Gastrointestinal tract (GIT)

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The Esophagus

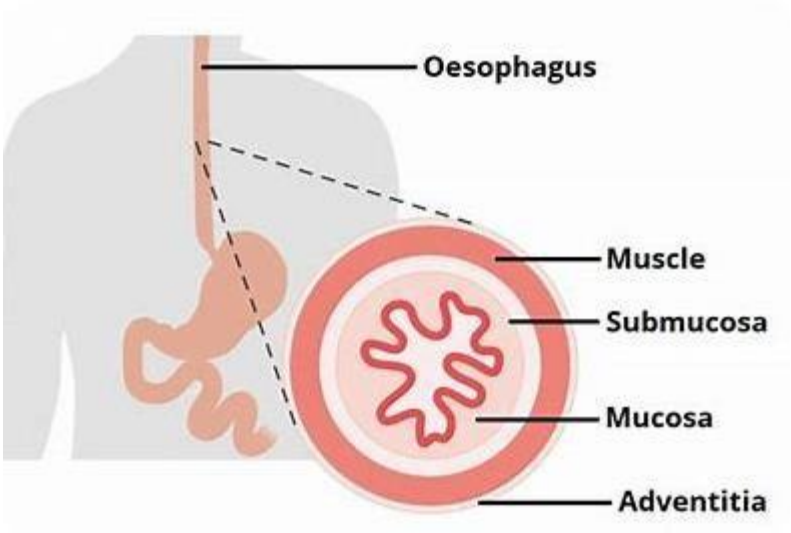
is an organ through which food passes, aided by peristaltic contractions, from the pharynx to the stomach.

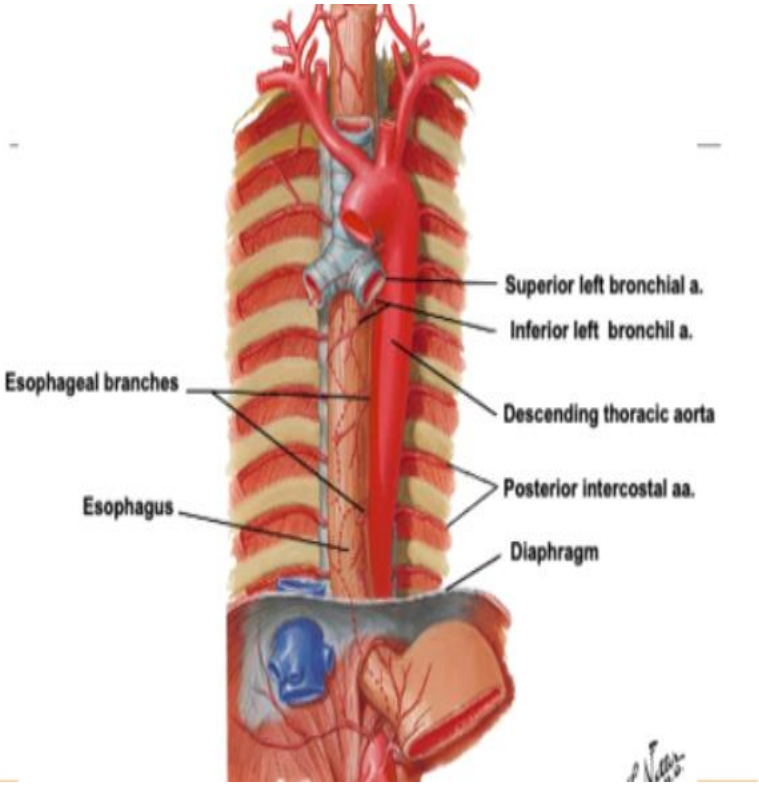
The esophagus is a **fibromuscular tube,** about 25 cm (10 in) long in adults, that travels behind the trachea and heart, passes through the diaphragm, and empties into the uppermost region of the stomach.

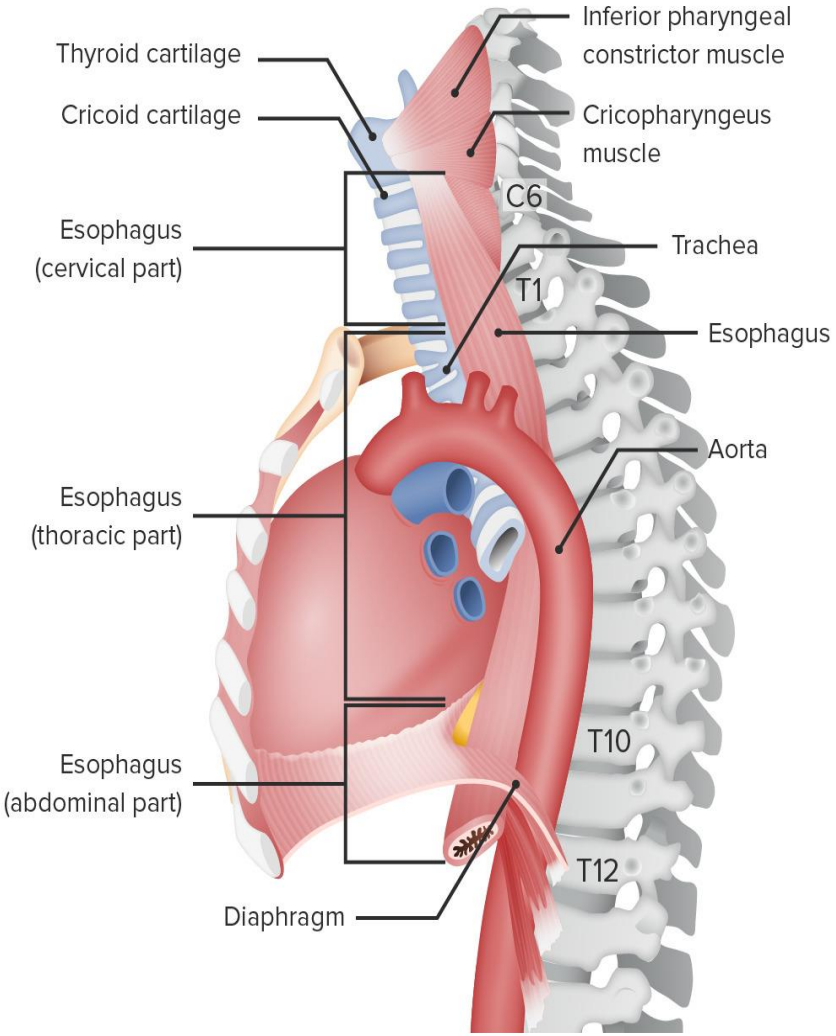
The wall of the esophagus from the lumen outwards consists of mucosa, submucosa (connective tissue), layers of muscle fibers between layers of fibrous tissue, and an outer layer of connective tissue.

The mucosa is a stratified squamous epithelium of around three layers of squamous cells, The upper esophagus lies at the back of the mediastinum behind the trachea.

The lower esophagus lies behind the heart.


Oesophagus
Muscle
Submucosa
Mucosa
Adventitia


Superior left bronchial a.
Inferior left bronchil a.
Esophageal branches
Descending thoracic aorta
Posterior intercostal aa.
Esophagus
Diaphragm


Thyroid cartilage
Cricoid cartilage
Esophagus (cervical part)
Esophagus (thoracic part)
Esophagus (abdominal part)
Diaphragm
Inferior pharyngeal constrictor muscle
Cricopharyngeus muscle
C6
T1
Trachea
Esophagus
Aorta
T10
T12

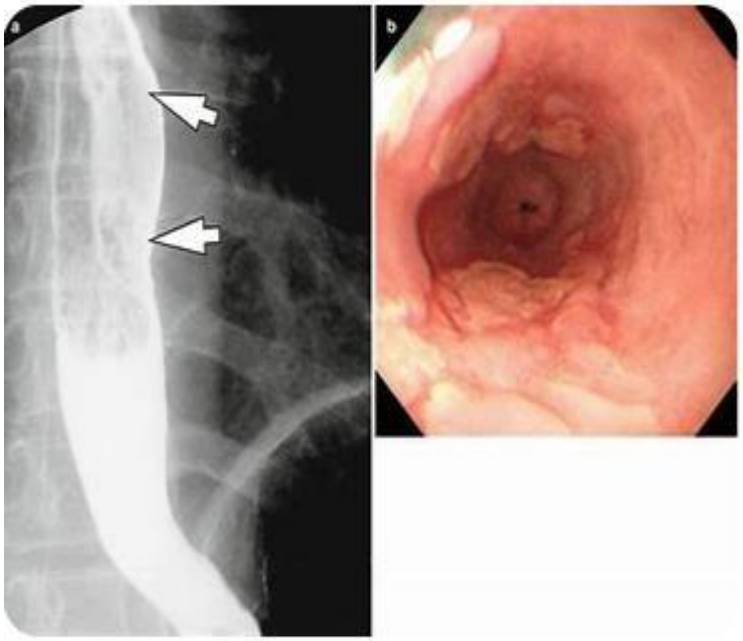
ESOPHAGITIS

Inflammation of the esophagus is known as esophagitis.

Causes includes Reflux of gastric acids from the stomach, infection, substances ingested (for example, corrosives),

some medications (such as bisphosphonates),

and food allergies .



Esophagitis | Radiology Key

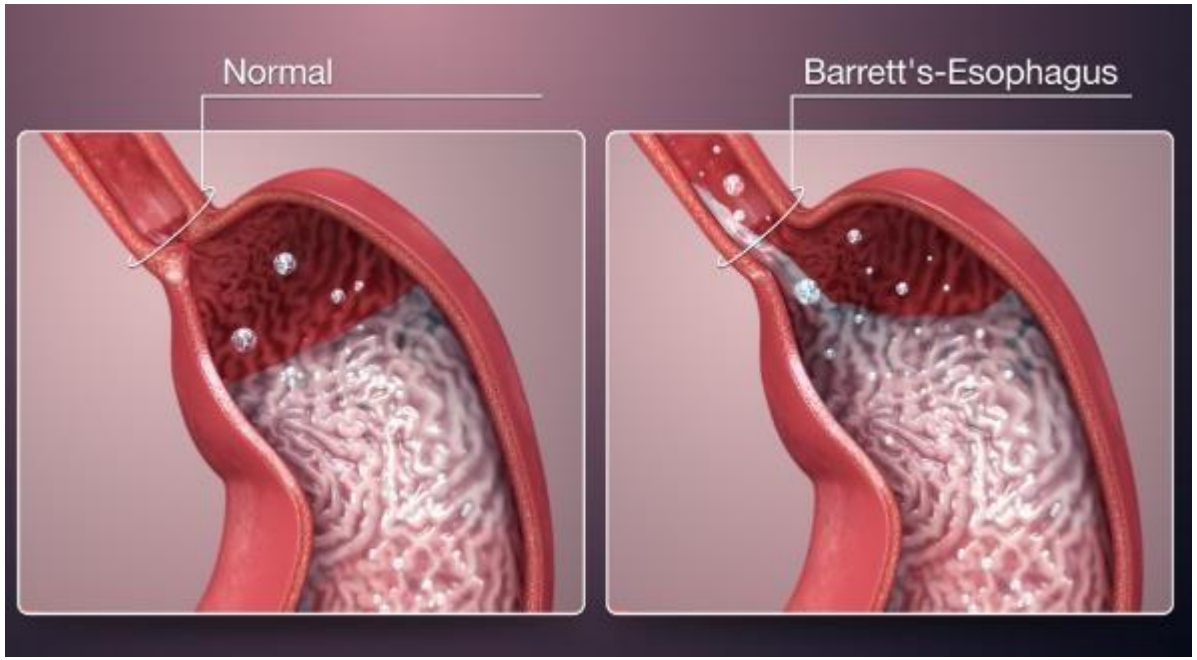
Multiple large nodular lesions with central superficial ulceration (arrows).

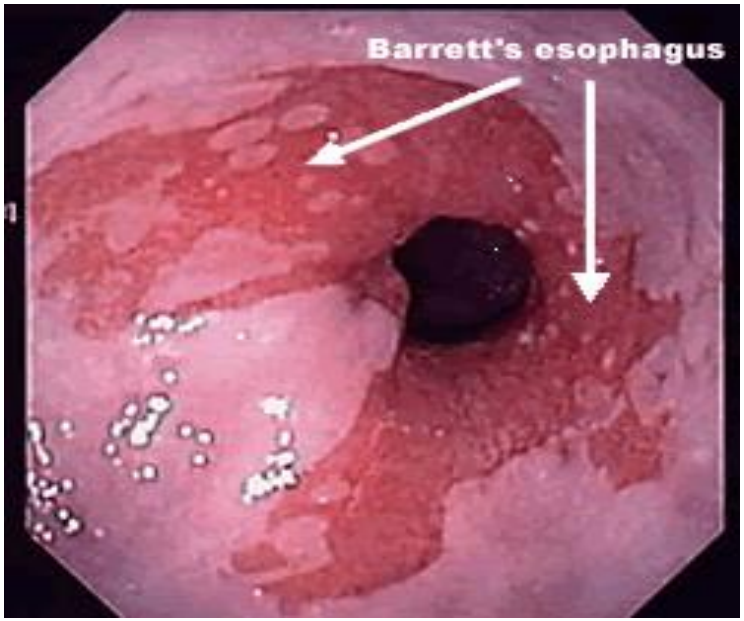
Barrett's esophagus

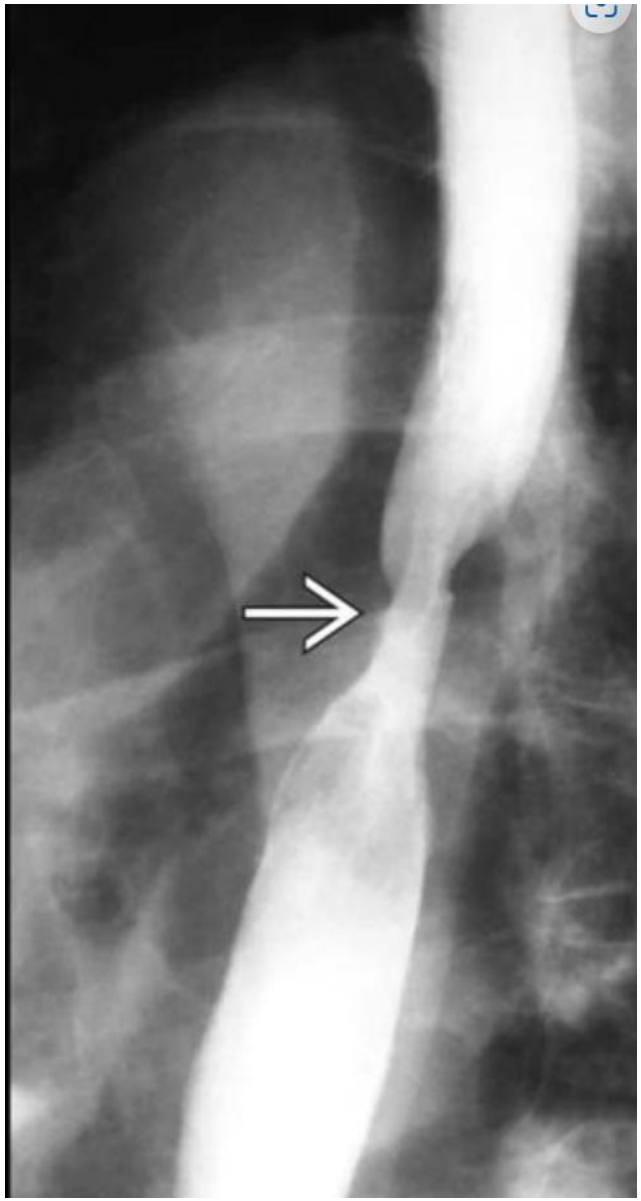
-Prolonged esophagitis, particularly from gastric reflux, is one factor thought to play a role in the development of Barrett's esophagus.

-In this condition, there is metaplasia of the lining of the lower esophagus, which changes from stratified squamous epithelia to simple columnar epithelia.

-Barrett's esophagus is thought to be one of the main contributors to the development of esophageal cancer.


Normal
Barrett's-Esophagus

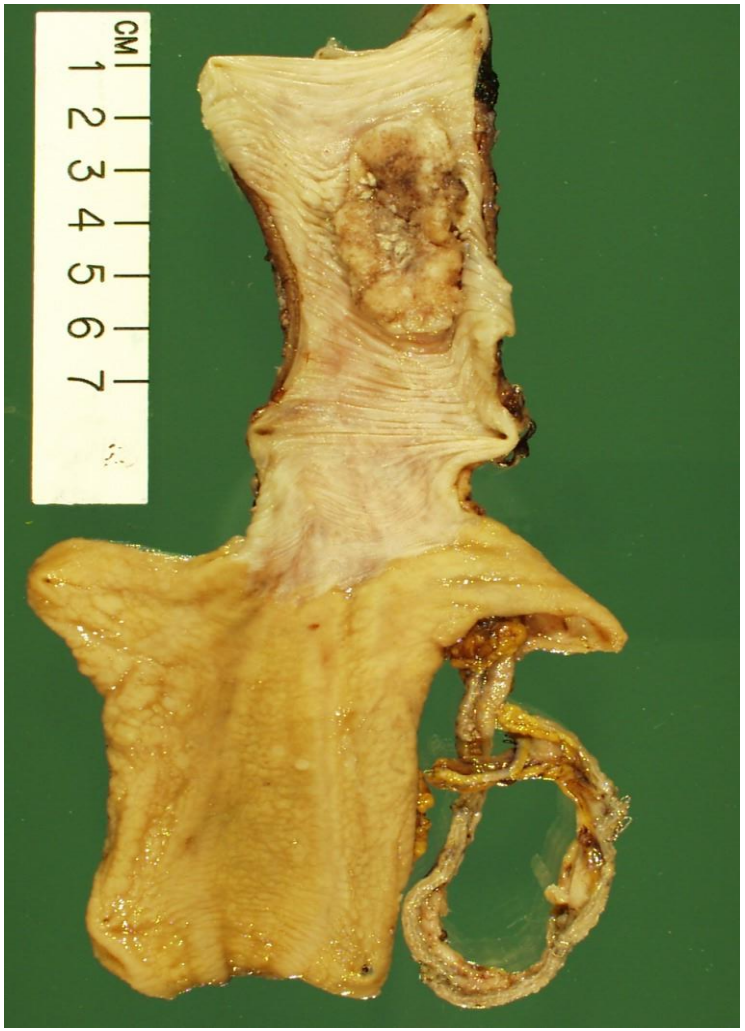

Barrett's esophagus



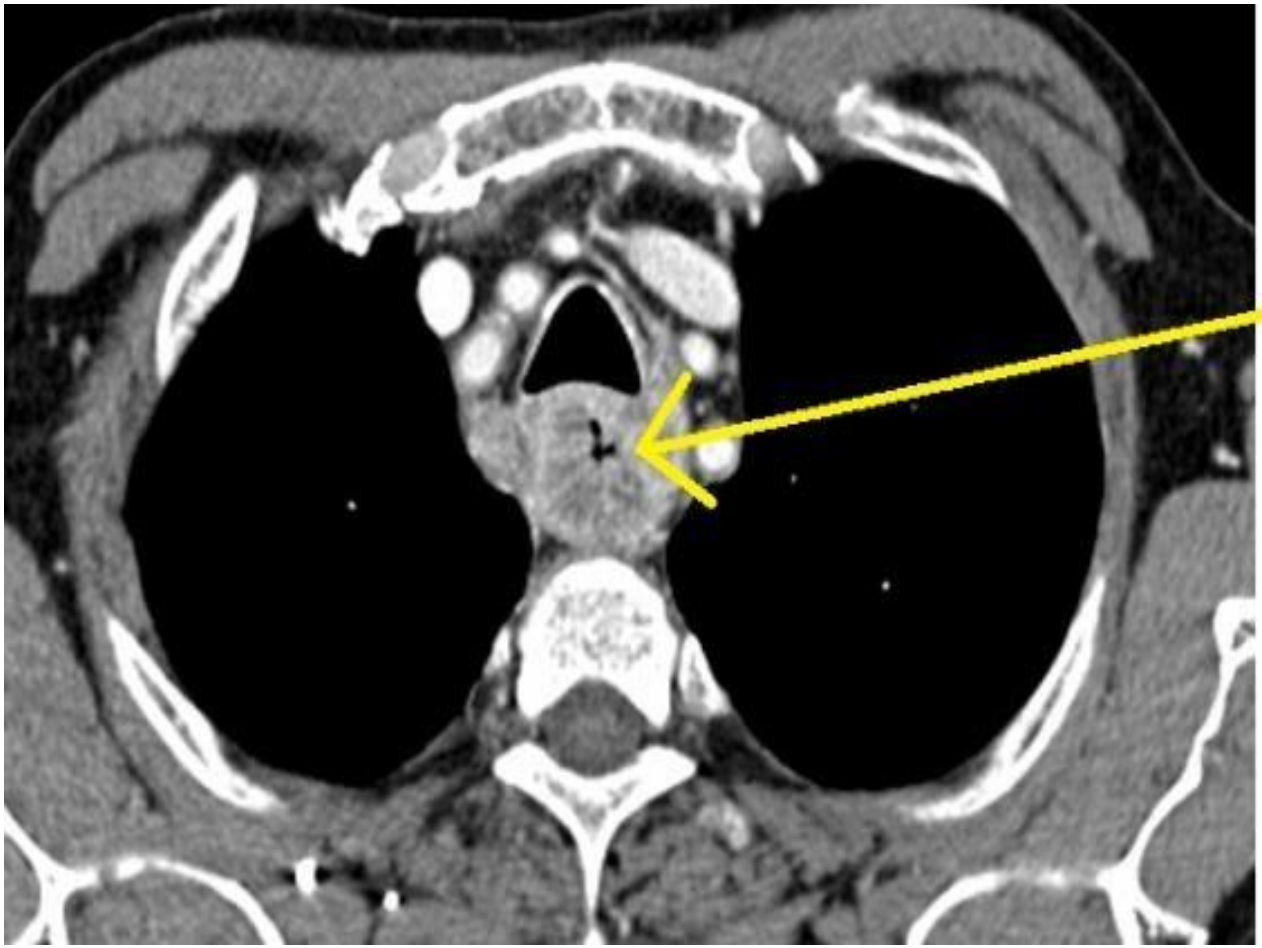
Esophageal cancer

There are two main types of cancer of the esophagus. Squamous cell ca,
The other main type is an adenocarcinoma that occurs in the glands or columnar tissue of the esophagus.

This is most common in those with Barrett's esophagus, and occurs in the cuboidal cells.



CT on sagittal view showed an ill defined, circumferential, heterogeneously enhancing mass involving the cervical and upper thoracic esophagus, measuring roughly 6.38 cm.



Esophageal cancer invading surrounding mediastinal structures

Achalasia

refers to a failure of the lower esophageal sphincter to relax properly, and generally develops later in life.

This leads to progressive enlargement of the esophagus, and possibly eventual megaesophagus.

Imaging

An X-ray of swallowed barium may be used to reveal the size and shape of the esophagus, and the presence of any masses.

The esophagus may also be imaged using a flexible camera inserted into the esophagus, in a procedure called an **endoscopy**. During an endoscopy, a biopsy may be taken.

CT scan also be used.

The Stomach

The stomach is a muscular, hollow organ in the gastrointestinal tract , The stomach has a dilated structure and functions as a vital digestive organ.

It performs a chemical breakdown by means of enzymes and hydrochloric acid.

In humans and many other animals, the stomach is located between the oesophagus and the small intestine.

The stomach secretes **digestive enzymes** and gastric acid to aid in food digestion.

The pyloric sphincter controls the passage of partially digested food (chyme) from the stomach into the duodenum, where peristalsis takes over to move this through the rest of intestines.

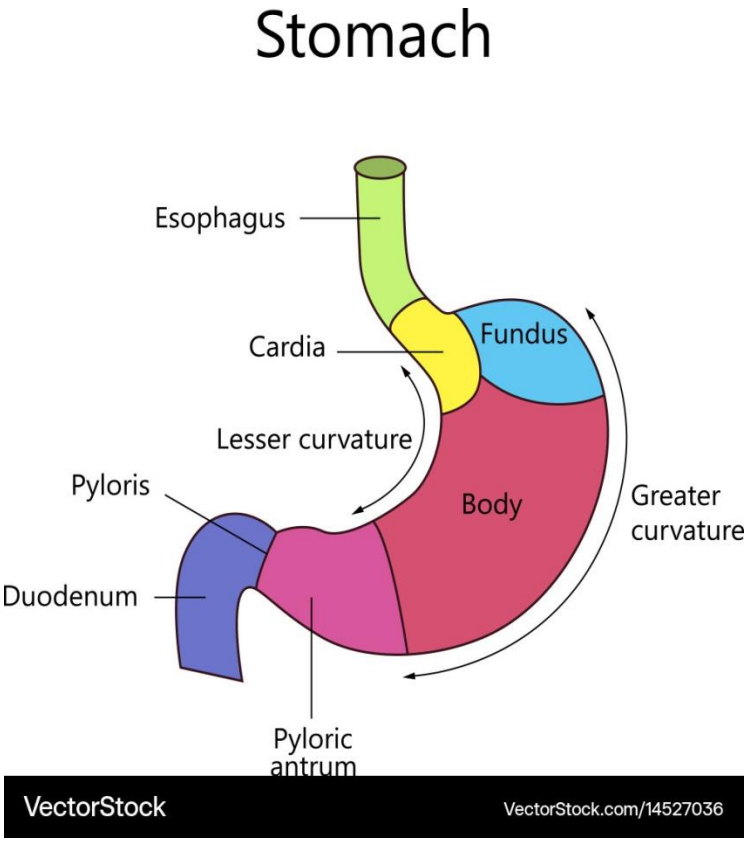
Sections of the stomach

The cardia is where the contents of the esophagus empty into the stomach.

The fundus (from Latin 'bottom') is formed in the upper curved part.

The body is the main, central region of the stomach.

The pylorus (from Greek 'gatekeeper') is the lower section of the stomach that empties contents into the duodenum.



Disease of the stomach

Gastritis is inflammation of the mucosal surface of the stomach. Clinically, the three most common causes of gastritis are Helicobacter pylori, nonsteroidal anti-inflammatory drugs (NSAIDs), and stress.
symptoms could be a symptomatic or include abdominal pain ,bloating .

Gastric ulcer it is break in the gastric mucosa, that can be superficial or deep.

Complication includes bleeding or stricture or gastric outlet obstruction, or malignant transformation.

Causes majority of peptic ulcers, and gastritis, in humans are caused by Helicobacter pylori infection, and an association has been seen with the development of stomach cancer.

Another causes include use of Non steroidal anti inflammatory drugs NSAID , Stress is another important cause.

Symptomes includes abdominal pain, bloating , blood loss that manifested either as anemia or malena or hematemesis.

Treatmant is with PPI like omeprazole and H pylori eradication.

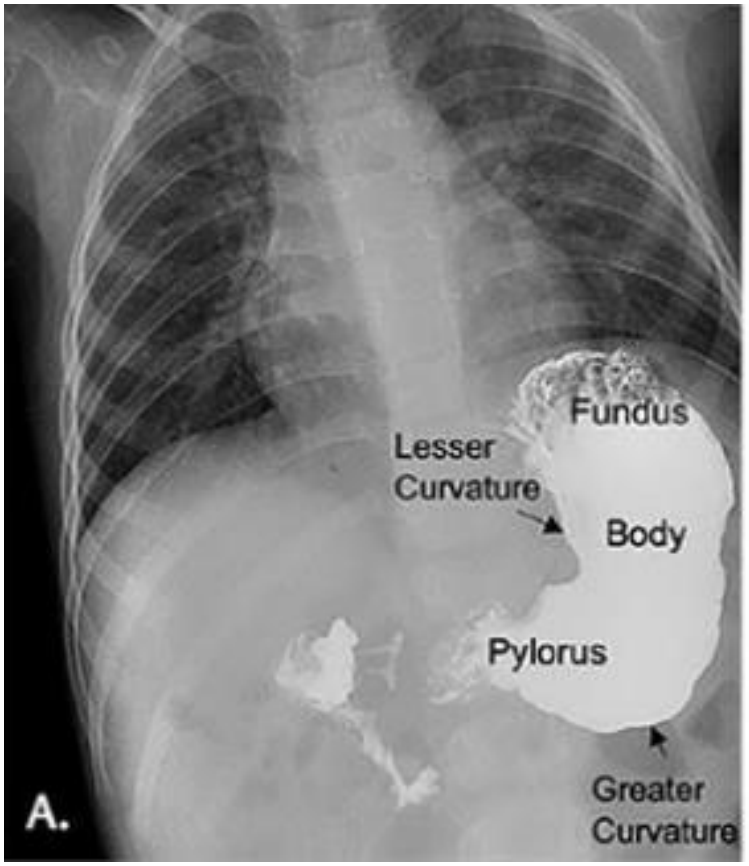
Surgery is indicated for mechanical complication like strictures, and obstruction.

Tests for gastric diseases

-Barium meal.

-Endoscopy is the gold standard test

-gastric emptying scan is considered the gold standard to assess gastric emptying rate.

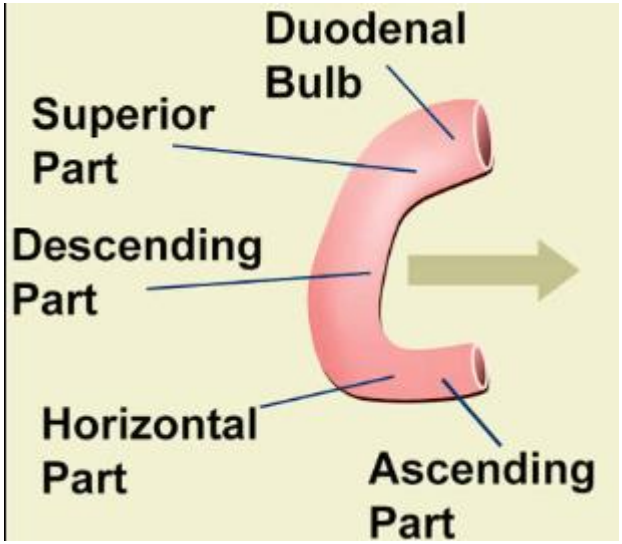


The Duodenum

the most proximal portion of the small intestine, forms a C-shaped loop around the head of the pancreas and is in continuity with the pylorus proximally and the jejunum it is devided into four parts .

The duodenal bulb, about 2 cm (0.79 in) long, is the first part of the duodenum and is slightly dilated.
Then the **second ,third and fourth segments**.

The wall of the duodenum also composed like the stomach
To mucosa, submucosa, muscularis, and serosa layers



Dudenal ulcer

The most important disease that affects is ulcer that occure in the first part due to effect of gastric acid, the symptoms includes abdominal pain , complication include perforation or bleeding.

Treatment is with ppi, antibiotic to eradicate H. pylori and surgery for emergencies like acute perforation that needs lapratomy. Bleeding can be controlled with endoscopy.

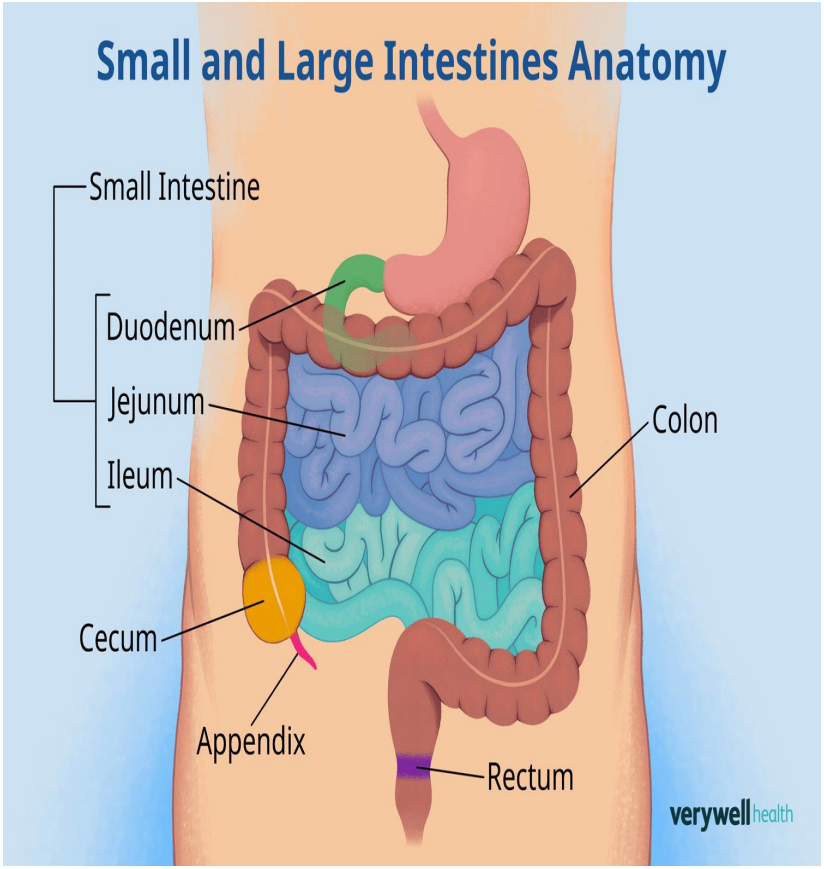
Diagnosis Main dx is with endoscopy .

The ileum

The ileum is the third and final part of the small intestine.

It follows the jejunum and ends at the ileocecal junction, where the terminal ileum communicates with the cecum of the large intestine through the ileocecal valve.

The ileum, along with the jejunum, is suspended inside the mesentery, a peritoneal formation that carries the blood vessels supplying them (the superior mesenteric artery and vein), lymphatic vessels and nerve fibers.



Bowel obstruction

also known as **intestinal obstruction**, is a mechanical or functional obstruction of the intestines which prevents the normal movement of the products of digestion.

Either the small bowel or large bowel may be affected.

Signs and symptoms include abdominal pain, vomiting, bloating and not passing gas.

Mechanical obstruction is the cause of about 5 to 15% of cases of severe abdominal pain of sudden onset requiring admission to hospital.

Etiology

Causes of bowel obstruction include adhesions, hernias, inflammatory bowel disease, tumors, diverticulitis, ischemic bowel, tuberculosis and intussusception.

Small bowel obstructions are most often due to adhesions and hernias while

large bowel obstructions are most often due to tumors and volvulus.

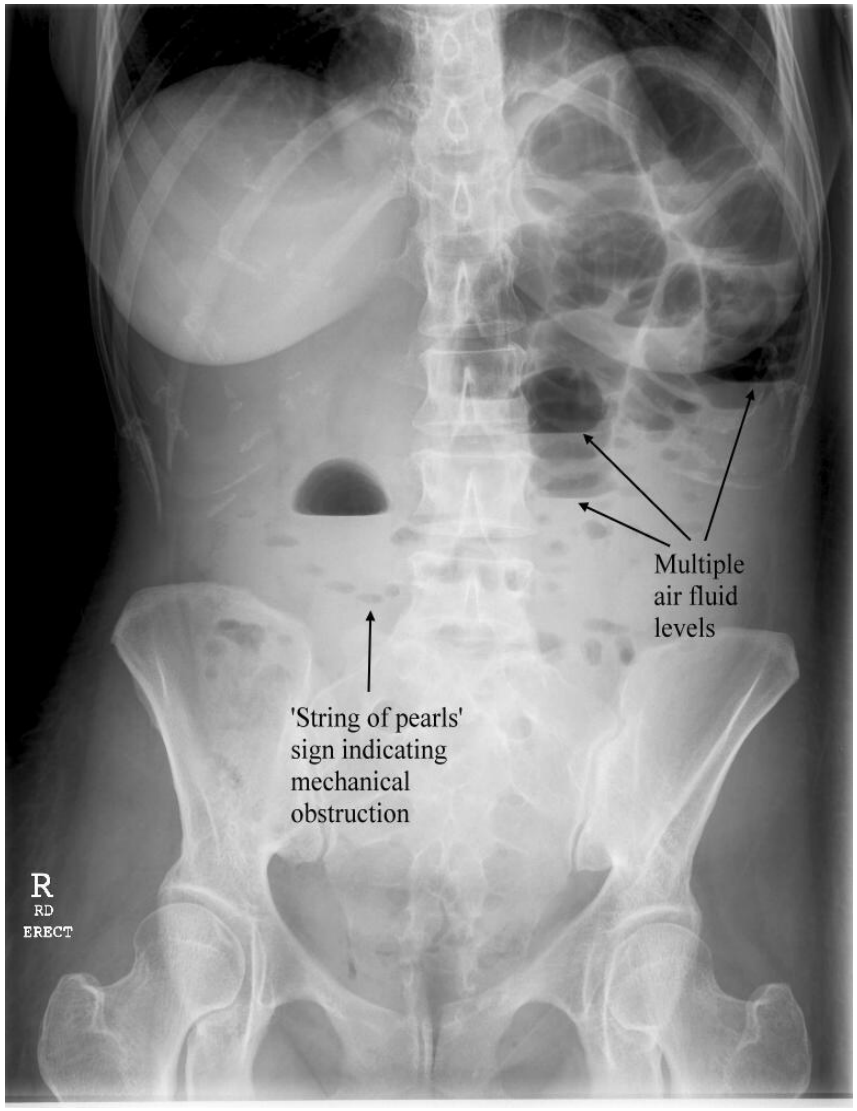
The diagnosis

may be made on plain X-rays; however, CT scan is more accurate. Ultrasound or MRI may help in the diagnosis of children or pregnant women.

Radiological signs of bowel obstruction include bowel distension and the presence of multiple (more than six) gas-fluid levels on supine and erect abdominal radiographs.

Ultrasounds may be as useful as CT scanning to make the diagnosis.

Contrast enema or small bowel series or CT scan can be used to define the level of obstruction, whether the obstruction is partial or complete, and to help define the cause of the obstruction.



Dilated small bowel loops with multiple air-fluid levels consistent with obstruction.

Inflammatory bowel disease (IBD)

a group of inflammatory conditions of the colon and small intestine, Crohn's disease and ulcerative colitis being the principal types.

Crohn's disease affects the small intestine and large intestine, as well as the mouth, esophagus, stomach and the anus,

whereas **ulcerative colitis** primarily affects the colon and the rectum.

Symptoms often include abdominal pain, diarrhea (which may be bloody if inflammation is severe), fever, abdominal distension, and weight loss

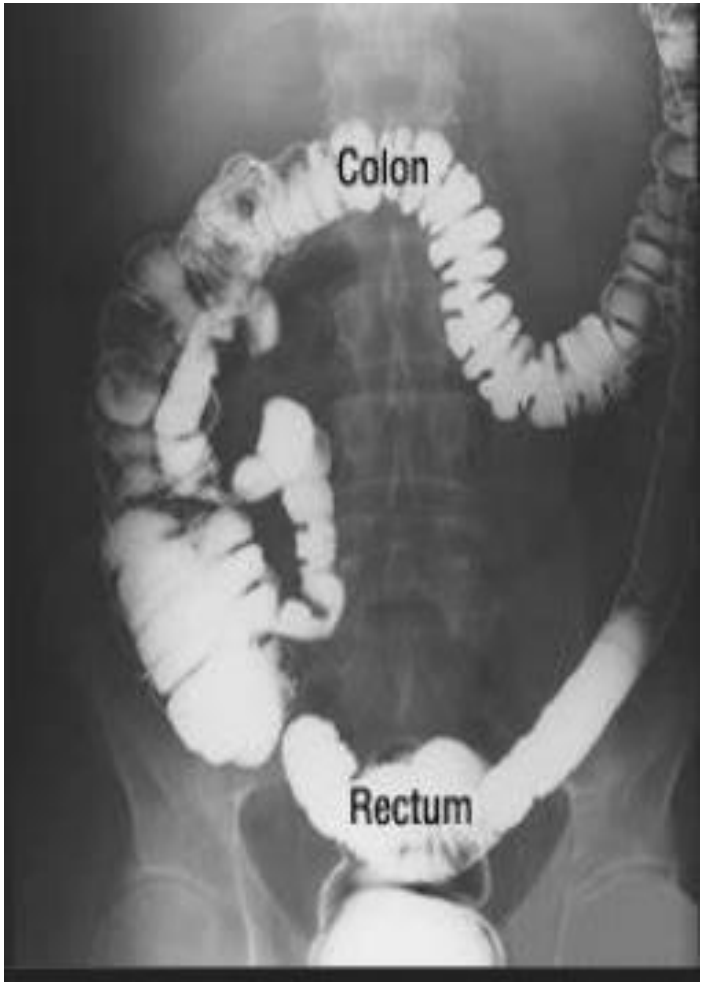
The large intestine

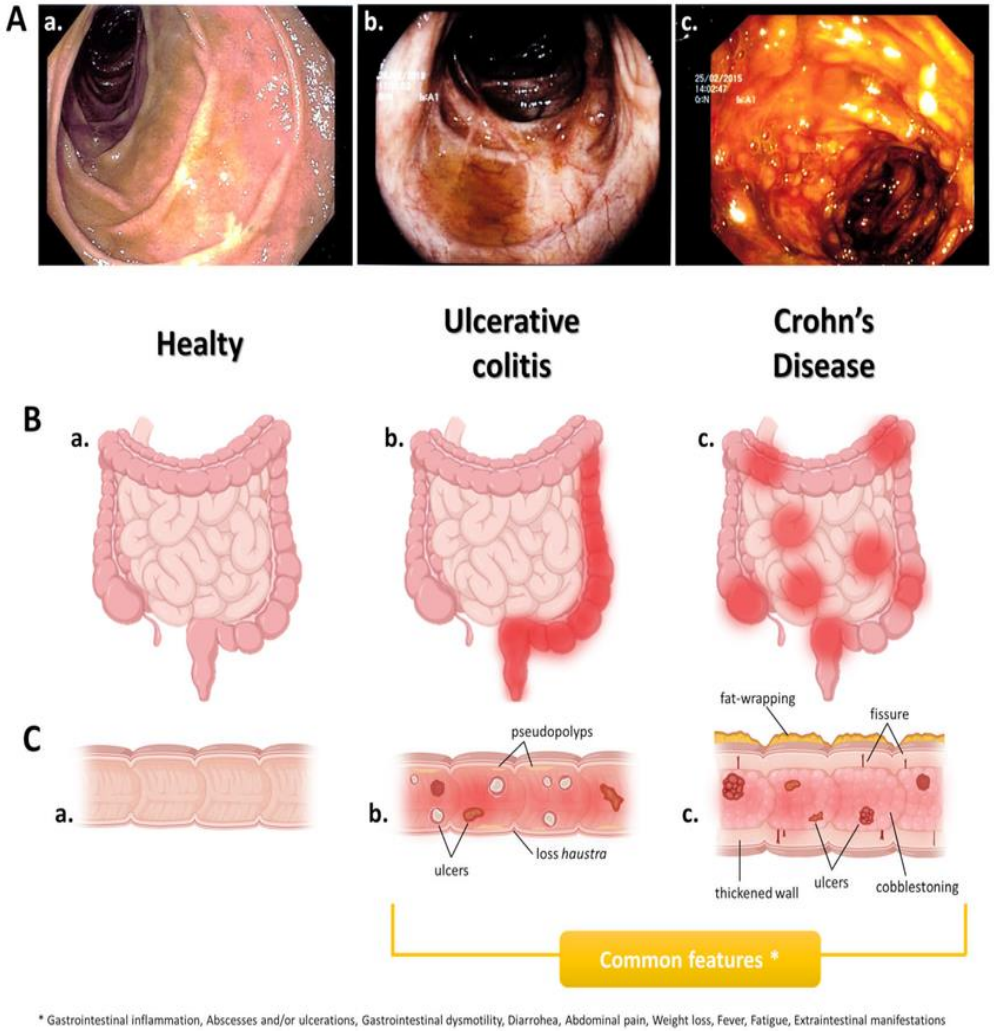
also known as the large bowel, is the last part of the gastrointestinal tract and of the digestive system in vertebrates. the large intestine composed of the cecum, colon, rectum, and anal canal.

The large intestine is about 1.5 m long.

The ascending colon, descending colon and rectum are retroperitoneal, while the cecum, appendix, transverse colon and sigmoid colon are intraperitoneal.

The cecum is the first section of the large intestine and is involved in digestion, while **the appendix** which develops embryologically from it, is not involved in digestion and is considered to be part of the gut-associated lymphoid tissue.


Colon
Rectum


A
a.
b.
c.
Healty
Ulcerative colitis
Crohn's Disease
B
a.
b.
c.
C
a.
b.
pseudopolyps
ulcers
loss haustra
c.
fat-wrapping
fissure
thickened wall
ulcers
cobblestoning
Common features *
* Gastrointestinal inflammation, Abscesses and/or ulcerations, Gastrointestinal dysmotility, Diarrohea, Abdominal pain, Weight loss, Fever, Fatigue, Extraintestinal manifestations

COLORECTAL CNACER

The most common form of colon cancer is adenocarcinoma, constituting between 95% to 98% of all cases of colorectal cancer.

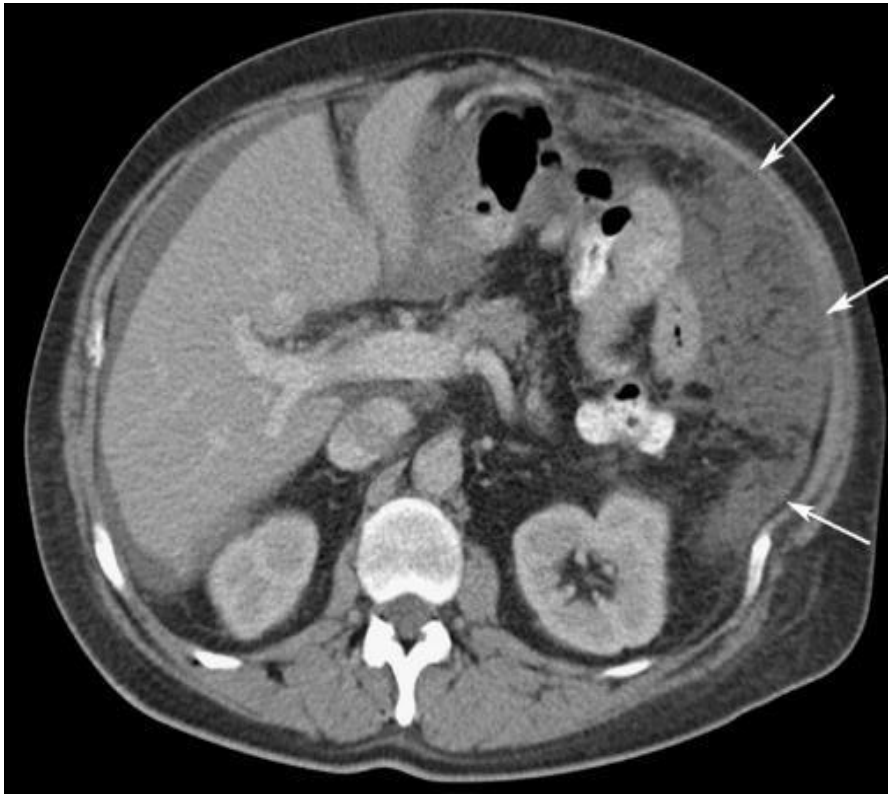
Colorectal cancer is the third most common tumor in men and second most common in women.

constitutes 10% of all tumor types globally.

Most colonic adenocarcinomas arise in preexisting adenomatous polyps, and progression from polypoid adenomas to carcinoma occurs over several years.

Colorectal cancer **diagnosis** is performed by sampling of areas of the colon suspicious for possible tumor development, typically during colonoscopy or sigmoidoscopy, depending on the location of the lesion.

It is confirmed by microscopical examination of a tissue sample.



Appendicitis

Is inflammation of the appendix.

Symptoms commonly include right lower abdominal pain, nausea, vomiting, and decreased appetite.

However, **approximately 40% of people** do not have these typical symptoms.

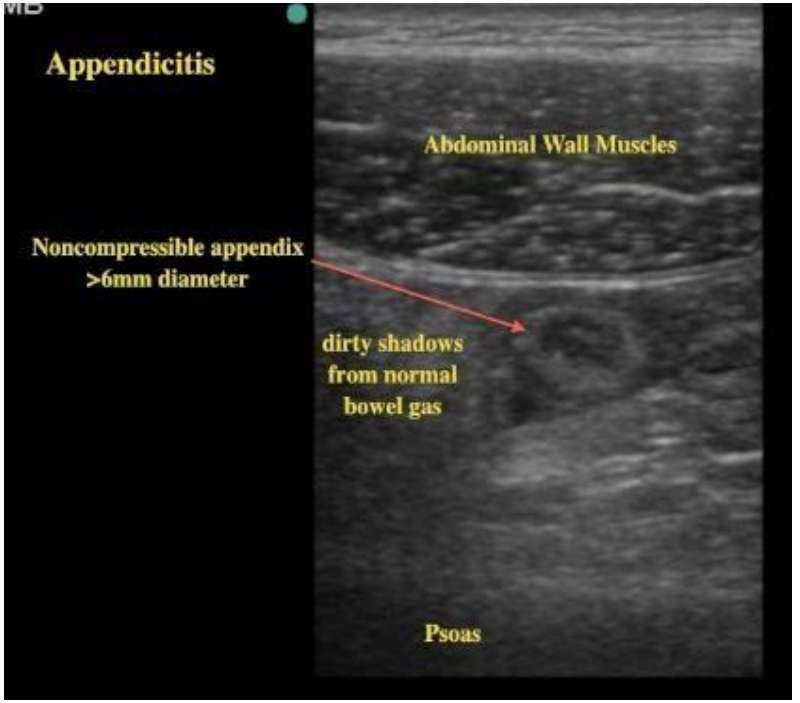
Severe complications of a ruptured appendix include widespread, painful inflammation of the inner lining of the abdominal wall and sepsis

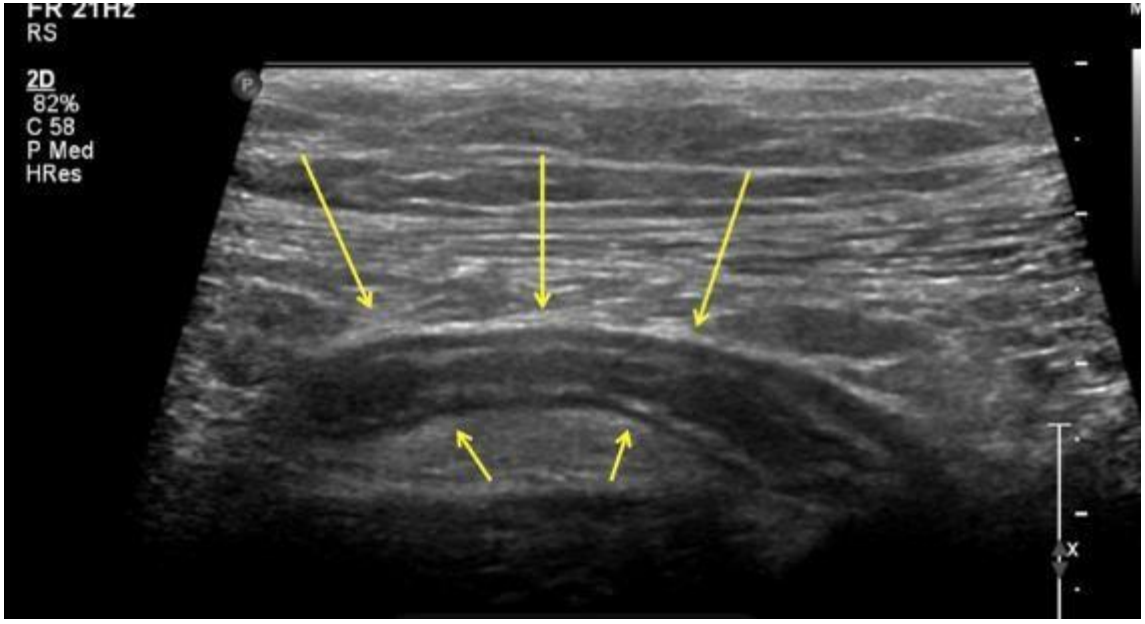
The two most common imaging tests used are an ultrasound and computed tomography (CT scan).

CT scan has been shown to be more accurate than ultrasound in detecting acute appendicitis.

However, ultrasound may be preferred as the first imaging test in children and pregnant women because of the risks associated with radiation exposure from CT scans


Appendix
TRANSITION POINT
NORMAL PROXIMAL APPX
ILIAC A
VEIN
DILATED DISTAL APPX


Appendicitis
Abdominal Wall Muscles
Noncompressible appendix
>6mm diameter
dirty shadows
from normal
bowel gas
Psoas


RS
2D
82%
C 58
P Med
HRes