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ACUTE PE

GUIDELINES FOR THE DIAGNOSIS AND MANAGEMENT OF ACUTE PULMONARY EMBOLISM

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ESC ESSENTIAL MESSAGES

FROM 2014 ESC GUIDELINES ON ACUTE PULMONARY EMBOLISM*

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Take home messages

1. Diagnosis

- Clinical probability is the basis of all diagnostic strategies for suspected pulmonary embolism (PE) and should systematically be assessed either by clinical judgement or by a validated prediction rule.
- Plasma D-dimer measurement, preferably using a highly sensitive assay, is recommended in outpatients and in the emergency department to reduce the need for unnecessary imaging and irradiation.
- A normal computed tomographic (CT) angiography safely excludes PE in patients with low or intermediate clinical probability, or PE-unlikely, while CT angiography showing a segmental or more proximal thrombus confirms PE.
- A normal perfusion lung scan excludes PE, and a high probability ventilation-perfusion (V/Q) scan confirms PE; in case of a non-diagnostic V/Q lung scan, PE may be excluded if proximal compression venous ultrasonography (CUS) is negative and the clinical probability is low or PE-unlikely.

2. Prognostic assessment

- At the stage of clinical suspicion of PE, haemodynamically unstable patients with shock or hypotension should immediately be identified as high-risk patients.
- Normotensive patients in Pulmonary Embolism Severity Index (PESI) Class ≥III or a simplified (s) PESI of ≥1 constitute an intermediate-risk group. Of these, patients who have both evidence of RV dysfunction (by echocardiography or CT angiography) and elevated cardiac biomarker levels in the circulation should be classified into an intermediate-high-risk category and monitored for early detection of haemodynamic decompensation.
- A PESI Class I or II, or a sPESI of 0, indicates a low risk of an early adverse outcome.

3. Acute phase treatment

- Primary reperfusion treatment, particularly systemic thrombolysis, is the treatment of choice for patients with high-risk PE. Unfractionated heparin with aPTT monitoring is the prefered anticoagulation regimen in such patients
- For most cases of acute PE without haemodynamic compromise, low molecular weight heparin (LMWH) or fondaparinux is the initial treatment of choice unless there is severe renal dysfunction.
- Systemic thrombolysis is not routinely recommended as primary treatment for patients with intermediate-high risk PE, but should be considered if clinical signs of haemodynamic decompensation appear; percutaneous catheter-directed treatment or surgical pulmonary embolectomy are alternative rescue procedures for intermediate-high-risk PE.
- The new oral anticoagulants (NOACs; direct inhibitors of factor Xa or thrombin) are non-inferior in terms of efficacy and possibly safer, particularly in terms of major bleeding, than the standard anticoagulation regimen consisting of heparin followed by a vitamin K antagonist (VKA).
- Low-risk patients in the PESI Class I or II, and probably those with sPESI of 0, should be considered for early discharge and outpatient treatment, if this appears feasible based on the patient's anticipated compliance as well as his/her family and social background.

4. Duration of anticoagulation

- For patients with unprovoked PE, oral anticoagulation is recommended for at least 3 months.
- In the extended treatment of VTE, NOACs are both effective (in terms of prevention of symptomatic or fatal VTE recurrence) and safe (particularly in terms of major bleeding), probably safer than standard VKA regimens.
- In patients who refuse to take or are unable to tolerate any form of oral anticoagulants, aspirin may be considered for extended secondary VTE prophylaxis.

Take home messages

5. Chronic thromboembolic pulmonary hypertension (CTEPH)

- Organized unresolved thrombi and pulmonary vascular remodelling contribute to progressive right ventricular failure and poor outcome in non-treated CTEPH.
- Life-long anticoagulation (with VKA and an INR of 2-3) is recommended for all patients with CTEPH.
- Pulmonary endarterectomy is the treatment of choice for the majority of patients.
- Pharmacotherapy and pulmonary angioplasty are emerging as treatment alternatives for non-operable patients as well as for those with pulmonary hypertension persisting after intervention.

6. PE in pregnancy

- Suspicion of PE in pregnancy warrants formal diagnostic assessment with validated methods.
- A negative D-dimer result has similar clinical significance as in non-pregnant patients.
- Perfusion lung scan may be considered to rule out suspected PE in pregnant women with a normal chest X-ray.
- A weight-adjusted dose of LMWH is the recommended therapy during pregnancy in patients without shock or hypotension.
- NOACs are contraindicated in pregnancy.

7. PE and cancer

- The risk of VTE in cancer patients is at least four times higher than in the general population and increases further with chemotherapy and surgical treatment.
- Incidental finding of pulmonary artery thrombi in cancer patients should be managed in the same way as symptomatic pulmonary embolism, particularly if found in segmental or more proximal arteries.
- For patients with PE and cancer, weight-adjusted subcutaneous LMWH should be considered for the first 3 to 6 months.
- Extended anticoagulation (beyond the first 3 to 6 months) should be considered for an indefinite period or until the cancer is considered cured.

Areas of Uncertainty

- The diagnostic value and clinical significance of subsegmental defects on CT angiography are still debated.
- Patients with incidental (unsuspected PE) on CT angiography should probably be treated, especially if they have cancer and a proximal clot, but solid evidence in support of this recommendation is lacking.
- The benefits versus risks of "triple rule-out" CT angiography (to confirm or exclude coronary artery disease, pulmonary embolism and/or aortic dissection) need thorough evaluation - also considering increased radiation and contrast exposure - given the low prevalence of PE and aortic dissection in published series using that approach.
- Preliminary results suggest that reduced-dose intravenous thrombolysis may be safe and effective, particularly in intermediate-risk PE, but solid evidence is still lacking.
- Catheter-directed treatment (e.g. pharmacomechanical thrombolysis) has shown a promising efficacy and (particularly) safety profile, but data from larger study populations are needed to determine whether it will become a widely accepted (and widely available) alternative option to systemic thrombolysis for reperfusion treatment.
- The results of the phase III trials on the use of new oral anticoagulants in the treatment of PE and secondary prevention of VTE appear convincing; clinical experience with these drugs under 'real world' conditions is accumulating.
- Further management trials are necessary to crystallize the criteria that might permit early discharge and home treatment of low-risk patients with acute PE.
- The true risk for developing CTEPH after acute PE needs to be determined on the basis of high-quality data.
- There is lack of data to support the use of riociguat, or the off-label use of drugs approved for pulmonary arterial hypertension, as a therapeutic bridge to pulmonary endarterectomy in CTEPH patients considered to be at high risk due to poor haemodynamics.
- Advances in balloon pulmonary angioplasty are continuing in an attempt to make this technique a therapeutic alternative for selected patients with non-operable CTEPH.
- Data on the validity of clinical prediction rules for PE in pregnancy are lacking.
- The evidence supporting screening for occult cancer after unprovoked VTE is inconclusive.
- Further data are needed on the treatment of cancer patients with NOACs.

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