

ACUTE LEFT VENTRICULAR FAILURE

Recognition:

- Sudden onset of dyspnoea or sudden deterioration?
- Previous cardiac history?
- Pallor/sweating?
- Pulmonary crepitations?
- Hypotension/ clammy?

Treatment

- Inform senior ED doctor immediately
- Consider arrhythmia or MI as cause – monitor, 12-lead ECG
- Give oxygen 100%*
- **Diamorphine 2.5-5mg iv** +/- metoclopramide 10mg iv
- Administer **Furosemide 40-80 mg iv** (repeat if necessary)
- Consider iv **GTN** (only if SBP >110)
- Consider **CPAP** if respiratory distress
- Notify Cardiac doctor ASAP +/- ICU

THROMBO-EMBOLIC DISEASE

- IT IS ESSENTIAL TO UNDERSTAND THE DIFFERENCES IN APPLICATION AND NORMAL RANGE BETWEEN D-DIMER TESTING FOR PULMONARY EMBOLISM AND DVT

1. Pulmonary Embolism

MASSIVE PULMONARY EMBOLISM IS A CLINICAL DIAGNOSIS MADE IN THE PRESENCE OF SHOCK, RIGHT HEART STRAIN AND SEVERE HYPOXIA WITH RISK FACTORS FOR THROMBOEMBOLIC DISEASE AND NO OBVIOUS ALTERNATIVE DIAGNOSIS (EG MI). GIVE O₂ via NRRM and CONSIDER IMMEDIATE LYSIS (PREFERABLY AFTER CARDIAC ECHO IN RESUS) – SEEK SENIOR ADVICE

Assessment for acute sub-massive pulmonary embolus follows the 'rule in-rule out' method outlined below. A scoring system devised by a team of Canadian physicians forms the basis for our assessment. Although this system incorporates D-dimer testing and is supported by diagnostic imaging, your clinical assessment of the likelihood of PE as opposed to some other diagnosis is crucial.

a) Step One: Clinical Assessment

History: Acute pulmonary embolus is often a difficult diagnosis as signs are often non-specific or unreliable. Patients often complain of dyspnoea, pleuritic chest pain or collapse with shock in the absence of other causes.

97% of patients have one of the following

1. Dyspnoea
2. Tachypnoea (Respiratory rate >29/min)
3. Pleuritic chest pain

But you must consider if another diagnosis is more likely.

Examination: of the cardiovascular system, chest and legs may confirm your suspicion of PE but physical findings are more often useful in suggesting an alternative diagnosis (see below).

Investigations:

- **ECG:** should be taken, mainly to exclude acute MI or pericarditis. In PE tachycardia is the most common finding, non-specific ST-T wave abnormality is common, S1Q3T3 is rare.
- **PACXR:** should be also requested. Once again, it is often more helpful in identifying an alternative diagnosis such as pneumothorax, LVF or chest infection. It is normal in 10-20% of patients with PE (note that a normal CXR with hypoxia and significant dyspnoea supports a diagnosis of PE). Most of the remaining patients have non-specific findings like atelectasis / small effusion / elevated diaphragm, cardiomegaly. Occasionally, specific findings like a pulmonary infarct will be seen (wedge shaped, Hampton's hump) or an area of oligaemia identified distal to a dilated vessel (Westermark sign).
- **ABG / O₂ sat:** should always be measured. Low O₂ saturation or P_O₂ increases suspicion in the absence of alternative diagnosis but normal oxygenation does not exclude PE. Comparing ABGs with and without O₂ mask is not helpful.

b) Step Two: Measure Canadian Score

Clinical features of DVT	3.0
Recent immobility or surgery	1.5
Active cancer	1.0
Hx of DVT / PE	1.5
Haemoptysis	1.0
Resting heart rate >100/min	1.5
PE <i>as likely as or more likely than</i> an alternative diagnosis	3.0

SCORE	Pre-test Probability of PE
<2	low
≥ 6	Medium to high risk

c) Step Three: Investigation to Rule In or Rule Out PE

RULE OUT: Patients with a low pre-test probability score can have a d-dimer test to rule out PE. IF their D-Dimer is < **250ng/ml**, PE can be excluded and an alternative diagnosis should be sought.

RULE IN: Patients with a medium or high pre-test probability OR a D-dimer > **250mg/ml** will probably require radio-isotope scan or CTPA scan to rule in PE irrespective of D-dimer result. Stable patients with a low PESI score may be investigated in the Observation Ward. Patients with a high PESI score are high risk and should be admitted for investigation and management under the medical inpatient team.

d) Management

All patients suspected of having a PE after the above assessment should be treated with **enoxaparin 1.5 mk/kg SC** (reduced in renal impairment as per BNF).

Next their PESI score should be calculated as an indication of risk of complications. Those patients with a PESI score of 85 or less can be investigated through the Observation Ward Pathway. Those with a PESI score higher than 85, a confirmed diagnosis of PE or clinical picture suggestive of a massive PE should be admitted under the respiratory team.

PESI Score

Clinical indicator	Points
Age	+ age (in years)
Male sex	+ 10
Cancer	+ 30
Heart failure	+ 10
Chronic lung disease	+ 10
Pulse > 110 bpm	+ 20
Systolic BP < 100 mmHg	+ 30
Respiratory rate ≥ 30 breaths/min	+ 20
Temperature < 36 ⁰	+ 20
Altered mental state	+ 60
Arterial saturation < 90%	+ 20

2. Acute Life Threatening Pulmonary Embolism

RESUSCITATION — When a patient presents with suspected PE, the initial focus is on stabilizing the patient.

Respiratory support — Supplemental oxygen should be administered if hypoxemia exists. Severe hypoxemia or respiratory failure should prompt consideration of intubation and mechanical ventilation.

Hemodynamic support — Hemodynamic support should be instituted promptly when a patient presents with PE and hypotension, defined as a systolic blood pressure <90 mmHg or a drop in systolic blood pressure of ≥ 40 mmHg from baseline.

Intravenous fluid administration is first-line therapy. Clinicians should be wary of administering more than 500 to 1000 mL of normal saline during the initial resuscitation period.

If the patient's hypotension does not resolve with intravenous fluids, intravenous vasopressor therapy should promptly follow.

THROMBOLYSIS — Thrombolytic therapy accelerates the lysis of acute PE and improves important physiologic parameters, such as RV function and pulmonary perfusion. However, no clinical trial has been large enough to conclusively demonstrate a mortality benefit. Thrombolytic therapy is associated with an increased risk of major hemorrhage, defined as intracranial hemorrhage, retroperitoneal hemorrhage, or bleeding leading directly to death, hospitalization, or transfusion.

Persistent hypotension due to PE (ie, massive PE) is the most widely accepted indication for thrombolytic therapy.

A 50 mg bolus of alteplase is recommended.