger-Ellison syndrome

In some cases of bowel resection (e.g. bypass) HCL will get in high amount in the small bowel, the small bowel will give a rapid movement trying to throw it out

بعض الاحيان اذا نفخت في معده المريض يصير لها Quick fast dilatation vasovagal يدخل في attack وهذا يصير لما حق التخدير يسوي انتيوبيشن للمريض ويجلس ينفخ بالامبو باق وبعض الهوا يروح للمعده فتتمدد خاصه اذا نفخ كميه كبيره فينزل ضغط المريض ويجيه تاكيكارديا لان الفيقس نيرف متربع على المعده وهالشي ما يصير دايم بس ممكن يصير

Zollinger-Ellison syndrome(gastrinoma)

- ❑ A triad of **(Basal gastric acid hypersecretion + severe peptic ulcer (duodenal) disease+ non B islet cell tumor of pancreas or duodenum).**
- ❑ Basal acid secretion is increased above 15 mEq/h
- ❑ **T**hese tumors secrete gastrin and known as gastrinomas.
- ❑ It accounts for 0.1–1% of peptic ulcers

Diagnosis:

- History and physical examination+ Upper GIT endoscopy
- Fasting serum gastrin level(normal 60 pg/mL; in ZES >150 and can be over 1000 pg/mL or 100.000) in patients with **ulcers (refractory/recurrent / multiple /unusual sites).**

The main investigation of gastrinoma is when gastrin is more than 150 and we will be sure when gastrin is more 1000 (there will be no doubt that the patient has gastrinoma)

Not only in duodenum

Because the secretion is in high amount

Gastrin level in ZES

- Gastrin is produced in the antrum(not in the fundus), duodenum, and small intestine. When distal stomach is removed gastrin levels decrease significantly.
- Gastrin stimulates parietal cells to secrete acid and stimulates chief cells to secrete pepsinogen.
- Most patients with gastrinoma have serum gastrin levels> 500 pg/mL. كل ما يزيد القاسترين كل ما كنا متاكدين اكثر
- If mildly elevated (<200–500 pg/mL) a provocation or stimulation test with intravenous cacium or secretin is performed to confirm the diagnosis, Arise of 200 pg/mL after 15 minutes, or a doubling of the fasting level is diagnostic.

يعني لو جانا مريض وكل شوي جاينا بالسر وعطيناه مدكال تريتمنت وبي بي اي ولا نفعت معه ولما سوينا اندوسكوب حصلنا unusual site multiple ulcers وسوينا قاسترين وطلع ١٥٠ فمحنا متأكدين، فايش نصلح ؟ نعطيه IV cacium or secretin ونحسب له القاسترين بعد ١٥ دقيقه اذا لقيناه عالي فمعناته هذا قاسترينوما

- ZES can occur sporadically or as part of multiple endocrine neoplasia (MEN I)
- 25% of ZES patients have MEN 1.
- ZES is due to a true pancreatic tumor in adults, but may be secondary to hyperplasia in children. Growth of the tumor is usually slow and survival is often prolonged.
- If an isolated tumor is found on CAT scan= surgical resection is indicated.
- About 2/3 of these tumors are malignant.

Helicobacter pylori testing

Urea breath test: based upon the ability of H. pylori to convert urea to ammonia and **CO_2**.(96% sensitive – 94% specific). شوفوه باليوتيوب

Patients swallow urea labelled with an isotope(either radio-active carbon 14 or non-radioactive carbon 13). In the subsequent 10–30 minutes, the detection of isotope-labelled **CO_2** in the exhaled breath indicates that the urea was split by urease enzyme secreted by H. pylori present in the stomach.

Mucosal biopsy: (histopathology examinations)(biopsies).

Blood test: serology detect IgG antibody(remain positive for 1 year post treatment)

Stool test (Fecal Ag test): detect protein Ag.

Breath and stool test are more accurate than blood test in detecting active H pylori infection(differentiate active/past infection).

PPIs-Bismuth-Antibiotics can interfere with test accuracy so better to be stopped 2 weeks pre-test)

Treatment :

- In 2005, **Barry Marshall** and **J. Robbin Warren** won the Nobel Prize in medicine for their work on H. pylori and its role in gastritis and peptic ulcer disease.
- 2 weeks treatment by (PPI+ 2 antibiotics)

  = Omeprazole + Clarithromycin + amoxicillin.

Later on, there are many lines chose one line and stick to it
حسب الدراسه اللي تعجبك

Omeprazole: must used for 3 Months
Clarithromycin & Amoxicillin: for 7 days
If we are going to give Flagyl (metronidazole) and remove Clarithromycin we must give it for 14 days

Treatment

Medical treatment (heals in 4-6 weeks).

- **6 weeks then endoscopy.** To confirm
- **Rest: physical-mental.**
- **Bland diet…small frequent meals/avoid heavy meals/avoid irritant food(hot-spicy)/stop smoking, Alcohol, NSAIDs.** To avoid acid secretion stimulation
- **Antacids like aluminium hydroxide.**
- **Anticholinergic xx??.**
- **H2 blockers:CIMETIDINE-Ranitidine- Famotidine.**
- **PPIs: omeprazole.**
- **Sucralfate (gastrofate)**

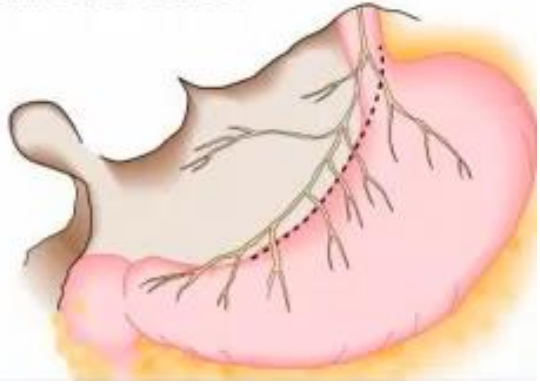
ممكن ما يجيكم باي امتحان وان جاكم بيكون ام سي كيو واحد لكن اعرفوه من باب العلم بالشيء لانها Pure surgical topic

Surgical Procedures for Peptic Ulcer Disease

Vagotomy

1. Truncal Vagotomy with Drainage Procedures (Dragstedt 1948) (pyloroplasty Vs gastrojejunostomy)(40% of cases have gastric stasis).
2. Selective vagotomy with drainage procedures.
3. Highly Selective Vagotomy (parietal cell vagotomy).lower complications but higher recurrence rate.

Taylor procedure:
posterior truncal vagotomy+ anterior seromyotomy **to avoid proximal(criminal) nerve of grassi.**



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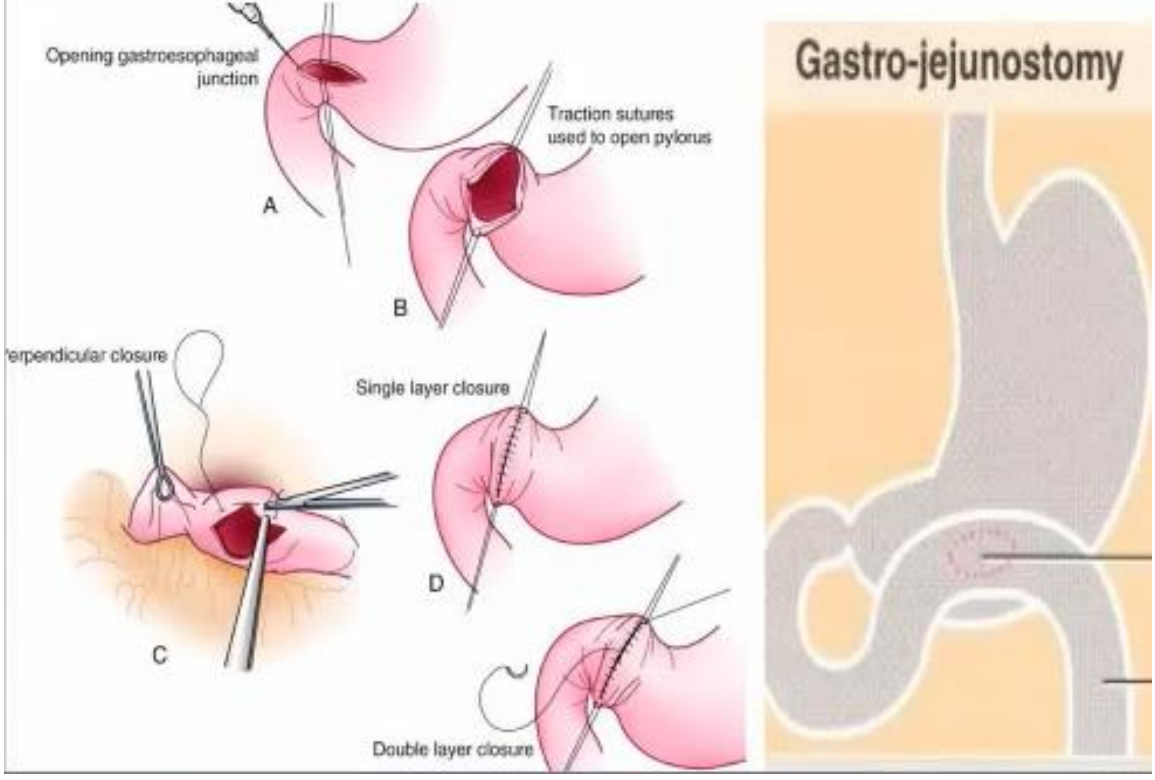
Heineke-Mikulicz pyloroplasty Vs gastro-jejunostomy



Pure surgical topic

Gastrectomy

Billroth1:

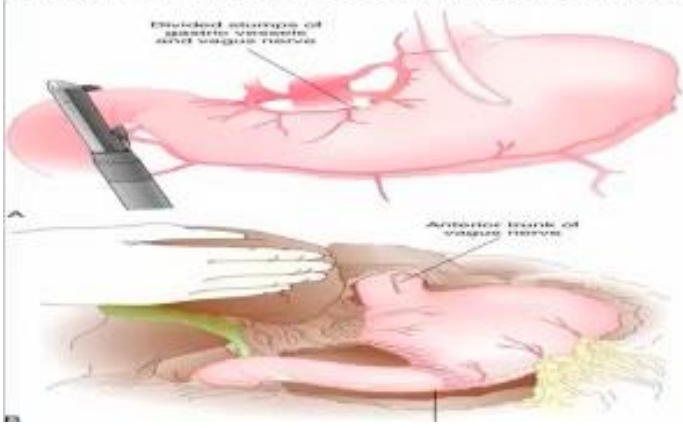
Hemigastrectomy + gastroduodenal anastomosis. for GU??

Billroth II:

Hemigastrectomy+ side to side gatrojejunostomy.

if end to side anastomosis = polya gastrectomy.

Polya with hofmeister valve to avoid reflux alkaline gastritis.



Postoperative Complications of Peptic Ulcer surgery

- Early complications :afferent loop obstruction /efferent loop obstruction /bleeding/stomal obstruction/duodenal stump blow-out
- Post-Vagotomy complications. + Gallstones
- Malignant transformation
- Post-gastrectomy Syndromes: Dumping syndrome/ metabolic

الدمبنق سندروم يجي بعد عمليات المعده وتختلف من عمليه الى اخرى وغالبا نشوفها مع مرضى البابياس

Dumping Syndrome

- Symptoms follow ingestion of a meal when portion of the stomach has been removed or normal pyloric sphincter mechanism has been disrupted.
- Dumping syndrome exists in either late or early forms, early form is more frequent.

❑ Early dumping(hypovolemia):

- Within 30 minutes following ingestion of a meal .
- Gastrointestinal symptoms: nausea/vomiting/epigastric fullness/Eructation/cramping abdominal pain/explosive diarrhea due to afferent loop distention by bile-pancreatic juices
- Cardiovascular symptoms :palpitations/tachycardia/ diaphoresis/fainting/dizziness/ flushing/blurred vision.

- This is because gastrectomy or interruption of pyloric sphincteric mechanism . The stomach can not prepare its contents or deliver them to the proximal bowel as small isotonic particles.
- Resultant hypertonic bolus passes to small intestine, induces rapid shift of intravascular fluid into the intestinal lumen to achieve isotonicity.
- Following this shift of extracellular fluid, luminal distention occurs and induces autonomic responses listed earlier.
- Dietary measures are usually sufficient to manage these patients.

يقصد هنا اننا في الايرلي دمبنق اول ما ياكل المريض احيانا تكون حركه الطعام من المعده للامعاء غير منظمه لان ممكن نكون شلنا البايلورس او سوينا انستموسيز بين المعده الامعاء فممكن الاكل ينزل على طول ومعه القاسترك سكريشن

So the bowel instead of shifting fluids from intra-lumenal to the extra-lumenal it will happen in the opposite way so the bowel will start to be in hyper movement and the patient will have these symptoms (hypovolemia, explosive diarrhea ...)

One of the main cause of death (but of course it is rare)

Late Dumping: pancreatico-cibal asynchronism (HYPOGLYCEMIA)

Starts 2 hours (1-3) after meal. Mimics diabetes

- Due to rapid gastric emptying. carbohydrates are delivered to the small intestine, quickly and absorbed, resulting in hyperglycemia . That triggers the release of huge amounts of insulin. This results later in profound hypoglycemia.
- This activates adrenal gland to release catecholamines, which results in diaphoresis, tachycardia, confusion.
- These patients are advised to ingest frequent dry small meals with low carbohydrate.

المقصد ان العاده الغذائيه بعد عمليات المعده تخلي المريض يدخل في دمبنق سواء ايرلي او ليت او لا، فلازم نقول للمريض انه ما يجمع بين الاكل والشرب وتاكل اكل خفيف ووجبات صغيره، هذا لمرضى البايباس اللي يجيهم دمبنق، طيب ايش دخل البيتك السر في الدمبنق؟ لان حنا نعالج البيتك السر بعض المرات سيرجكال والدمنبنق من الكومبلكيشنز حقتها

Metabolic disturbances

Anemia: **Iron deficiency anemia:** due to

- ❑ Decreased intake.
- ❑ Impaired absorption(site of absorption=duodenum) is bypassed(Billroth 1or 2??)/no binding to gastroferrin protein/An acid environment is necessary to release ferric ion from food and make it available for absorption in the small intestine.
- ❑ Chronic subclinical blood loss due to hyperemic, friable gastric mucosa connected to small intestine(Stoma).

Treatment: Iron supplements.

Megaloblastic anemia: Vitamin B12 deficiency due to poor absorption /lack of intrinsic factor secretion. from the stomach

treatment: IM injection of cyanocobalamin .

If the food has no enough acidic environment and not going through the duodenum, the patient may suffer from iron deficiency anemia. Most of Saudi people has IDA especially obesity patients and females. So if obese patient or female patient underwent any gastric surgery bypassing the duodenum and has no enough acidic environment, it is better to start him/her on iron supplement.

Metabolic disturbances

.Osteoporosis,osteomalacia: ca deficiency (duodenal absorption bypassed)

- Impaired absorption of fat, steatorrhea post Billroth II gastrectomy as a result of inadequate mixing of bile salts and pancreatic lipase with ingested fat because of duodenal bypass.

  Treatment: pancreatic replacement enzymes.

Efferent loop obstruction

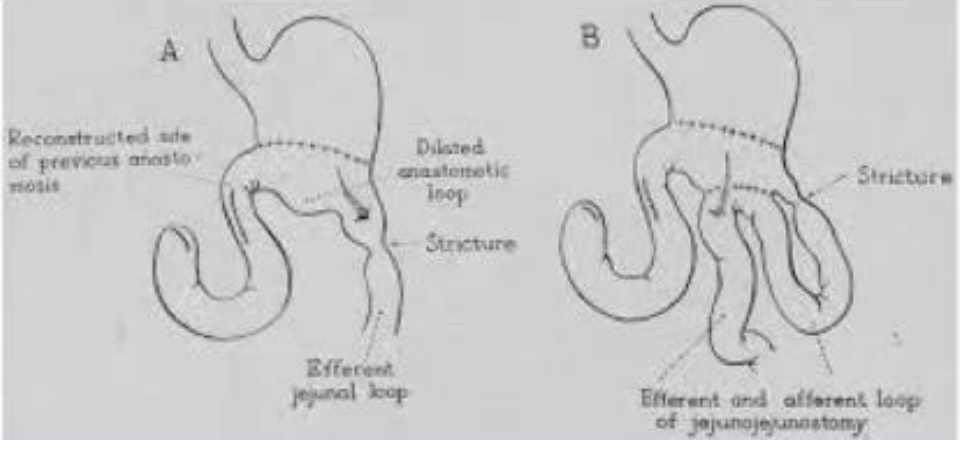
Commonest causes of efferent loop obstruction:

***Herniation of the limb behind the anastomosis.**

***Stomal edema.**

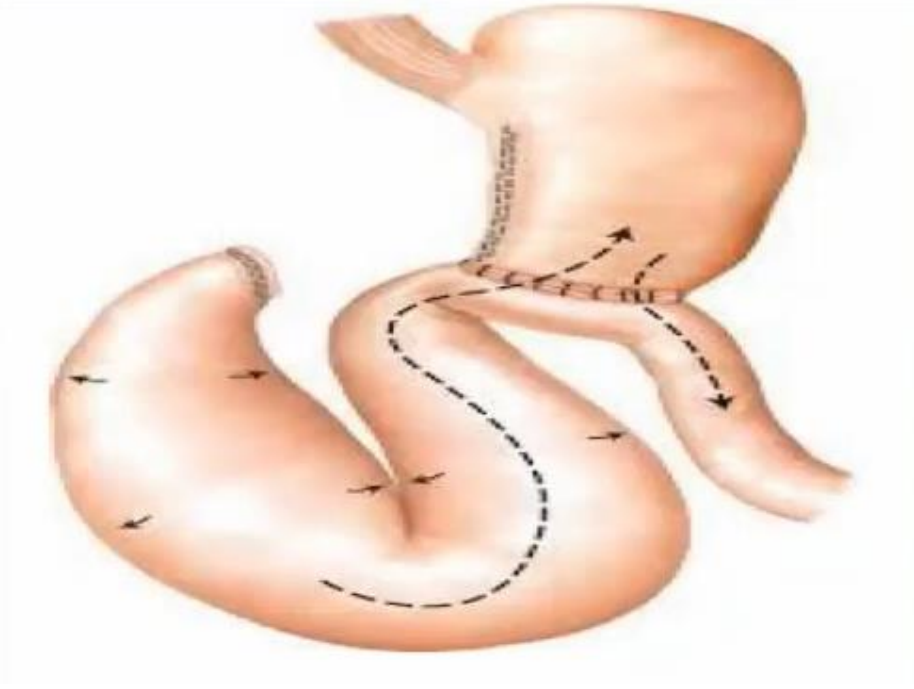
***Jejuno-gastric intussusception.**

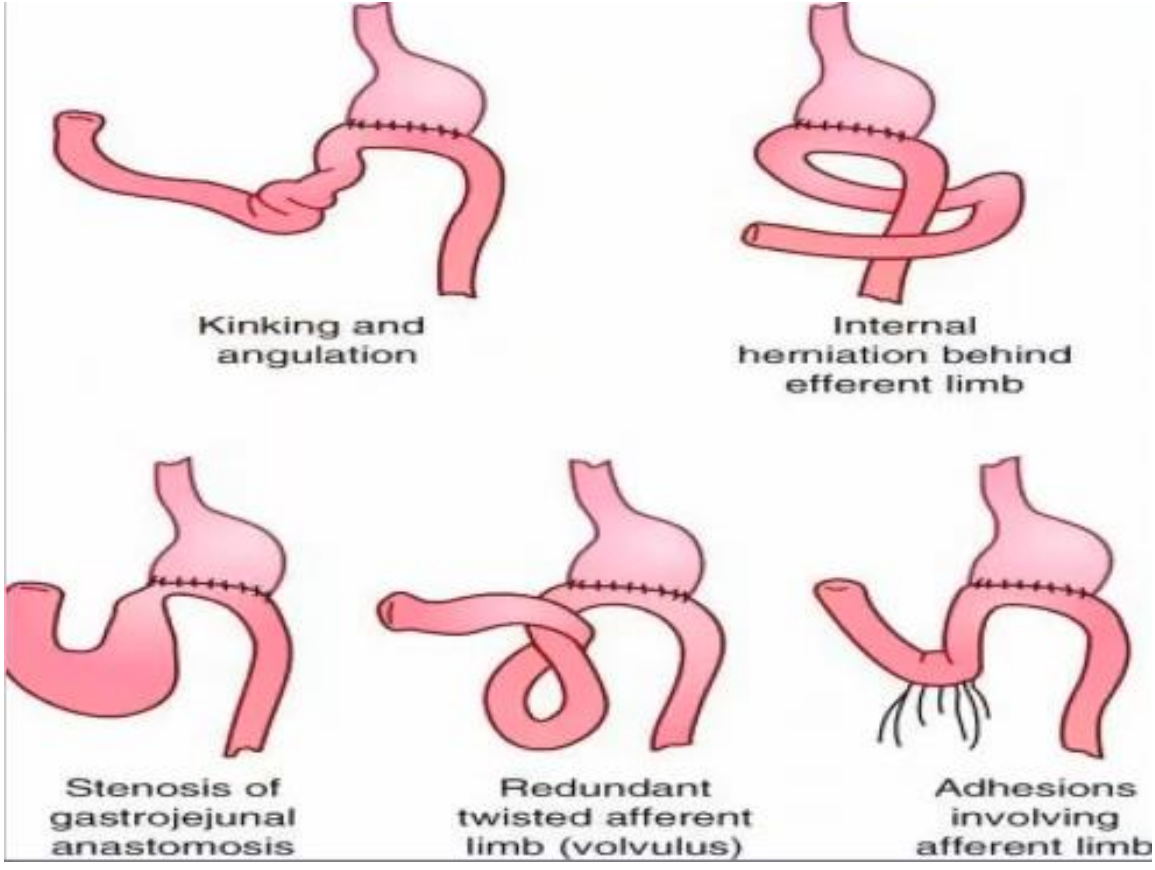
Surgery is necessary: reduce retro-anastomotic hernia and close retro-anastomotic window to prevent recurrence



Afferent loop syndrome

- Longer afferent limb more than 30 cm.
- Following obstruction of the afferent limb, accumulation of pancreatic-biliary secretions(in response to food ingestion) within the limb, resulting in its distention causing epigastric discomfort and cramps.
- In partial obstruction, intraluminal pressure increases to forcefully empty its contents into the stomach, results in a projectile bilious vomiting that offers immediate relief of symptoms. But NO food contents within the vomitus.
- In complete persistent obstruction: blind loop syndrome/ duodenal stump blow out/pancreatitis.
- Surgery is indicated(mechanical problem/not functional): enteroentrostomy.




Kinking and angulation
Internal herniation behind efferent limb
Stenosis of gastrojejunal anastomosis
Redundant twisted afferent limb (volvulus)
Adhesions involving afferent limb

Post-vagotomy complications

1.Diarrhea

- Approximately 30% of patients suffer from diarrhea after gastric surgery. it is mild(rarely fulminant) and disappears within 4 months.
- May be due to dumping syndrome/vagotomy due to drainage procedure so more with truncal than selective or highly selective Vagotomy.
- Post-vagotomy diarrhea usually resolve over time. If not, cholestyramine (chelates bile salts and renders them unabsorbable) decreases the severity of diarrhea.

احيان في عمليات الاوبيزيتي او الهياتال هيرنيا نقطع الفيقس نيرف فتصير معنا هذي الكومبلكيشن

2. Gall stones due to denervation.

Malignant transformation

- Gastrectomy or vagotomy with drainage are independent risk factors of gastric cancer(four folds risk)(10 years).
- Reflux alkaline gastritis(Bile) and gastric cancer(intestinal metaplasia)are linked.
- Highly selective vagotomy does not have increased risk.

هذي الثلاثه
احفظوها دائما

Cushing's ulcer: PUD/gastritis with neurologic trauma or tumor.

For example: patient came to the ER with trauma and developed ulcer days after. This is cushing's ulcer caused by stress

Neurologic trauma is stasis of acid causing ulcer or tumor that can cause obstruction or hyper acidity or stress in general.

Curling's ulcer: PUD/gastritis with major burn injury.

Marginal ulcer: ulcer at the margin of GI anastomosis (stoma).

هذي لما نسوي عمليه بايباس مثلا والاسيد على طول ينزل في الباول تحته بدون بايكارب او اي شي فيصير السر هناك نسميها المارجنال السر

Cushing's ulcer > with stress, trauma or tumor
Curling's ulcer > with major burn injury
Marginal ulcer > in the anastomoses between stomach to bowel

Ménétrier's disease-hypertrophic gastritis

Rare, characterized by gross hypertrophy of gastric mucosal folds+ mucus production+ hypochlorhydria + GI protein loss

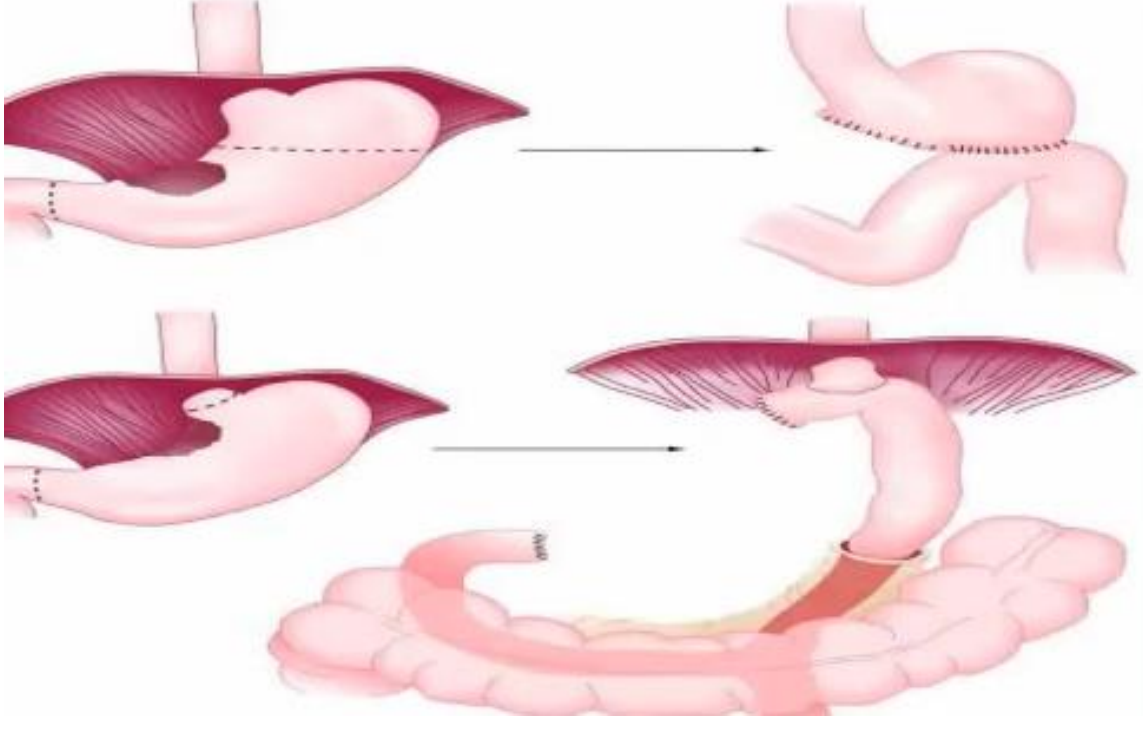
Pre-malignant?.

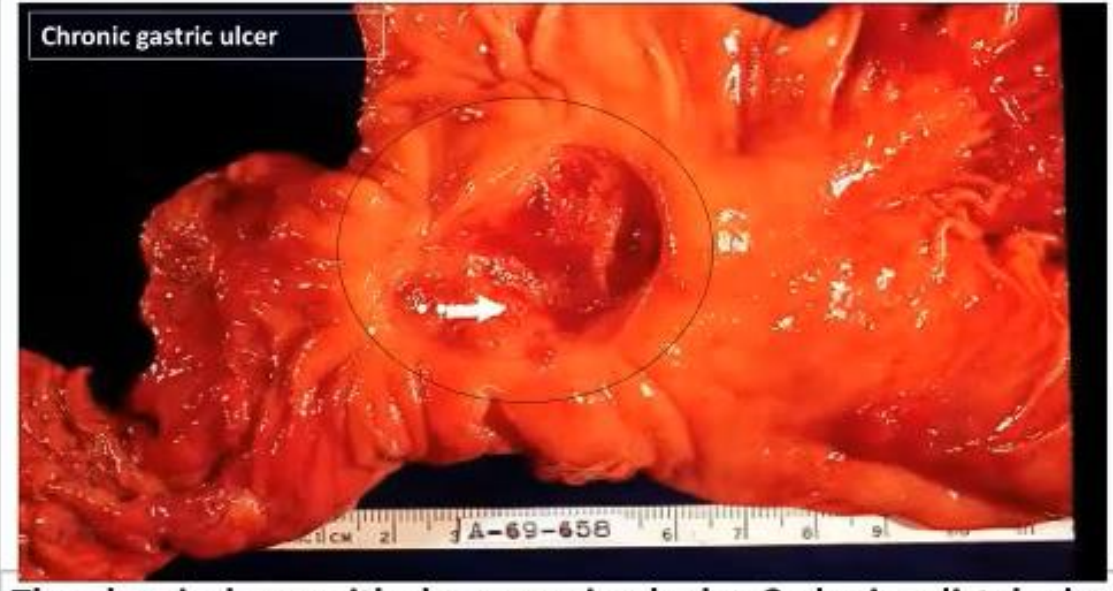
Presentation: hypoproteinemia and anemia.

Treatment i: maintain adequate nutrition+ gastrectomy to prevent cancer developing.

Caused by over expression of transforming growth factoralpha (TGFα).

Gastrectomy



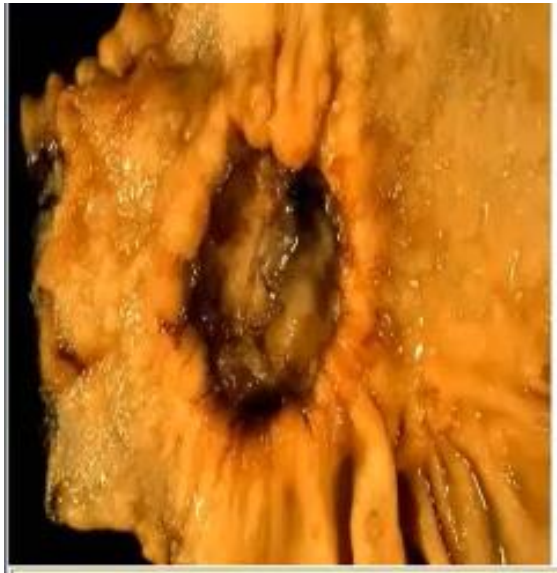


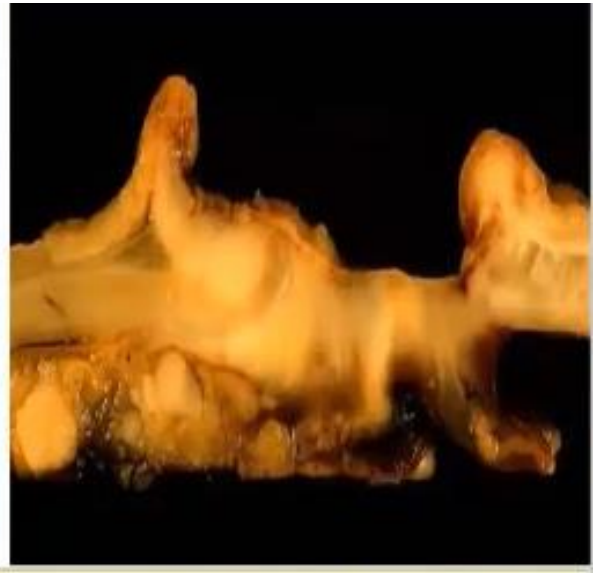
The ulcer is deep, with sharp proximal edge & sloping distal edge

The arrow points to eroded gastric artery which has caused fatal hemorrhage

What are the complications of chronic gastric ulcer?

Bleeding, perforation and obstructing





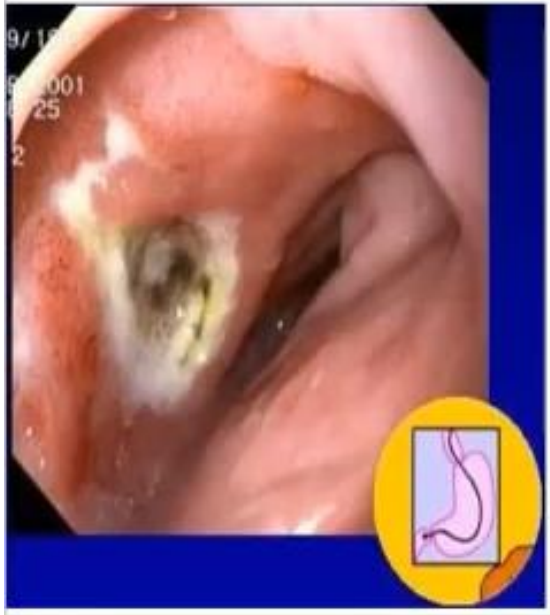
Malignant gastric ulcer (Adenocarcinoma)

The left view: ulcer is suspicious.

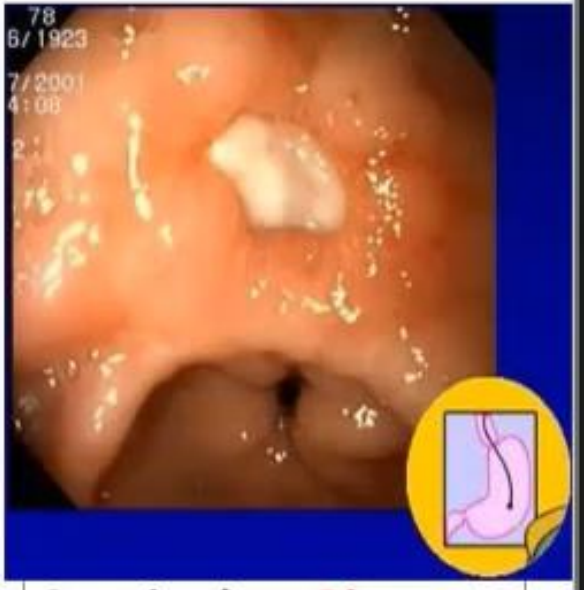
Longitudinal section: pylorus is to the left. Edges are everted
Several metastatic nodes within the lesser omentum.

Investigations for suspected peptic ulcer

Gastro-duodenoscopy is the most sensitive investigation



Duodenal ulcer



Gastric ulcer, Biopsy

Barium meal –2 duodenal kissing ulcers

Two well-defined filling excesses facing each other on the opposite contour of the duodenal bulb (arrows)