

# EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER  
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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## Pulmonary Embolism

A 29-year-old female with no significant past medical history presents to the ED for a Code Sepsis. She had liposuction and a Brazilian butt lift procedure done 4 weeks ago and over the past week she has developed a worsening, diffuse burning sensation in her chest and abdomen. She admits to subjective fevers, chills, shortness of breath, palpitations, and chest and abdominal tightness. Patient has a low-grade fever, hypotension, O<sub>2</sub> saturation of 95%, and tachycardia on initial presentation. On physical exam, patient is alert and in severe distress. Her abdomen is diffusely tender to palpation with reproducible pleuritic chest wall pain. She has labored breathing with lungs clear to auscultation. Skin exam shows multiple healing liposuction port insertion sites with bruising and no discharge. Remainder of the physical exam is within normal limits. Which of the following is the most appropriate next step in management of this patient?

- A. Obtain blood cultures and initiate empiric antibiotic treatment for possible sepsis**
- B. Initiate empiric anticoagulation therapy**
- C. Assess hemodynamic stability**
- D. Intubate, put in a central line, and begin pressors and IV fluids immediately**
- E. Obtain serial ABGs and provide respiratory support with supplemental oxygen**

Age <50 years

Heart rate <100 bpm

Oxyhemoglobin saturation  $\geq 95\%$

No hemoptysis

No estrogen use

No prior DVT or PE

No unilateral leg swelling

No surgery/trauma requiring hospitalization within the prior four weeks

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The Pulmonary Embolism Rule Out  
Criteria (PERC)

**This rule is only valid in patients with a low clinical probability of PE (gestalt estimate <15 percent). In patients with a low probability of PE who fulfill all eight criteria, the likelihood of PE is low and no further testing is required. All other patients should be considered for further testing with sensitive D-dimer or imaging.**

*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.

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**The correct answer is C.** We must assess the patient's hemodynamic stability before making any further treatment decisions. Obtaining blood cultures, providing respiratory support, and initiating IV fluids are all appropriate approaches to management but the initial step in our evaluation must begin with an assessment of hemodynamic stability because that can change the course of our ongoing management.

Pulmonary Embolism refers to the obstruction of the pulmonary artery or one of its branches by a thrombus, tumor, air, or fat. The clinical presentation of PE is variable and often nonspecific making the diagnosis challenging. Risk factors include recent surgery, trauma, hormone therapy, malignancy, obesity, and smoking. More than 50 percent of patients with proximal vein deep venous thrombosis (DVT) have concurrent PE at presentation.

### Discussion

Pulmonary embolism (PE) has a wide variety of presenting features, ranging from no symptoms to shock or sudden death. The most common presenting symptom is dyspnea followed by chest pain (classically pleuritic in nature), cough, and symptoms of deep venous thrombosis. Initial assessment should begin with determining a Well's Score. For patients with a low Well's score, clinicians can rule out a PE with the PERC rule and/or D-dimer levels. For moderate or high Well's scores, definitive imaging including CT pulmonary angiography and less commonly, ventilation perfusion scanning or other imaging modalities should be considered. For patients who are hemodynamically unstable and in whom definitive imaging is unsafe, bedside echocardiography or venous compression ultrasound may be used to obtain a presumptive diagnosis of PE to justify the administration of potentially life-saving therapies.

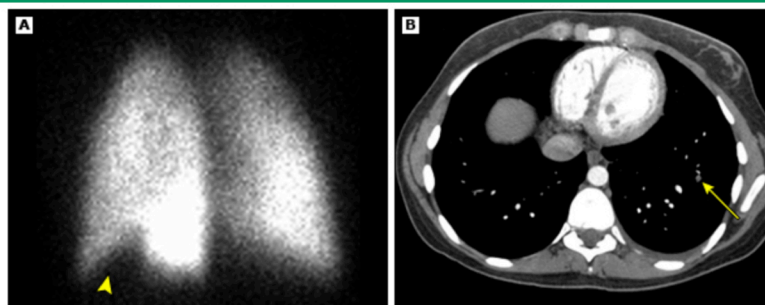
### Treatment

In the hemodynamically stable (normotensive) patients with low risk of bleeding, anticoagulation therapy is indicated. For those with contraindications to anticoagulation, placement of an inferior vena cava (IVC) filter is warranted. For most hemodynamically stable patients, thrombolytic therapy is NOT indicated.

Initial anticoagulation refers to systemic anticoagulation administered immediately following the diagnosis of deep vein thrombosis (DVT) or pulmonary embolism (PE; typically, **first 0 to 10 days**). For most patients with venous thromboembolism (VTE) who are hemodynamically stable, research suggests subcutaneous LMW heparin or fondaparinux, or the oral factor Xa inhibitors, rivaroxaban or apixaban, rather than intravenous UFH. The administration of empiric anticoagulation depends upon the risk of bleeding, clinical suspicion for PE and the expected timing of diagnostic tests.

Most patients with a first episode of venous thromboembolism (VTE; provoked or unprovoked) should receive anticoagulation for a minimum of **three months**. All patients on anticoagulation should be monitored clinically for therapeutic efficacy (recurrence), bleeding, as well as the development of conditions that affect the half-life of the medications used (e.g., renal failure, pregnancy, weight gain/loss) and adverse effects of the medications (e.g., skin necrosis, thrombocytopenia, osteoporosis).

### V/Q scan and CT of small pulmonary emboli



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*All are welcome to attend!*

# Warriors

## 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
<b>Probability</b>	<b>Score</b>
<b>Traditional clinical probability assessment (Wells criteria)</b>	
High	>6.0
Moderate	2.0 to 6.0
Low	<2.0
<b>Simplified clinical probability assessment (Modified Wells criteria)</b>	
PE likely	>4.0
PE unlikely	≤4.0

©2018 UpToDate® Wells Criteria

Major adverse outcomes of a PE include recurrent thromboembolism and rarely chronic thromboembolic pulmonary hypertension. If left untreated, the mortality rate of a PE is 30% with most deaths occurring during the first week of diagnosis. Among prognostic models, the Pulmonary Embolism Severity Index (PESI) and the simplified PESI (sPESI) can predict all-cause mortality after PE. Patients should continue to be monitored for therapeutic efficacy of anticoagulation, early and late complications of PE, and risk of bleeding.

## Take Home Points

- The presentation of a PE is variable and clinical suspicion must be high
- Assess hemodynamic stability before initial therapies and obtain stability in an unstable patient before anticoagulation
- Clinical presentation, D-dimer, Well's Criteria, and radiological imaging can help guide the diagnosis and treatment plan
- Anticoagulation is the primary treatment option with various medications that can be used based on bleeding risk, compliance, renal function, pregnancy status, etc. Initial therapy should last for 3 months
- Consider IVC filter placement in individuals with high risk of bleeding or contraindications to anticoagulation
- Continue to monitor the patient for therapeutic efficacy, recurrence of PE, bleeding risk, or medication side effects



## ABOUT THE AUTHOR

This month's case was written by Misbah Yehya. Misbah is a 4<sup>th</sup> year medical student from NSU-COM. She did her emergency medicine rotation at BHMC in March of 2018. Misbah plans on pursuing a career in General Surgery after graduation.

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