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Implementation of the Guidelines for Ventilation/Perfusion Scintigraphy in Pulmonary Embolism

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Referral criteria for imaging studies include the investigation of suspected acute pulmonary embolism (PE), the follow up of PE, and the investigation of chronic thromboembolic pulmonary hypertension. To ensure appropriate referral, individual Departments or Institutions should establish a clinical algorithm for the investigation of suspected PE. This should include an assessment of clinical probability of PE and the result of a quantitative serum D-dimer (1). Patients requiring an imaging test for suspected PE should undergo the investigation as soon as possible and preferably within 24 hours of referral (2). Unless contra-indicated, it is important that patients with suspected acute PE are started on treatment with low molecular weight heparin while awaiting the outcome of the confirmatory test. The choice of imaging test (Ventilation Perfusion Scintigraphy [V/PSCAN] or multidetector CT scan [MDCT]) will depend on local circumstances. Because of its high sensitivity and specificity, V/PSPECT should be considered the first line investigation.

An assessment of disease severity of acute PE should be made at the outset. This should include an assessment of blood pressure, right ventricular function and a marker of myocardial damage such as the serum Troponin (3). In high risk patients, the diagnosis of acute PE should be established with haste using echocardiography, MDCT or V/PSCAN depending on local availability. MDCT has the advantage of providing information about alternative diagnoses. Early diagnosis of patients at risk will facilitate the appropriate use of thrombolysis or embolectomy.

In patients undergoing a V/PSCAN for suspected PE, a ventilation study should be done to support the perfusion scan in all cases except during the first trimester of pregnancy. In pregnancy, it is important to minimise radiation exposure particularly during the first trimester (4) and a two day protocol starting with a perfusion-only scan should be done followed if necessary by a second day ventilation study. ^{81}mKr is the radioactive gas of choice allowing simultaneous acquisition with the perfusion images. When using radiolabelled aerosols, it is important that there is knowledge of the particle size and distribution pattern. $^{99\text{mTc}}$ -Technegas is the agent of choice in the presence of obstructive lung disease. $^{99\text{mTc}}$ -MAA is the agent recommended for perfusion scintigraphy. The minimum number of particles is 60 000 but ideally the number should be about 400 000 (5). In infants/children and in patients with known pulmonary hypertension or right to left shunt, the number of particles should be reduced. The vial should be gently shaken before injection and blood withdrawal into the syringe before injection should be avoided. Injection of MAA should be performed under normal tidal breathing in the supine posture. For PE imaging a one-day V/P study should be performed, starting with ventilation, followed by perfusion, aiming for an activity ratio of 1:4. When using planar imaging, a minimum of 6 views is recommended.

The V/PSCAN report should record whether the scan is normal or abnormal and whether there is evidence of pulmonary embolism as defined by the criteria within the guidelines. The lung scan report should include mention of all relevant findings particularly when this may have a bearing on further patient management. The report should make recommendations as to further management of the patient if appropriate and the result of the lung scan should be communicated to the referring team on the day of the study.

References

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