



Pneumothorax Looking for a Way Out

Michael R. E. Pierce, LT, MC, USN¹; Megan H. Halliday, LT, MC, USN²; Craig M. Sharkey, MD³

Department of Emergency Medicine,

^{1,2}Naval Medical Center Portsmouth, ³Riverside Regional Medical Center, Virginia

Introduction

- Shortness of breath accounts for 3.4 million Emergency Department (ED) visits per year
- ED providers, particularly in military setting, are well trained on recognition and treatment of pneumothorax (PTX)
- Rarely, PTX can be precipitated by underlying bronchial obstruction, which entirely alters typical PTX treatment course

Case Presentation

71 year-old male presents to the ED with sudden onset difficulty breathing and swelling over his chest, neck, and lower face. Had thoracentesis performed 3 days prior. In ED patient in respiratory distress, but hemodynamically stable. Computed tomography (CT) scan of patient's chest showed "contained pneumothorax" and lung laceration extending to patient's mediastinum.



Figure 1: Presentation: Chest, neck, lower face swelling

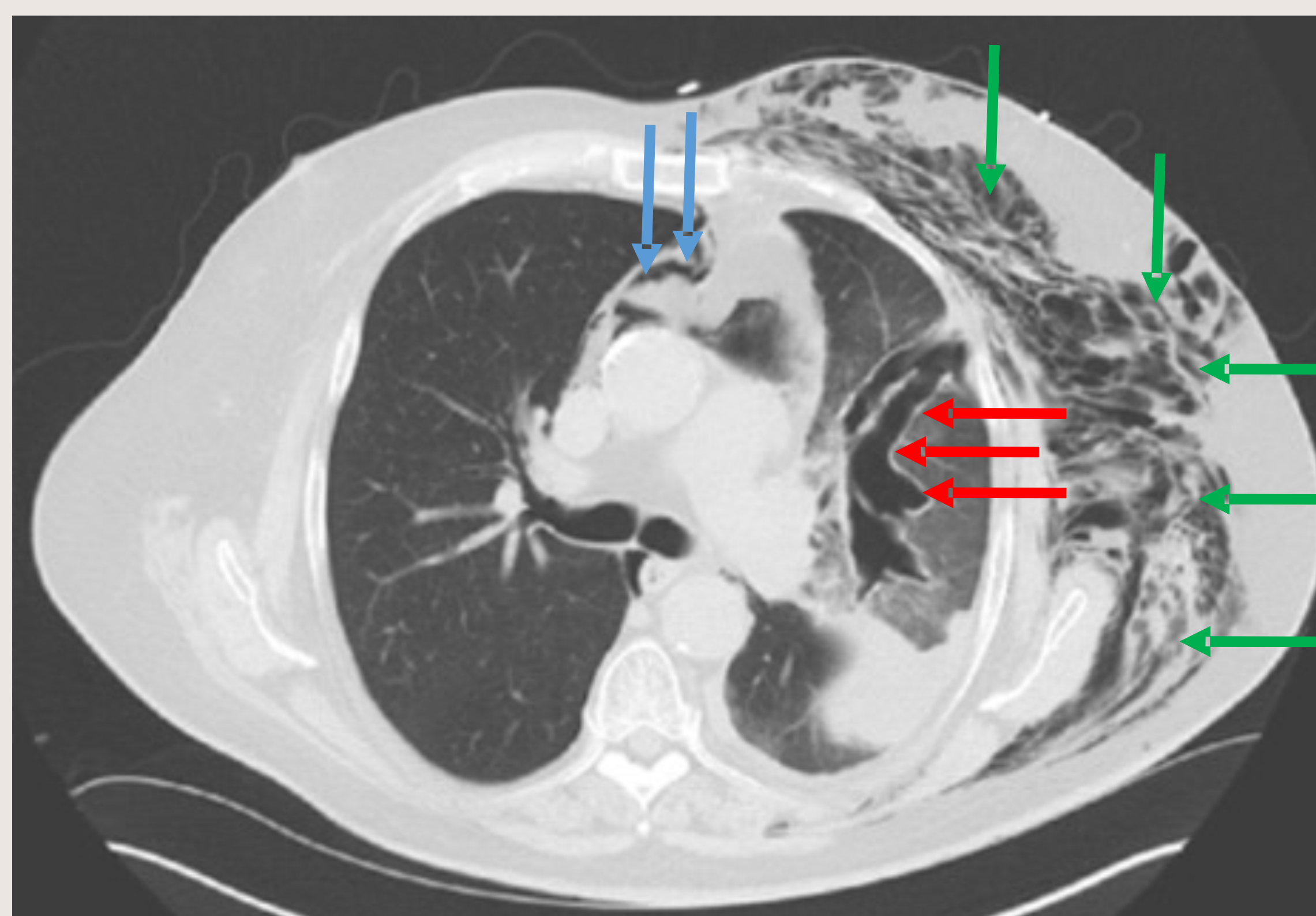


Figure 2: CT thorax showing contained area of air in left lung (red), that extends to the mediastinum (blue) as well subcutaneous chest tissue (green)

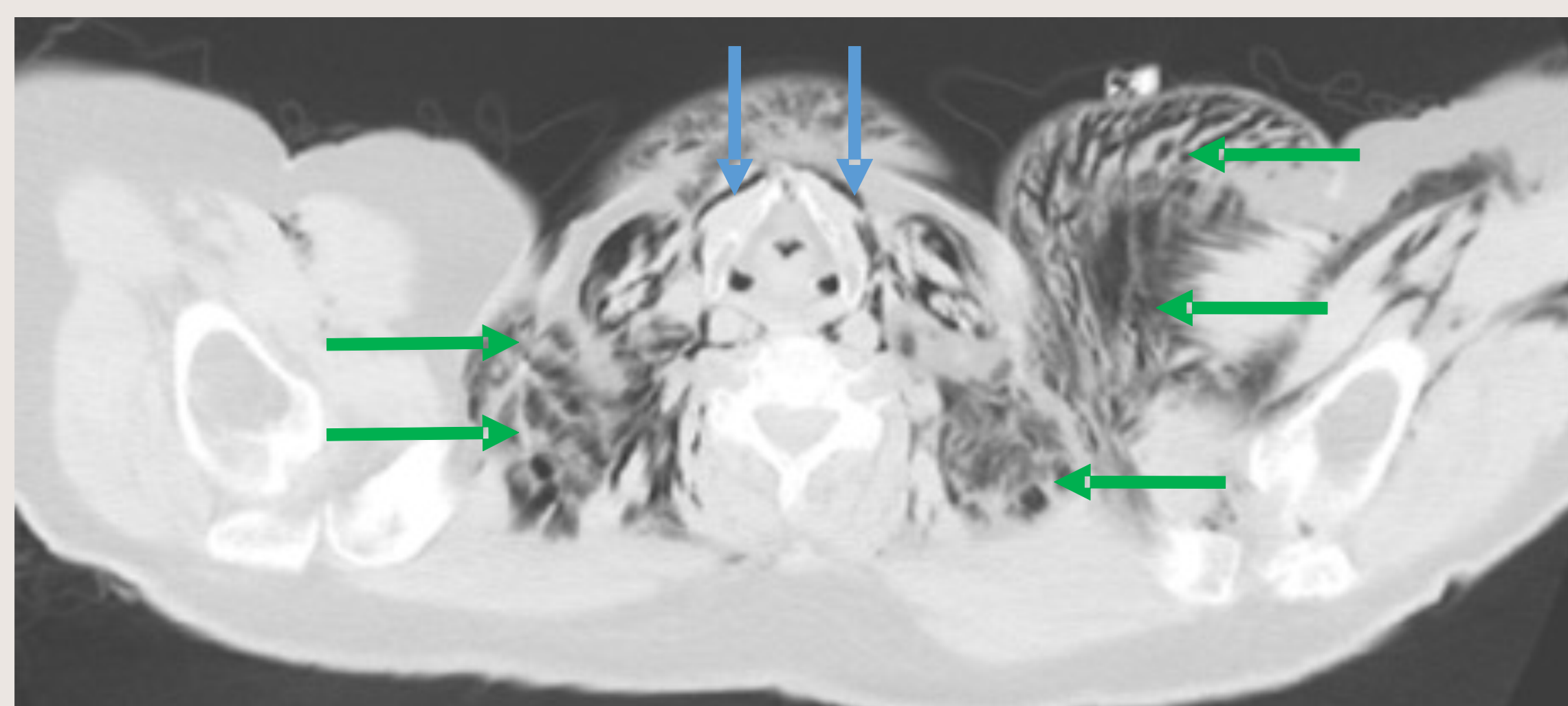


Figure 3: CT chest/neck showing air in mediastinum (blue), and subcutaneous air in neck and chest tissue (green)

Discussion

Pneumothorax "ex vacuo" refers to the idea that a bronchial obstruction with partial lung lobar collapse creates a vacuum effect in an isolated area surrounding the partially collapsed lobe. This area can be fluid filled, and if that fluid is drained (via pleuracentesis), the area then fills with air that cannot escape. The patient presented underwent pleuracentesis, which led to a pocket of "trapped" or "ex vacuo" air. This case was complicated by an additional iatrogenic lung laceration (sustained during pleuracentesis), which created a fistulous tract from the PEV to the mediastinum. When the tract eventually met the mediastinum, air escaped into the subcutaneous tissue and led to our patient's acute complaints.

Because the underlying pathology of a PEV is bronchial obstruction, a simple tube thoracostomy or catheter insertion does not resolve the issue. If a chest tube is inserted into a PEV, the pathology may be temporized, but removal of the chest tube without resolution of the bronchial obstruction will lead to rapid re-accumulation of air.

Case Conclusion

- Patient taken to OR for surgical repair of lung laceration, PEV
- Lung laceration repaired, obstruction resolved
- Patient discharged home

Take Home

In the field of medicine, we often anchor on what diagnoses we are familiar with. In the military setting in particular, all providers are very well trained on the recognition and treatment of pneumothoraxes, given our focus on trauma combat medicine. Recognizing that PEV can present as, and appear similar to a typical pneumothorax is extremely important. If the diagnosis can be recognized, the patient can receive prompt, and more importantly proper, treatment.

Sources

1. Ahmed, A. Evaluation of the adult with dyspnea in the emergency department. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2021
2. Rezaee, Amir. "Pneumothorax Ex Vacuo: Radiology Reference Article." Radiopaedia Blog RSS, radiopaedia.org/articles/pneumothorax-ex-vacuo?lang=us.
3. "Pneumothorax Ex Vacuo: Post-Thoracentesis Pneumothorax in the Ultrasound Era." EMCrit Project, 13 Dec. 2016, emcrit.org/pulmcrit/pneumothorax-ex-vacuo-post-thoracentesis-pneumothorax-in-the-ultrasound-era/.
4. Woodring JH, Baker MD, Stark P. Pneumothorax ex vacuo. Chest. 1996 Oct;110(4):1102-5. doi: 10.1378/chest.110.4.1102. PMID: 8874276.
5. Ponrartana S, Laberge JM, Kerlan RK, Wilson MW, Gordon RL. Management of patients with "ex vacuo" pneumothorax after thoracentesis. Acad Radiol. 2005 Aug;12(8):980-6. doi: 10.1016/j.acra.2005.04.013. PMID: 16087092.