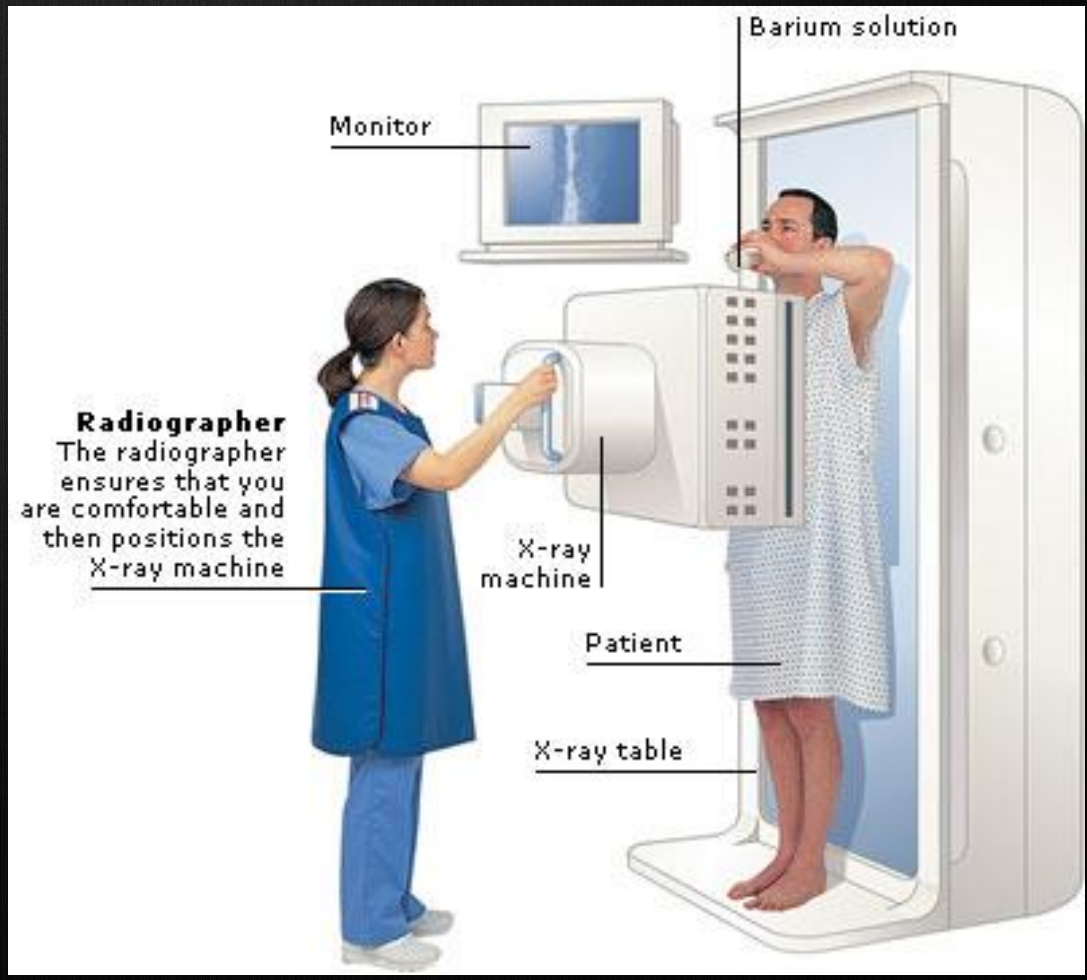
Upper GI (gastrointestinal tract)

- Real-time x-ray called fluoroscopy
- Exam is tailored to the individual patient and the clinical indication
- Barium contrast is swallowed to produce images of the esophagus and stomach



Real life example

UGI (Fluoroscopy)

- A study of a moving body structure or contrast moving through the GI tract, vessels, etc.
  - **like an** X-ray "movie."
- A continuous X-ray beam is passed through the body part being examined
- The movie is transmitted to a TV monitor so it can be viewed in real time, by the radiologist

UGI (Fluoroscopy)

- **One must be in the room to accurately interpret the exam**
  - Images are captured for reference purposes and stored
  - The movie is not stored
- Fluoroscopy is one of the oldest technologizes in radiology
- It may be of value, but its usefulness is limited by the technology
  - A 3-dimensional object (the human body) is superimposed on a 2D image
  - **One is not seeing inside of the body**
  - To see inside the human body, more advanced imaging is necessary (US, CT, MRI)

Tailored UGI

- Ensure patients safety
- Patient stands for the exam
- Patient is at risk for fall (knees can buckle)
- Reasons
  - Recent anesthesia
  - Pain medication
  - No food for over 2 days
  - Dehydration
  - Laying in be for 36 hours
  - Elderly patient

Tailored UGI

- Ensure patient's comfort
- Patients are weak with low energy
- Patients are sore and in pain due to recent surgery
- Difficult for patients to move around
  - Weak/low energy
  - Dehydration
  - Sore and uncomfortable
  - Elderly state
  - Hooked up to multiple devices and tubes (oxygen, IV, Foley catheter , etc..)

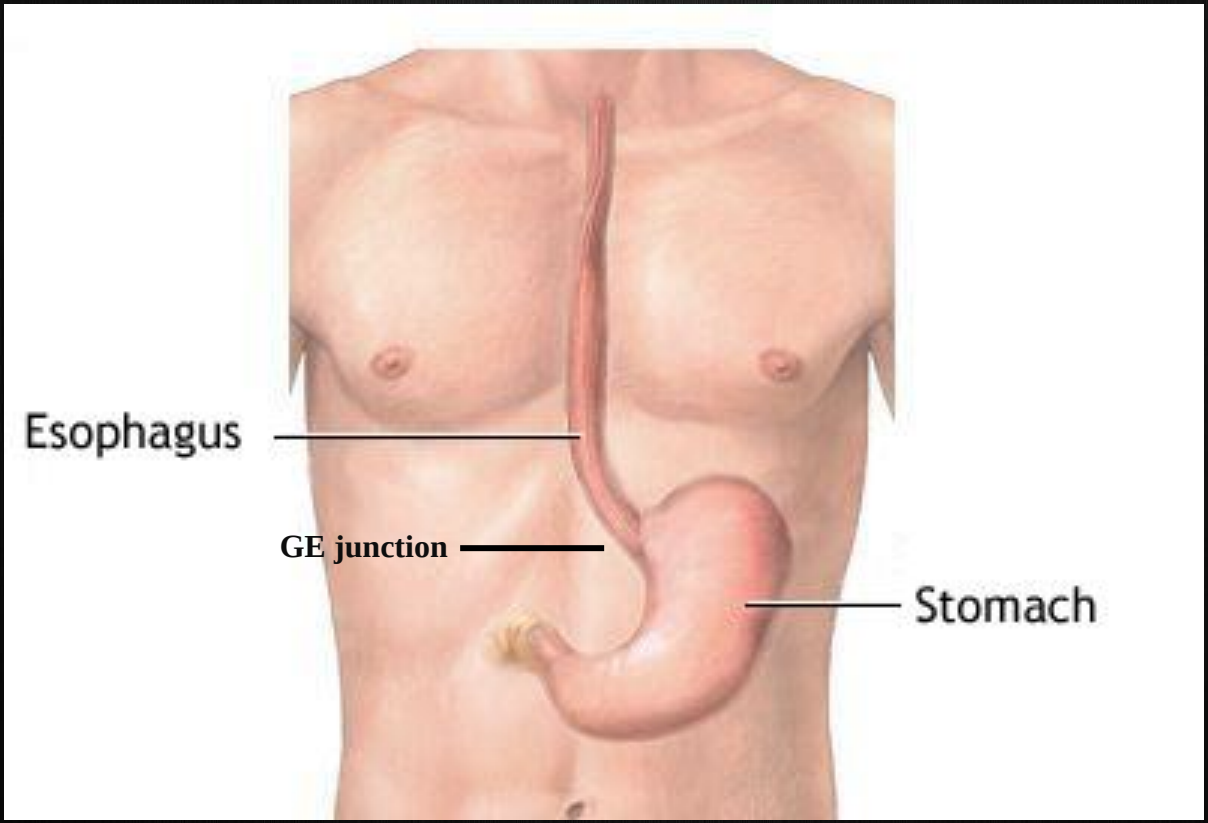
Goals of tailored UGI

- Obtain the important information as efficiently and safely as possible
- Ensure GE junction is in the expected anatomic location
- Ensure no obstruction at the GE junction (location of surgery)
- Ensure no leak of Barium at location of surgery (GE junction)
  - Barium (contrast) stays inside of the esophagus and stomach

Goals of tailored UGI

- Visualizing contrast passing into the small intestines is not as important
- Why?
  - Surgery was not preformed in this anatomic region
  - Waiting for long periods of time may be insufficient for barium to enter the small bowel, Why?
    - » It is common after surgery for the stomach to be paralyzed
    - » Surgery and Pain medication contributes to paralysis
    - » Due to the anatomy, gravity also works against one.
- If necessary, recommend more advanced imaging
  - Radiologists have multiple tools in their toolbox
  - Advanced imaging is more specific and can lead to a more accurate diagnosis

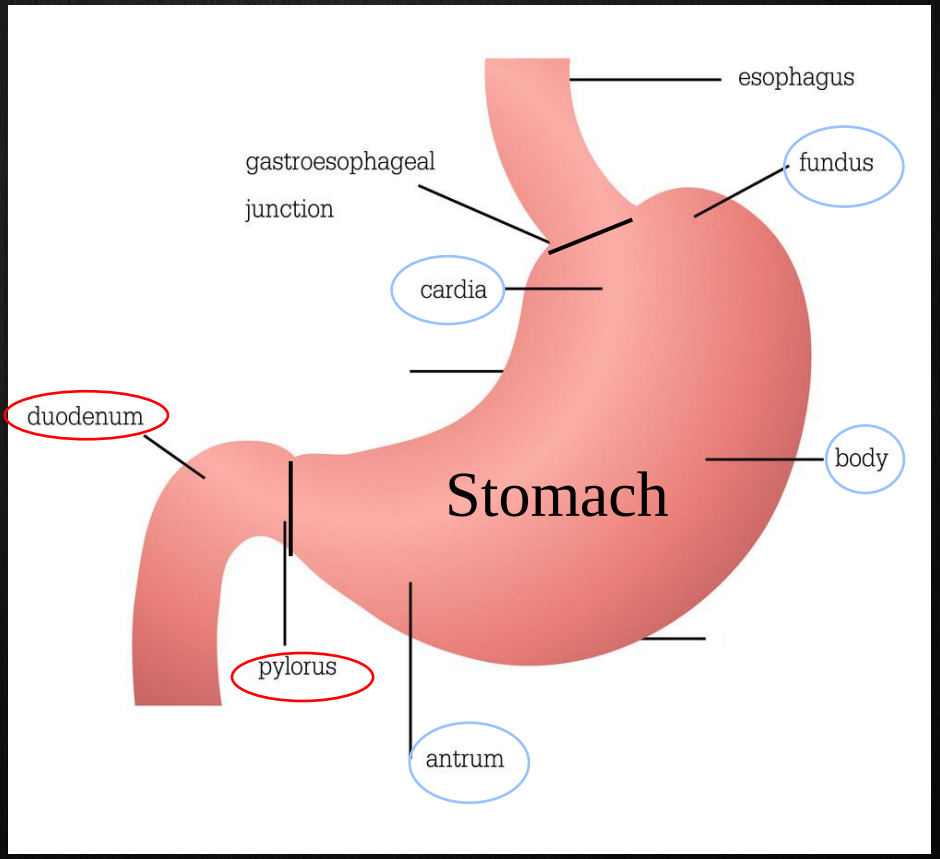
Normal anatomy



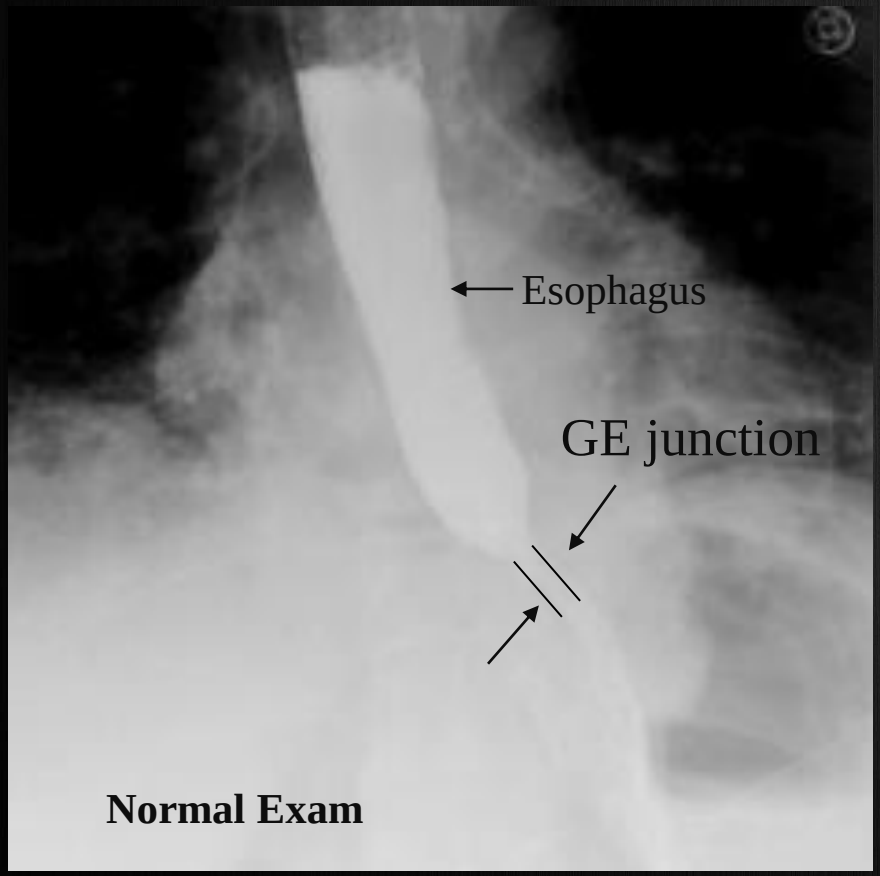
Gastro-esophageal (GE) junction
Location where esophagus meets stomach

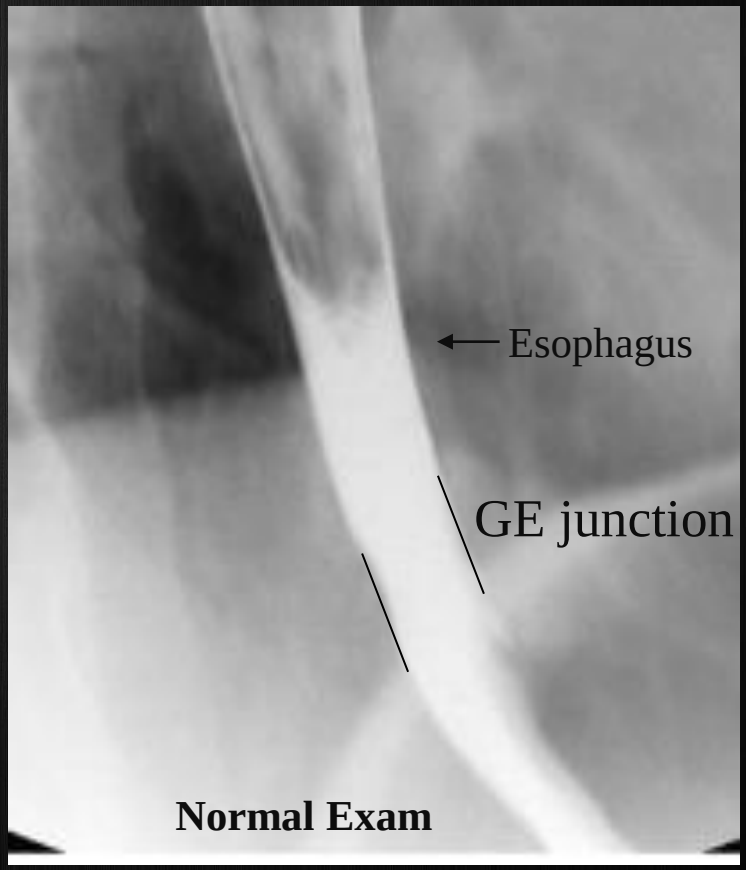
Normal stomach anatomy

- Stomach
  - Fundus
  - Cardia
  - Body
  - Antrum
- Small Bowel
  - Pylorus
  - Duodenum



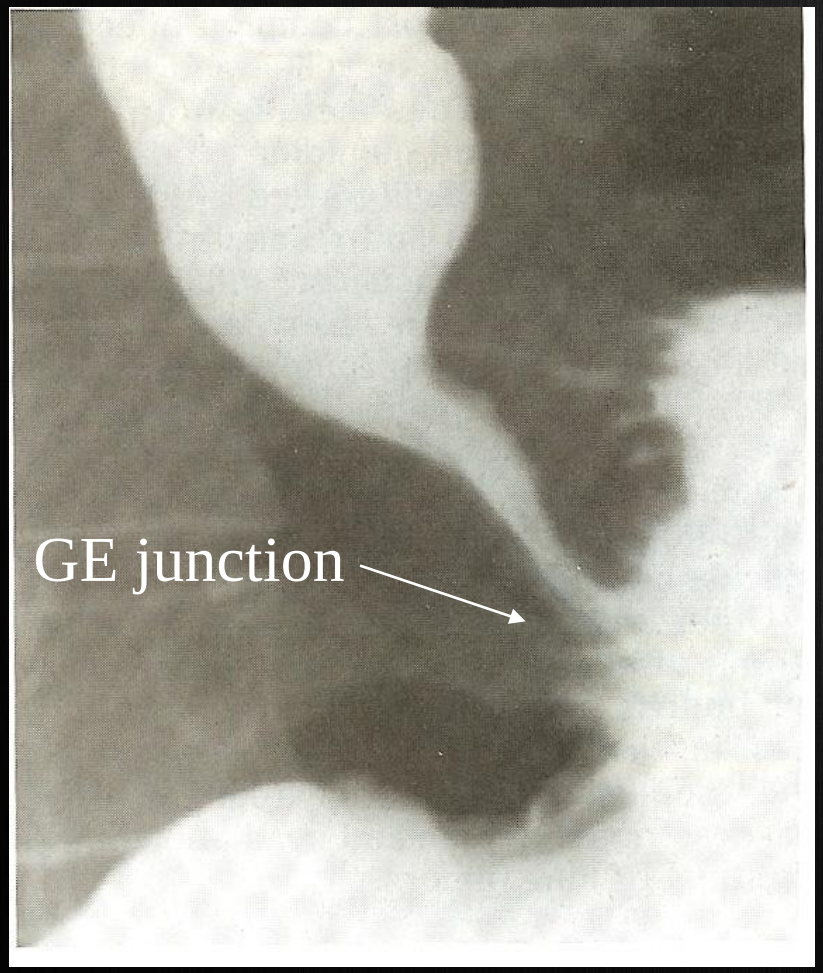
Normal GE junction



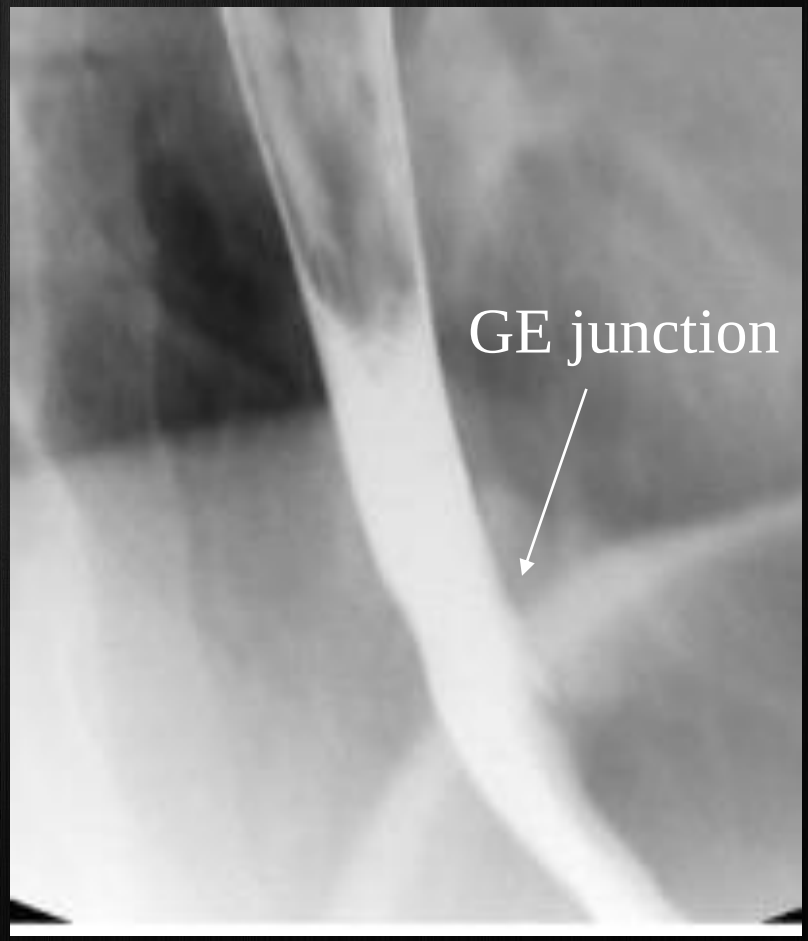


- GE junction expands and contracts
- Depending on when one takes a picture, GE junction can be of different widths
- It can be challenging to take the picture at its largest width
- **One needs to be in the room during the exam, to accurately evaluate the GE junction**

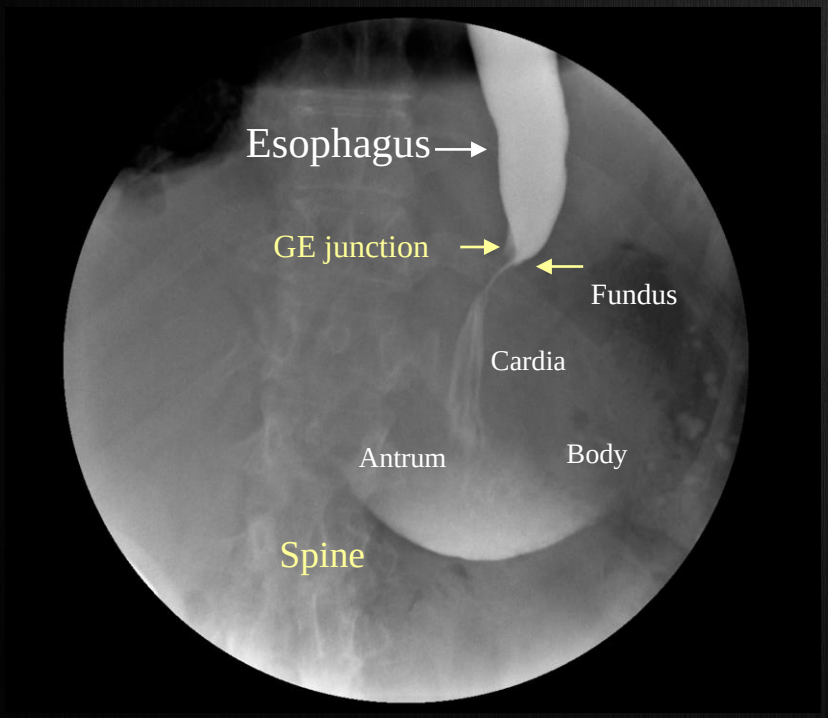
Normal GE junction after hernia repair

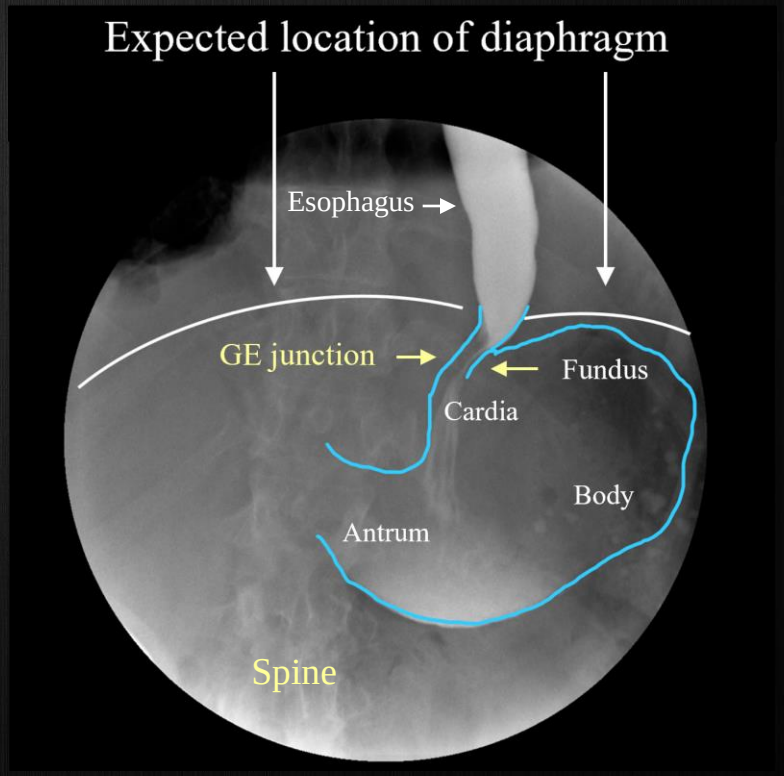


Normal GE junction in healthy patient with no prior surgery

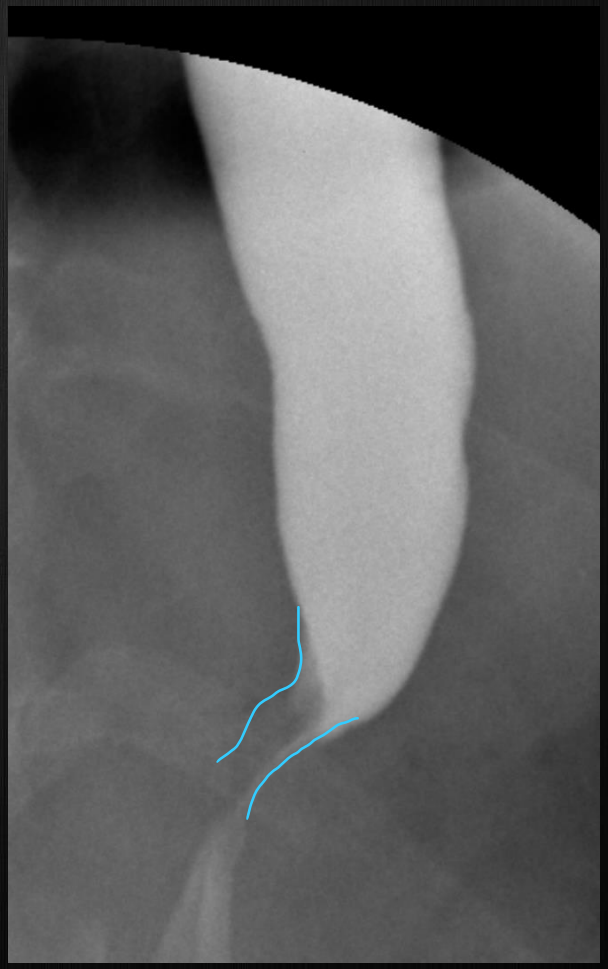


Current case image

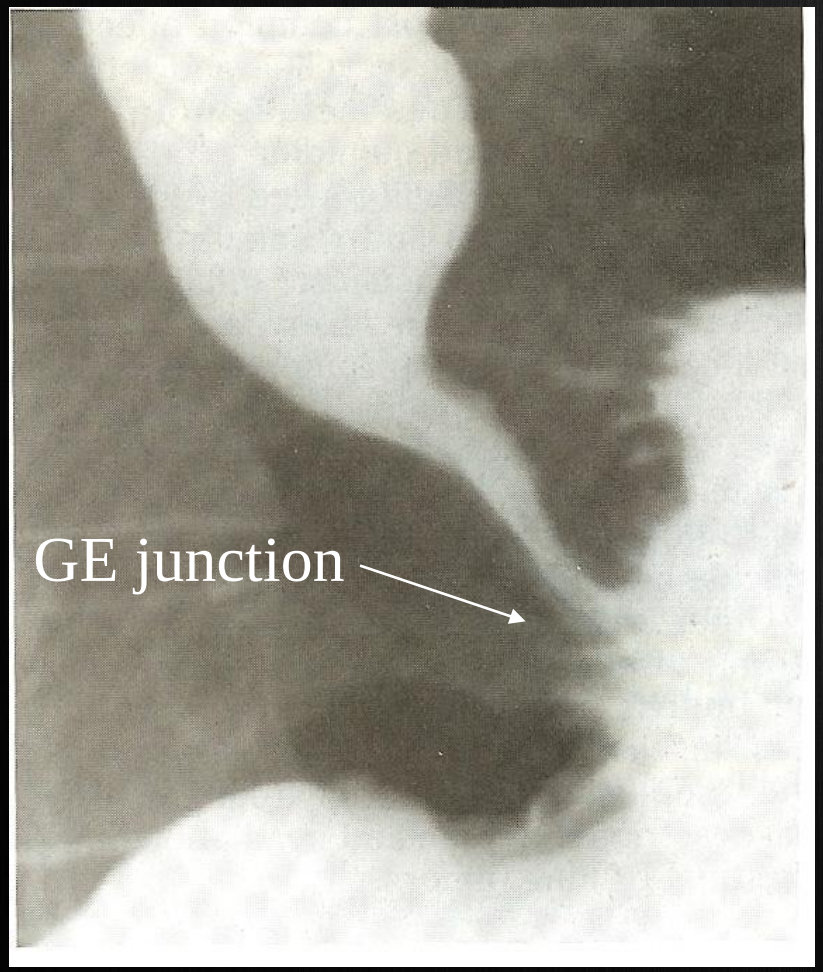




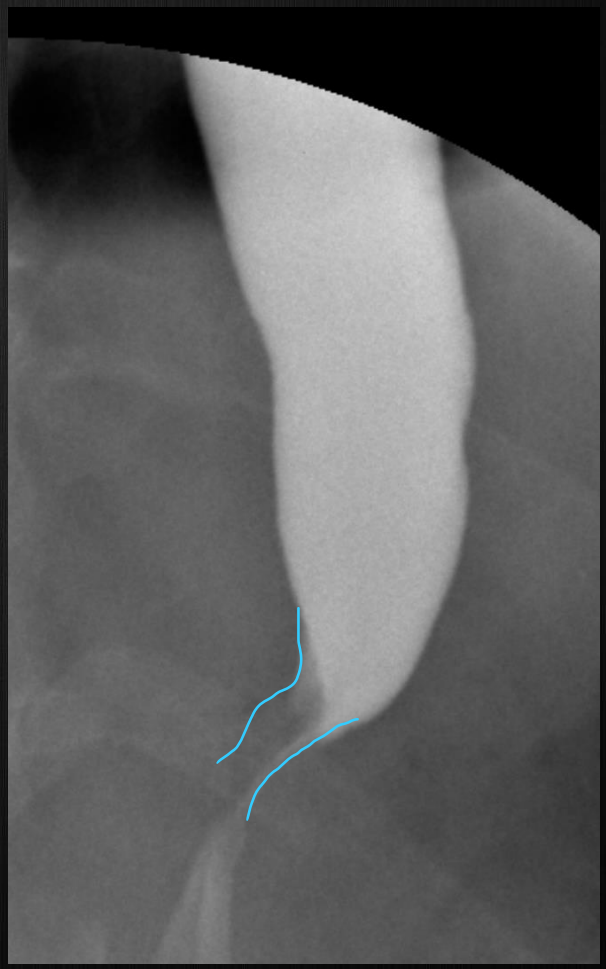
Ge junction (current case)



GE junction

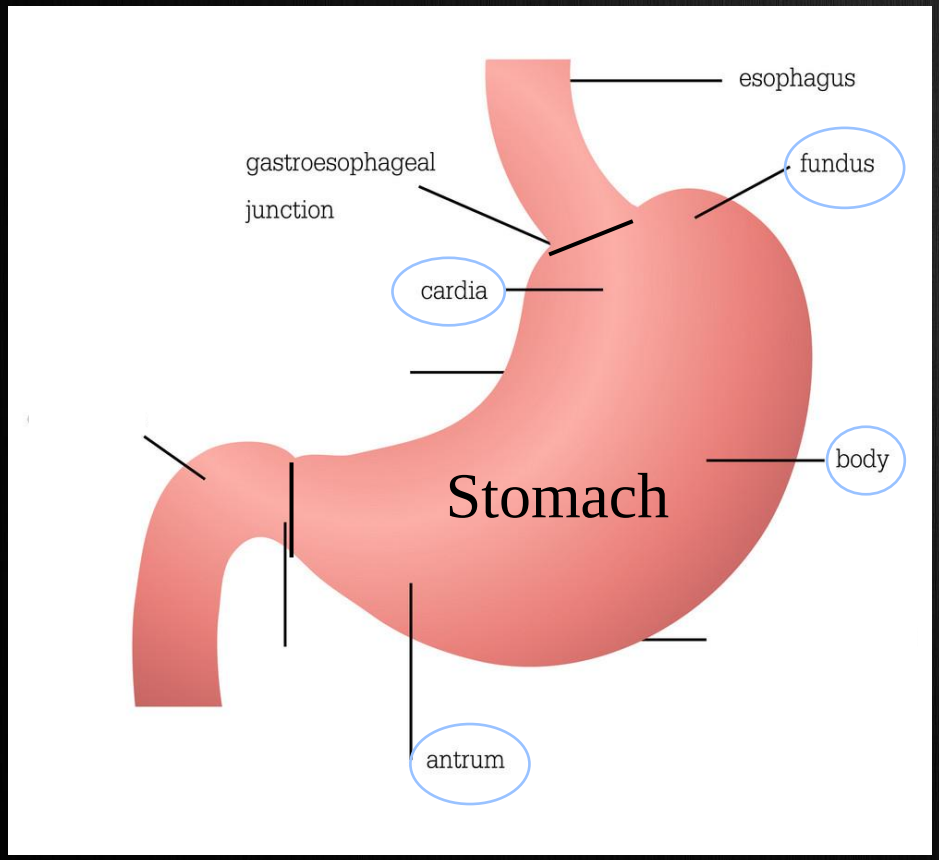


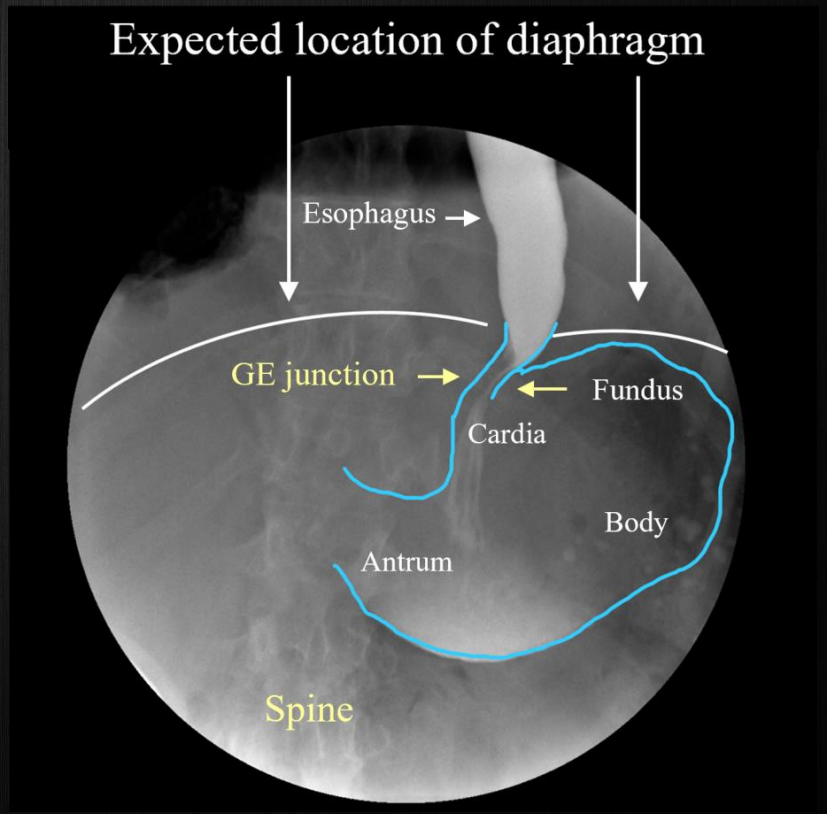
Normal post op GE junction



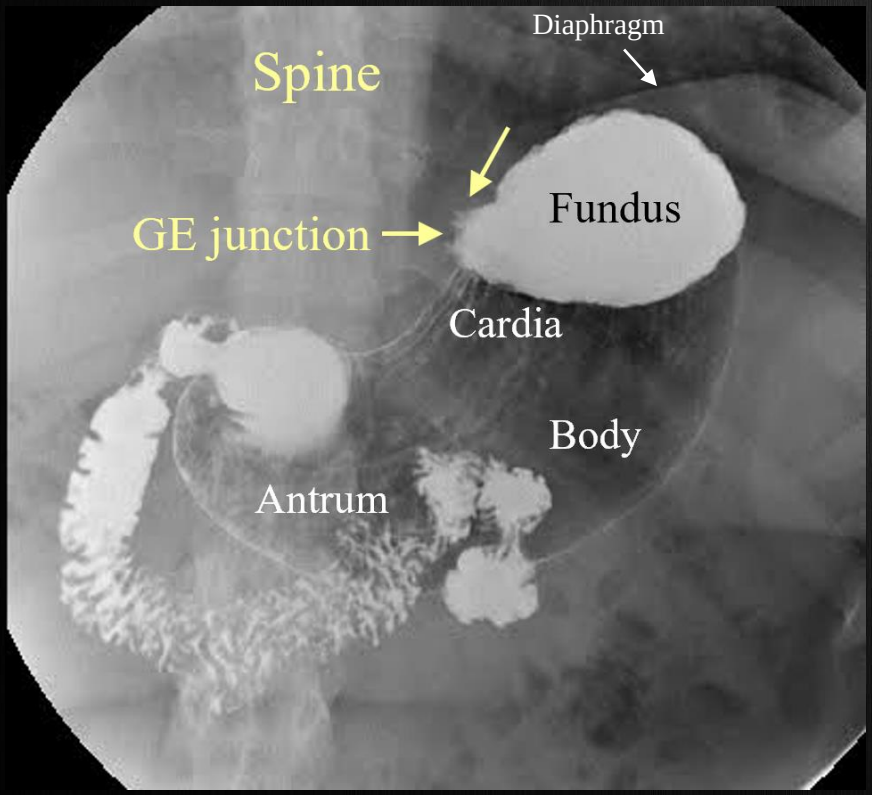
Current case

Current case image vs normal anatomy

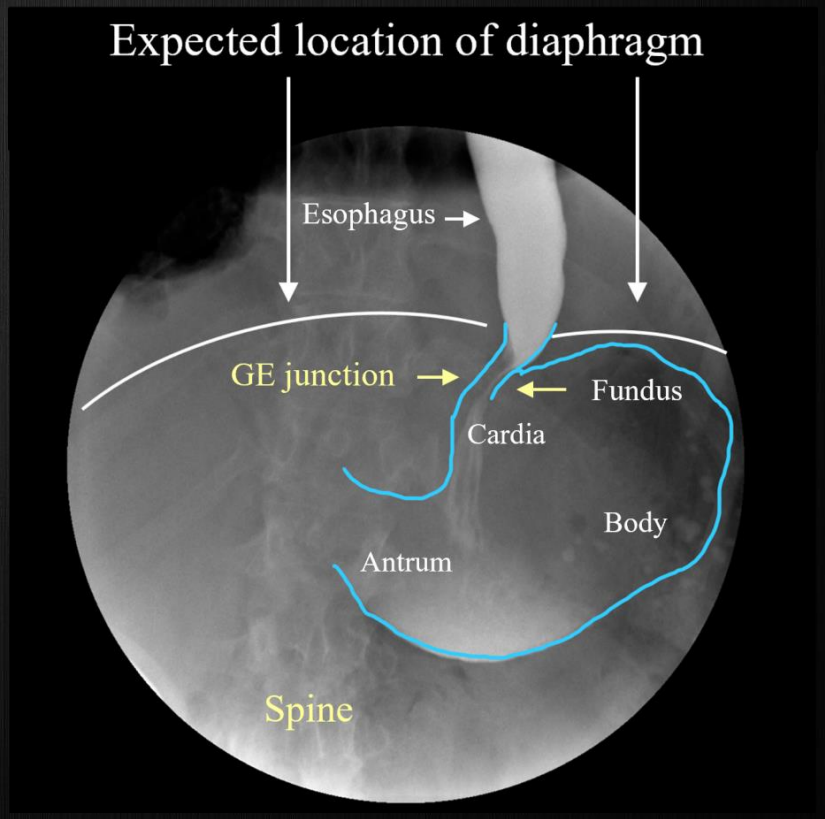




Current case image vs normal anatomy



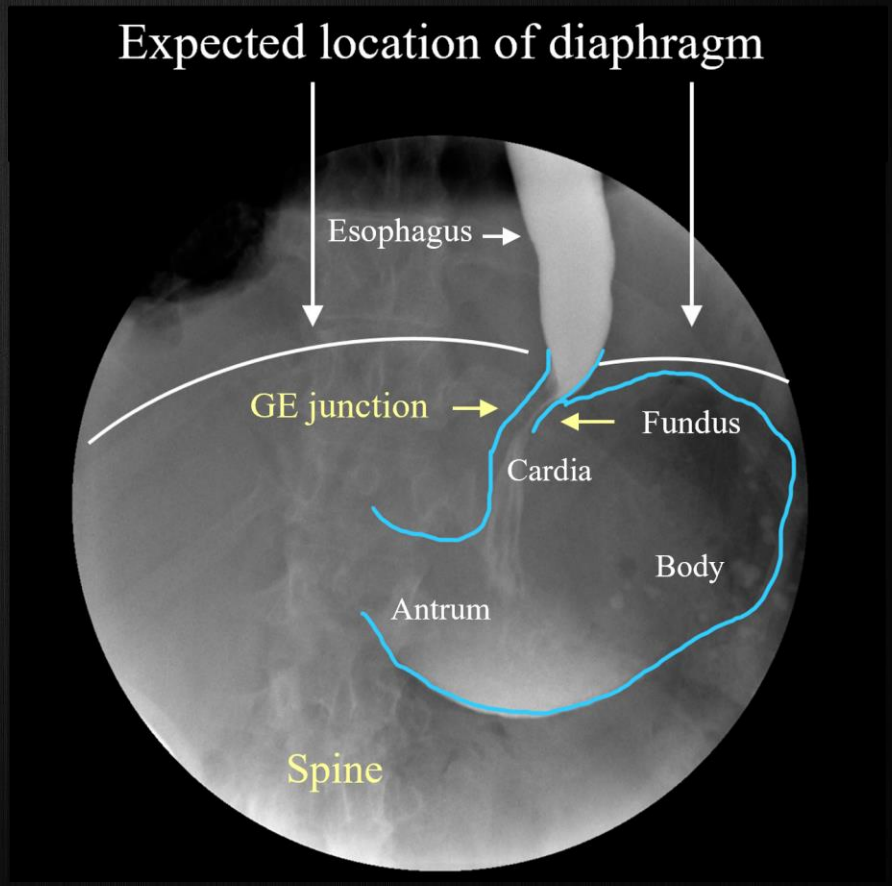
Normal anatomy



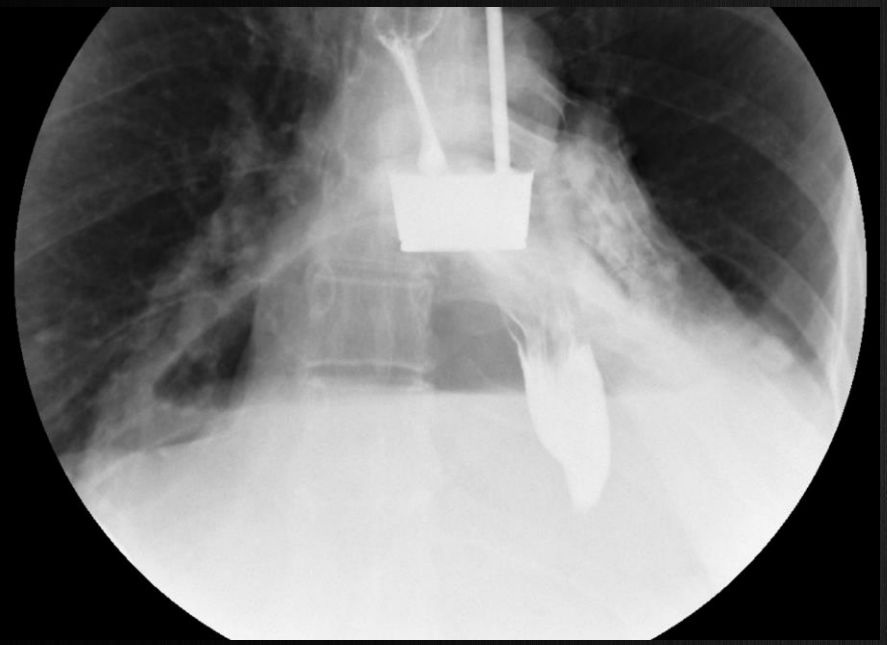
Current case

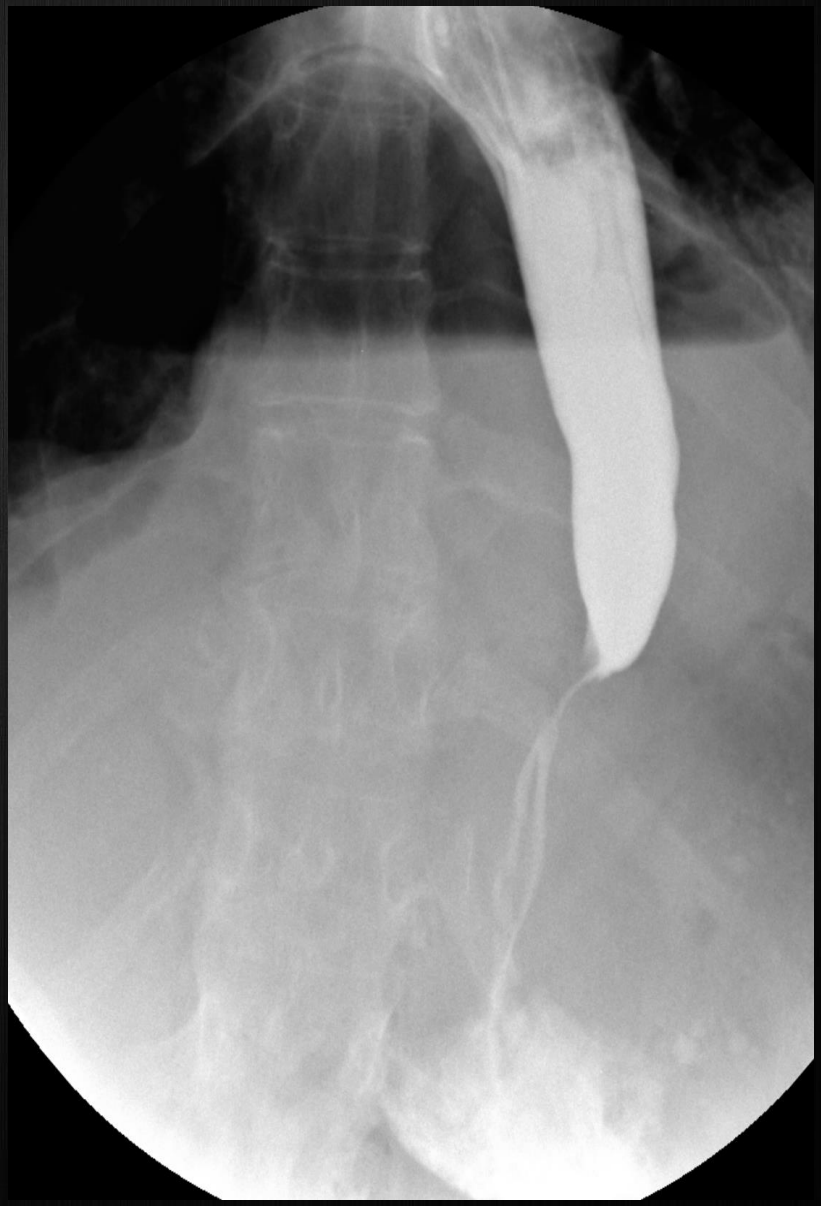
Goals of tailored UGI met

- Important information was obtained as efficiently and safely as possible
- GE junction is in the expected anatomic location
- There is no obstruction at the GE junction (location of surgery)
- There is no leak of Barium at location of surgery (GE junction)
- Advanced imaging was recommended for a more accurate diagnosis, based on an unexpected finding



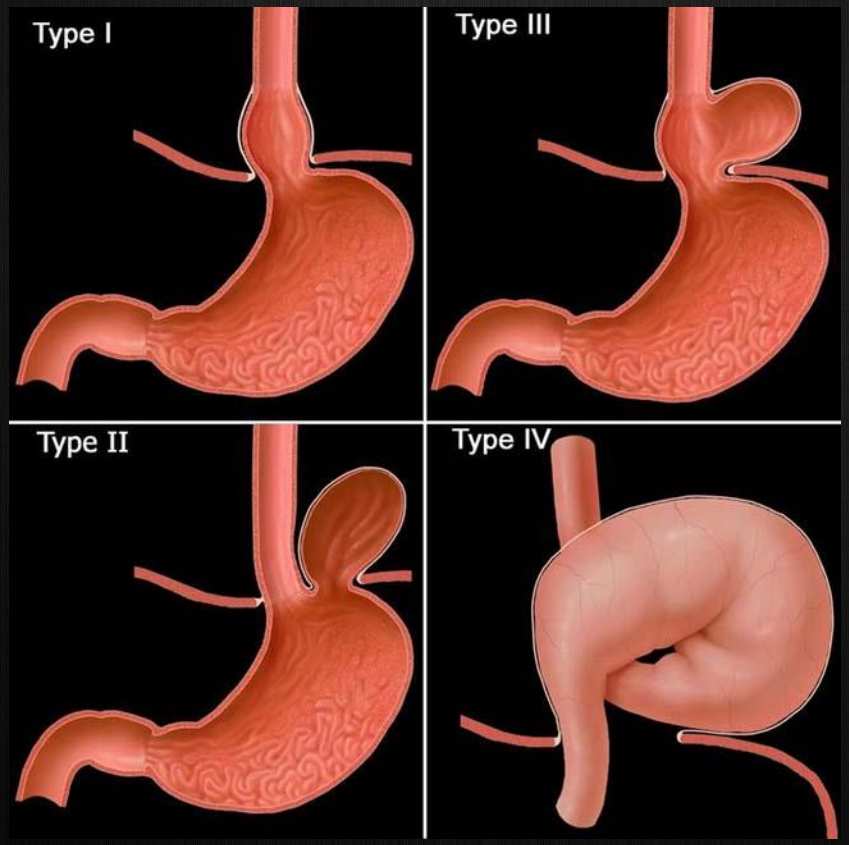
CT Recommended





- 10:00 AM
  - Exam preformed
- 10:48 AM
  - Study signed and flagged as significant
- 11:05 AM
  - Team/nurse contacted and notified.

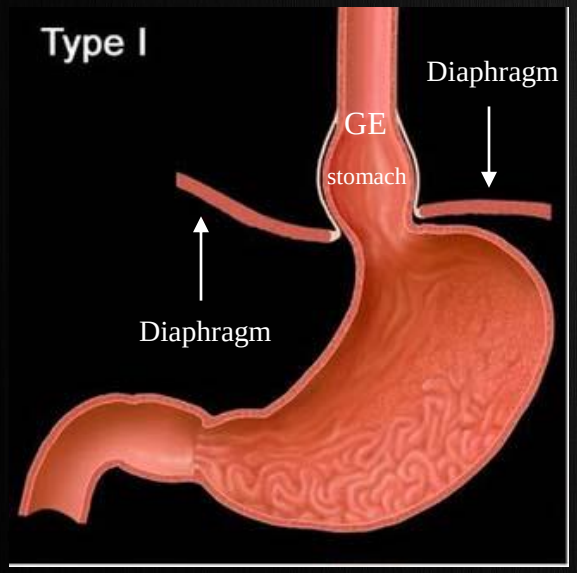
Types of hiatal hernias

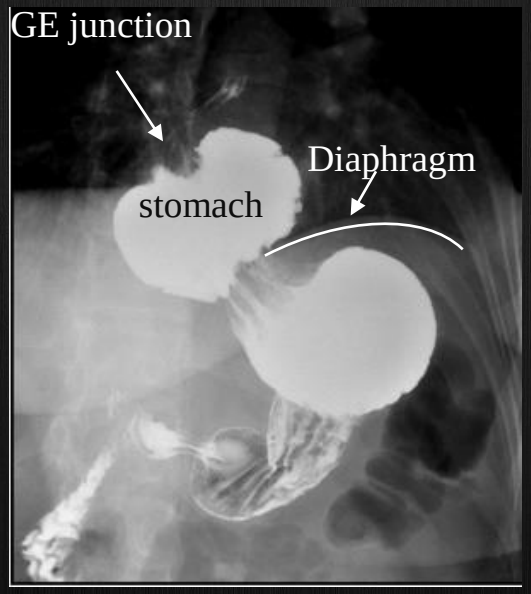


Case in question does not meet any of the criteria for any of the 4 types

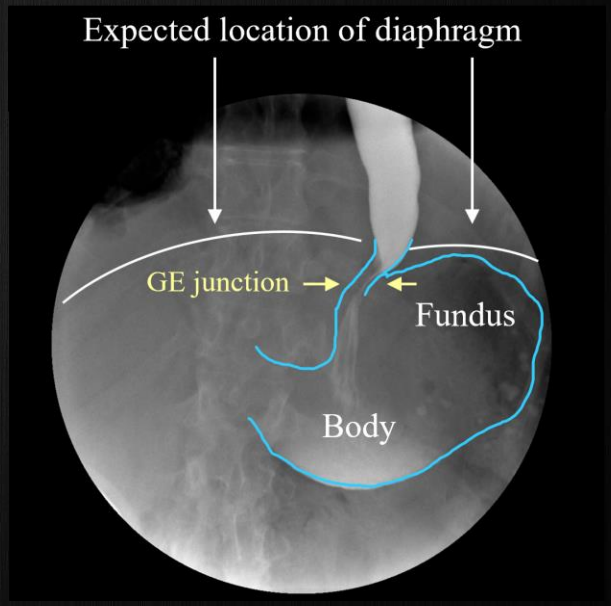
Type 1 (sliding)

GE junction is displaced upwards





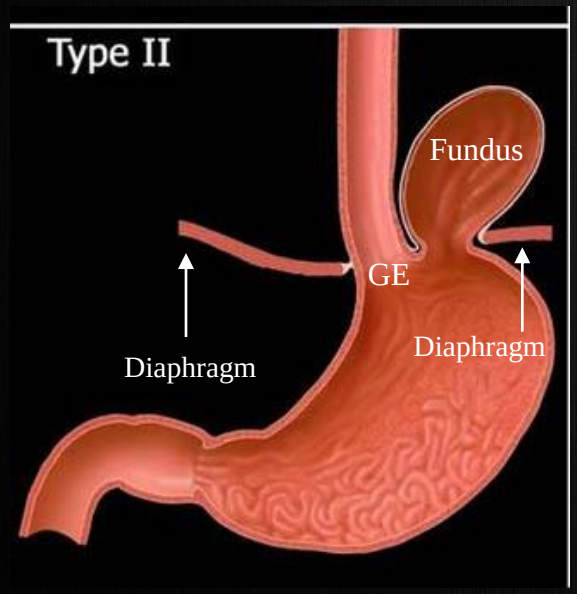
Type 1 example

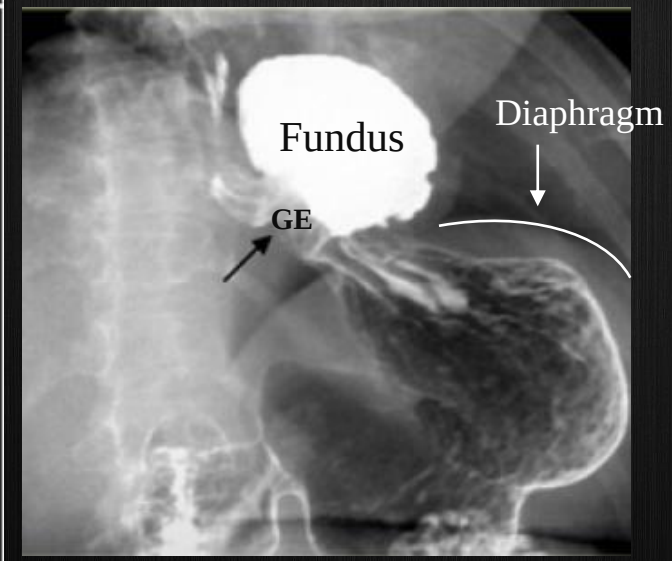


Current case

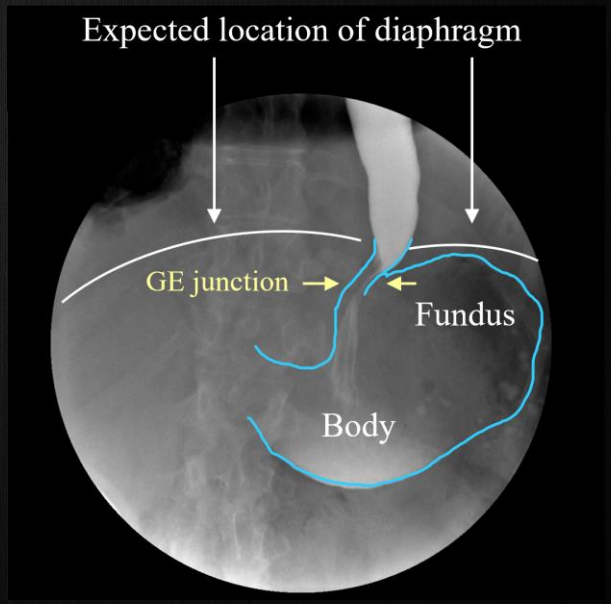
Type 2 - Paraesophageal (rolling)

Fundus herniates upwards





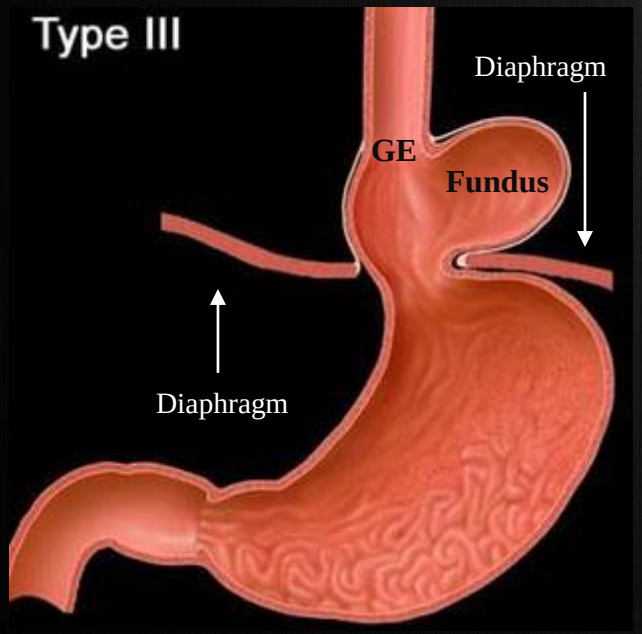
Type 2 example

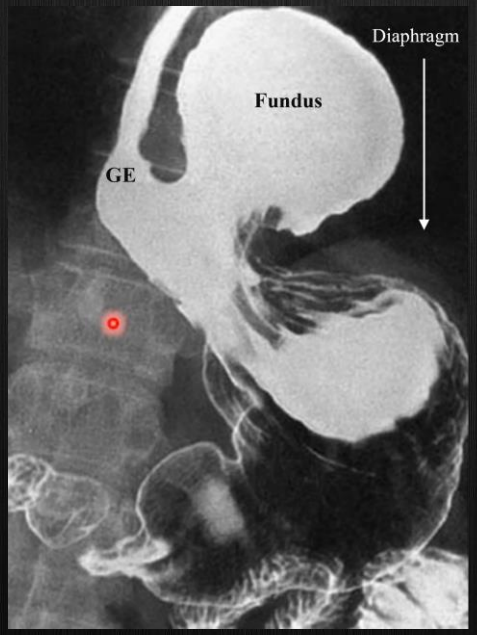


Current case

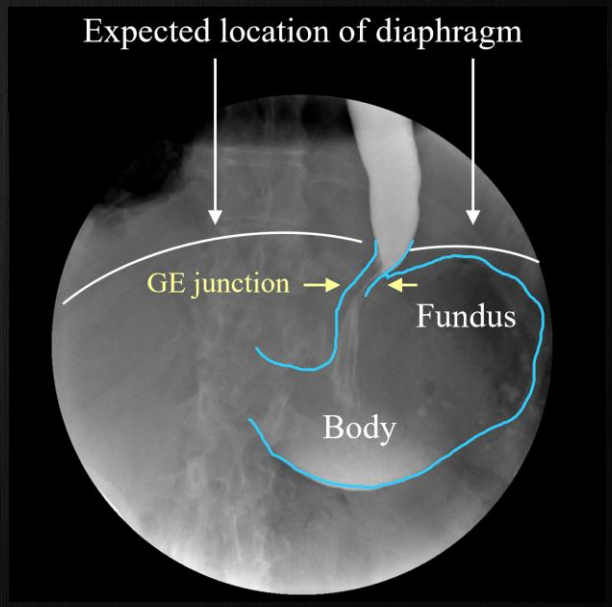
Type 3 (mixed)

GE junction and fundus herniate upwards





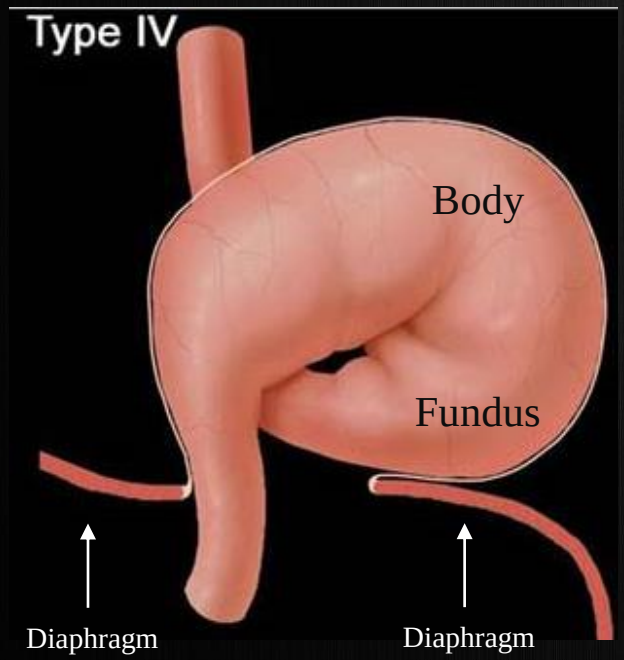
Type 3 example

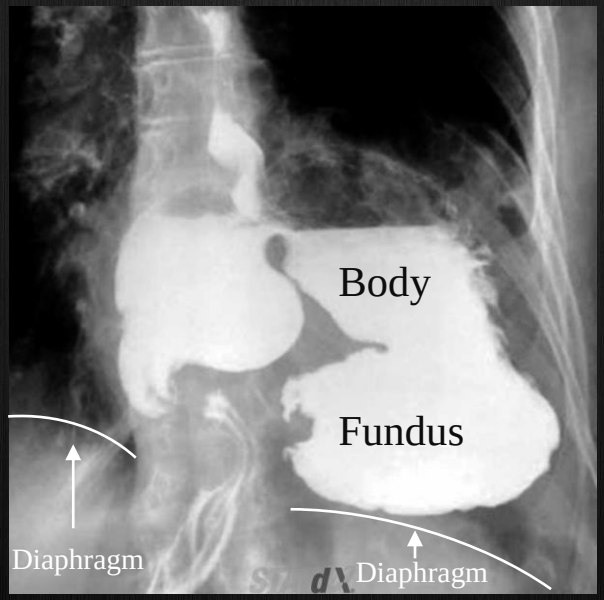


Current case

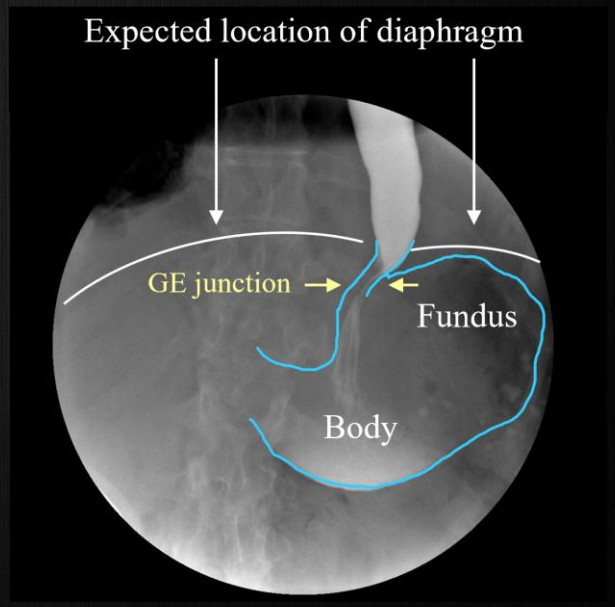
Type 4 (intrathoracic stomach)

Entire stomach is in the chest
Stomach commonly flips upside down





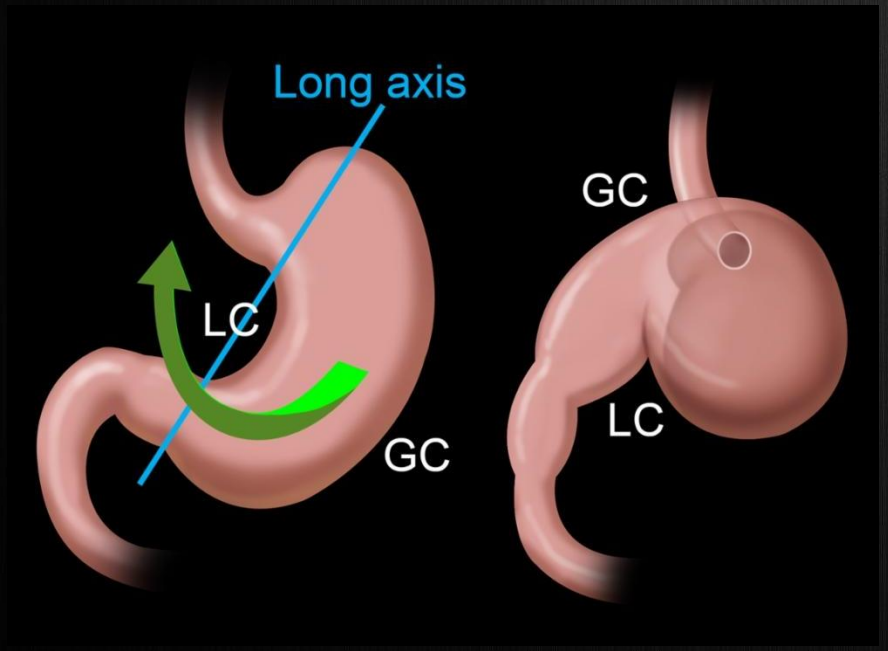
Type 4 example



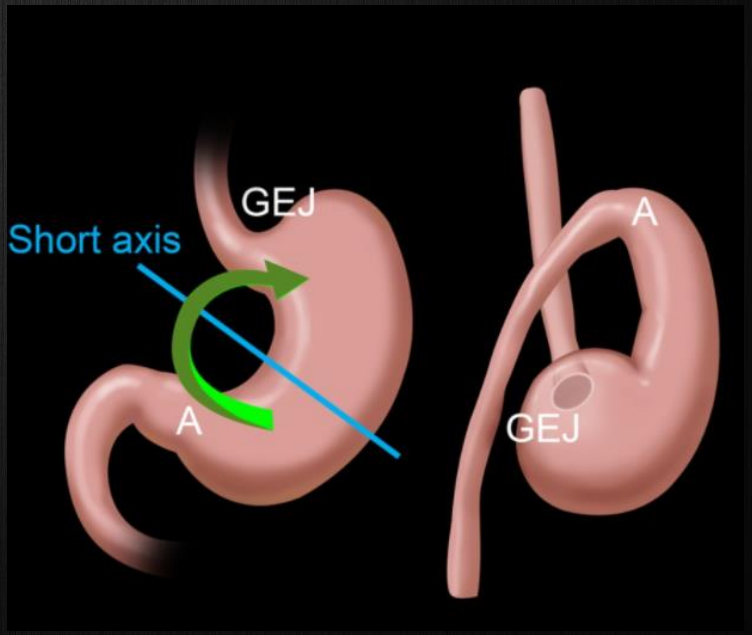
Current case

Stomach (gastric) volvulus -2 types

Organoaxial: Flips upside down

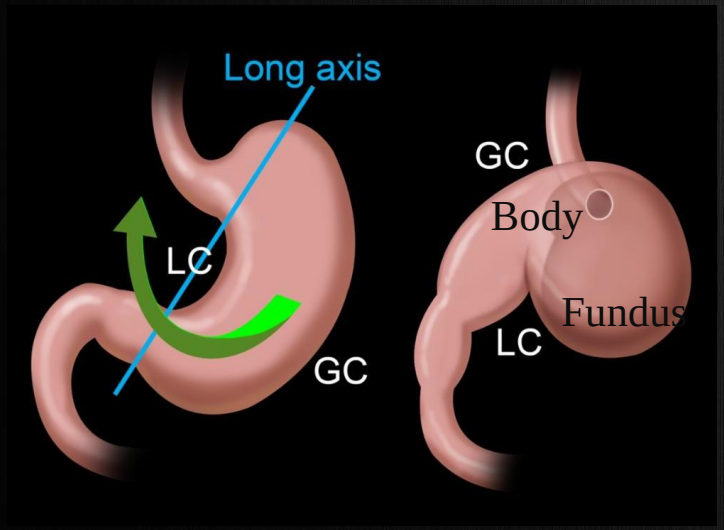


Mesenteroaxial: Flips right >> left
Rare in adults

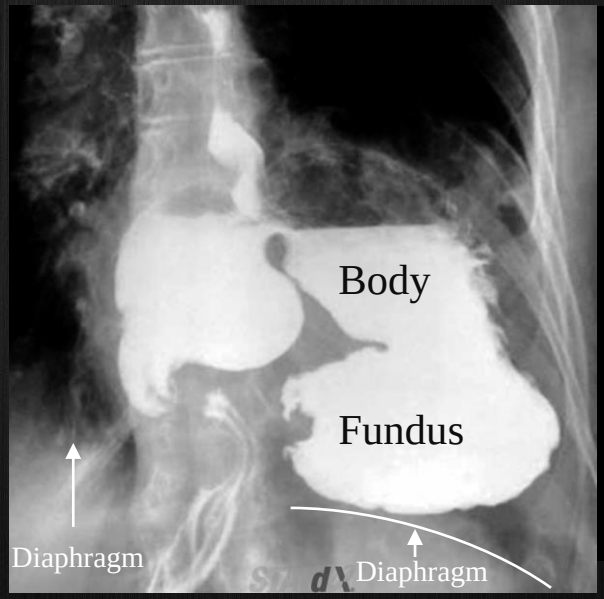


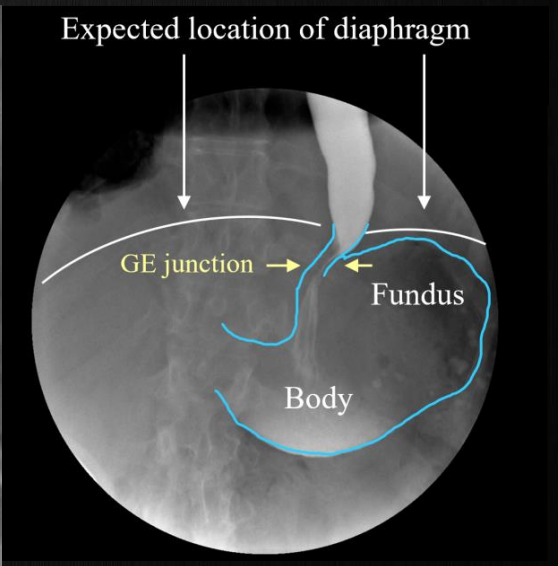
No evidence of either type in the case in question

Organoaxial



Organoaxial Schematic

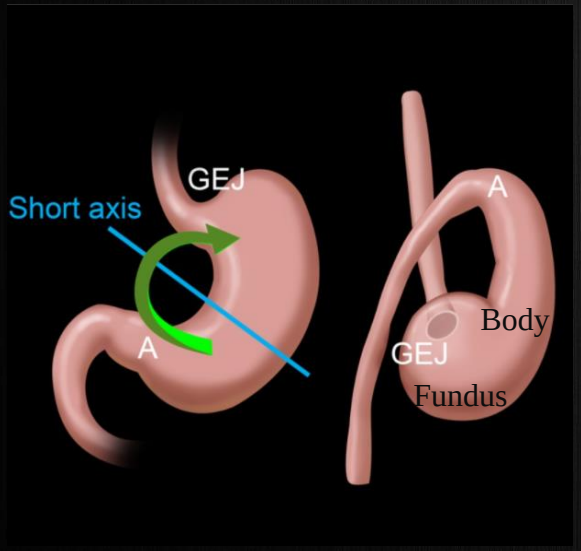




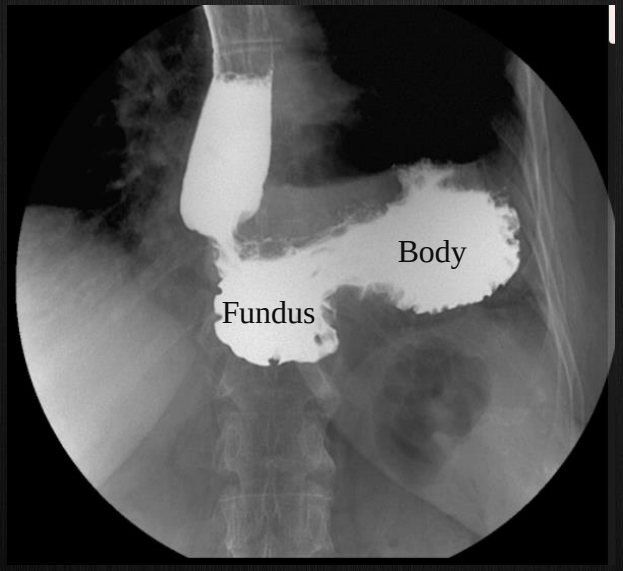
Current case

Organoaxial example
Entire stomach is in the chest
Stomach is flipped upside down

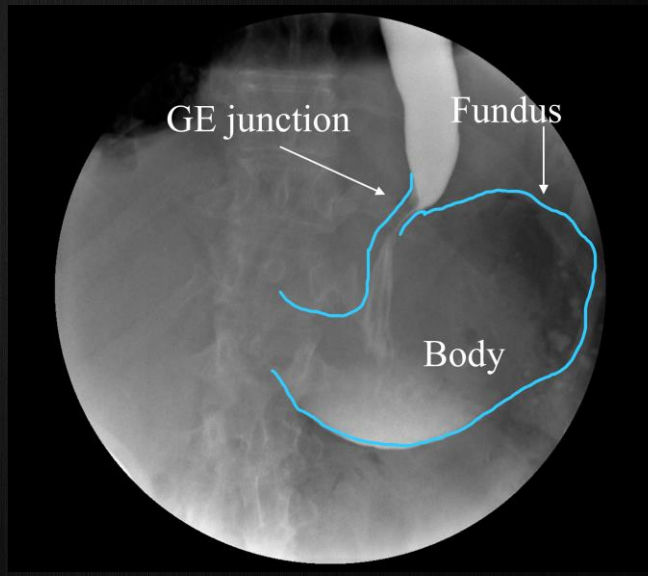
Mesenteroaxial (rare in adults)



Mesenteroaxial Schematic

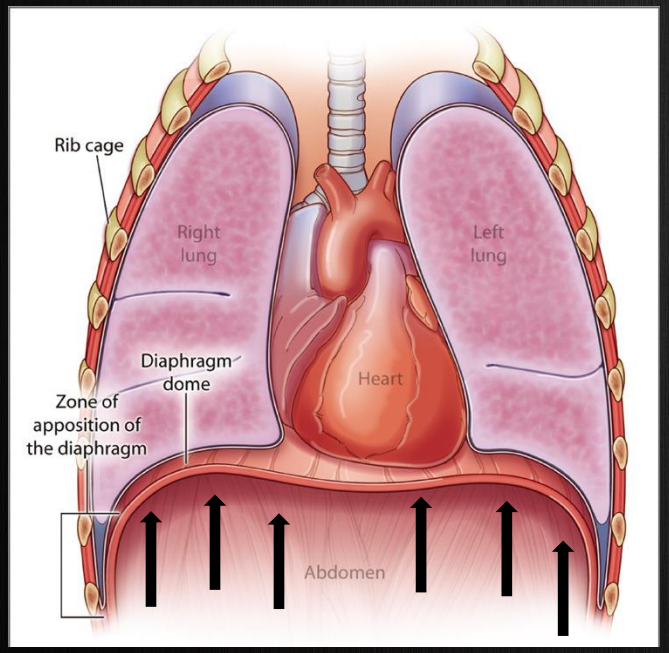


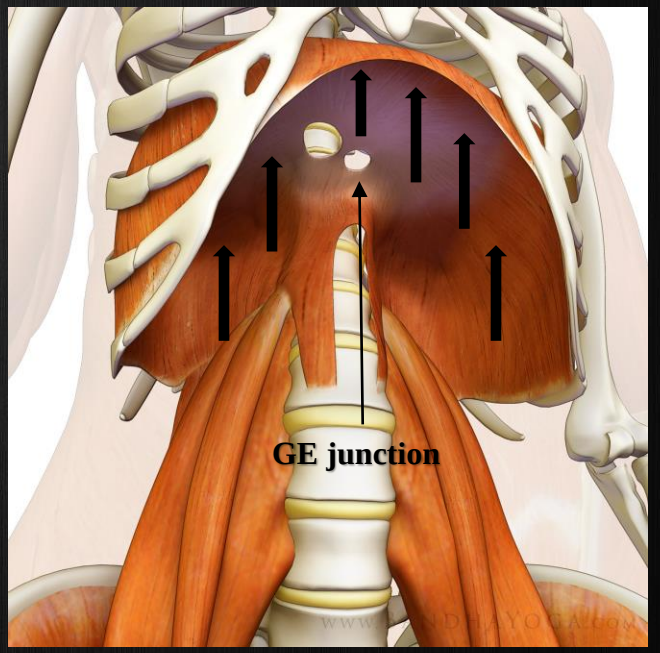
Mesenteroaxial example
Stomach flips right >> left



Current case

Diaphragm





Diaphragm is one muscle with 2 domes