

Pulmonary Embolism [60, 469-477]

1. Introduction

- Pulmonary embolism (PE) is an obstruction of the pulmonary vessels which usually presents as one of four types:
 1. **Multiple small pulmonary emboli** – characterised by progressive breathlessness more commonly identified at outpatients appointments than through emergency presentation due to the long-standing nature of the problem.
 2. **Segmental emboli with pulmonary infarction** – may present with pleuritic pain and/or haemoptysis but with little or no cardiovascular compromise.
 3. **Major pulmonary emboli obstruction of the larger branches of the pulmonary tree** – may present with sudden onset of shortness of breath with transient rise in pulse and/or fall in blood pressure. Often a precursor to a massive PE.
 4. **Massive pulmonary emboli** – often presenting with loss of consciousness, tachypnoea and intense jugular vein distension, and may prove immediately or rapidly (within 1 hour) fatal or unresponsive to cardiopulmonary resuscitation.
- Pulmonary embolism can present with a wide range of symptoms (Table 3.70). The presence of predisposing factors (Table 3.71) increases the index of suspicion of PE; which increases with the number of predisposing factors present. However, in approximately 30% of cases, the presentation is idiopathic.
- Symptoms such as dyspnoea, tachypnoea or chest pain have been found in >90% of cases of patients with PE; with pleuritic chest pain is one of the most frequent symptoms of presentation.
- There may be sudden collapse with no obvious physical signs, other than cardiorespiratory arrest.
- Lesser risk factors include air, coach or other travel leading to periods of immobility, especially whilst sitting, oral oestrogen (some contraceptive pills) and central venous catheterisation.
- Over 70% of patients who suffer PE have peripheral vein thrombosis and vigilance is therefore of great importance – it may not initially appear logical to check the legs of a patient with chest pain but can be of great diagnostic value in such cases.

Table 3.70 – SIGNS AND SYMPTOMS OF PE

Symptoms

- Dyspnoea.
- Pleuritic chest pain.
- Substernal chest pain.
- Apprehension.
- Cough.
- Haemoptysis.
- Syncope.

Signs

- Respiratory rate >20 breaths per minute.
- Pulse rate >100 beats per minute.
- $\text{SpO}_2 < 92\%$.
- Signs of Deep Vein Thrombosis (DVT).

Table 3.71 – PREDISPOSING FACTORS

Factor
Surgery especially recent <ul style="list-style-type: none">● Abdominal.● Pelvic.● Hip or knee surgery.● Post operative intensive care.
Obstetrics <ul style="list-style-type: none">● Pregnancy.
Cardiac <ul style="list-style-type: none">● Recent acute myocardial infarction.
Limb problems <ul style="list-style-type: none">● Recent lower limb fractures.● Varicose veins.● Lower limb problems secondary to stroke or spinal cord injury.
Malignancy <ul style="list-style-type: none">● Abdominal and/or pelvic in particular advanced metastatic disease.● Concurrent chemotherapy.
Other <ul style="list-style-type: none">● Risk increases with age.● 65% ≥ 60 years of age.● Previous proven PE/DVT.● Immobility.● Thrombotic disorder.● Neurological disease with extremity paresis.● Thrombophilia.● Hormone replacement therapy and oral contraception.● Prolonged bed rest >3 days.● Other recent trauma.

2. Incidence

- Pulmonary embolism is a relatively common cardiovascular condition affecting approximately 21 per 10,000 per annum.

3. Severity and Outcome

- Pulmonary embolism can be life-threatening leading to death in approximately 7–11% of cases, however, treatment is effective if given early.
- Patients with a previous episode/s of PE are three times more likely to experience a recurrence.

4. Pathophysiology

- The development of a pulmonary embolism occurs when a blood clot (thrombus), comprising red cells, platelets, and fibrin, forms in a vein, subsequently dislodges (embolism) and travels in the circulation. This is known as venous thromboembolism (VTE). If the embolism is small it may be filtered in the pulmonary capillary bed, but if the embolism is large it may occlude pulmonary blood vessels. The development of a VTE can also lead to deep vein thrombosis.
- The haemodynamic problems occur when >30–50% of the pulmonary arterial bed is occluded.