

Case 1

Pt is a 45 yo female who presents with a “run down feeling” after returning from a trip to India. When talking with the patient you learn that she just hasn’t been able to perform the activities she normally could without having to rest. For example, a few weeks ago she was able to work on her house for approximately 12 hrs per day, but recently she is exhausted after a few hours of activity. The patient is not aware of an “exact” moment that the symptoms started, but noted it has not changed in intensity over the past two weeks. Activity worsens the feeling; rest improves her symptoms. The patient also complains of chest pain with deep breathing. Pt denies cough, wheezing, feelings of palpitations, hiccoughs, episodes of seizures or syncope.

What things could be causing her problems?

This is a patient who has decreased exercise capacity that came on fairly quickly. Things that could be causing this could involve decreased oxygenation of the blood or decreased pumping of well oxygenated blood. Additionally, build up of toxins, that should be cleared by the liver or kidney, can make people feel crummy.

The list is very broad still, pneumonia, congestive heart failure (CHF), acute anemia, pericarditis, pulmonary embolism (PE), acute renal failure (ARF) viral illness, etc.

What review of systems would you like to know?

Any fever, change in weight, rash or jaundice, dizziness, cough, shortness of breath (SOB), wheezing, palpitations, new edema, abdominal pain, nausea/vomiting, GERD (gastroesophageal reflux disease) symptoms, BRBPR (bright red blood per rectum), melena, episodes of seizures or syncope, any signs of depression (SIG E CAPS- sleep, interests, guilt, energy, concentration/memory, affect/appetite, psychomotor changes, suicidal/sexuality/somatic symptoms)

The patient says no to most of your questions, except his left lower leg seems larger than his right.

What other history would you like to know?

Past medical history, Past surgical history, Smoker, Drinker, Work type, Marital status, Travel history, LMP (last menstrual period), Medications, Allergies.

Pt had breast cancer and had a lumpectomy performed in 2002, her estrogen receptors were positive and she is on Tamoxifen, she does still smoke, no alcohol, Business woman, married, returned from India 2 ½ weeks ago, gone thru menopause. On Tamoxifen and alendronate. No allergies.

Past Medical History: Attention Deficit Disorder

Social History: married, nonsmoker, occasional alcohol intake, travels a lot with work

What physical exam finding would you look for?

First, you want to know the vital signs. These can be very helpful. Is the patient febrile, tachycardic, tachypneic, hyper or hypotensive, hypoxic? The patient's overall color (looking for pale or jaundice), any rubs, gallops, or muffled heart sounds? Does the patient have rales, crackles, wheezes, or decreased breath sounds? Is the belly tender? Hypo or hyperactive bowel sounds? and about that swollen leg.... the best way to evaluate is to grab measuring tape and compare the two sides. Is the leg hot and red also? Is there any pain? Any other skin changes?

The patient had a heart rate of 120, was saturating 86% on RA (room air). Aside from the tachycardia, the cardiovascular exam was normal, as was the pulmonary and abdominal. The right leg measured 5cm greater than the left leg.

What labs/imaging studies would you like to order in a patient with SOB, chest pain, and a swollen leg?

CBC- looking for anemia and elevated WBC count

EKG- looking for tachycardia, low voltage, evidence of angina, etc

BNP- shows evidence of an enlarged heart (CHF)

CXR- could this be a pneumonia? you will also get a peak at the heart size (Congestive heart failure), also sometimes PE can have Westermark's sign, Hampton's hump, atelectasis, or infiltrate

CMP- Renal failure could make a patient be tired and have a uremia induced pericarditis, liver failure could make someone feel toxic and a low albumin could cause effusions.

Lower Extremity Ultra sound (LE U/S)- a swollen leg is concerning. However, remember a patient can have a PE from a deep venous thrombosis (DVT) that moved to a more proximal location and therefore isn't seen on the ultrasound.

D-dimer- This test comes in two forms now, a latex agglutination and an ELISA. The latex agglutination is not very sensitive. The ELISA is very helpful in ruling out a PE in someone that you do not think has a PE.

V/Q scan- This test has largely been replaced by PE protocol CT scan. V/Q scan is helpful if it is negative (although 1 out of 25 patients with PE will have a negative scan), but any other result will need to be followed up with more definitive tests.

CT scan, PE protocol- This imaging has replaced the conventional V/Q scan and pulmonary angiography, and is just as sensitive. Problems are that the patient must be able to receive i.v. contrast (people with renal insufficiency can not usually) and they must be under a specified weight (approx 300 lbs).

Your patient had an elevated WBC count of 15,000 (often seen with PE), normal hemoglobin, normal BMP and BNP, the EKG showed an large S wave in lead I, a Q wave in lead III, and an inverted T wave in lead III (seen in < 20% of PE). CXR and CMP were normal. LE U/S revealed a DVT. D-dimer was 10. You ordered CT scan instead of a V/Q scan; it showed large filling defect in one of the pulmonary arteries.

What is the diagnosis?

This patient has a pulmonary embolism which is when a clot (in this case and usually it's a blood clot, but it can be air or fat) migrates to the pulmonary artery. As described by Virchow (thus Virchow's triad) venous thrombosis is most likely to occur when stasis of blood, hypercoagulability, and intimal injury are present. Hemodynamic compromise is a result of a ventilation perfusion mismatch. Deoxygenated blood from the heart is unable to make it to the alveoli to receive oxygen, and in turn, the lung parenchyma void of its normal blood flow can have a loss of surfactant and can become infarcted.

What you should carry away from this case:

1. Pulmonary embolisms are significantly lethal often because of misdiagnosis since it can present in a variety of ways.
2. Possible presentations of PE:
 - a. chest pain
 - b. decreased exercise capacity
 - c. syncope
 - d. seizures
 - e. productive (phlegm or blood) cough
 - f. abdominal pain
 - g. atrial fibrillation
 - h. wheezing
 - i. fever
 - j. altered mental status
3. Risk factors for PE:
 - a. hypercoagulable states: clotting dysfunction (factor V Leiden mutation, protein C, S, or antithrombin III deficiency are the most common), pregnancy, oral contraceptive pills, or malignancy
 - b. venous stasis from immobility (travel, surgery, or weakness) or hyperviscosity (dehydration, polycythemia, or heart failure)
 - c. misc items: indwelling intravenous catheter, varicose veins, long bone fractures, inflammatory bowel disease)

Treatment summary

Depends largely on hemodynamic stability of patient and if anticoagulation is contraindicated.

1. Oxygenation
2. Thrombolytics
3. Anticoagulation (start with LMWH while warfarin is becoming effective)
3. Inferior vena caval filter

End with a short statement, or outline if the basics of treatment. Not meant to be real specific or lengthy.

1. Improve oxygenation
2. Removal clot
 - a. Dissolve
 - b. Evacuate if feasible
3. Prevention
4. Family matters. Who else is at risk?

Sometimes I leave the student with an unanswered 'thought' question. For Example:

Why does a person die suddenly with a PE? This is not so obvious and, unless it's a huge saddle embolus, the cause is not directly a result of poor oxygenation of the blood. See what other people think.