1st Semester

كلية المأمون الجامعة

قســـــم تقنيات الأشـــــعة

المرحلة الثانية

Special radiological procedures of gastrointestinal tract and bones

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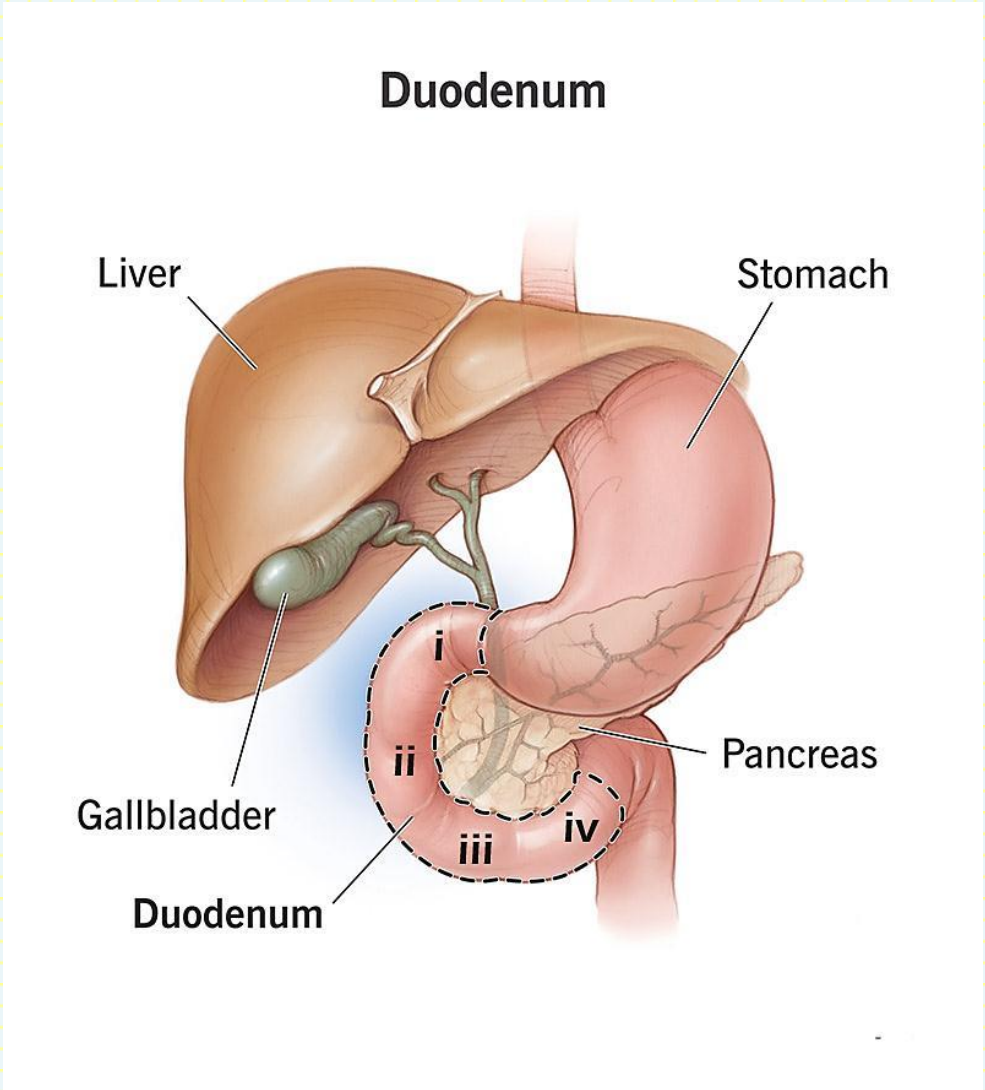
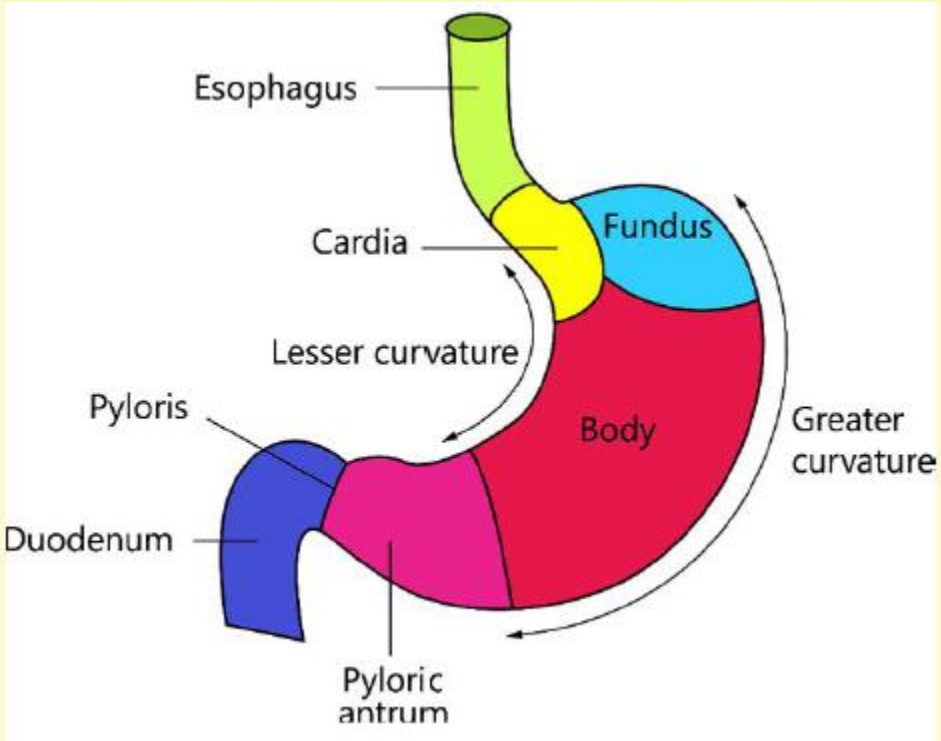
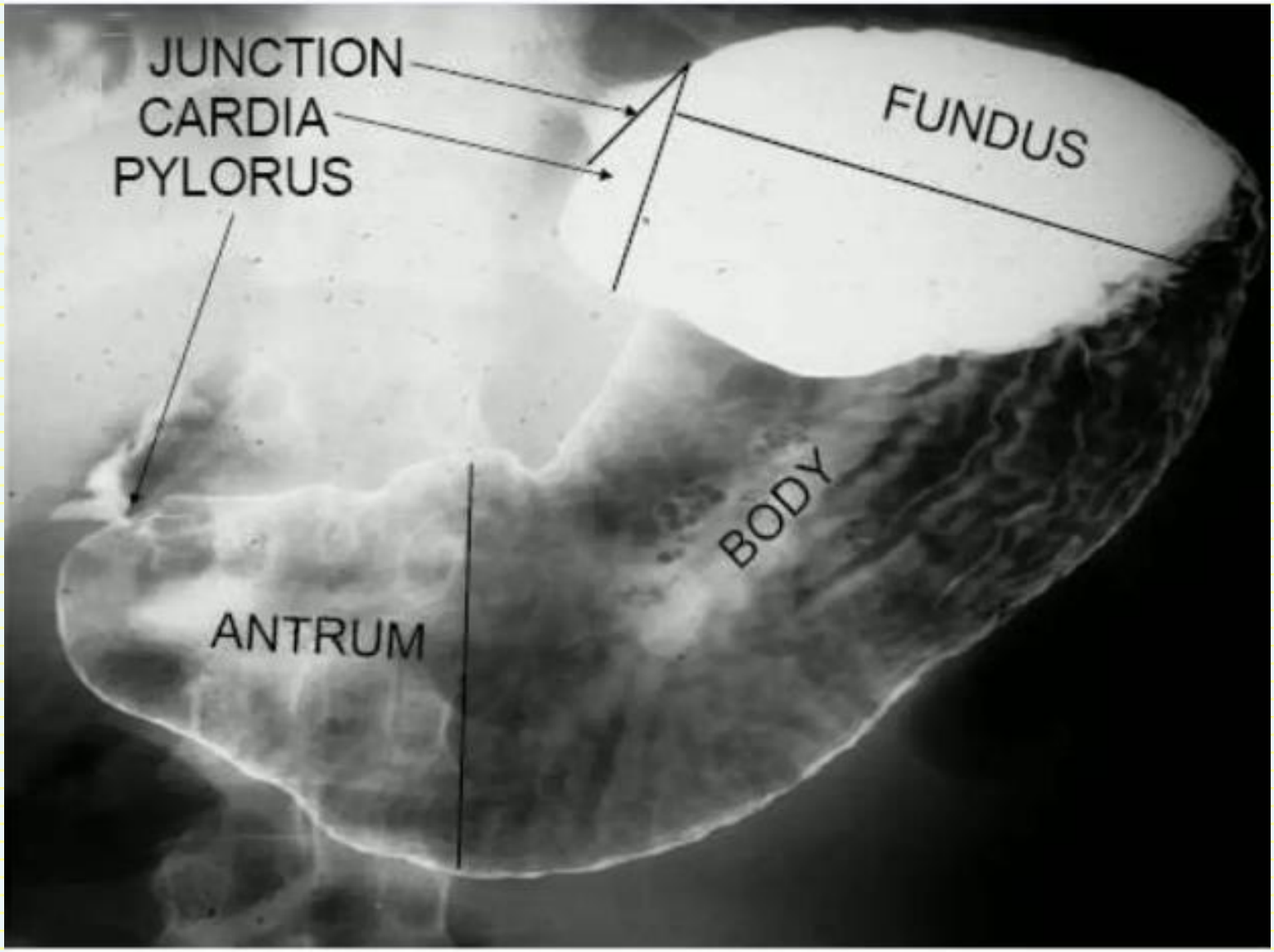
MSc Medical Imaging / MRI Applications

Lecture 4

Barium Meal


Duodenum
Liver
Stomach
i
ii
iii
iv
Pancreas
Gallbladder
Duodenum


Esophagus
Cardia
Fundus
Lesser curvature
Pyloris
Body
Greater curvature
Duodenum
Pyloric antrum


JUNCTION
CARDIA
PYLORUS
FUNDUS
BODY
ANTRUM

Clinical signs and symptoms:

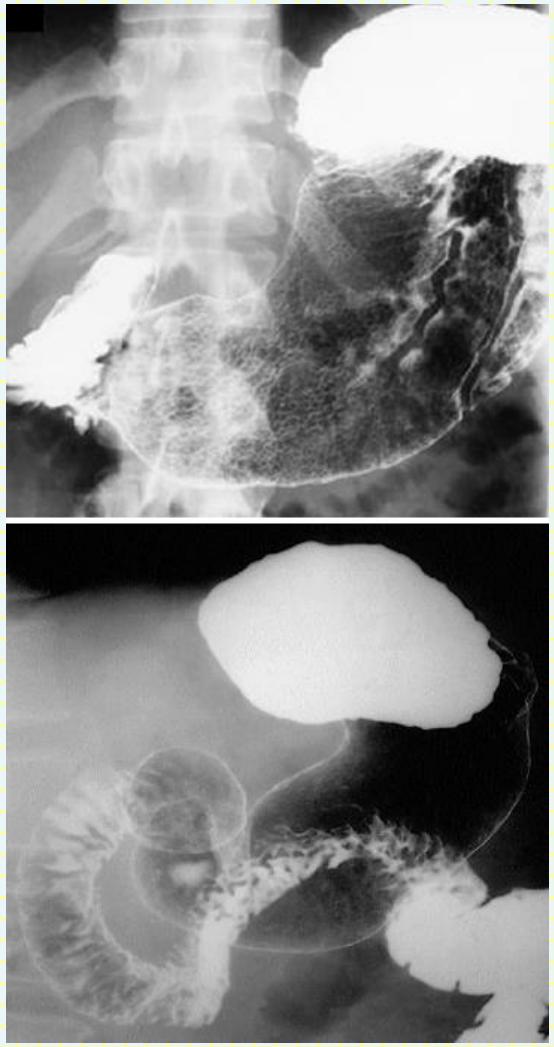
- *Epigastric pain*
- *Vomiting*
- *Hematemesis*

Imaging Modalities:

- *X-ray (initial): We can see the stomach filled with gas.*
- *Fluoroscopy, contrast study (Barium meal): Used to visualize stomach mucosa.*
- *Ultrasound: Limited.*
- *CT: For staging and characterization of the disease.*
- *MRI: not used.*
- *Nuclear Medicine: not used.*
- *Angiography not used.*

Barium meal

Normal Stomach and Duodenum on double contrast barium meal. On this supine view, barium collects in the fundus of the stomach. The body and the antrum of the stomach together with the duodenal cap and loop are coated with barium and distended with gas. Note how the fourth part of the duodenum and duodenojejunal flexure is superimposed on the body of the stomach.



Imaging overview:

- *Most often the stomach is examined along with the esophagus and duodenum in a joint examination called: (UG study upper gastrointestinal Study / barium swallow, barium meal.*
- *UG study is a series of radiographs used to examine the gastrointestinal tract for abnormalities. A contrast medium, usually a radio- contrast agent such as barium sulfate mixed with water, X-rays are used to create radiographs of the regions of interest.*
- *The barium enhances the visibility of the relevant parts of the gastrointestinal tract by coating the inside wall of the tract* and *appearing bright on the film (stomach lining, size, shape, contour, and patency).*

- *Functional movements of organs such as swallowing, peristalsis, or sphincter closure can also be visualized through fluoroscopy.*
- *To further enhance the quality of images, air or gas is sometimes introduced into the gastrointestinal tract in addition to barium, and this procedure is called double-contrast imaging. In this case the gas is referred to as the negative contrast medium.*
- *Intravenous injection of Buscopan 20 mg is used to distend the stomach and slow down the emptying of the contrast into the duodenum.*

Typical Film Series

- ***Supine Abdomen AP**: Demonstrates the stomach and small intestines. Provides a general overview of the abdominal region.*

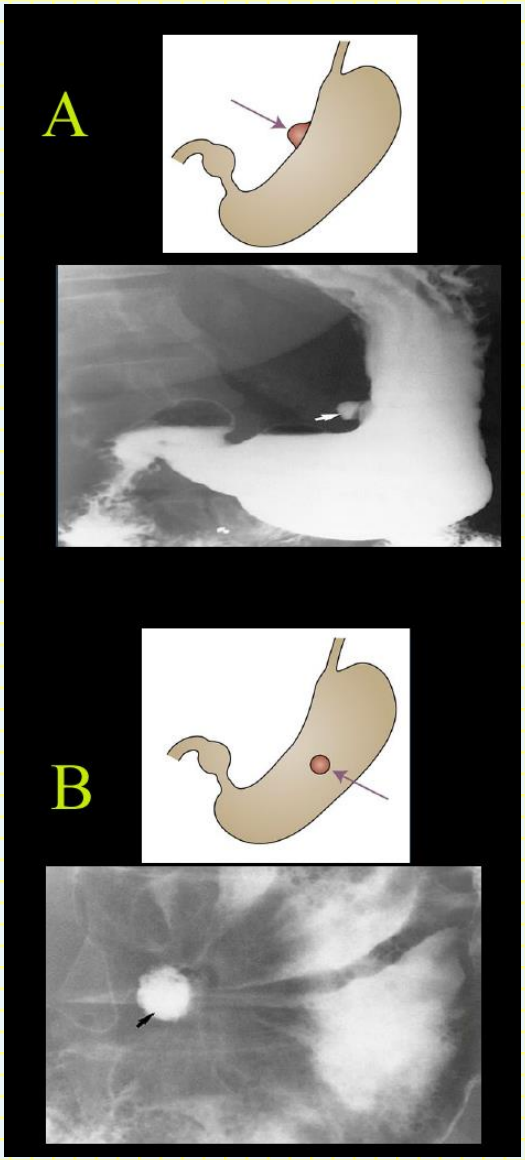
- ***Prone RAO (Right Anterior Oblique):** Demonstrates the antrum and greater curvature of the stomach. Useful for evaluating gastric emptying and peristalsis.*

- ***Supine Left Lateral**: Highlights the fundus of the stomach. Useful for showing fundal gas or abnormalities.*

Pathology Aspects:

1- Gastric ulcer disease

A gastric ulcer is an open sore that develops on the inner lining of the stomach. It's commonly caused by Helicobacter pylori infection or long-term use of no steroidal anti-inflammatory drugs (NSAIDs).

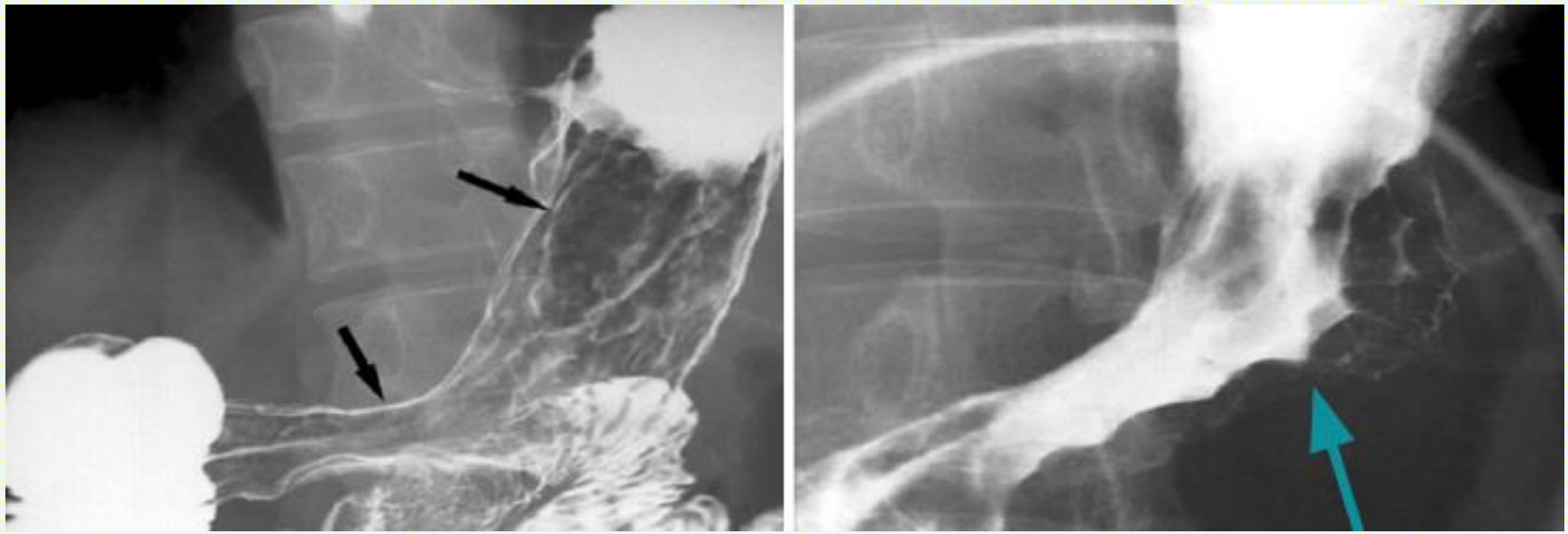


A: In profile ulcer, out pouching.

B: In profile ulcer, de pouching

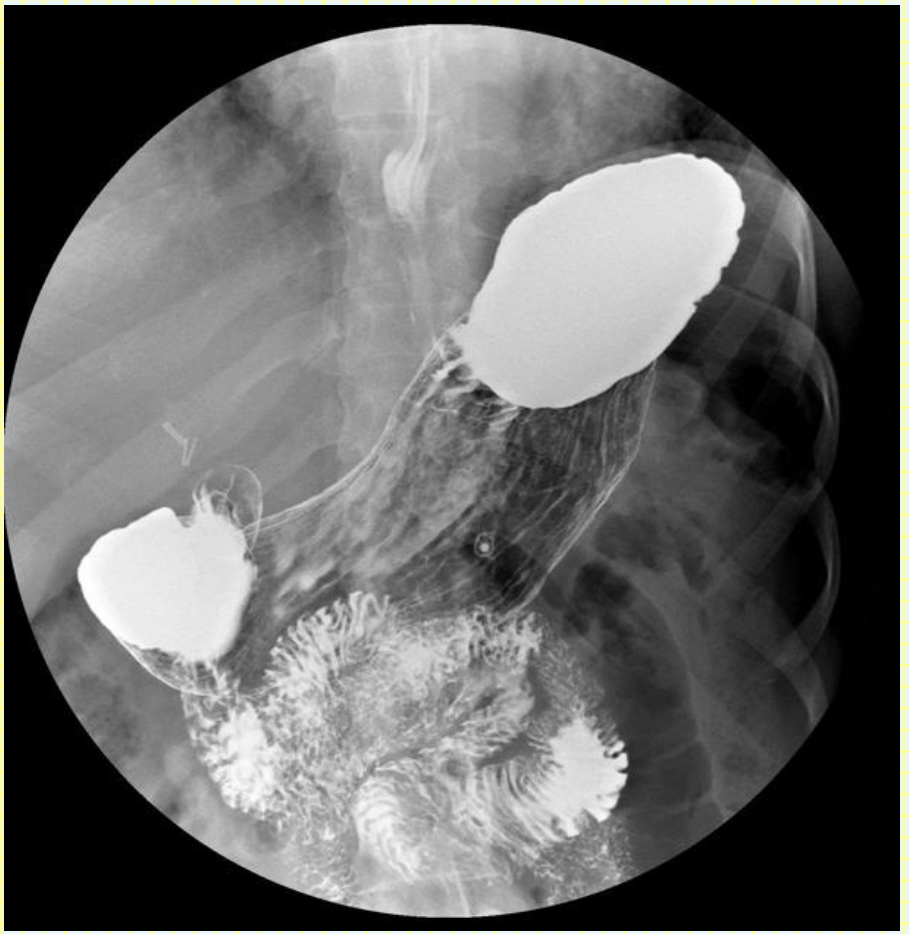
2- Gastric carcinoma

Thickened mucosal fold, narrowing of gastric lumen with lobulation in the outline (seen in diffuse infiltrative process involving the gastric wall.



Filling defects

Case Report:



- *The barium-filled gastric lumen reveals a Bull's Eye Sign, suggestive of a mass-like lesion. This classic appearance is indicative of a central ulcerated area surrounded by thickened.*
- *Bull's Eye Sign in the pyloric region of the stomach, most consistent with an ulcerated gastric carcinoma.*
- *Differential diagnoses include a gastric adenocarcinoma or less likely a benign peptic ulcer with surrounding mass effect.*
- *Recommend further evaluation with contrast-enhanced CT or MRI to assess the extent of the mass, involvement of surrounding structures, and to evaluate for any metastasis.*
- *Biopsy is suggested if clinically indicated to confirm the diagnosis.*

Anatomy-Pathology Related Terms

- ***Cardia*** *– The region where the esophagus connects to the stomach.*
- ***Fundus*** *– The upper part of the stomach.*
- ***Body of Stomach*** *– The main central part of the stomach.*
- ***Pylorus*** *– The lower section of the stomach that empties into the duodenum.*
- ***Lesser Curvature*** *– The concave border of the stomach.*
- ***Greater Curvature*** *– The convex outer border of the stomach.*
- ***Gastric Mucosa*** *– The inner lining of the stomach.*
- ***Rugae*** *– Folds in the lining of the stomach.*
- ***Pyloric Sphincter*** *– The valve controlling the passage from the stomach to the duodenum.*
- ***Duodenal Bulb*** *– The first part of the duodenum attached to the stomach.*
- ***Gastric Antrum*** *– The lower portion of the stomach before the pylorus.*

- ***Gastric Lumen*** *– The interior space of the stomach where food is digested.*
- ***Gastroesophageal Junction*** *– The junction where the esophagus meets the stomach.*
- ***Angular Incisure*** *– A notch on the lesser curvature marking the transition from the body to the pylorus.*
- ***Pneumatosis*** *– Presence of air in the stomach wall.*
- ***Double Contrast*** *– Use of barium and air for better visualization of the stomach lining.*
- ***Filling Defect*** *– Area where contrast does not fill, suggesting a mass or lesion.*
- ***Gastric Outlet Obstruction*** *– Blockage at the pylorus preventing food from leaving the stomach.*
- ***Gastric Volvulus*** *– Twisting of the stomach, usually seen on barium studies.*
- ***Gastric Ulcer*** *– Open sore on the stomach lining, often seen with barium studies.*

- ***Gastritis*** *– Inflammation of the stomach lining.*
- ***Pyloric Stenosis*** *– Narrowing of the pyloric canal.*
- ***Achalasia*** *– Failure of the lower esophageal sphincter to relax.*
- ***Gastrointestinal Perforation*** *– A hole in the stomach or intestine.*
- ***Bezoar*** *– Accumulation of indigestible material in the stomach.*
- ***Gastric Dilatation*** *– Enlargement of the stomach.*
- ***Thickening****- refers to the abnormal increase in the thickness of tissue or organ walls, commonly indicating inflammation, fibrosis, or tumors.*


THANKS !