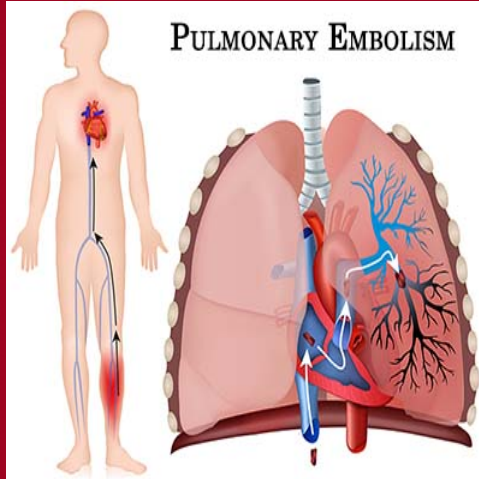


EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE



In its most general form an embolus is a blood clot that travels in the blood stream from one area of the body to another and can become lodged in a small blood vessel, preventing further blood flow.

EM CASE OF THE WEEK

EM Case of the Month is a monthly “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.



Diagnosing Pulmonary Embolism

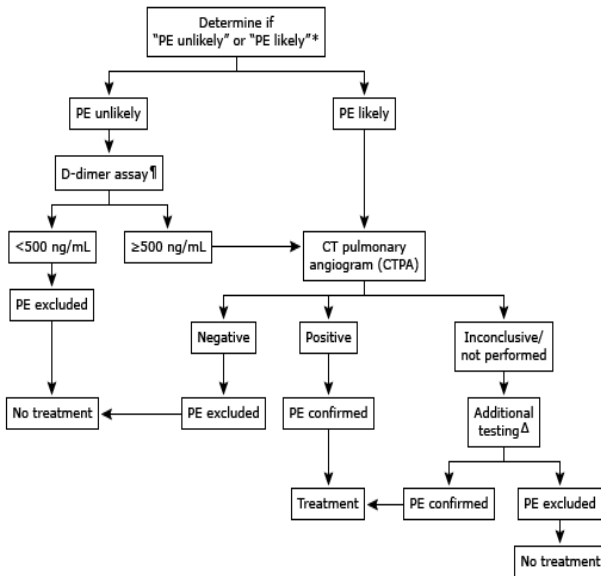
A 36 year old male presents to the ED with a 3 day history of cough, chest pain and shortness of breath. His symptoms are sudden in onset and worsened by deep inspiration. He has not had fever, has not traveled recently and has had no sick contacts. His vital signs are T 98.7, HR 110, RR 22, BP 110/70, O2 sat 95%. A CXR is ordered and results are within normal limits. Next, a D-dimer level is ordered which is found to be elevated. The patient is suspected of having a pulmonary embolism and a CT Angiogram is ordered. The test confirms the diagnosis and the patient is immediately started on anticoagulation. Which of the following is NOT a criteria of the Wells Score (used to determine the probability of PE)?

- A. Malignancy
- B. Immobilization > 3 days
- C. Hemoptysis
- D. O2 Saturation <95%
- E. Tachycardia >100



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Diagnostic Strategy used in PE



The correct answer is D.

The Wells Score

To diagnose pulmonary embolism, medical societies recommend a review of clinical criteria to determine the need for testing. The most commonly used method to predict clinical probability is the Wells score, which is a clinical prediction rule, used to determine the likelihood of PE based on specific criteria.

Select Criteria:

- Symptoms of DVT (3 points)
- No alternative diagnosis better explains the illness (3 points)
- Tachycardia with pulse >100 (1.5 points)
- Immobilization > 3 days or surgery in the previous 4 weeks (1.5 points)
- Prior history of DVT or PE (1.5 points)
- Hemoptysis (1 point)
- Malignancy (1 point)

Score Interpretation:

- Score >6 = High probability
- Score 2-6 = Moderate probability
- Score <2 = Low probability

D-Dimer

In a patient with low or moderate pretest probability of PE, D-dimer testing is the usual next step. D-Dimer is a fibrin degradation product present in the blood after a blood clot is degraded by fibrinolysis. Its concentration in the blood can help diagnose thrombosis. **Negative results of a D-dimer test in a patient with a low pretest probability of PE indicate a low likelihood of venous thromboembolism and reliably exclude PE.** D-dimer testing is most reliable in younger patients who have no associated comorbidity or history of venous thromboembolism and whose symptoms are of short duration. However, it is of questionable value in patients who are older than 80 years, who are hospitalized, who have cancer, or who are pregnant, because

Take Home Points

- Diagnostic approach includes a combination of clinical and pretest probability assessment using the Wells Score.
- Negative results of a D-dimer test in a patient with a low pretest probability of PE indicate a low likelihood of venous thromboembolism and reliably exclude PE.
- The PERC rule is designed to rule out risk of PE in patients determined to be low-risk.
- Abnormalities historically considered to be suggestive of PE such as S1Q3T3 pattern are not commonly seen.
- CTA is the current standard of care for the detection of pulmonary embolism.

For a list of educational lectures, grand rounds, workshops, and didactics please visit

<http://www.BrowardER.com>

and click on the "Conference" link. All are welcome to attend!

nonspecific elevation of D-dimer concentrations is common in such patients. **Because of the poor specificity, positive D-dimer measurements are not helpful in confirming the diagnosis of venous thromboembolic disease.**

However, a positive D-dimer may lead to consideration of venous thromboembolic as a differential diagnosis in selected patients.

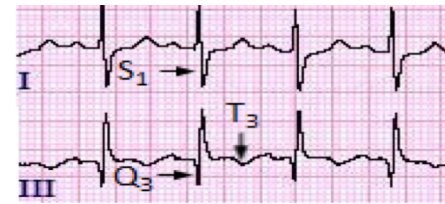
The PERC Rule

The PE rule-out criteria is an alternate to D-dimer testing in patients with a low-probability assessment for PE. It helps assess people in whom PE is suspected, but unlikely. Unlike the Wells score, which is intended to risk stratify patients with suspected PE, the PERC rule is designed to rule out risk of PE in patients when they have already been stratified into a low-risk category. The PERC rule has eight criteria:

- Age <50 years
- Heart rate <100 beats/minute
- Oxyhemoglobin saturation \geq 95 percent
- No hemoptysis
- No estrogen use
- No prior DVT or PE
- No unilateral leg swelling
- No surgery/trauma requiring hospitalization within the prior four weeks.

ECG

Electrocardiogram abnormalities are common in patients with suspected PE. However, they are nonspecific with limited value diagnostically. The most common findings are tachycardia and nonspecific ST-segment and T-wave changes (70 percent). Abnormalities historically considered to be suggestive of PE such as S1Q3T3 pattern, right ventricular strain, new incomplete right bundle branch block are rather infrequent (less than 10 percent).



The S₁Q₃T₃ pattern

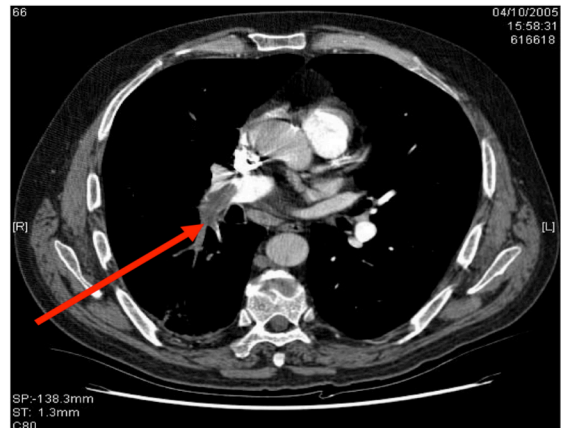
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CXR

Initially, the chest radiographic findings are normal in most cases of PE. **Generally, CXRs cannot be used to conclusively prove or exclude PE.**

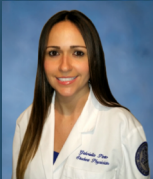
CT Angiogram

CTA is the initial imaging modality of choice for stable patients with suspected PE. **The American College of Radiology (ACR) considers chest CTA to be the current standard of care for the detection of PE.**



V/Q Scan

V/Q scanning may be used when CT scanning is not available or if the patient has a contraindication to CT scanning or IV contrast material.



ABOUT THE AUTHOR:

This month's case was written by Gabriella Pinto. Gabriella is a 4th year medical student from NSU-COM. She did her emergency medicine rotation at BHMC in August 2015. Gabriella plans on pursuing a career in Pediatrics after graduation.