

Tension Pneumothorax after Esophagogastroduodenoscopy

Julia Kim MD, Madina Gerasimov MD

Donald and Barbara Zucker School of Medicine at Hofstra/Northwell Health, Department of Anesthesiology, New Hyde Park, NY



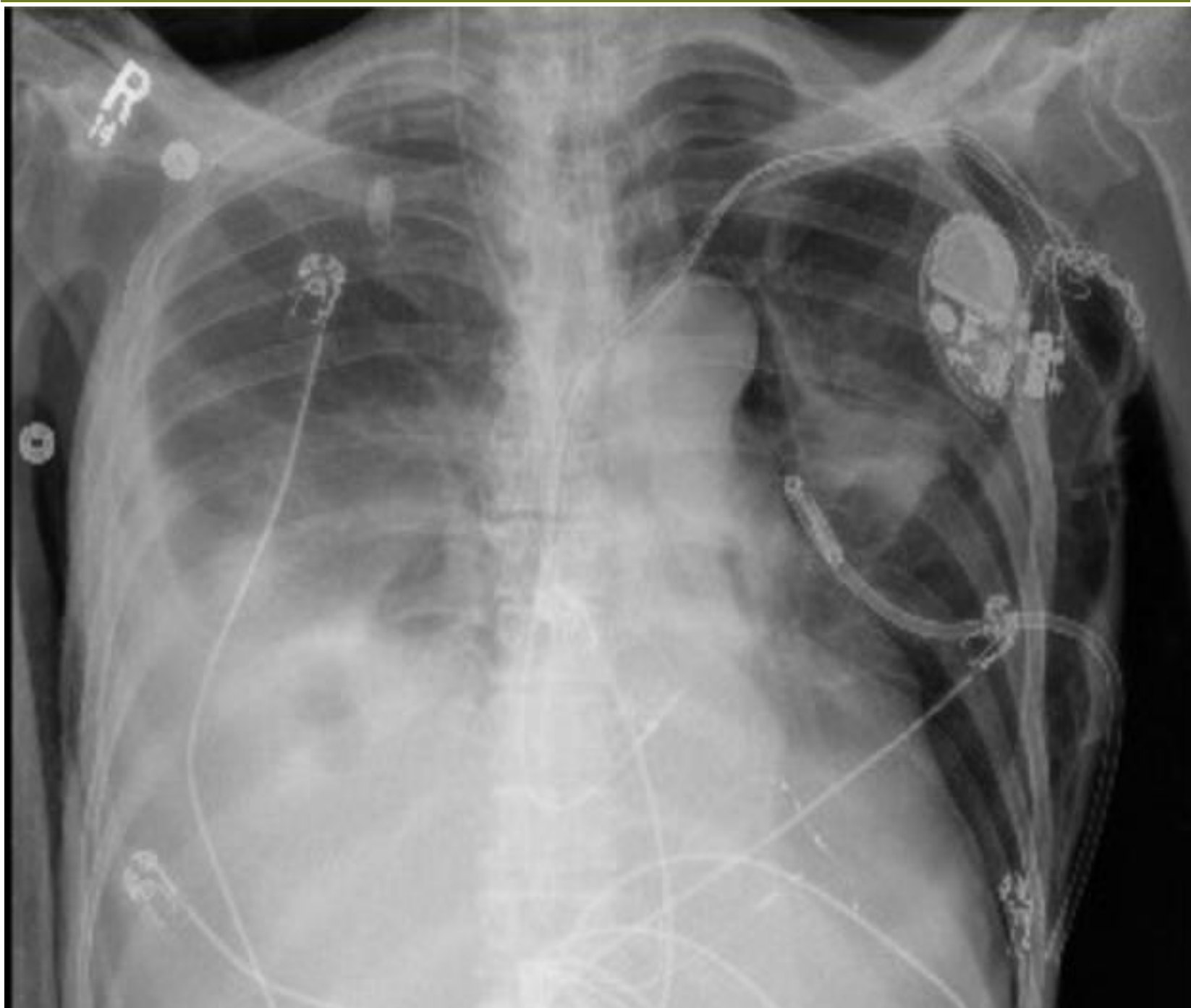
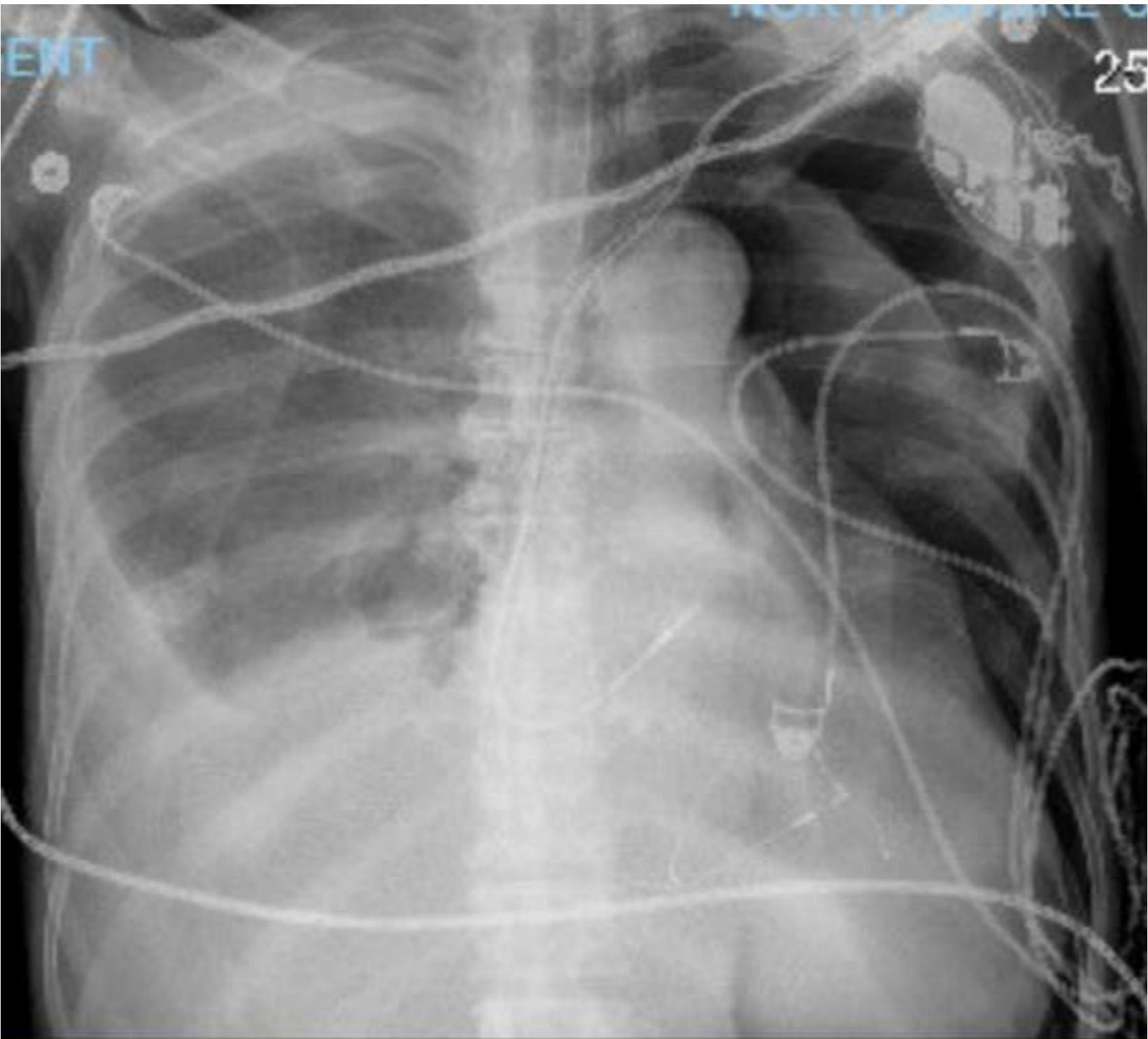
DONALD AND BARBARA
ZUCKER SCHOOL *of* MEDICINE
AT HOFSTRA/NORTHWELL®

Introduction

The scope of anesthesia practice has continued to grow in non-operating room settings, including the endoscopy suite. As anesthesiologists, it is prudent to be aware of all potential complications of procedures for which a patient receives anesthesia. Bleeding, infection, gastrointestinal perforation are well-known complications of endoscopic intervention. Less common complications include pneumothorax with the potential to progress to a tension pneumothorax. Patients with a history of chronic pulmonary disease including but not limited to COPD, lung malignancy, and cystic fibrosis are at a particularly elevated risk. Other factors including operator experience, timing of the procedure (e.g. emergent vs elective), and central venous line placement may also play a role (1).

Case Presentation

- An 84-year-old male with a history of esophageal squamous cell carcinoma status post radiation with prior serial dilations and esophageal stent placement/removal presented for esophagogastroduodenoscopy and esophageal dilation in the setting of recurrent dysphagia.
- Other significant comorbidities included hypertension, hyperlipidemia, atrial fibrillation, systolic heart failure (with last known ejection fraction of 35%) status post AICD placement, and severe tricuspid and mitral regurgitation.
 - The case initially proceeded under monitored anesthesia care with etomidate 12 mg and fentanyl 50 mcg.
 - Supplemental oxygen was provided via nasal cannula.
 - Towards the end of the procedure, the patient became tachycardic and desaturated to as low as 60% with decreased breath sounds on the left side.
 - The patient was emergently intubated with succinylcholine 180 mg and etomidate 12 mg. After intubation, oxygen saturation improved to the mid-80s.
 - A chest x-ray showed a moderate to large left sided pneumothorax without mediastinal shift.
 - A rapid response team was also simultaneously called to the endoscopy suite. The MICU team placed a left-sided chest tube with improvement to blood pressure and oxygen saturation to 90%.
 - An arterial line was placed. Blood pressure was supported with a phenylephrine infusion and intermittent epinephrine boluses.
 - The patient remained intubated and was transferred to the MICU.



C Circulation, Colour (saturation) and Capnograph
O Oxygen supply and Oxygen analyser
V Ventilation (intubated patient) and Vaporisers
E Endotracheal tube and Eliminate machine
R Review monitors and Review equipment

A Airway (with face or laryngeal mask)
B Breathing (with spontaneous ventilation)
C Circulation (in more detail than above)
D Drugs (consider all given or not given)

A Be Aware of Air and Allergy.

SWIFT CHECK of patient, surgeon, process, and responses.

Post-Operative Hospital Course

- An additional left sided chest tube was placed in the MICU due to parenchymal placement of the initial chest tube with persistent pneumothorax.
- A barium esophagram later showed no evidence of contrast leak or extravasation. No further endoscopic intervention was pursued.
- The chest tube was removed on post-procedure day 5 with resolution of the left pneumothorax.

Discussion

Intraoperatively, early signs of a pneumothorax may be nonspecific, including desaturation, changes in heart rate, and hypotension. Supportive measures should be administered while a diagnosis is being investigated. An algorithm such as the "COVER ABCD–A SWIFT CHECK" can aid in identification of a pneumothorax as well as rule in or out other potential differential diagnoses underlying clinical deterioration during general or regional anesthesia (2, 3).

A chest x-ray should be promptly obtained, ideally in an upright position in which air can be detected in the apical portion of the lung. However, in ventilated and intraoperative patients, this may not be feasible. In a supine chest x-ray, air moves to the dependent portions of the lung in the anterior and subpulmonic fields, generating a "deep sulcus" sign. Intraoperatively, pneumothorax can also be detected using point-of-care ultrasound and would result in absent lung sliding. However, since this finding is not unique to pneumothorax, confirmatory chest x-ray should still be obtained (4).

Positive pressure ventilation in a patient with a pneumothorax can mediate progression to a tension pneumothorax due to exacerbation of pleural air leak and impair pleural healing (5). Hemodynamic compromise should increase suspicion for a tension pneumothorax, while tracheal deviation can be a late sign (2). Given this elevated risk, a chest tube should be placed in all mechanically ventilated patients with a pneumothorax. In mechanically ventilated patients with symptoms concerning for tension pneumothorax, emergent needle decompression should be performed followed by chest tube placement (5).

References

1. YC Gary Lee. Pneumothorax in adults: Epidemiology and etiology. UpToDate, Connor RF (Ed), Wolters Kluwer. (Accessed on October 26, 2024.)
2. Bacon AK, Paix AD, Williamson JA, Webb RK, Chapman MJ. Crisis management during anaesthesia: pneumothorax. Qual Saf Health Care. 2005 Jun;14(3):e18. doi: 10.1136/qshc.2002.004424. PMID: 15933291; PMCID: PMC1744020.
3. Heyba M, Rashad A, Al-Fadhli AA. Detection and Management of Intraoperative Pneumothorax during Laparoscopic Cholecystectomy. Case Rep Anesthesiol. 2020 Apr 7;2020:9273903. doi: 10.1155/2020/9273903. PMID: 32318295; PMCID: PMC7166272.
4. YC Gary Lee. Clinical presentation and diagnosis of pneumothorax. UpToDate, Connor RF (Ed), Wolters Kluwer. (Accessed on October 26, 2024.)
5. Hsu CW, Sun SF. Iatrogenic pneumothorax related to mechanical ventilation. World J Crit Care Med. 2014 Feb 4;3(1):8-14. doi: 10.5492/wjccm.v3.i1.8. PMID: 24834397; PMCID: PMC4021154.