

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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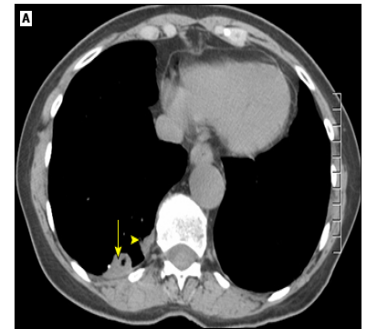
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Pulmonary Embolism

A 36-year-old female with past medical history of a DVT presents to the ED with chest pain and dyspnea for the past 12 hours. The patient's symptoms were sudden in onset and her shortness of breath worsens with deep inspiration. She denies cough, palpitations, nausea, or vomiting. Her past medical history consists of prior DVT and hypertension. Her only medication is lisinopril. She was on OCP's in the past but this was discontinued after her DVT. On physical exam, her vitals are T- 98.7, pulse 118, RR 26, and BP 134/80 and BMI of 32. O2 sat is 88% on room air. Lungs are clear to auscultation, she has a tachycardic rate with a regular rhythm, with no murmur discernable. Chest x-ray shows no acute abnormalities. Left leg is moderately swollen around the calf when compared to her right.

What is the next appropriate step to take for this patient?

- A. CT Angiogram
- B. Venous doppler Ultrasound
- C. Bedside Echo
- D. V/Q scan



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Chest CT without contrast show a thrombus/cavating nodule (arrow) in the right lower lobe.

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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The correct answer is A.

Discussion/Diagnosis:

Definitive diagnostic testing should be pursued which includes computed tomography pulmonary angiography, or, if contrast is contraindicated, a V/Q scan. For patients who are hemodynamically unstable, bedside echo or venous compression ultrasonography can be done.⁴

Introduction

Pulmonary Embolism is defined as an obstruction of the pulmonary artery or its branches.^{1,2} It is commonly a form of venous thromboembolism that originates as a DVT and often travels to the pulmonary arteries causing a blockage.¹ It can often times also be caused by tumor, fat, or air. It can be fatal and is common. A PE can be further categorized as acute, subacute, or chronic. It can also be subdivided into provoked or unprovoked category. Unprovoked causes include obesity or cigarette smoking, both of which were factors for this patient. For provoked, Risk factors include malignancy, pregnancy, trauma, paralysis, immobilization, surgery, OCPs, IV drug use, HIT, or inherited hypercoagulable disorders such as Protein C or S deficiency, antithrombin deficiency or Factor V Leiden deficiency. Virchow's Triad describes the pathogenesis of DVT/PE. It includes a hypercoagulable state, endothelial injury and venous stasis.^{1,2}

Clinical Presentation

Presentation of a PE can often have vague symptoms therefore, clinical suspicion is important. Typically, a patient will present with sudden onset of SOB, chest pain which can be pleuritic, hypoxia, tachypnea, and hypotension.^{1,2}

Wells criteria and modified Wells criteria: Clinical assessment for pulmonary embolism

- Clinical symptoms of DVT (leg swelling, pain with palpation) 3.0
- Other diagnosis less likely than pulmonary embolism 3.0
- Heart rate >100 1.5
- Immobilization (≥ 3 days) or surgery in the previous four weeks 1.5
- Previous DVT/PE 1.5
- Hemoptysis 1.0
- Malignancy 1.0

Probability Score

Traditional clinical probability assessment (Wells criteria)

High >6.0
Moderate 2.0 to 6.0
Low <2.0

Simplified clinical probability assessment (Modified Wells criteria)

PE likely >4.0
PE unlikely ≤ 4.0

DVT: deep vein thrombosis; PE: pulmonary embolism.

Data from van Belle A, Buller HR, Huisman MV, et al. Effectiveness of managing suspected pulmonary embolism using an algorithm combining clinical probability, D-dimer testing, and computed tomography. JAMA 2006; 295:172.

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Figure 1: Data from Van Belle A, Buller HR, Huisman MV, et al. Effectiveness of managing suspected pulmonary embolism using an algorithm combining clinical probability, D-dimer testing, and computed tomography. JAMA 2006; 295:172.

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All are welcome to attend!

Diagnosis

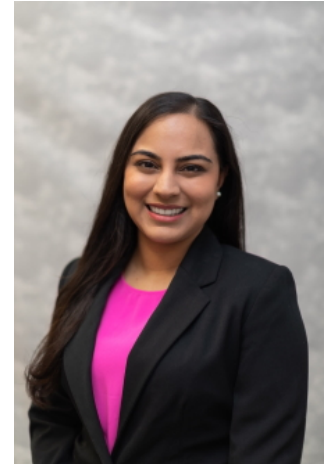
For stable patients, one should combine clinical and pre-test probability assessment, d-dimer, and definitive diagnostic testing. Pre-test probability includes the Wells Criteria.³ D-dimer can be used if the patient has a low pre-test probability. Should the D-dimer be positive, further more specific diagnostic testing should be pursued. D-Dimer is sensitive, but not specific. If it is negative, you can rule out PE unless there is high clinical suspicion. More definitive imaging includes computed tomography pulmonary angiography, or, if contrast is contraindicated, V/Q scan. For patients who are hemodynamically unstable, bedside echo or venous compression ultrasonography can be done.^{3,4}

Management

Initial management of suspected PE should be to stabilize the patient. This may include hemodynamic support or supplemental oxygen.⁴ The main treatment for PE is anticoagulation. Classically, low molecular weight heparin bridged to warfarin has been used.⁵ In some instances, anticoagulation may started even before a definitive diagnosis is made if clinical suspicion for PE is high and bleeding risk is low. If a patient has a life-threatening PE, they may require additional therapies such as emergent tPA or embolectomy.^{4,5} In patients with a DVT that cannot be anticoagulated, an IVC filter can be considered to prevent further pulmonary emboli.

Take home points

- Well's criteria is an important risk stratification criteria to determine risk for PE.³
- CTA is the best imaging modality and most specific for diagnosis of PE.⁴
- With life threatening and unstable PE's, it may be more beneficial to begin treatment before diagnosis is determined if clinical suspicion is high.⁵



ABOUT THE AUTHOR

This month's case was written by Divya Pandya. Divya is a 4th year medical student from NSU-COM. She did her emergency medicine rotation at BHMC in Jan 2020. Divya plans on pursuing a career in Internal Medicine after graduation.

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