Pulmonary Emboli: A Clinical Review of Unprovoked Thrombosis in an Atypical Patient

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Introduction

What is it:
Pulmonary embolism (PE) is an obstruction of a pulmonary artery commonly caused by thrombus that originated from venous circulation.
Saddle embolus is most severe form, lodges at the bifurcation of the main pulmonary artery (which, in turn, blocks a large amount of airflow from reaching the alveoli

Presentation:
- Most common: **dyspnea**
- Followed by…
  - Chest pain, cough, symptoms of deep venous thrombosis (calf tenderness, pain, swelling)
- With severe PE, patients can present with:
  - Shock, arrhythmia, syncope

Diagnosis:
- Definitive: **computed tomographic pulmonary angiography**
- D-Dimers and VQ scans also used, but less reliable
- **Wells Criteria** as diagnostic tool:

■ 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

Treatment:
- Initial treatment: **oxygen and stabilization**
- **Anticoagulation**, pending bleeding risk
- If life-threatening PE, additional treatment may be required, such as thrombolysis, ICV filters, embolectomy

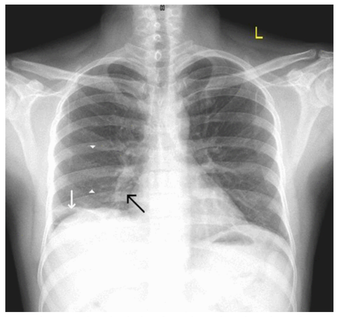
Case Description

Case:
45-year-old Caucasian female presents to the ED

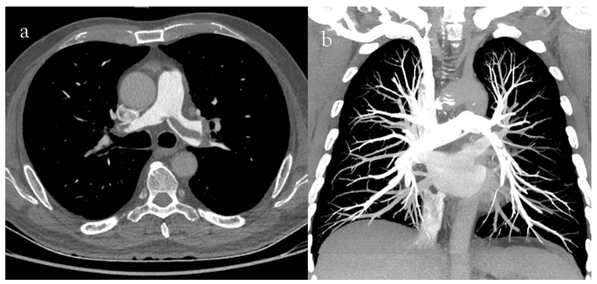
CC: "Chest pain, shortness of breath and syncopal episodes"
- Increased dyspnea, pleurisy, diaphoresis, nausea and 2 syncopal episodes the morning of ED presentation
- 4 week history of shortness of breath and pleuritic sharp chest pain which progressively worsened over the last week.
- Left lower leg soreness x2 weeks prior

History:
- Medications: High dose combined oral contraceptive x18 years
- Allergies: None
- No prior history of DVT or PE. No recent trauma, travel or immobility
- No tobacco, alcohol or illicit drug use

Exam:
- Afebrile
- Hypotensive (64/28)
- Hypoxic (88% on room air) on initial presentation
- In no acute distress, alert and oriented x3
- Heart and lung exam: No acute findings



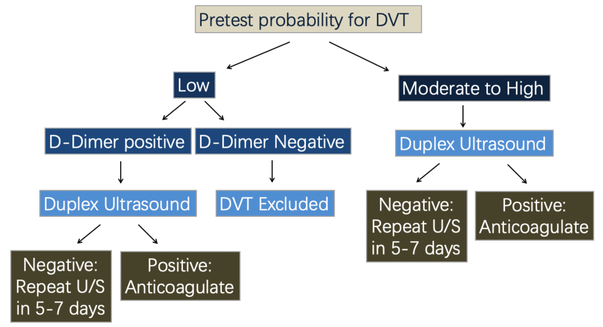
Chest radiograph (posterior–anterior view) showing a lateral wedge-shaped opacity (white arrow) in the right lower zone (Hampton's hump), a focal area of oligemia (space between white arrowheads) in the right lower zone (Westermark's sign) and a prominent right descending pulmonary artery (black arrow) (Palla's sign).



Contrast-enhanced computed tomography angiography (CTA) has been accepted as gold standard for detecting pulmonary embolism

Patient Course

Patient Course
- Hemodynamically stable following 2L IV fluid bolus. Placed on 50mL/hr LR infusion after initial bolus.
- Placed on non-rebreather then weaned to 6L via nasal cannula.
- Received 5000u IV heparin and placed on a heparin drip.
- Admitted for catheter-directed thrombolysis after unresponsive to heparin.
- Required 12 hours with EKOS catheter in place post-procedure.
- Transition to Eliquis during admission with plan to continue x6 months.
- Recommend OCP cessation and further hypercoagulable workup from hematology/oncology.



Results

BMP:
- pH 7.3
- pCO2 33.4
- HCO3 16.5
- K 2.9
- BUN:Cr 14:0.83
- high sensitivity troponin 47 then 217 on repeat
- BNP 82
- WBC 19.7
- lactic acid 2.2

CT Chest
- Bilateral pulmonary emboli and right heart strain
- CT head without contrast: No acute intracranial findings

Conclusion

- 26% of patients who go to their general practitioner with symptoms of a PE receive a delayed diagnosis of 7 days or more
- Delayed diagnosis and treatment of PE is common due to non-specific symptoms leading to a high mortality rate.
- PE left untreated has an overall mortality of up to 30 percent, which is significantly reduced with anticoagulation
- For patients with suspected PE an approach which combines clinical and pretest probability assessment should be taken.
- Treatment focuses upon oxygenating and stabilizing the patient. Once the diagnosis is made, the mainstay of therapy is anticoagulation, depending upon the risk of bleeding.
- PE's can come from various locations in the body, but most commonly come from the lower extremity

Superficial veins	Deep veins	Perforator veins
Telangiectasias or reticular veins	Inferior vena cava	Thigh
Great saphenous vein above the knee	Common iliac vein	Calf
Great saphenous vein below the knee	Internal iliac vein	
Small saphenous vein	External iliac vein	
Nonsaphenous veins	Pelvic: gonadal, broad ligament veins, other	
	Common femoral vein	
	Deep femoral vein	
	Femoral vein*	
	Popliteal vein	
	Crural: anterior tibial, posterior tibial, peroneal veins (all paired)	
	Muscular: gastrocnemial, soleal veins, other	

CEAP: Clinical-Etiology-Anatomy-Pathophysiology classification of lower extremity chronic venous disorders.

* Formerly referred to as the superficial femoral vein, a misnomer since it is a deep vein.

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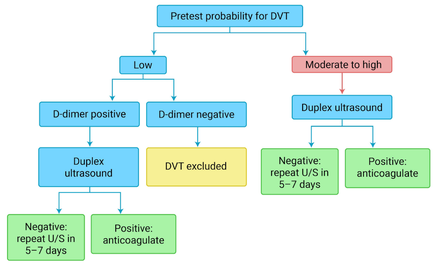
Pretest probability for DVT
Low
Moderate to high
D-dimer positive
D-dimer negative
Duplex ultrasound
Duplex ultrasound
DVT excluded
Negative: repeat U/S in 5–7 days
Positive: anticoagulate
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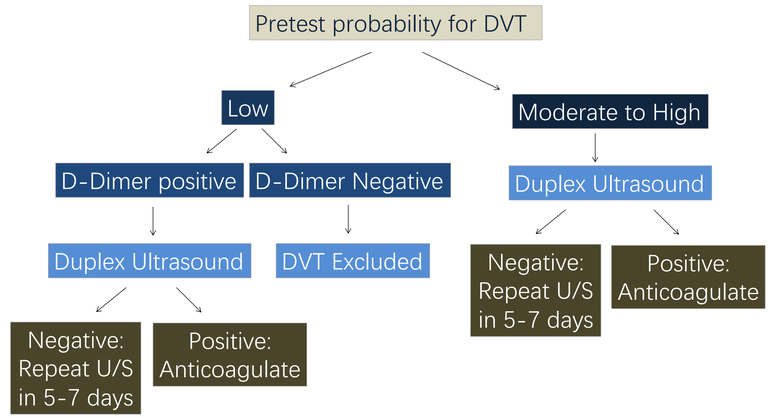
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