

Tension Over Too Much Testing  
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### **Story from the Front Lines**

A woman in her 60s with a history of myofascial pain syndrome presented to the emergency department (ED) with right-sided chest pain and shortness of breath. Several hours earlier she had received trigger point injections to bilateral trapezius muscles, just medial to both scapulae. Upon arrival she was found to be tachycardic with a new oxygen requirement of 4L, but otherwise not in distress. Pulmonary exam revealed diffused wheezes and decreased breath sounds at the right lung base. A chest x-ray (CXR) was ordered as was a D-dimer, which was elevated at 750. In response to this, CT pulmonary angiography was ordered, prior to reviewing the CXR, which had not yet been interpreted by the attending radiologist . Both CXR and CT of the chest revealed a right-sided tension pneumothorax (PTX). A pigtail chest tube was placed in the right lung resulted in prompt re-expansion and the patient was discharged the next day.

### **Teachable Moment**

Two major issues led to an avoidable CT scan in this case. First, was the desire to expedite a work up – the so-called “shotgun” approach – rather than testing sequentially on the basis of probability. Second was excess reliance on a positive test result with poor specificity – the D-dimer – in the context of a patient whose pre-test probability of pulmonary embolism was very low given her recent history of injections into her chest wall. A review of 32 PTXs in 1990 revealed that CXR was 84% sensitive in detecting PTX while CT scan was 91% sensitive. These numbers were not statistically significant [1]. The CXR would have made the diagnosis but due to the “shotgun approach,” the diagnosis was delayed, the cost of the healthcare delivery was increased, and the patient was exposed to unnecessary radiation and contrast dye. Fortunately the patient was not obviously harmed at the point of care, though the eventual harms from radiation or incidental findings (acts of commission) are often far downstream and thus easier to forget than harms from acts of omission. This case made me examine my own practice as well. Do I take a shotgun approach to ordering tests when they are perhaps not necessary? Do I really need the rest of the rheum work up before the ANA comes back? When I am admitting a patient with acute kidney injury, do I need a renal US even before trying fluid resuscitation? After examining this case I believe when time is not critical, the work up can be done in a more stepwise fashion, reviewing each piece of data before ordering the next in according with Bayesian principles. Tests should always be prioritized based on your clinical suspicion i.e. prevalence or pre-test probability. This case demonstrates nicely how an “expedited” evaluation can actually delay diagnosis instead of helping us to reach it quicker.

References:

1. CT and chest radiography are equally sensitive in the detection of pneumothorax after CT-guided pulmonary interventional procedures. Murphy FB<sup>1</sup>, Small WC, Wichman RD, Chalif M, Bernardino ME. AJR American Journal of Roentgenology 1990 Jan; 154 (1): 45-6