Pulmonary Embolism, Classification and Management

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Basics

Pulmonary embolism (PE) results from obstruction within the pulmonary arterial tree. The emboli can be caused by:

- Thrombosis - accounts for the majority of cases and has usually arisen from a distant vein and travelled to the lungs via the venous system. This will be the focus of the presentation.
- Fat - following long bone fracture or orthopaedic surgery.
- Amniotic fluid.
- Air - following neck vein cannulation or bronchial trauma

Differential Diagnosis

Other causes of collapse, chest pain or dyspnoea – importantly:

- Acute coronary syndromes.
- Aortic dissection - especially as anticoagulation might be fatal.
- Cardiac Tamponade
- Pneumonia
- Pneumothorax
- Septicaemia.

Thrombosis Risk Factors

- Acquired thrombophilia
  - Polycythemia vera
  - Antiphospholipid Syndrome
- Inherited Thrombophilia
  - Deficiency in antithrombin, protein C or S
  - Factor V Leiden mutation
- Surgery
- Medical
  - Pregnancy
  - Cancer
  - Heart/Kidney Failure
  - Obesity
  - Smoking
  - OCP & HRT

Presentation

Symptoms include:

- Dyspnoea.
- Pleuritic chest pain, retrosternal chest pain.
- Cough and haemoptysis.
- In severe cases, right heart failure causes dizziness or syncope.

Signs include:

- Tachypnoea, tachycardia.
- Hypoxia, which may cause anxiety, restlessness, agitation and impaired consciousness.
- Pyrexia.
- Elevated jugular venous pressure.
- Gallop heart rhythm, a widely split second heart sound, tricuspid regurgitant murmur.
- Pleural rub.
- Systemic hypotension and cardiogenic shock.

Diagnosis

Classification

- A classification of pulmonary thromboembolism is based on the stage (acute or chronic) and the size of the emboli (massive or submassive).
- Chronic presents with insidious onset of the same symptoms, can present with signs of RHF
- Surgery is the only definitive treatment in the case of a true chronic PE

Classification Cont.

- Sub-Massive other PE's that don't fall into massive category
  - Saddle PE- a subgroup, lodges and straddles the bi-furcation of the pulmonary arteries (R&L) infrequently cause hypotension
- Massive
  - Hypotension- systolic <90 mm/Hg or drop of systolic by 40mm/Hg from baseline for >15minutes
  - Suspect anytime there is hypotension jugular distension and definitely no MI
  - If fatal, death will occur usually within the first few hours

Two-level PE Wells score

Adapted with permission from

Clinical feature	Points	Patient score
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3	
An alternative diagnosis is less likely than PE	3	
Heart rate > 100 beats per minute	1.5	
Immobilisation for more than 3 days or surgery in the previous 4 weeks	1.5	
Previous DVT/PE	1.5	
Haemoptysis	1	
Malignancy (on treatment, treated in the last 6 months, or palliative)	1	
Clinical probability simplified scores		
PE *likely*	More than 4 points	
PE *unlikely*	4 points or less	

- Wells PS et al. (2000) Derivation of a simple clinical model to categorize patients' probability of pulmonary embolism: increasing the model's utility with the SimpliRED D-dimer. Thrombosis and Haemostasis 83: 416–20
- The National Clinical Guideline Centre