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You are called to a residence for a complaint of difficulty breathing. Upon arrival you find a 58 year old female patient sitting in a living room chair in obvious respiratory distress. The patient is alert and oriented but very anxious and agitated. She appears to be in severe distress. Through 3 word dyspnea the patient is able to tell you she had a sudden onset of difficulty breathing two hours ago while at rest. She has been well this week and has never experienced this before. She has associated complaints of mild, dull chest discomfort and feels fatigued and lightheaded when she attempts to stand. Together you and your partner begin to assess the patient while gathering history. The patient has a past medical history of COPD (never intubated or ICU care) and lung cancer for which she has had lung surgery 2 months ago and will be starting chemotherapy next week. Her home medications include hydromorphone PO and inhalers (salbutamol, Symbicort). She has no known allergies. Your primary exam and vital signs reveals the following: GCS – 15; HR – 110, thready/regular/sinus tachycardia; RR – 32 regular/full/very laboured, though she is tiring; auscultation findings – A/E = bilaterally, apices to bases without wheezing, moving large volumes of air; BP – 90/60; Skin: pale, cool, moist; SPO2 – 92% on R/A; ETCO2 – 22 mmHg; blood glucose: 6.2 mmol/L. The 12-lead ECG acquired is non-specific without STEMI and confirms sinus tachycardia.

You realize that this presentation does not fit COPD. What is the most likely life threatening condition that could be causing the respiratory distress? If you are strongly considering pulmonary embolism (PE) as the cause of this patient's problem, you are correct! The list of differential diagnoses in this patient could be very long including COPD, pneumonia, pneumothorax, acidosis, sepsis, myocardial ischemia/infarction, cardiomyopathy, pericardial tamponade, etc. Some of the common risk factors for PE can be found in the case above including active cancer with recent surgery and decreased mobility. Other common risks not found here are previous history of blood clots (DVT/PE), family history of DVT/PE, smoking, estrogen therapy, and immobilization of a lower limb (following surgery or in a cast). Common signs and symptoms found in this patient but that are not always present are tachypnea, tachycardia, hypotension, and low SPO2. Other findings commonly associated with PE are unilateral leg swelling (DVT) and pleuritic chest pain but these don't always occur.[1] The best use of a 12 lead ECG in suspected PE is to rule out STEMI and consider acute coronary syndromes (ACS).[2] The most likely finding on an ECG in PE is sinus tachycardia.

Prehospital management of PE should be focused on:

- Maintaining a high index of suspicion based on history and presentation
- Triage and hospital notification based on the patient's condition. In the shock presentation such as the patient above, the best treatment available may be rapid transport. In the witnessed cardiac arrest patient due to suspected PE, consider initiating transporting early (if in PEA) as per the Clinical Considerations direction in the Medical Cardiac Arrest Medical Directive. Emergency Department thrombolysis during cardiac arrest may be life-saving in rare cases of witnessed arrest from massive PE
- Where authorized, consider initiating an IV as per the Intravenous and Fluid Therapy Medical Directive for hypotensive patients
- Be sure to pass on your suspicion upon arrival in the ED so this can be considered in the patient's triage and ED assessment

1. Courtney, M et al. Clinical features from the history and physical examination that predict the presence or absence of pulmonary embolism in symptomatic emergency department patients: Results of a prospective, multicenter study. Ann Emerg Med. 2010;55:307-315.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2847003/
2. ECG findings in acute PE: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3267566
3. For a good review of PE: http://emedicine.medscape.com/article/300901-overview