Do you have x-ray vision? A review of medically complex dysphagia cases

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Learning Objectives

- Purpose of today's presentation:
  - Prepare you for some unique Videofluoroscopic swallow study cases including diagnosis & recommendations regarding diet and referral
  - Review literature on 14 different medically complex conditions

Dysphagia & role of MBSS/VFSS

- Highly complex issue with huge impact on QOL
- When bedside/clinical swallow evaluation is not enough, need more dynamic assessment

Dysphagia

- Dysphagia may be caused by cancer & it's treatments, stroke, neurologic diseases, debility, GERD
- Potentially serious clinical complications, including malnutrition, dehydration, airway obstruction, aspiration pneumonia, intubation, death
- Effective management of swallowing disorders has been shown to improve quality of life (QOL)
- Dysphagia has a significant negative impact on both patients and caregivers

MBSS/VFSS

- According to Fynes (2019) MBSS:
  - Real-time fluoroscopic motion study looking inside the anatomy of the upper digestive tract
  - Considered the reference standard to assess swallowing physiology involving the oropharynx and screening of the esophagus
- Also known as a videofluoroscopic swallow study (VFSS)
- "Optimally performed by an SLP together with a radiologist, assisted by a radiologic technologist, to evaluate anatomy and swallowing physiology simultaneously in real time. The goals of the MBSS are to assess both swallowing function and safety (i.e., aspiration, choking)."

Esophageal Transection & Esophagostomy Placement

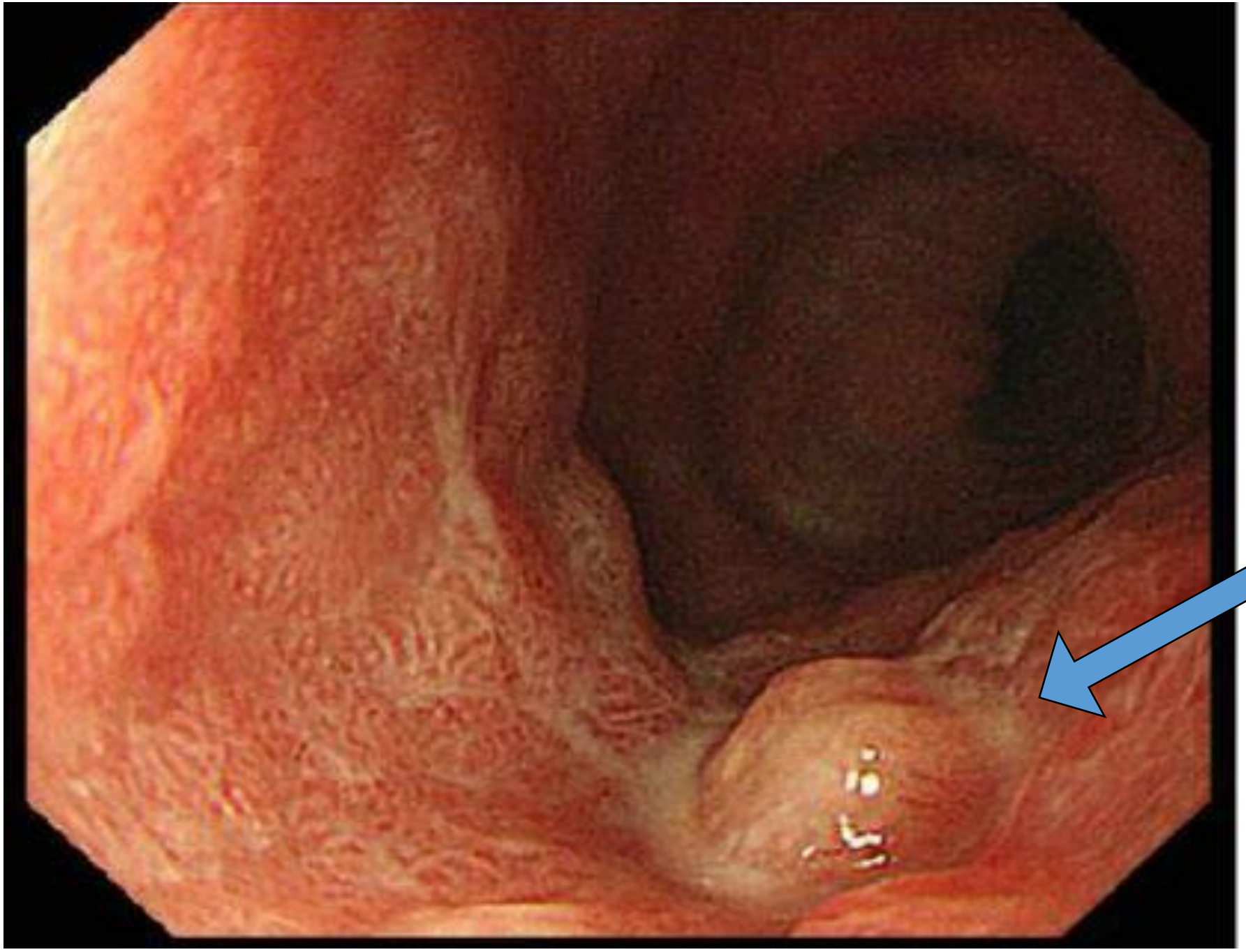
- 75-year-old male with history of type B aortic dissection s/p thoracic endovascular aortic repair (TEVAR) on 6/16/17
- Prolonged intubation with numerous self-extubations; a PEG tube was in place
- VFSS completed 7/11/17, and he was cleared for regular consistency diet with nectar thick liquids
- Patient was discharged to inpatient rehab 7/12/17

Esophageal Transection & Esophagostomy Placement

- Patient was transferred back to hospital on 8/9/17 with fever, tachycardia, and elevated white blood cell count
- Imaging "suggesting free air around the graft concerning for possible infection."
- Esophagram 8/10/17: "Small 7.9 x 7.9 mm barium collection noted at the level of carina lateral to left mid esophagus. This overlaps the adjacent aortic stent graft."
- Upper GI Endoscopy 8/10/17: "…a fistula to the aorta/aortic stent was suspected."

Esophageal Transection & Esophagostomy Placement

- Findings all concerning for aortic esophageal fistula (AEF)
- Patient taken to operating room 8/11/17 for esophageal transection and exclusion and esophagostomy for diversion



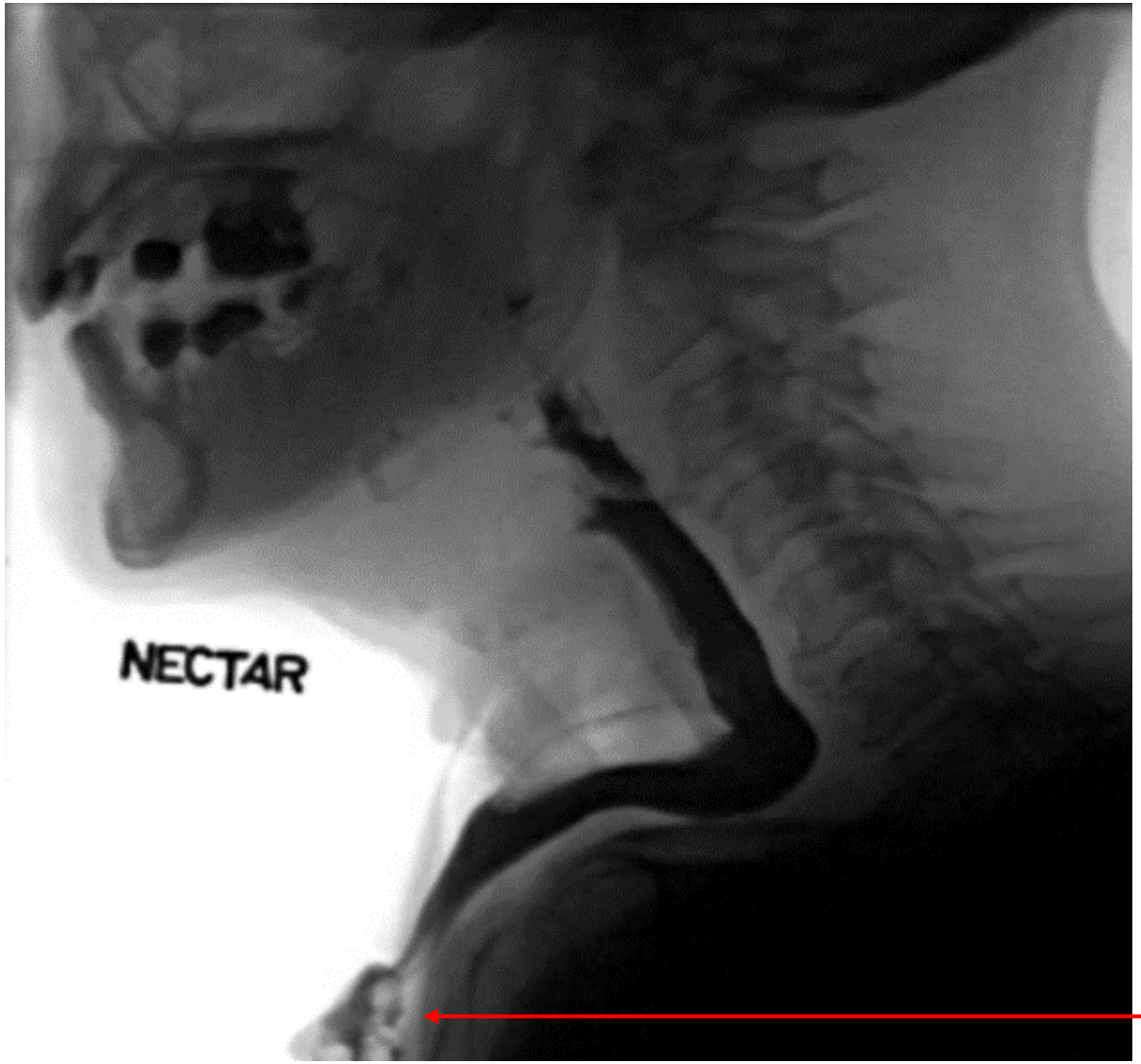
EGD image showing small lesion with pus discharge

Esophageal Transection & Esophagostomy Placement

- The incidence of AEF post TEVAR was 1.7% (Chiesa, 2008)
- The exact cause of the AEF is unknown, but hypotheses include stent graft infection, erosion of stent through aorta to esophagus, and pressure necrosis of prosthesis (Uno, 2017)

Esophageal Transection & Esophagostomy Placement

- Treatment is typically suturing of the aortic fistula, esophagectomy, cervical esophagostomy, and placement of G or J tube (Kubota, 2013)


NECTAR

Esophagectomy with Anastomotic Leak

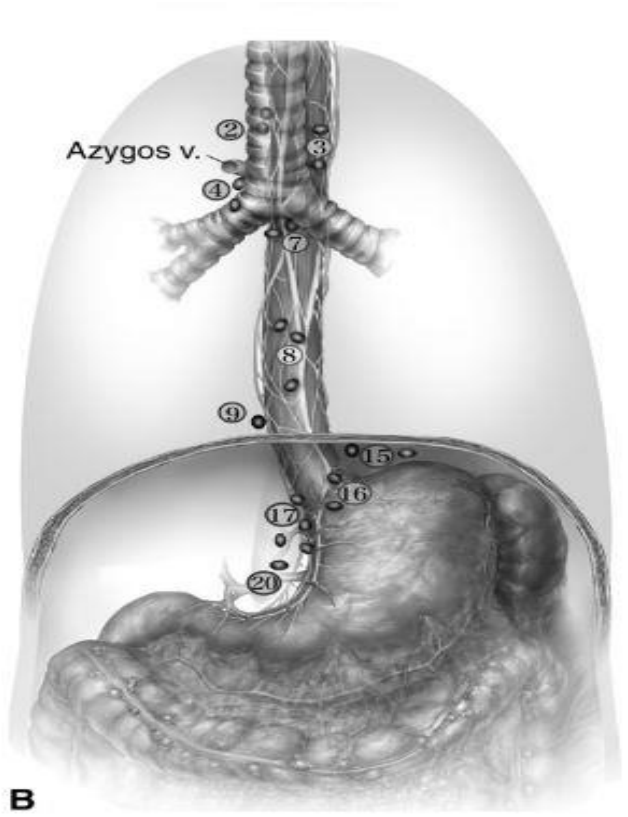
- 82-year-old male with history of T3 N1 M0 (IIIA) cancer of the esophagus
- Patient completed chemo and radiation treatments on 3/20/17 at outside hospital. He also had J-tube placed around this time
- Patient had recurrence and a robot-assisted Ivor-Lewis Esophagectomy (ILE) was the offered surgical treatment
- ILE completed 6/30/17

Esophagectomy with Anastomotic Leak

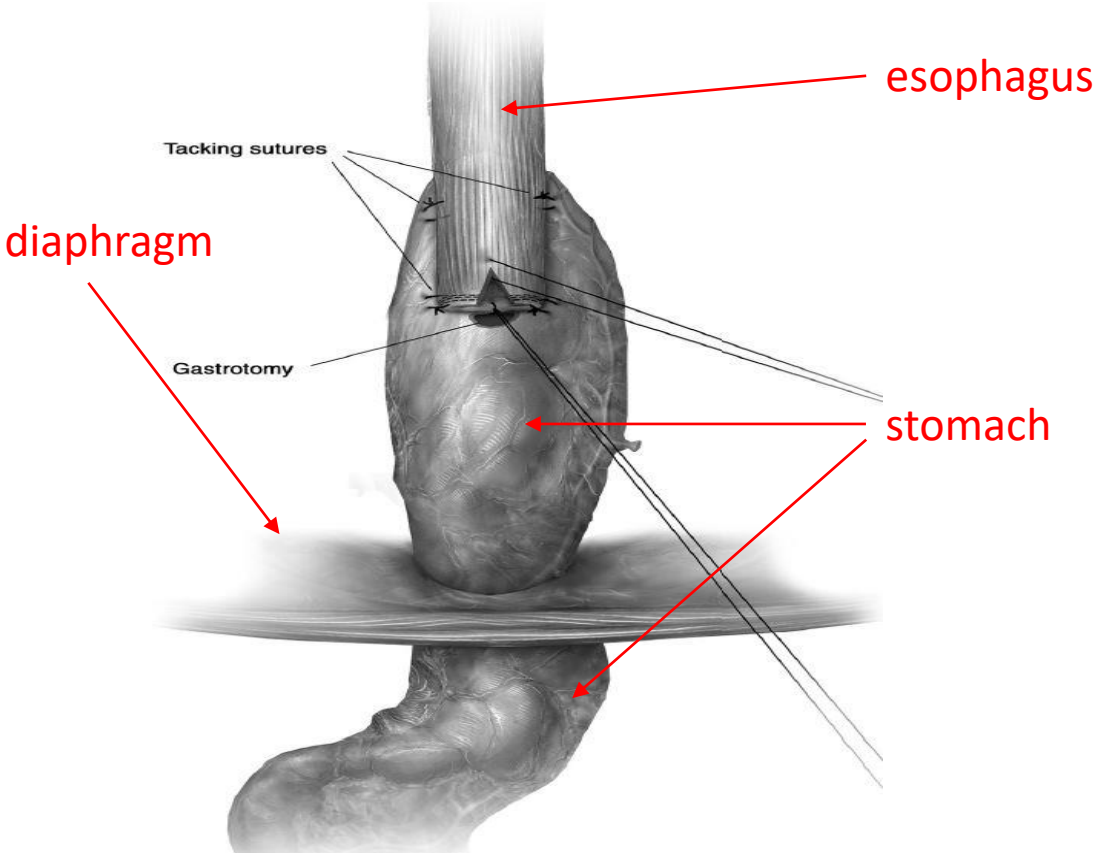
- ILE is appropriate for tumors located in the distal esophagus (Reed, 2009)
- Conventional ILE consists of a laparotomy, right thoracotomy for esophageal resection, and anastomosis of the gastric conduit with proximal esophagus
- Minimally invasive ILE consist of laparoscopy and thorascopy
  - "could minimize gastric mobilizations, **avoid recurrent laryngeal nerve injury**, and allow more extensive gastric resection" (Huang, 2014)

Esophagectomy with Anastomotic Leak

Pre-ILE



Post-ILE



Esophagectomy with Anastomotic Leak

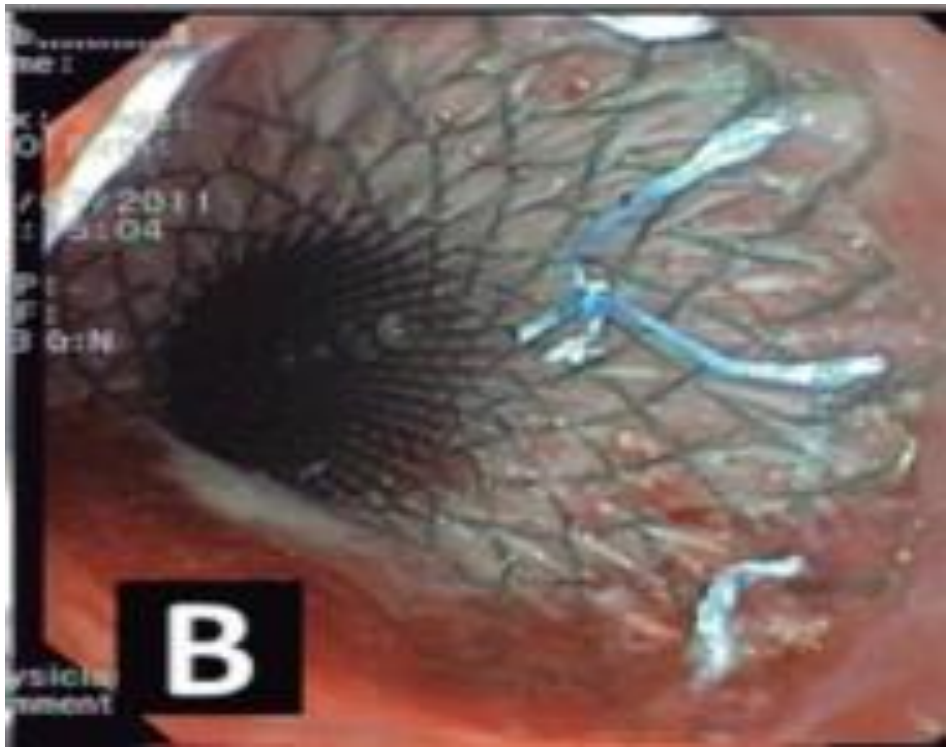
- Esophagram to rule out leak completed on 7/6/17 – no leak present
- Patient started on clear liquid diet 7/8/17
- SLP was consulted 7/10/17 for clinical bedside swallowing evaluation
- Thoracic team had concerns for prandial aspiration given new fever and concerning chest x-ray

Esophagectomy with Anastomotic Leak

- In a study of 412 patients, 2.9% developed an esophageal leak following ILE (Daele, 2015)

Esophagectomy with Anastomotic Leak

- Patient had two stents placed
  - Clinical success of esophageal stenting was 81% in one study (Desari, 2014)
- Repeat Esophagram on 7/28/17 revealed persistent leak



Villaverde, Alberto Fernández, 2015

Esophagectomy with Anastomotic Leak

- On 8/3/2017, an endoscopic vacuum (endoVAC) was placed
  - Esophageal defects healed in 70% with placement of endoVAC (Moschler, 2015)
- Esophagram on 8/19/17 showed that previous esophageal leak has healed

Arnold Chiari Malformation

- 67-year-old female with history of Arnold Chiari Malformation Type I (CMI) diagnosed in 2015
- Decompressive surgery at outside hospital in March 2015 and again in June 2015
- Reported severe dysphagia post surgery requiring placement of PEG tube

Arnold Chiari Malformation

- Repeat VFSS completed by OSH in February 2016 revealing persistent dysphagia
  - SLP noted "severe aspiration" with thin liquids
  - Recommendations were for a regular consistency diet with "pudding thick" liquids and follow up with Neurology for further assessment into etiology of dysphagia
- Suspicion for Progressive Supranuclear Palsy (PSP) in March 2016

Arnold Chiari Malformation

- Arnold Chiari malformation is structural defect in the base of skull and cerebellum
- The cerebellum is pushed through the foramen magnum
- This can put pressure on the cerebellum and brainstem and block CSF flow
- Type I
  - Inferior portion of the cerebellum is pushed through foramen magnum
  - Most common form
  - Usually diagnosed in adolescence or adulthood
  - Chiari Malformation Fact Sheet. (n.d.). Retrieved from https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Chiari-Malformation-Fact-Sheet

Arnold Chiari Malformation

- Type I

Jones, J. (n.d.). Chiari malformations: Radiology Reference Article. Retrieved from https://radiopaedia.org/articles/chiari-malformations?lang=us

Arnold Chiari Malformation

- A study conducted VFSS with 11 patients with CMI
  - More than half of these patients had dysphagia (Andersson, 2018)

Arnold Chiari Malformation

- Two cases where dysphagia is the only symptom of CMI
  - One VFSS revealed no swallowing abnormality besides aspiration (Achiron, 1990)
- Several studies finding CMI mimicking bulbar onset ALS until MRI performed (Gamez, 2003)

Progressive Supranuclear Palsy and Arnold Chiari Malformation

- Clark, 2019: VFSSs completed on 25 patients with PSP
  - 20% had a Penetration-Aspiration Scale (PAS) of 8 with thin liquids; silent aspiration (material enters the airway, passes below the vocal folds, no effort is made to eject)

Progressive Supranuclear Palsy and Arnold Chiari Malformation

- Patient admitted in April 2016
  - Altered mental status
    - CSF leak at level of thoracic spine
    - UTI

Progressive Supranuclear Palsy and Arnold Chiari Malformation

- **MRI:** There is redemonstration of suboccipital craniectomy changes. Additionally, enlargement of the midbrain/deformity of the midbrain with caudal displacement of the midbrain, pons, and medulla.

History of CVA

- 63-year-old male with a history of CVA five years ago in Kuwait
- Patient resided in Oklahoma; visiting family in Michigan during this admission for myocardial infarct
- No imaging or relevant information pertaining for CVA
- However, it was documented that patient had PEG tube placed following CVA, but "fell out" in 2015
- Since that time, patient had been consuming a pureed diet with thin liquids

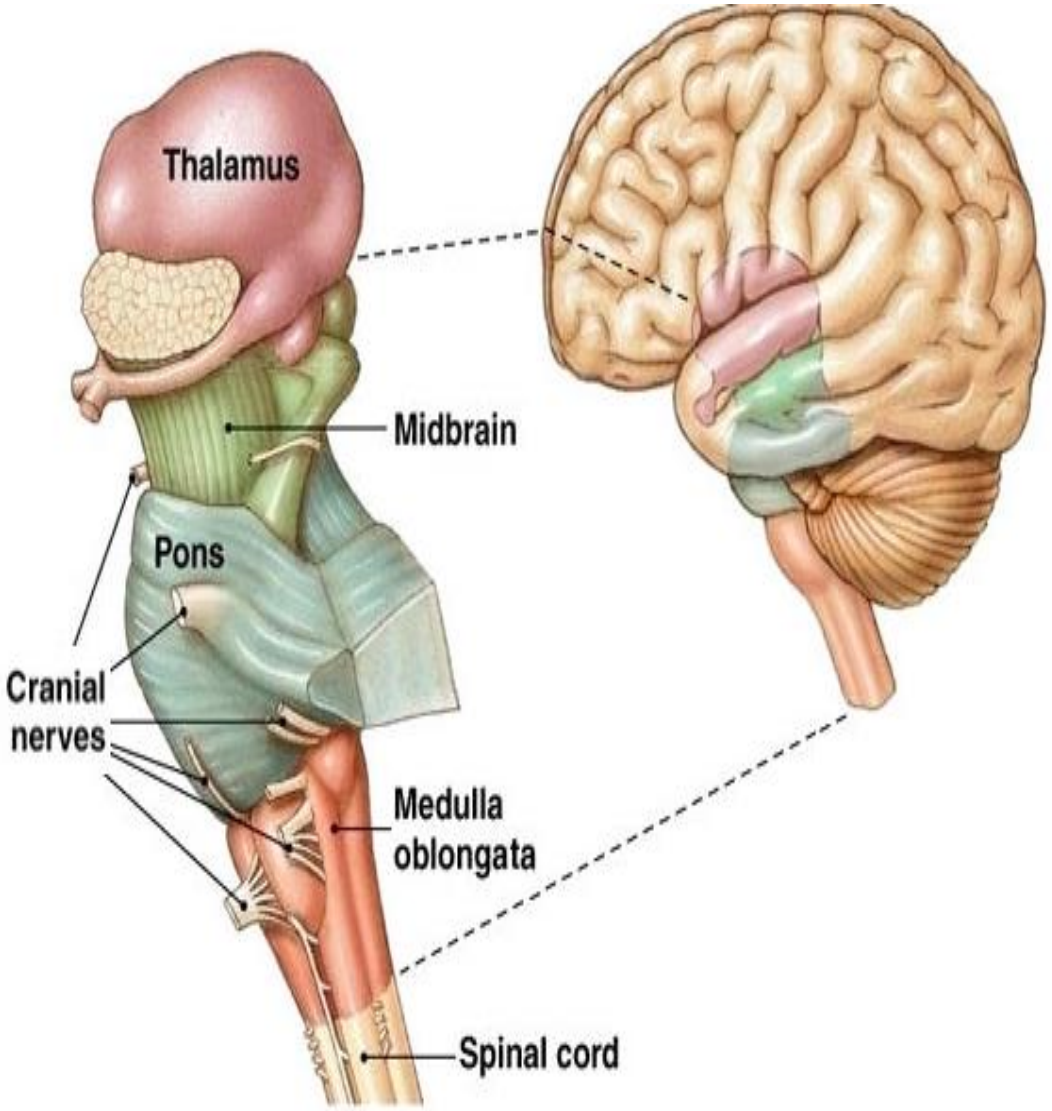
History of CVA

- SLP consulted shortly after admission given concerns for swallowing
- Oral motor examination significant for absent/minimal labial and lingual movement
- Patient with anarthria
- Effective written communication
- No obvious deficits in receptive language

History of CVA

- BSE revealed:
  - Weight has been stable
  - Patient ambulatory and active
  - Denied recent pneumonia
  - Patient reclines to at least 45 degrees to prevent anterior bolus loss (absent labial closure) and aid in A/P bolus transit with the assistance of gravity (absent lingual movement)
  - Patient exhibited sporadic coughing during PO trials; a VFSS was recommended

History of CVA



- Brainstem stroke?
  - 81% of brainstem stroke patients presented with dysphagia (Meng, 2000)
  - Isolated symptom of complete lingual paralysis following bilateral medullary stroke (Benito-Leon, 2003)
  - >80% of patients resumed an oral diet (Horner, 1991)

Laryngeal Cancer

- 87-year-old male with history of sarcomatoid carcinoma of the glottis
- Treated with multiple surgeries to remove lesions from vocal folds
- Patient presented to HFHS tumor board in 2018
  - spindle cell carcinoma (carcinosarcoma) with recommended treatment of radiation therapy
- Patient re-presented to tumor board in March 2019
  - recurrence
  - recommended treatment was salvage total laryngectomy

Laryngeal Cancer

- January 4, 2019
- Image from ENT exam

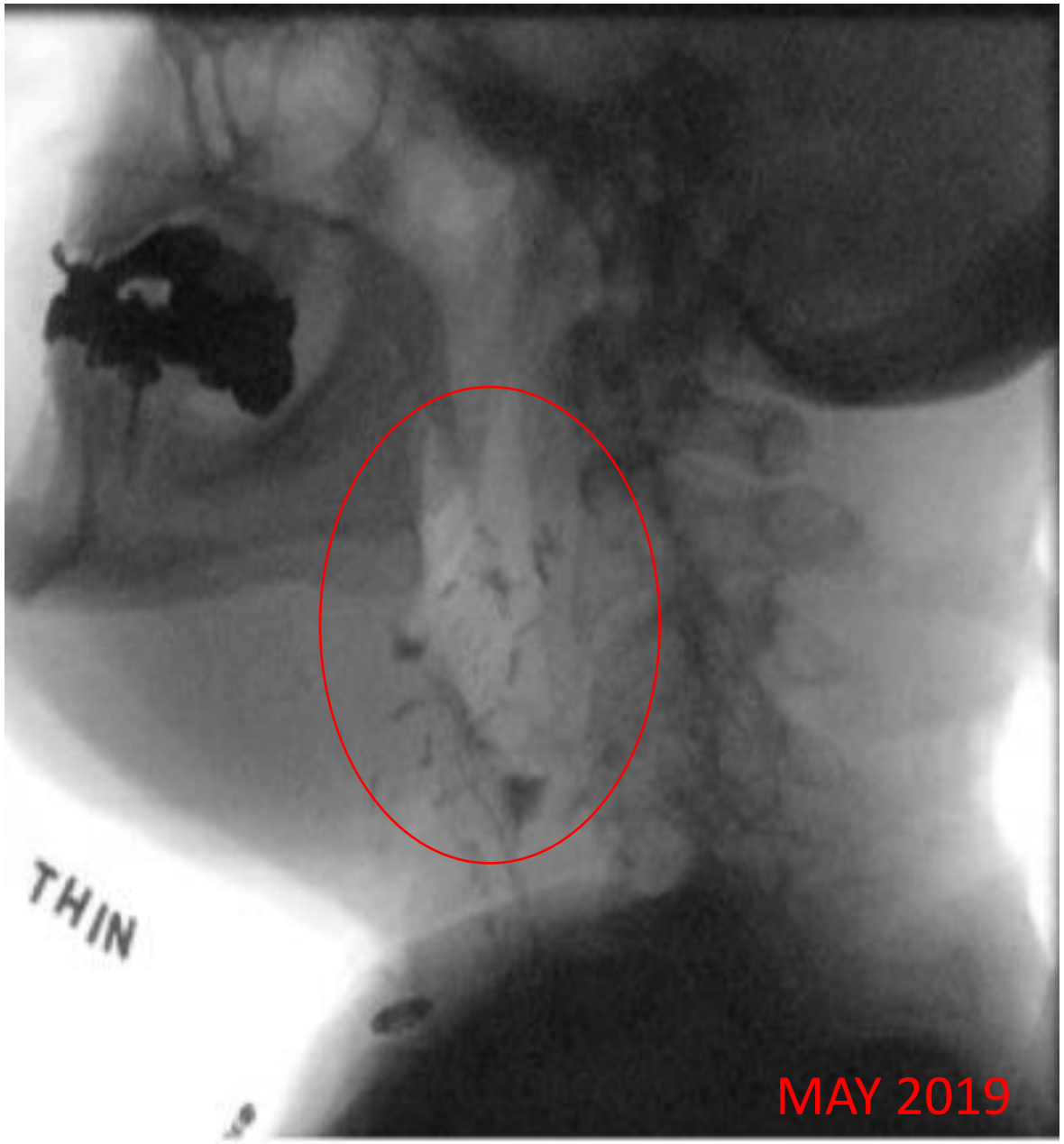
Laryngeal Cancer

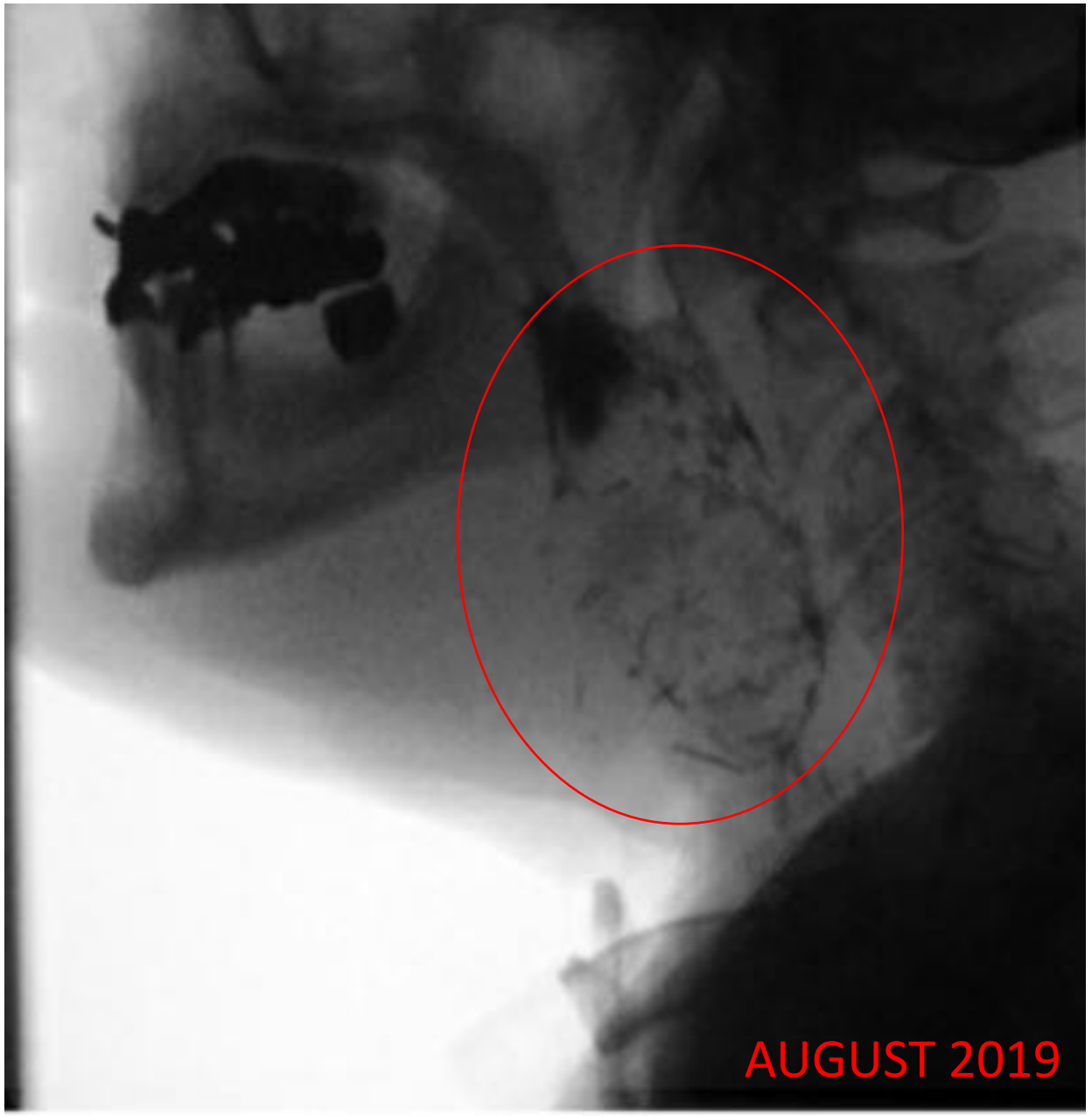
- Total laryngectomy with left pectoral flap completed in April 2019
- Patient cleared for PO intake for soft food and liquids by ENT
- Patient referred for VFSS in May 2019 following complaints of difficulty swallowing; specifically, nasal regurgitation
  - ~72% of total laryngectomy patients had reported dysphagia (Maclean, 2008)

Laryngeal Cancer

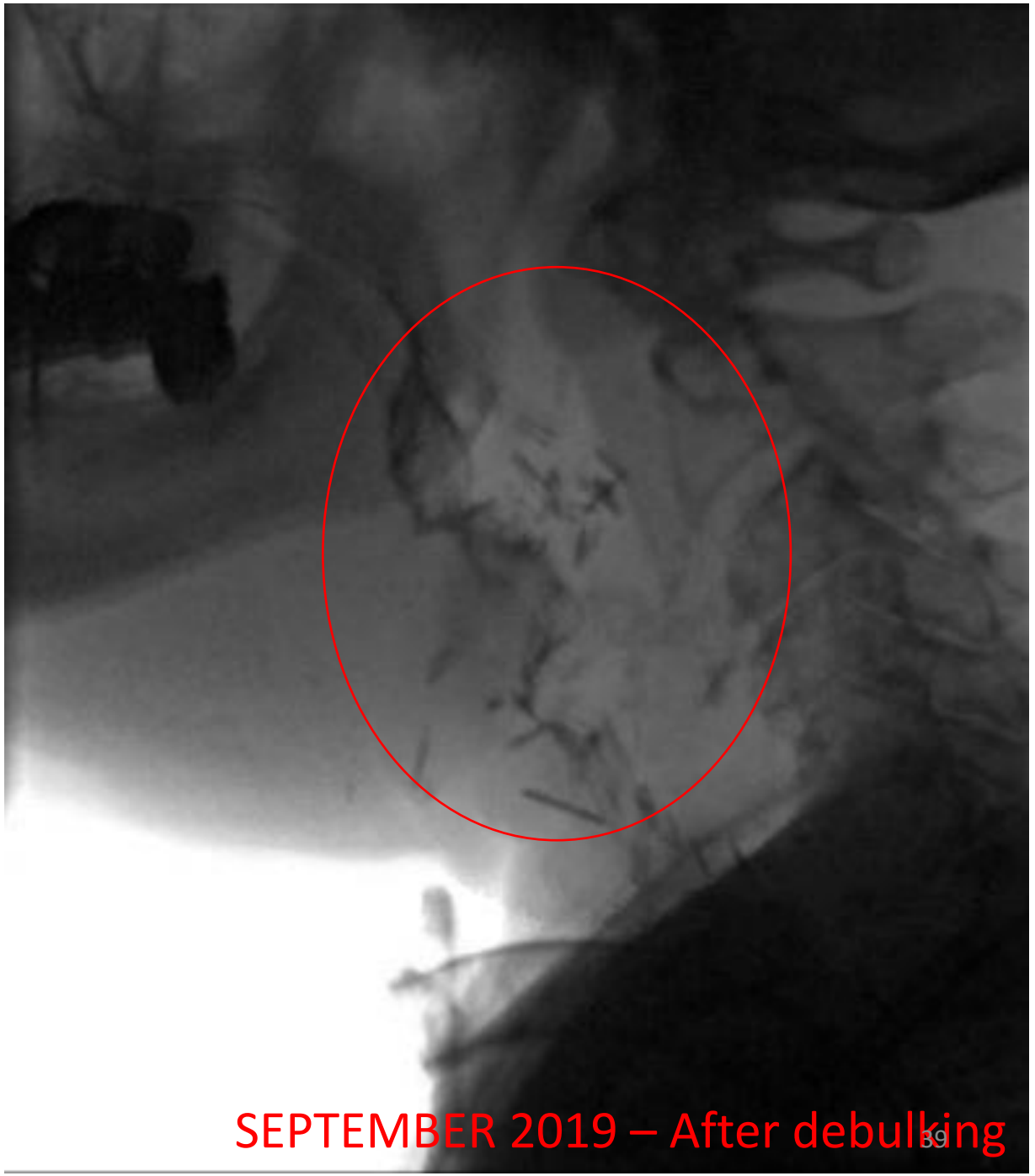
- Study found that 19% of patients developed a stricture but other reports have been 13-50% (Sweeny, 2012)

- 23% of TL patients required dilations due to stricture (Peterson, 2019)


THIN
MAY 2019


AUGUST 2019


AUGUST, 2019


SEPTEMBER 2019 – After debulking

Post-cricoid radiation-induced cervical esophageal stricture

- 69-year-old male with h/o cT3N2aM0 stage IV SCC of left true vocal fold s/p chemo/XRT
- Timeline
  - Initial c/o hoarse voice 1/25/18
  - Biopsy 5/10/18
  - 7 weeks of chemo/XRT 6/26/2018- Aug 2018
  - Clinical swallow evaluation (7/5/18): WFL
  - PEG tube placement due to severe malnutrition with EGD on 08/08/2018 EGD results indicated "Normal endoscopic evaluation to the 2nd portion of the duodenum."

Post-cricoid radiation-induced cervical esophageal stricture

- Second VFSS (10/18/18): Mild oral and severe pharyngeal dysphagia (aspiration of thin, penetration on NT), NPO with PEG
- Referred to GI and ENT
- 5 sessions of swallow therapy from November 18 - January 2019 but not complaint with home practice

Post-cricoid radiation-induced cervical esophageal stricture

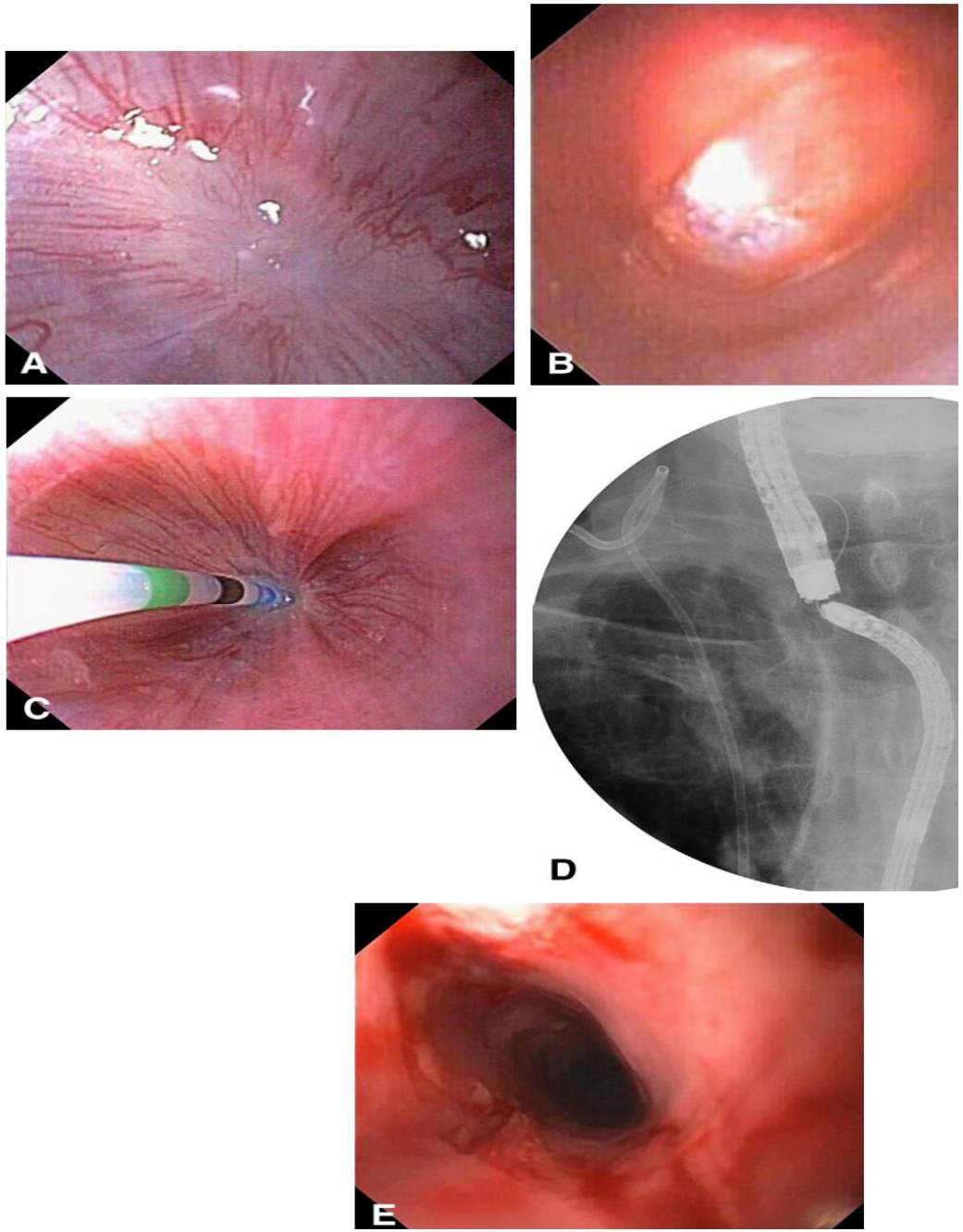
- Followed up with ENT who recommended dilation but patient undecided
- EGD with antegrade retrograde rendezvous dilation on 7/31/19
- Repeat esophageal dilations:
  - 8/2/19, 8/21/19, 9/5/19, 9/16/19, 10/11/19, 11/27/19, 1/24/20
  - able to eat meats following each dilation but not before the next

Post-cricoid radiation-induced cervical esophageal stricture

- Proximal esophageal stricture reported in 3-4% of H&N ca and 2-16% in lung ca after RT (Laurell, Kraepelien & Mavroidis, 2003)
- Risk factors: Female sex, twice daily radiation fractionation, and a hypopharyngeal primary site in concurrent chemo/XRT (Lee et al., 2006)
- Radiation-induced strictures have a delayed onset (>30 days) from time of radiation injury (Agarwalla et al., 2015)
- High long-term recurrence rate of up to 33 % (Agarwalla et al., 2015)

Post-cricoid radiation-induced cervical esophageal stricture

- The antegrade-retrograde rendezvous technique was first described in 1998 by Van Twisk et al.
  - Antegrade mucosal puncture and dissection through a rigid esophagoscope was used from above (ENT), whereas puncture and stricture traversal was accomplished from below (GI)
  - No major complications and patients respond well to serial dilations (Maple et al., 2006)



Antegrade-retrograde rendezvous procedure

A= Complete esophageal obstruction

B= Light from endoscope shining on hypopharynx above stricture after some dissection

C= Catheter puncturing the membrane

D= Opposed endoscopes separated by thin membrane obstruction on fluoroscopy

E= Antegrade image of upper esophagus 8 days post-dilation

(Maple et al., 2006)