Boerhaave Syndrome and Esophageal Stricture

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Rad 4001

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Clinical History

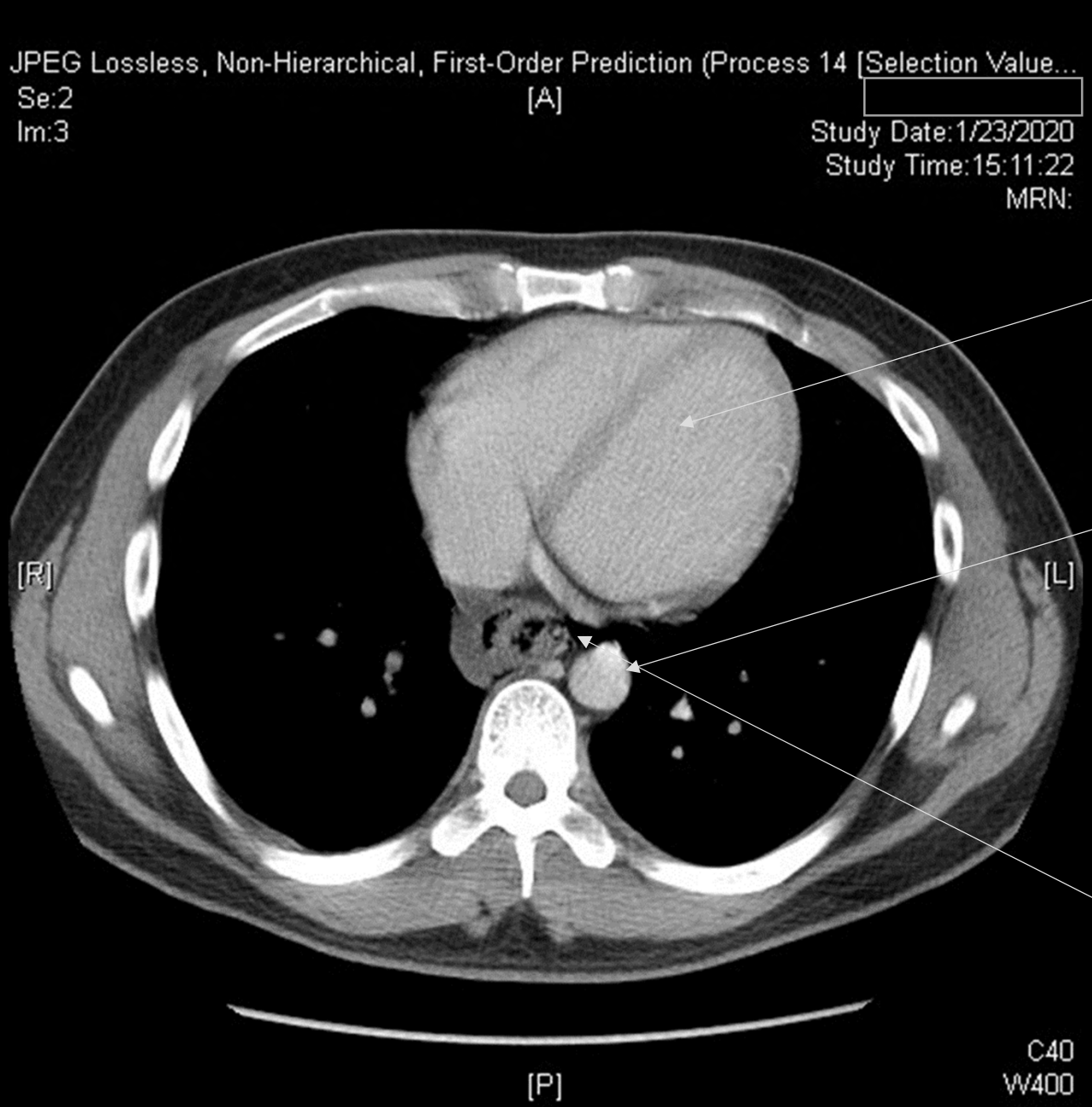
- 28 year old M w/ a 10 yr history of dysphagia presented to an Urgent Care Center after experiencing sharp chest pain while eating his lunch and “burping”
- The patient notes that he uses a “burping motion” to swallow his food
- Liquids are easier to ingest as compared to solids especially meats
- During this time the patient vomited food as well as blood, given concern for esophageal tear patient was transferred to Memorial Hermann

Vitals / Physical

- T: 97.4
- HR: 57
- RR: 18
- BP: 114/77
- SpO2: 95%
- WT: 87.73
- Physical Exam: WNL

Initial Management

- At the urgent care center a CT Chest/Abdomen was ordered
- Given concern for esophageal rupture the patient was transferred to Memorial Hermann for HLOC and made NPO
- IV antibiotics initiated

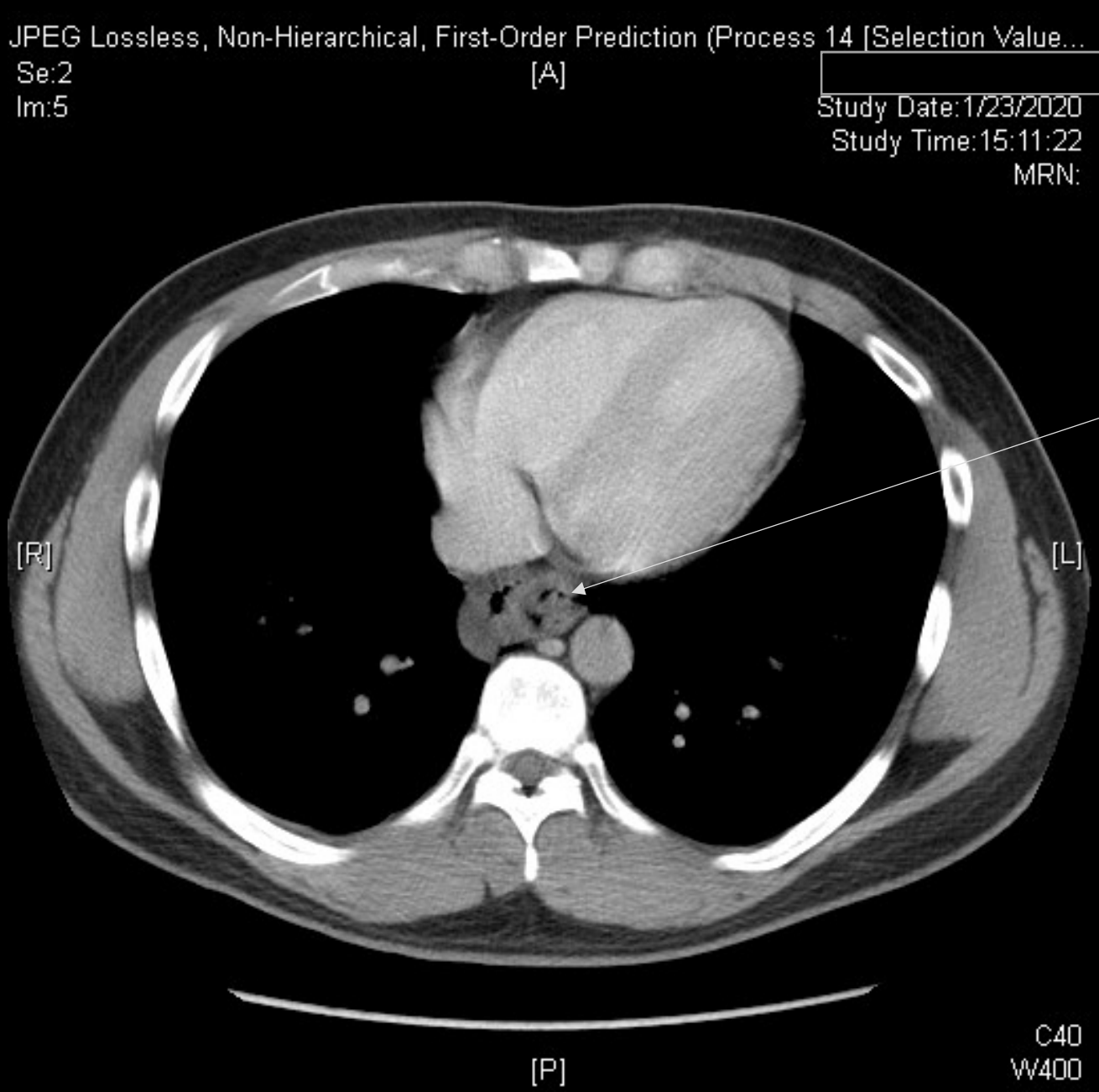


Initial CT imaging

Heart

Aorta

Suspected perforation in esophagus



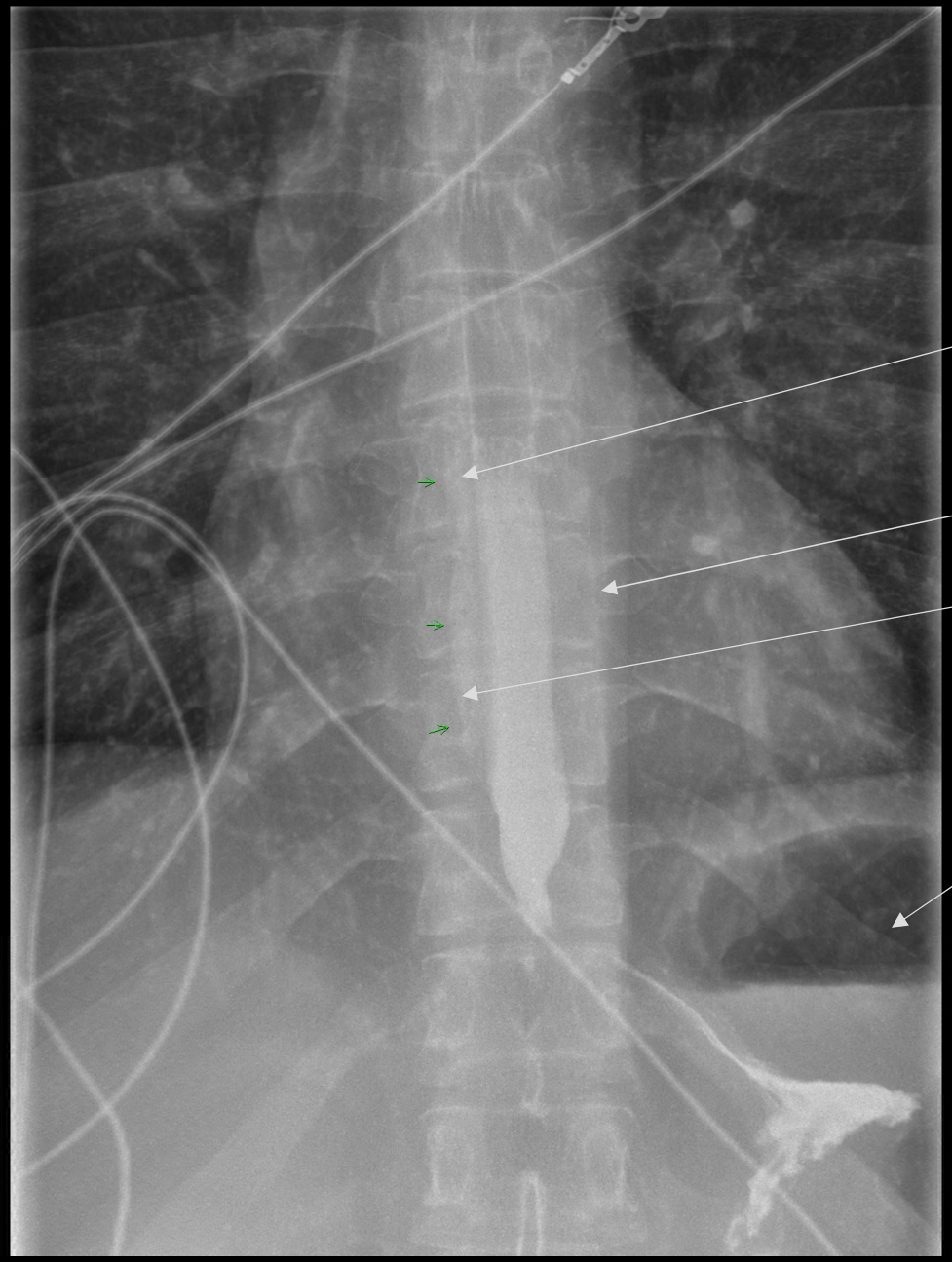
Initial CT imaging

Evidence of double lumen of esophagus demonstrating either a complete or partial tear

Given the suspicion for an esophageal tear the next diagnostic modality utilized was a barium study/ upper GI series.

Teaching Point : Solubility of contrast agent

- When evaluating for suspected esophageal perforation a water soluble contrast agent should be utilized
- Given the caustic properties of Barium, if it is leaked into the mediastinum it can cause inflammation
- Water soluble agents such as Omnipaque should be used in these cases
- Caution should still be exercised with water soluble agents as aspiration of these high osmolality agents has been associated with pulmonary edema and death



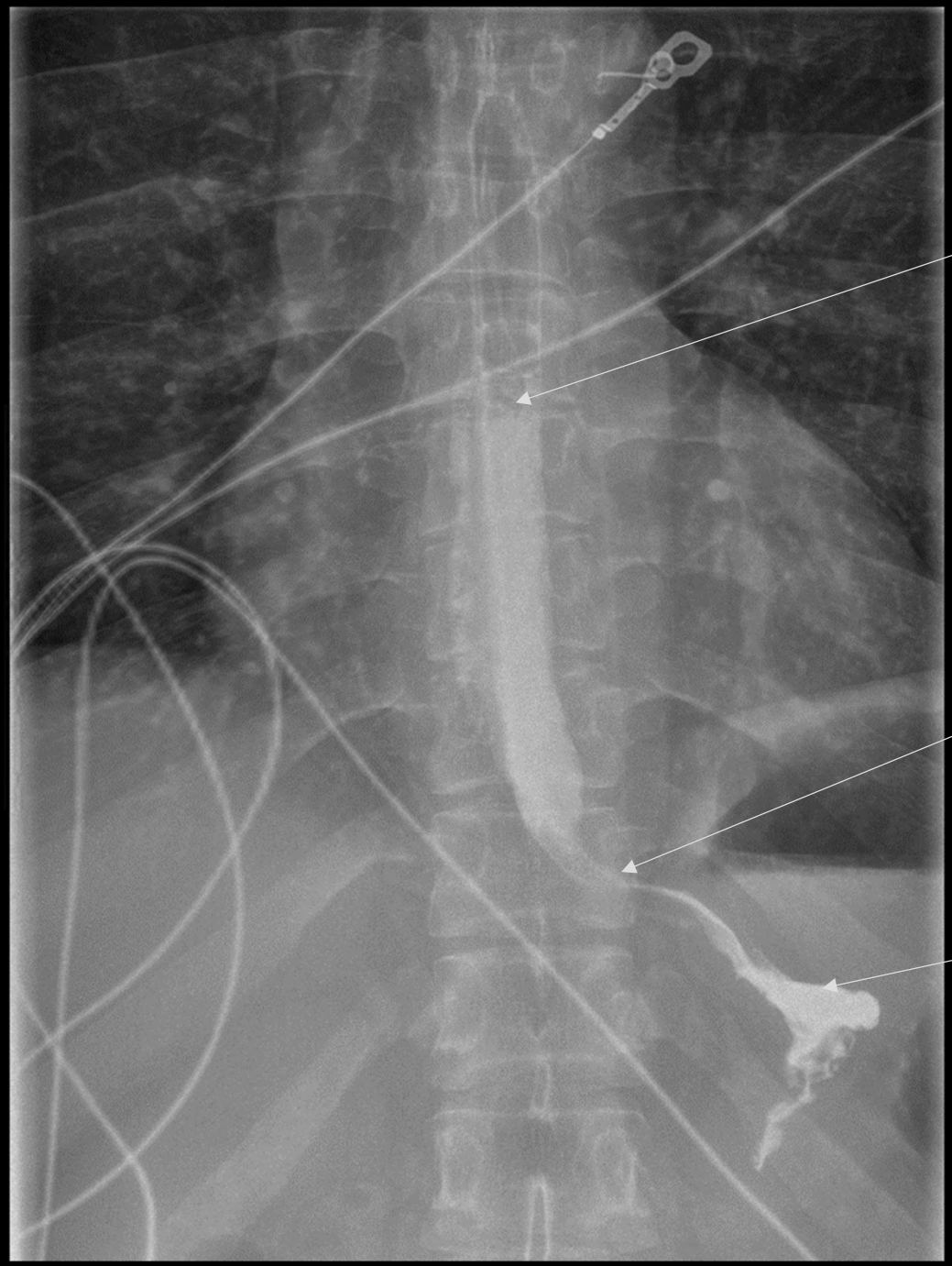
Barium Study

Green arrows identify a pooling of Omnipaque parallel to the esophagus indicating a dissection within the mucosa.

Thoracic spine

Parallel chamber opacified with contrast

Stomach Gas Bubble



Barium Study

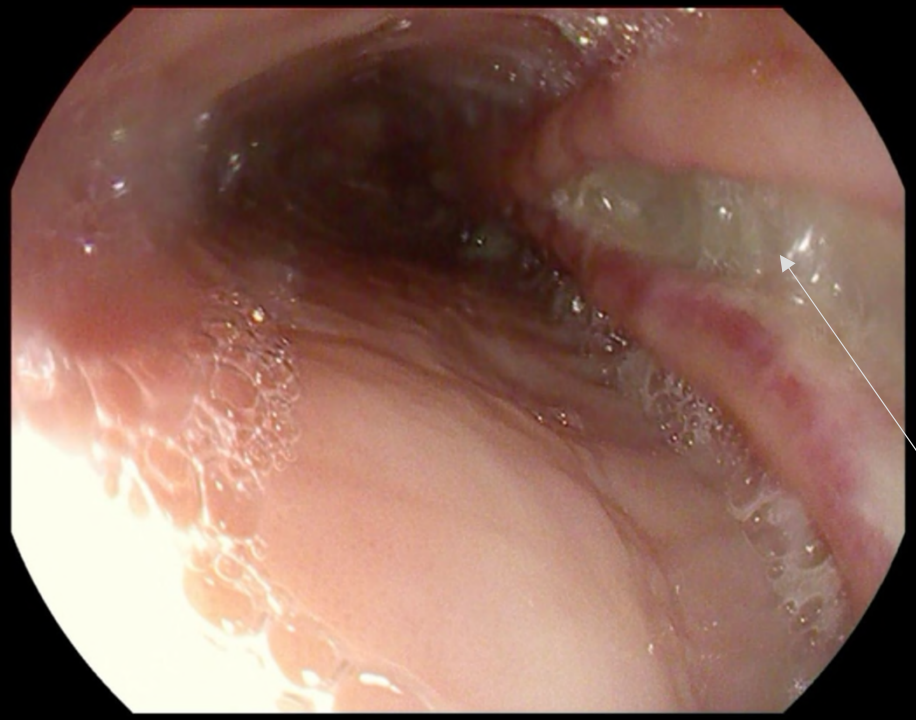
Transition point of barium flow

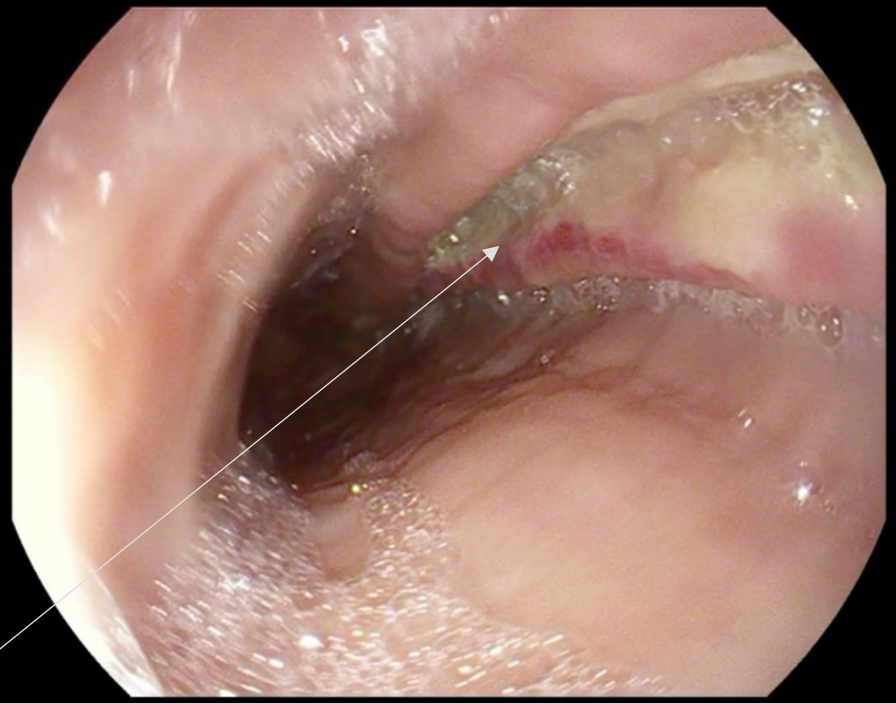
Narrowing of esophageal lumen as well as decreased filling with barium suspicious for esophageal stricture.

Barium accumulation in stomach

Given the presence of esophageal tear and stricture endoscopic evaluation will be required

EGD



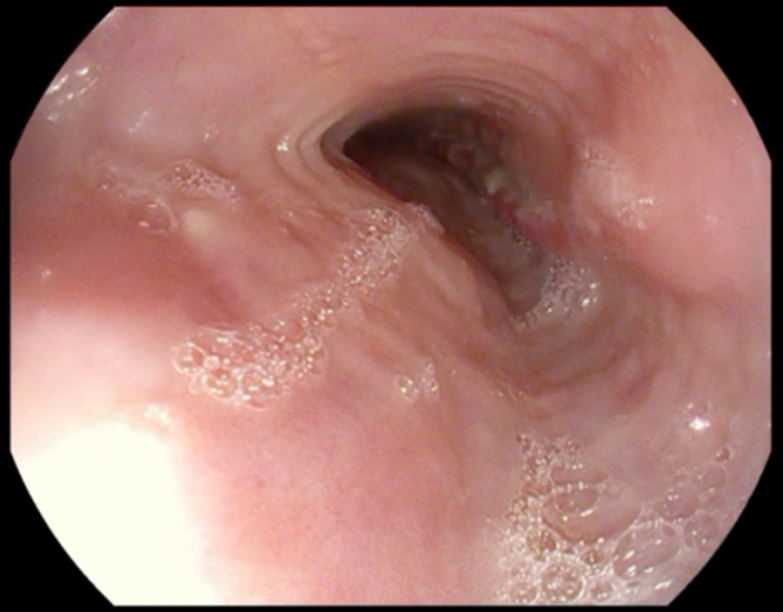


Linear Esophageal ulcer and tear

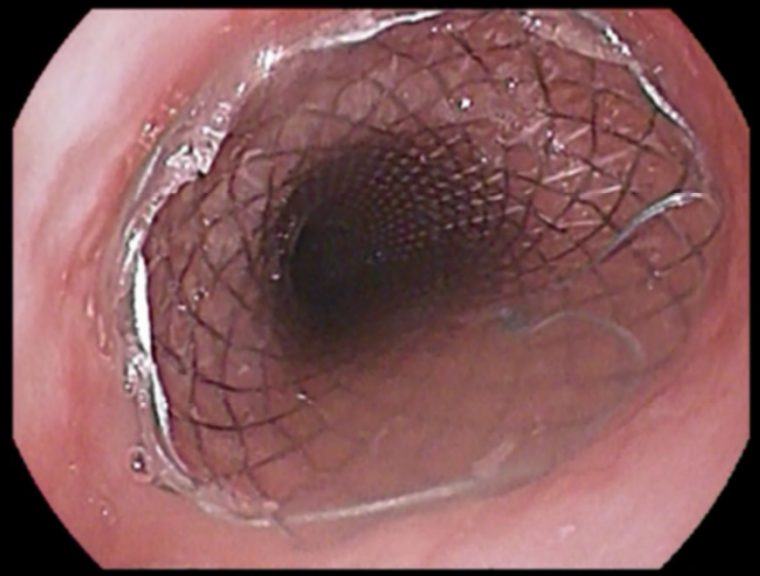
Endoscopic evaluation is consistent with the upper GI series, the tear is seen as well as a long linear ulcer.

In general EGD is contraindicated when there is a suspected esophageal rupture, however due to the absence of contrast leakage in the UGI Series a complete luminal rupture could be excluded and EGD and endoscopic intervention were deemed safe.

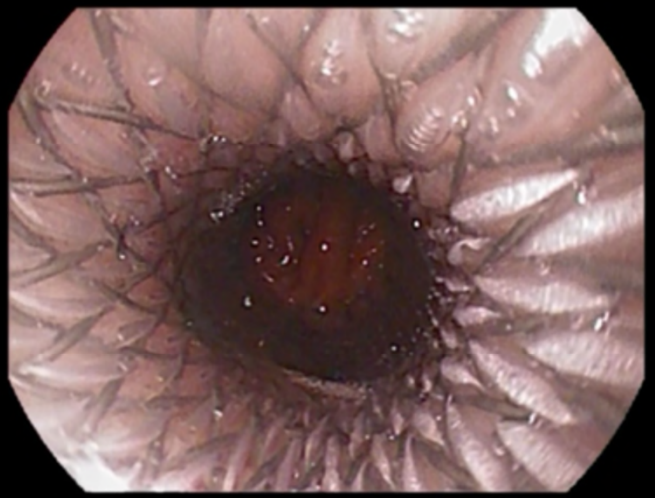
EGD



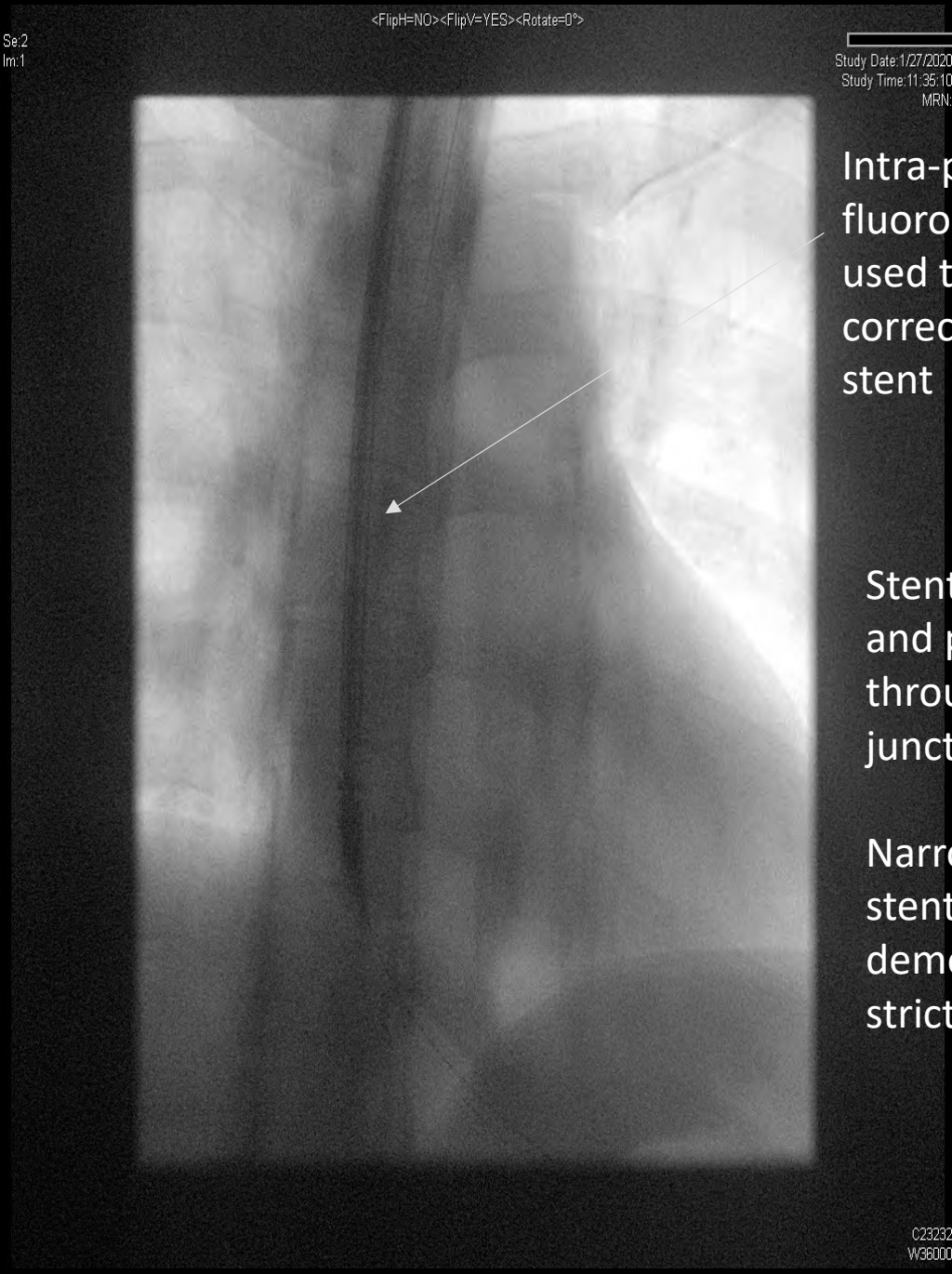
Trachealization of the esophagus was identified indicating luminal narrowing and stricture.



Esophageal stent was temporarily placed in the stricture for dilation as well as covering the section of esophagus with the tear in order to allow the damaged tissue to heal.



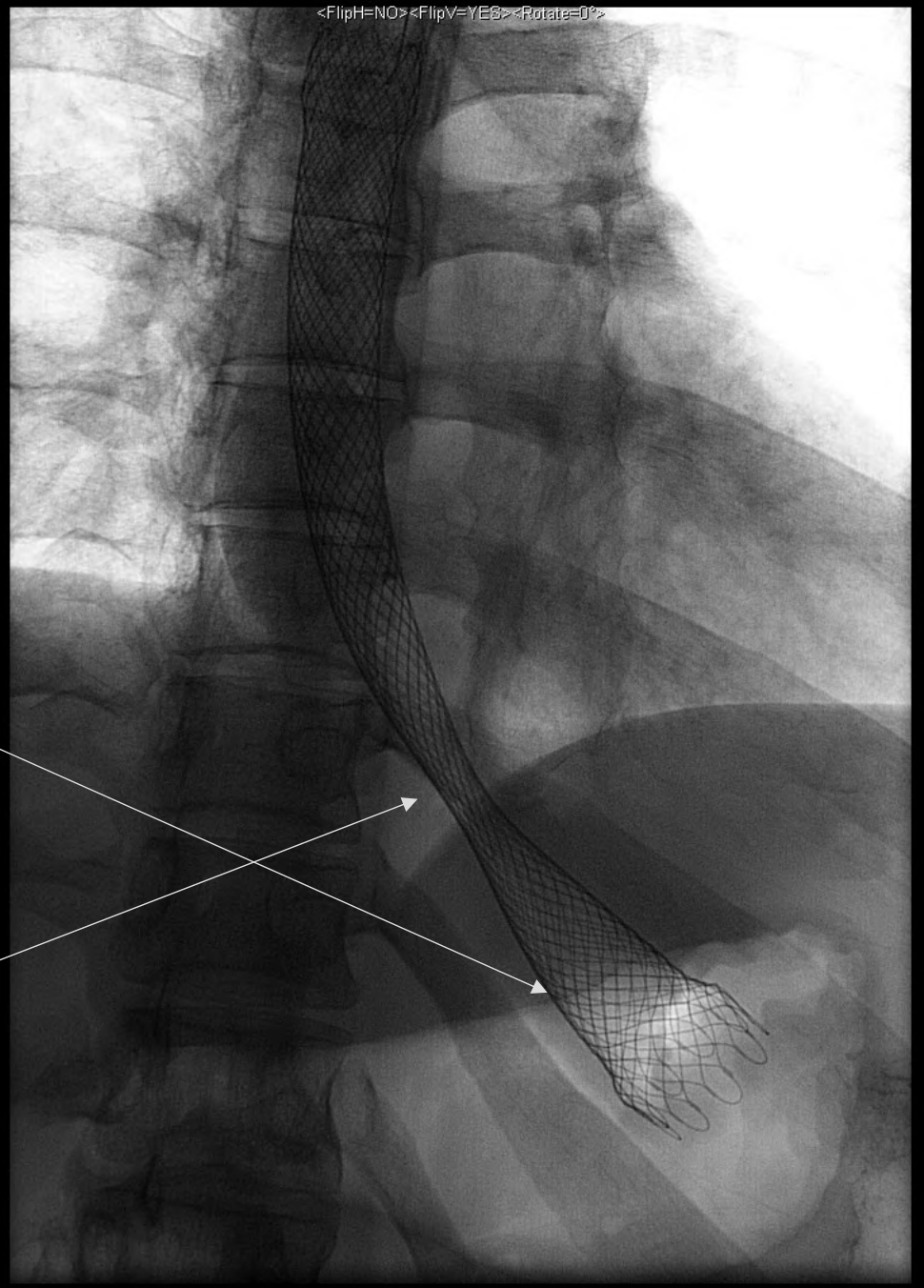
GE junction patency



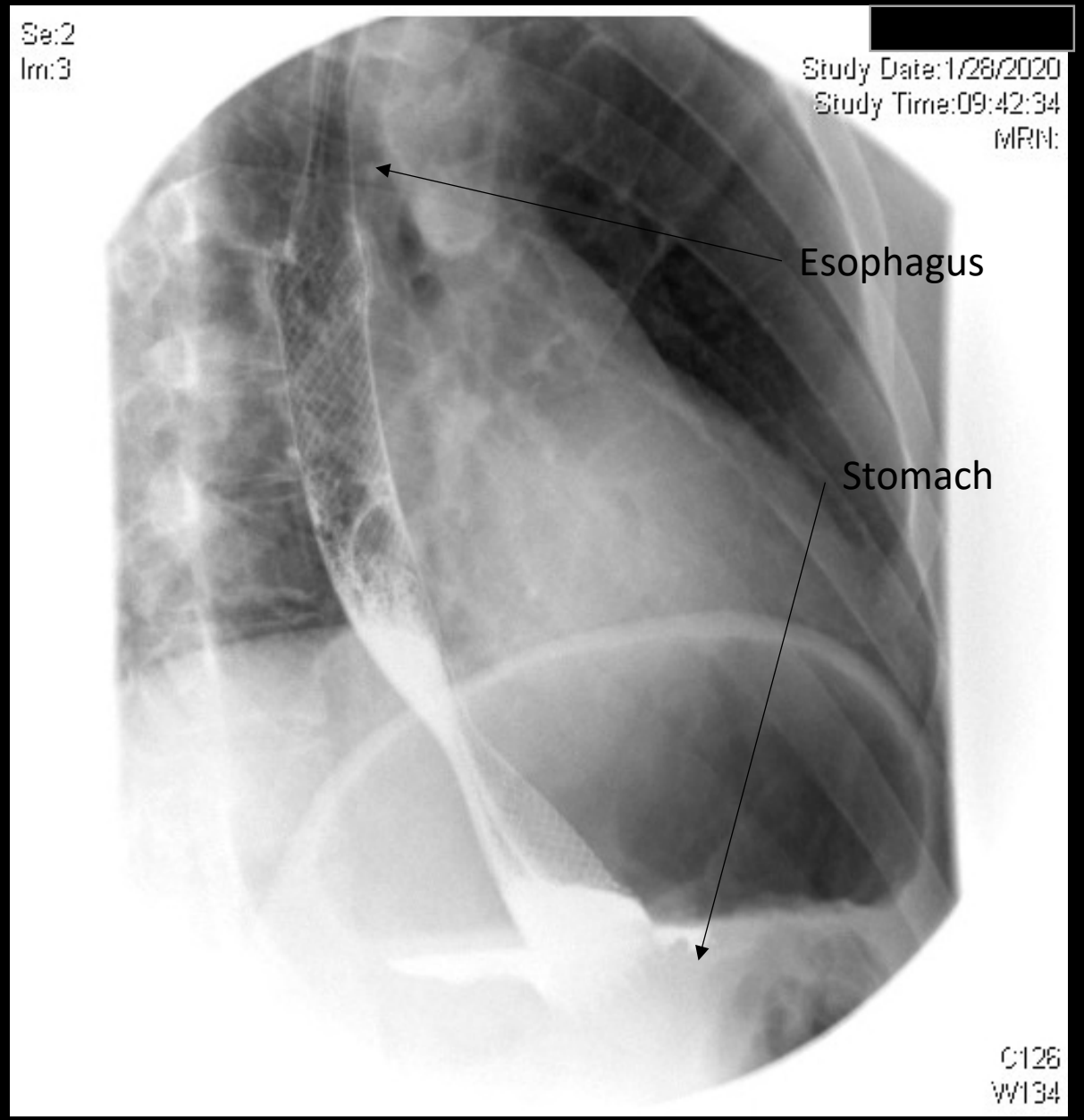
Intra-procedural fluoroscopy used to correctly place stent

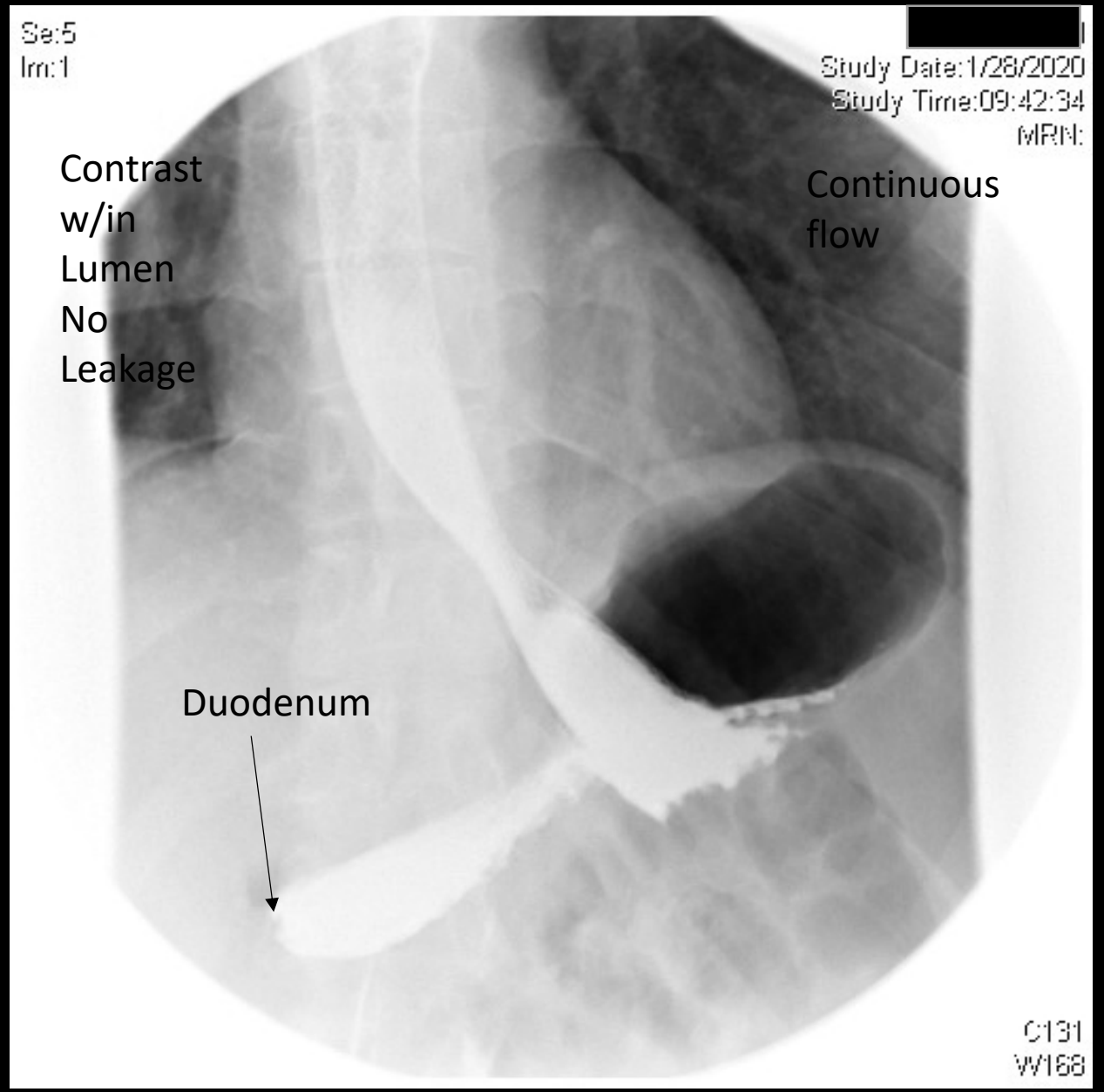
Stent opened and passed through GE junction

Narrowing of stent demonstrated stricture



Gastrografin Study S/P EGD and Stent Placement





Gastrografin study after stent placement demonstrating no contrast leakage into mediastinum

Key imaging findings

- Dysphagia was likely related to the esophageal dissection identified in the upper GI series
- The burping motion required for swallowing was likely related to the increased intraluminal pressure generated by the stricture identified in the Upper GI series and EGD
- The increased intraluminal pressure during swallowing was also likely related to the perforation

Differential Diagnosis

- Scleroderma –rare autoimmune diseases that involve the hardening and tightening of the skin and connective tissues.
- Eosinophilic Esophagitis - eosinophils build up in your esophagus causing inflammation, dysphagia and food impaction
- Achalasia - inability of peristalsis, to overcome the pressure of the lower esophageal sphincter, which cannot relax.

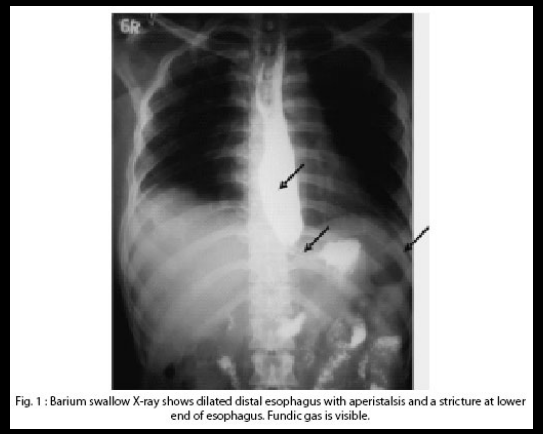
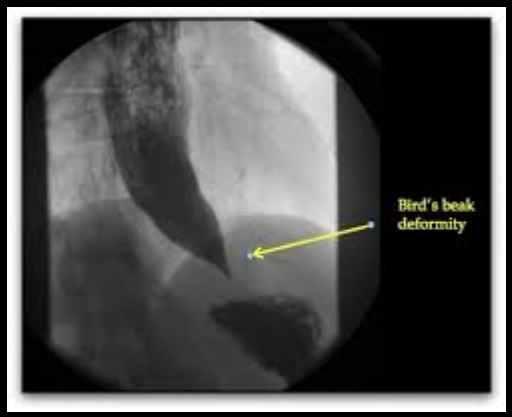


Fig. 1 : Barium swallow X-ray shows dilated distal esophagus with aperistalsis and a stricture at lower end of esophagus. Fundic gas is visible.

http://www.japi.org/january_2009/P-1.html

https://radiopaedia.org/articles/idiopathic-eosinophilic-oesophagitis-1?lang=us



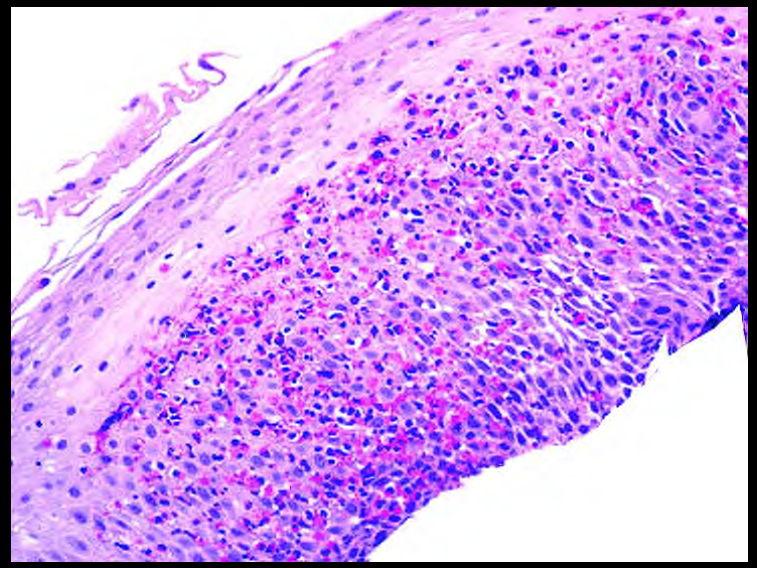
https://eapsa.org/parents/learn-about-a-condition/a-e/achalasia/

Discussion

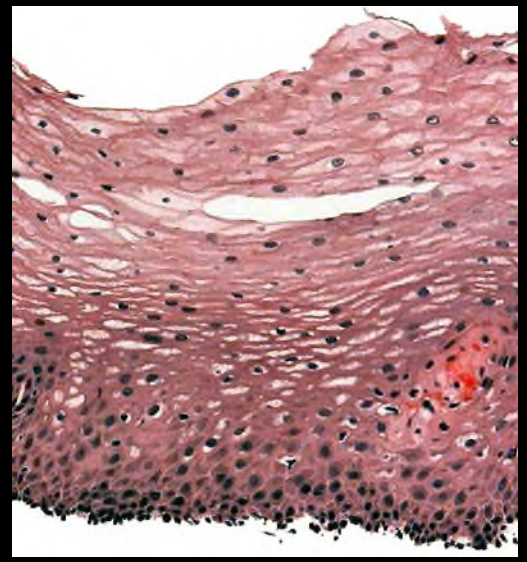
- Given the weakness in the esophageal lumen as well as the scar tissue resulting in a stricture a chronic inflammatory pathology is suspected.
- Esophageal biopsies will be required in order to determine the pathologic etiology however eosinophilic esophagitis or achalasia are suspected
- The findings in this case demonstrate that chronic esophagitis can lead to weakening or fibrosis of the esophageal lining
- The stent will need removal in 2 weeks after the shunted track scars shut

Final Diagnosis

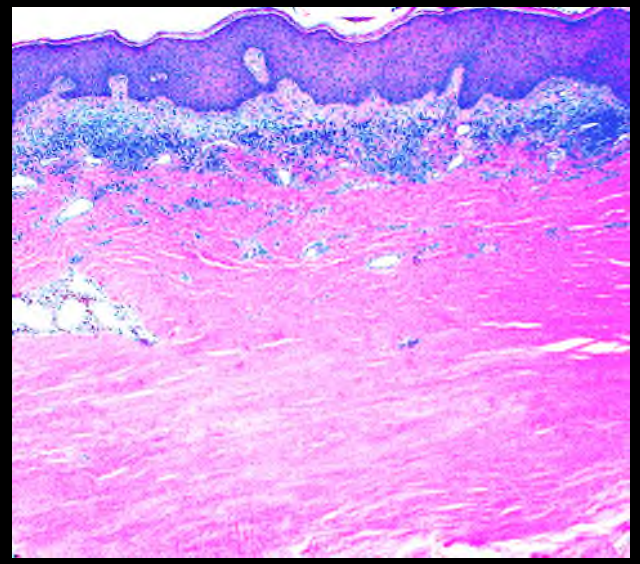
- Final diagnosis pending endoscopic biopsy results



https://www.pathologyoutlines.com/topic/esophaguseosinophilic.html



https://www.britannica.com/science/achalasia



http://www.pathologyoutlines.com/topic/skinnontumorscleroderma.html

Treatment

- The esophageal stent will allow the dissected track to close, and allow for increased bolus transit through the stricture
- Metallic stents are more efficacious than plastic, however in cases without malignancy they must be removed
- Once the stent is removed the patient will likely need immunosuppressive therapy with glucocorticoids and potentially need balloon dilations of esophageal stricture
- Recurrent upper GI series will be required to asses reoccurrence of stricture and patency of esophageal lumen

ACR appropriateness Criteria

Variant 2: **Unexplained oropharyngeal dysphagia. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Fluoroscopy biphasic esophagram	Usually Appropriate	☢☢☢
Fluoroscopy barium swallow modified	May Be Appropriate	☢☢☢
Fluoroscopy single contrast esophagram	May Be Appropriate	☢☢☢
Fluoroscopy pharynx dynamic and static imaging	May Be Appropriate (Disagreement)	☢☢☢
Esophageal transit nuclear medicine scan	May Be Appropriate	☢☢☢
CT neck and chest without IV contrast	Usually Not Appropriate	☢☢☢☢
CT neck and chest with IV contrast	Usually Not Appropriate	☢☢☢☢
CT neck and chest without and with IV contrast	Usually Not Appropriate	☢☢☢☢

https://acsearch.acr.org/docs/69471/Narrative/

While the initial imaging for dysphagia, the presenting symptom of this patient, is recommended to be an esophagram, given the severity of the etiology a CT scan which was able to capture the perforation seems permissible.

Cost Calculation

Imaging Modality	Cost Estimated at Hermann w/ Insurance
CT scan	$432
Upper GI Series	$857
EGD w/ Fluoroscopy	$819
Gastrografin Study	$221
Total	$2329

https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/

Take Home Points

- When suspecting esophageal perforation an esophogram is the initial modality of imaging
- Using a water soluble contrast agent is essential to prevent caustic injury to the mediastinum in the case of perforation
- If the lumen of the esophagus is completely ruptured thoracic surgery should be consulted immediately, if the lumen is partially torn endoscopic intervention may be considered

Case Summary

1. Patient arrived at Urgent Care w/ Dysphagia, and hematemesis
2. Patient underwent CT imaging revealing suspected esophageal tear
3. Patient was transferred to MHH where they underwent Upper GI series and EGD stenting
4. Gastrografin study was used to confirm closure of esophageal tear and patency of esophageal stricture

References

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3219576/
- https://radiopaedia.org/articles/barium-swallow


Questions?