



## Gastric and Duodenal Diseases

430 Surgery Team

- Green: Team notes
- Blue: Additional notes
- Red: Important notes

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In acknowledgement of Abdulaziz AlZahrani's notes

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## Introduction

### ❖ Anatomy of the Stomach and Duodenum:

#### ▪ Stomach:

The stomach is an easily distensible viscus partly covered by the left costal margin.

- Anterior surface: Diaphragm and Left lobe of the liver
- Posterior surface (stomach bed) is formed by: Diaphragm, Spleen, Left adrenal, upper part of the left kidney, splenic artery and Pancreas.

On its sides there are the Greater and Lesser curvatures which correspond to the long and short borders of the stomach respectively.

The stomach is divided into 4 areas (based on the microscopic mucosal appearance):

1. Cardia [**\*Clinical importance: Barrett's Esophagus and reflux**].
2. Fundus (When it's distended, it signals to the brain that the body needs food and your brain will generate signals to make you feel hungry)
3. Body (The function of the body of the stomach is the storage and secretion of acid)
4. Antrum

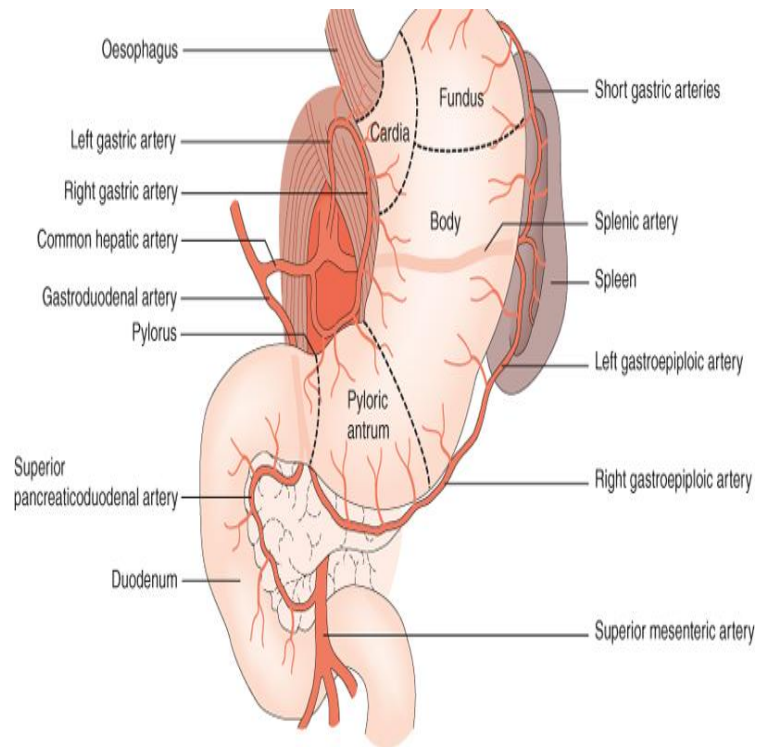
The stomach is surrounded by 2 sphincters:

1. The upper or proximal sphincter "Lower esophageal sphincter": it is a physiological sphincter that prevents stomach contents from regurgitating into the esophagus
2. The lower or distal sphincter "Pylorus": it is a true anatomical sphincter, which is composed of greatly thickened inner circular muscle and it helps to regulate the emptying of the stomach contents into the duodenum

- \* **Blood Supply:** The stomach has an extensive blood supply derived from the **Coeliac axis**. The arteries of the stomach arise from the Common hepatic artery (Right gastric artery), Celiac artery (Left gastric artery), Gastrooduodenal artery (Right gastroepiploic artery) and the Splenic artery (Left gastroepiploic artery and Short gastric artery)

The arterial supply:

- The Lesser curvature is supplied by: **Left gastric artery** (Superiorly) and the **Right gastric artery** (Inferiorly)
- The Cardiac region of the stomach is supplied by: **Left gastric artery**
- The Greater curvature is supplied by the **Left gastroepiploic artery** (Superiorly) and **Right gastroepiploic artery** (inferiorly)



- The Fundus of the stomach and the upper part of the Greater curvature is supplied by the **Short gastric artery** which arises from the splenic artery

The venous drainage:

The veins from the stomach accompany the arteries and drain into the portal venous system

\* Lymphatics:

The lymphatics of the stomach accompany the arteries and drainage is to nodes around these vessels. Thereafter, drainage is to other groups around the aorta, liver, splenic hilum and pancreas, and then to the celiac nodes.

\* Nerve supply:

- a. The parasympathetic nerve supply to the stomach is derived from the anterior and posterior **vagal trunks**. These pass through the diaphragm with the esophagus. The Anterior trunk supplies: Liver, Gallbladder and descends along the lesser curvature.

The Posterior trunk gives off a celiac branch and descends along the lesser curvature of the stomach, going on to supply the Pancreas, Small intestine and Large intestine till the distal transverse colon.

The parasympathetic system supplies the stomach with:

- Motor fibers to the stomach wall
- Inhibitory fibers to the pyloric sphincter
- Secretomotor fibers to the glands of the stomach

- b. The sympathetic fibers accompany the gastric arteries to reach the stomach from the celiac ganglion. These provide motor fibers to the Pyloric sphincter.

▪ **Duodenum:**

The duodenum is divided into 4 parts, which are closely applied to the head of the pancreas.

The four parts:

- 1- The 1<sup>st</sup> part of the Duodenum:

- 5 cm in length
- **Most common site for peptic ulceration to occur**

- 2- The 2<sup>nd</sup> part of the Duodenum:

- Its medial wall is associated with the Ampulla of Vater, where the conjoined pancreatic duct and common bile duct deliver their contents to the Gastrointestinal tract
- **If the ampulla is obstructed, it might result with Obstructive jaundice or**

**Periampullary cancer**

- 3- The 3<sup>rd</sup> part of the Duodenum

- 4- The 4<sup>th</sup> part of the Duodenum (**Ligament of Treitz**)

} These parts pass behind the transverse mesocolon into the infracolic compartment

\* Blood Supply:

The arterial supply:

The blood supply to the duodenum is derived from both the celiac axis (via gastroduodenal artery) the superior mesenteric artery.

**Superior mesenteric artery syndrome**

The obstruction of the 3<sup>rd</sup> part of the duodenum by the superior mesenteric artery

- Proximal to the 2<sup>nd</sup> part of the duodenum (approximately at the major duodenal papilla – where the bile duct enters) the arterial supply is from the **Gastroduodenal artery** and its branch the **Superior pancreaticoduodenal artery**.
- The 3<sup>rd</sup> and 4<sup>th</sup> part of the duodenum are supplied by the **Inferior pancreaticoduodenal artery** which is a branch from **Superior mesenteric artery**.

The venous drainage:

The veins from the duodenum accompany the arteries and drain into the portal venous system.

\* Lymphatics:

The lymphatics of the duodenum drain into the nodes located at the **celiac axis** and **superior mesenteric vessels**.

\* Nerve Supply:

The duodenum receives a sympathetic and parasympathetic supply from the celiac and superior mesenteric plexuses

❖ **Physiology of the Stomach and Duodenum:**

▪ **Gastric Motility:**

- Food passes from the esophagus into the stomach, where it gets stored and partially digested.
- As the food enters the stomach, the muscles in the stomach walls relax and intragastric pressure rises slightly, this is known as “Receptive relaxation”
- Receptive relaxation is mediated by the vagus nerve
- The receptive relaxation is followed by muscular contractions that increase in amplitude and frequency.
- The contractions start in the fundus and move to the body and antrum
- The main role of the antrum in digestion is grinding of food and propulsion of small amounts (chyme) into the duodenum when the pyloric sphincter relaxes
- Antrum has 2 main functions:
  1. Hormonal: Secretion of Gastrin through G cells
  2. Motility: Contracts to open the pylorus and send the food to the duodenum

Gastric emptying is controlled by 2 mechanisms:

1. Hormonal Feedback: Fat in the chyme is the main stimulus for the production of a number of hormones, the most powerful being Cholecystokinin, which exerts a negative feedback on the stomach, decreasing its motility.
2. Neural reflex “Enterogastric reflex”: initiated in the duodenal wall, and this further slows stomach emptying and secretion

▪ **Gastric Secretions:**

Gastric secretion is divided into 3 phases:

1. Cephalic (neural) phase: signals arise in the cortex or appetite centers, triggered by the sight, smell, taste and thought of food, and travels down the vagus nerves to the stomach.
2. Gastric phase: Food (especially protein) causes acid release which is controlled by a negative feedback mechanism dependent upon the pH of the stomach.

The gastric phase accounts for the greatest part of daily secretion, approximately 1.5 litres.

3. Intestinal phase: The presence of food in the duodenum triggers the release of a number of hormones, including duodenal gastrin. These exert a positive feedback effect on the stomach, causing a small increase in gastric secretion.

Mucus is produced by all regions of the stomach, it has 2 important functions:

- 1) It serves as a lubricant and it protects the surface of the stomach against the powerful digestive properties of acid and pepsin
- 2) Bicarbonate ions are secreted into the mucus gel layer and this creates a protective buffer zone against the effects of the low pH secretions

The Parietal cells in the stomach are responsible for the production of **acid**. This is stimulated by the Acetylcholine from the vagus nerve or Gastrin from the antrum.

Somatostatin, gastric inhibitory peptide and vasoactive intestinal peptide inhibit acid secretion.

**Intrinsic factor** is also produced by the parietal cells. It is a glycoprotein that binds to Vit. B12 present in your diet and carries it to the terminal ileum. Here specific receptors for intrinsic factors exist and the complex is taken up by the mucosa. Intrinsic factor is broken down and Vit. B12 is then absorbed into the blood stream.

**Pepsin** is a proteolytic enzyme produced in its precursor form, Pepsinogen. It is secreted by the peptic cells present in the body and fundus of the stomach.

Pepsinogen production is stimulated by Acetylcholine from the vagus nerve. Pepsinogen is then activated to Pepsin by the acid produced in the stomach.

#### Alkaline mucus

The Alkaline mucus is produced in the duodenum and small intestine, where it has a similar function of mucosal protection.

## Diseases of the Stomach and Duodenum

### ❖ Peptic ulcer:

- Sites:

Ulceration can occur at a number of sites, including:

- Esophagus
- Stomach
- Duodenum
- Jejunum (following a gastrojejunostomy)
- Ileum (This occurs very rarely and usually associated with a Meckel's diverticulum containing ectopic acid-secreting gastric mucosa)

- Epidemiology:

- Men are affected three times as often as women
- **Duodenal ulcers are Ten times more common than gastric ulcers in young patients**
- In the older age groups the frequency is about equal

- Clinical presentation:

- Pain
- Bleeding (This is a sign of a complicated ulcer, it means that either perforation or obstruction have occurred)

#### Presentation of most stomach and duodenal diseases:

- Epigastric pain (The commonest cause is ulcer)

Another cause of pain is the complications of ulceration which are: Obstruction and Perforation)

- Vomiting
- Bleeding

*\*Note: Pain is a sign NOT a symptom*

- Perforation
- Obstruction

We will discuss 2 main types of peptic ulcer; Duodenal Ulcer and Gastric Ulcer.

#### A. Duodenal Ulcer:

- Pathology and Epidemiology:
  - Duodenal ulcers usually occur in the 1<sup>st</sup> part of the duodenum and 50% occur in the anterior wall. (95% in duodenal bulb [2 cm])
  - They may be acute (ulcers with a history of less than 3 months with no evidence of fibrosis) or chronic
  - Duodenal ulcers are usually benign, they are very rarely malignant
  - Common in young – middle-aged males
  - Normal or increased acid secretion
- Etiology:
  1. Helicobacter Pylori (GNCB aerophilic): It is detected in 95% of patients with Duodenal ulcer
  2. NSAIDs (not very common to cause duodenal ulcer, it is of greater importance in gastric ulcer)
  3. Smoking (more important in gastric ulcers): It delays ulcer healing and increases the risk of developing complications
  4. Genetic factors: First-degree relatives of patients with a duodenal ulcer are at increased risk of developing a duodenal ulcer themselves
  5. Zollinger-Ellison Syndrome
  6. Other Factors; e.g. People with O blood group, hyperparathyroidism, etc.
- Clinical Features:
  - Well-localized epigastric pain (mid-day, noon and night)
  - Pain when hungry, and is relieved by food
- Diagnosis:
  - EGD (Esophageo-gastro-duodeno-scopy)
  - Contrast meal (Is used when either endoscopy is contraindicated or complications of the ulcer have occurred)
  - Ultrasound (may be useful to exclude coexistent pathology)
  - Gastric analysis: Basal vs. Maximal (not practical and isn't used nowadays)
  - Gastrin serum levels: Severe or Refractory (It is secreted by either Food contact, Neurogenic or Hormonal stimulation)
- Treatment:
  1. Medical Treatment (80% in 6 weeks)

#### Imaging

-If the patient has an ulcer only, we do an endoscopy to confirm diagnosis

-If patient suffers from perforation, an X-ray must be performed immediately and the patient is taken to the OR

#### Differentiation between Duodenal and Gastric ulcer

It is usually impossible to differentiate between the pain of gastric ulceration and that of duodenal ulceration from clinical presentation alone



- a. H<sub>2</sub> antagonist (e.g. Zantac): They competitively inhibit histamine at the target cell receptor and can decrease acid secretion up to 80%
  - b. Proton pump inhibitors (e.g. omeprazole): The best and they are powerful inhibitors of acid secretion
  - c. Antibiotics (e.g. Amoxicillin): For H.pylori eradication
2. Surgical Treatment (it has been limited to patients in whom complications have occurred or to block Hormonal stimulation)
  - a. Vagotomy (It is done to reduce acid secretion and pain)
  - b. Antrectomy and vagotomy
  - c. Subtotal gastrectomy (To remove most the gastric acid production)

## B. Gastric Ulcer:

- Pathology and Epidemiology:
  - Gastric ulcers usually occur in the lesser curvature in the distal half of the stomach
  - In 10% of patients, gastric and duodenal ulcers may coexist
  - Gastric ulcers generally run a chronic course
  - Gastric ulcers may be benign or malignant
  - **Common in 40-60 years male (Gastric ulcer is more prevalent with older age)**
  - It occurs more in Females
- Types:
  1. In incisura angularis with normal acid
  2. **Prepyloric and DU with high acid** [The most common type]
  3. In the Antrum due to NSAIDs
  4. At the Gastroesophageal junction (GEJ)
- Etiology:
  1. Helicobacter pylori: is found in approximately 75% of cases of gastric ulcers
  2. NSAIDs: By inhibiting prostaglandin synthesis, NSAIDs damage the gastric mucosa and are implicated in 30% of gastric ulcers
  3. Smoking (same act as in Duodenal ulcer)
  4. Genetic Factors: First-degree relatives of patients with gastric ulcers are at increased risk of developing gastric ulcers
  5. Zollinger-Ellison Syndrome
  6. Other factors (similar to the ones mentioned in duodenal ulcer)
- Clinical Features:
  - Epigastric pain
  - The pain occurs during eating and is relieved by vomiting (Patient might lose weight)
- Diagnosis:
  - EGD-scopy with **biopsy** (Biopsy is important here to exclude malignancy)
  - Contrast swallow (filling defect)
- Treatment:

### CBC in Peptic Ulcer

The full blood count in pt with a chronically bleeding ulcer may indicate iron-deficiency anemia



1. Medical Treatment (Similar to the ones mentioned in duodenal ulcer)

2. Surgical Treatment:

- a. Malignant ulcers: The extent and type of resection will be determined by the position of the ulcer within the stomach and its suspected malignant potential
- b. Benign distal ulcers:
  - Billroth I gastrectomy: Distal part of the stomach is removed and the proximal stump anastomosed to the duodenum.
  - Polya-type reconstruction: is done for more proximal ulcers, where it involves anastomosis of the gastric remnant to the jejunum

This is why we try to limit the use of surgical treatment for ulcers

#### If perforation is found

- Duodenal ulcer perforation: surgical treatment is close it.
- Gastric ulcer perforation: surgical treatment, we don't just close it, we have to **excise** it first and send it to confirm presence of cancer cells.

#### \* Complications of surgical treatment for peptic ulcers (both duodenal and gastric):

1. Early complications: Leakage, bleeding and retention
2. Late complications:
  - a. Recurrent ulcer (marginal, stomal, or anastomotic ulcers)
  - b. Gastrojejunocolic and gastrocolic fistula
  - c. **Dumping syndrome** (The food passes quickly to the duodenum)
  - d. Alkaline gastritis
  - e. Anemia (Iron deficiency and vit.B12 deficiency [pernicious anemia])
  - f. Post-vagotomy diarrhea
  - g. Chronic gastroparesis
  - h. Pyloric obstruction/ stenosis

#### □ Complications of Peptics ulcers:

- I. Pyloric obstruction: (**Dull epigastric pain & Projectile vomiting of large volumes of undigested food matter**)
  1. Medical treatment (must make sure pt is taking their medication even if the pain stops)
  2. Surgical treatment
- II. Perforation:
  - Occurs in acute ulcers (duodenal mostly)
  - On the anterior wall of the duodenum (duodenal ulcer)
  - If an old aged female presents with perforation, it is usually due to a gastric ulcer not duodenal
  - Acute onset of **severe unremitting epigastric pain**
  - Diagnosis: X-ray will demonstrate free air under the diaphragm [which means air in the peritoneum which indicates that there is perforation of the viscus] (85%) and fill 400 cc of air by the Nasogastric tube (NGT) [**Never do gastroscopy**]

#### To check for Anemia

- Do MCV and MCH:
- In iron deficiency anemia: Microcytic Hypochromic.
  - In Vit. B12 deficiency: Macrocytic Hyperchromic [Pernicious]

#### Dumping Syndrome:

**Gastric dumping syndrome**, or **rapid gastric emptying** is a condition where the ingested food bypass the stomach too rapidly and enter the small intestine largely undigested. It happens when the upper end of the small intestine, the duodenum, expands too quickly due to the presence of hyperosmolar food from the stomach.

#### Clinical presentation:

- Tachycardia
- Flushing
- Sweating
- Colicky pain
- Hypoglycemia and may lead to fainting (seen more in late dumping)

- Treatment: Always starts with the ABCs when a pt comes to the ER with a perforated ulcer. If perforation is confirmed, emergency surgery should be performed to close the perforation. (Duodenal ulcer perforation: Simple closure & omental patch, followed by eradication therapy. Gastric ulcer perforation: first take a biopsy than simple closure and omental patch is the treatment of choice)

#### ❖ Zollinger – Ellison Syndrome:

- Results with peptic ulcer disease (often severe) in 95%
- **Gastric hypersecretion**
- Elevated serum gastrin
- Single gastrinoma is usually malignant
- If multiple gastrinomas are present, it is usually benign (MEN 1 = Multiple endocrine neoplasia syndrome \*Gastrinoma, pituitary adenoma and parathyroid tumor)
- To diagnose it we usually check Gastrin levels, if it is more than 500 pg/ml,
- **C T Scan** (to localize the tumor and its metastasis), somatostatin scan
- Portal vein blood sample
- Pts present with Diarrhea (steatorrhea, due to the inactivation of the pancreatic lipase) and severe persistent epigastric pain.
- Treatment:
  1. Medical treatment: Acid control
  2. Surgical treatment: Distal hemi-gastrectomy and Ulcer excision (to localize and remove the tumor)

#### ❖ Upper Gastrointestinal Bleeding:

- Clinical Presentation:
  - Hematemesis (vomiting blood)
  - Melena
  - Hematochezia (fresh rectal bleeding) [Occurs very rarely]
- Causes:

Causes	Relative incidence
<b>Common Causes:</b>	
Peptic ulcer	45%
Duodenal ulcer	25%
Gastric ulcer	20%
Esophageal varices	20%
Gastritis	20%
Mallory- Weiss Syndrome	10%
<b>Uncommon Causes</b>	
Gastric carcinoma	5%
Esophagitis	
Pancreatitis	

#### Bleeding site in duodenal ulcer:

When bleeding (upper GI, presents with vomiting blood) is seen, we suspect the ulcer to be in the posterior wall of the 1<sup>st</sup> part of the duodenum. Perforation occurs in the anterior wall's ulcer, bleeding more commonly occurs in the posterior ulcer mainly due to the Gastroduodenal artery that lies behind the 1<sup>st</sup> part of the duodenum.

#### Melena

Is the passage of black tarry stool that has a very characteristic smell.

It results from the digestion of blood by enzymes and bacteria

#### Lower GI bleeding

When pt presents with lower GI bleeding, we must insert NGT, if blood comes out, the source of the bleeding is in the upper GI tract

## Hemobilia

### Duodenal diverticulum

- Management:

1. Resuscitation
2. Detection and endoscopic treatment (If the cause is an ulcer we can either put a clip on it, burn it, use a rubber band or injection of a sclerosing agent to form a clot and stop the bleeding)
3. Surgical management

#### Esophageal Varices Treatment:

Any upper GI bleeding first we start with the ABCs. Then to investigate we do **endoscopy** to identify cause of bleeding then we can either clip it or use a rubber band, but never burn it

❖ **Mallory – Weiss Syndrome:** (Also known as: Gastro-esophageal laceration syndrome)

- refers to upper GI bleeding from tears (a Mallory-Weiss tear) in the mucosa at the junction of the stomach and esophagus, usually caused by severe retching, coughing, or **forceful vomiting**.
- Accounts for 10% of UGIB cases (Upper Gastrointestinal Bleeding)
- 1-4cm longitudinal tear in gastric mucosa at EGJ (Esophageogastric junction)
- EGD (Esophageo-Gastro-Duodenoscopy) is done to confirm diagnosis
- 90% of bleeding stops spontaneously. **We start with the ABCs (after the NGT we do a cold gastric wash to induce vasospasm to stop the bleeding) and give him fluid and blood and the bleeding will usually stop by itself. If it doesn't stop, we perform a gastroscopy, if the tear is small we can burn it, if not it will need surgical intervention.**
- **Common in young-aged drinkers**
- Tear is usually located in the distal esophagus, esophageal junction or in the first 2 cm of the cardia of the stomach

#### Treatment of Mallory – Weiss Syndrome:

Treatment is usually supportive as persistent bleeding is uncommon. However cauterization or injection of **epinephrine** to stop the bleeding may be undertaken during the index endoscopy procedure. Very rarely embolization of the arteries supplying the region may be required to stop the bleeding. If all other methods fail, high gastrostomy can be used to ligate the bleeding vessel. It is to be noted that the tube will not be able to stop bleeding as here the bleeding is arterial and the pressure in the balloon is not sufficient to overcome the arterial pressure.

❖ **Stress Gastroduodenitis, Stress Ulcer & Acute Hemorrhagic Gastritis:** (Definitions only)

1. Stress ulcer: Ulcer due to shock or sepsis
2. Curling's ulcer: ulcer due to burns
3. Cushing's ulcer: ulcer due to the presence of a CNS tumor or injury (more to perforate, high acid production)
4. Acute hemorrhagic Gastritis

❖ **Gastric Polyps:** (99% of gastric polyps are asymptomatic, found incidentally)

Types of Gastric polyps:

1. Hyperplastic

2. **Adenomatous** (Premalignant)
3. Inflammatory
4. Hammertomatus

Characteristics:

- Affects distal part of the stomach usually
- Presentation: Anemia
- EGD-scopy (If found through endoscopy, remove the polyp and if polyp is found to be adenomatous, we do further investigations)
- Rule out: malignancy

❖ **Gastric Leiomyomas:** (90% asymptomatic, found incidentally)

- Benign smooth muscle tumor
- Submucosal growth (bulging)
- Asymptomatic usually, less than 1% present with massive bleeding
- Diagnosis: EGD-scopy and CT scan (well-defined)
- Never take biopsy (The capsule will break)
- Surgery wide excision

❖ **Menetrier's Disease:**

This is a condition of gastric mucosal hypertrophy, in which the mucosal rugal folds are grossly enlarged in the fundus and body of the stomach; the antrum is usually spread.

- Mucosal hypertrophy may lead to abnormally large secretion of protein-rich mucus and acid (This over-secretion contributes to symptoms of epigastric pain and **hypoproteinaemia**)
- Patient usually presents with Malabsorption, **Diarrhea**, edema and weight loss
- When we do gastroscopy the rugal folds of the stomach will be enlarged
- Treatment: Atropine (to reduce the secretion), omeprazole, H.pylori eradication. If patient still has symptoms we perform a gastrectomy.

❖ **Prolapse of The Gastric Mucosa:** (Incidental finding)

- Occasionally accompanies small gastric ulcer
- Presentation: Vomiting and abdominal pain
- X-ray: Antral folds into duodenum (Double ring on X-ray) [not well defined]
- Treatment: Antrectomy with Billroth 1

❖ **Gastric Volvulus**

- Benign disease, but lethal (can lead to death)
- Types:
  1. Its longitudinal axis (Organo-axial volvulus):
    - More common
    - Associated with HH (hiatus hernia)

**How to differentiate between leiomyomas and leiomyosarcoma**

- Leiomyoma: Benign smooth muscle tumor
- Leiomyosarcoma: Malignant smooth muscle tumor
- How to differentiate: by reading the mitosis of the sample in the high power field. If the mitosis in the high power field is more than 10, it's a leiomyosarcoma (malignant), less than 10 it's a leiomyoma (benign)

**In the book:**

Menetrier's disease is associated with a high incidence of malignancy in the stomach; once it has been diagnosed, total gastrectomy is indicated in the otherwise fit patient

2. Transverse (Mesenterioaxial volvulus): Draw a line from the mid lesser curvature to the mid greater curvature: Associated with vomiting (obstruction)

-Present with: Severe abdominal (epigastric) pain and Brochardt's triad

❖ **Brochardt's triad:**

- Vomiting followed by retching and then inability to vomit
- Epigastric distention
- Inability to pass a nasogastric tube
- Confirm diagnosis: Ground Glass appearance on X-Ray
- If diagnosed, we should immediately take him to the OR

❖ **GASTRIC DIVERTICULA:**

- Uncommon
- Asymptomatic
- 1% will present with Malabsorption: Weight loss, diarrhea
- It causes Anemia
- Diagnosis: EGD-scopy, X-ray (Diverticula will be found when we do gastroscopy or polyp appearance)
- Surgery

❖ **DUODENAL DIVERTICULA:**

- Affects 20% of the population
- Asymptomatic
- 90% medial aspect of the duodenum: 2<sup>nd</sup> part of the duodenum is the most common site for diverticulam formation in the GI tract.
- Rare before 40 years of age
- Discovered incidentally at endoscopy or on barium meal examination
- Most are solitary and 2.5 cm peri-ampullary of vater
- It can cause obstruction, bleeding and inflammation

❖ **BEZOA:** (Foreign body in the stomach)

- Benign
- Concretions formed in the stomach
- Types:
  1. Trichobezoars: Hair matter
  2. Phytobezoars: Vegetable matter
  3. Combination of both (Trichophytobezoars)
- Presentation: Obstruction
- Diagnosis: EGD, X-ray and barium examination
- Treatment: Surgical removal

❖ **Benign Duodenal Tumors:**

- a. Brunner's gland adenomas
- b. Carcinoid tumors
- c. Heterotopic gastric mucosa
- d. Villous adenomas

**Presentation and Intervention of the tumors:**

- Presentation: They're usually asymptomatic
- Intervention: We interfere only if the tumor is either Adenomatous or Carcinoid

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### ❖ Superior Mesenteric Artery Obstruction of the Duodenum:

- Obstruction of the third portion of the duodenum leads to compression of the superior mesenteric artery (SMA) and Aorta (Fat is the only thing that lies between the duodenum and the SMA, when the person is cachexic and bedridden, the fat will diminish and this will bring the duodenum and SMA closer to each other)
- Appears after rapid weight loss following injury
- Distance between two vessels is 10-20 mm
- Proximal bowel obstruction symptoms and signs (Vomiting)
- Diagnosis: CT Scan, contrast study or gastroscopy
- Treatment:
  - 1.Nutrition
  - 2.Bypass surgery

### ❖ Regional Enteritis of the Stomach & Duodenum:

- Food poisoning
- Presentation: Pain and diarrhea
- Diagnosis: Clinical diagnosis
- Observation of the patient

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