**Appropriateness of usage of computed tomography pulmonary angiography (CTPA) investigation of suspected pulmonary embolism**

**Descriptor:**

Many departments now use CTPA as the primary imaging technique for assessment of suspected pulmonary embolism. This audit aims to assess, when being used as the primary imaging investigation, whether CTPA is being used appropriately and also to look at the diagnostic yield of CTPA scans in terms of pulmonary emboli and alternative diagnoses.

**Background:**

A significant morbidity and mortality is associated with pulmonary embolism (PE). The role of diagnostic imaging in PE is being increasingly undertaken by computed tomography pulmonary angiography (CTPA). As documented in the Royal College of Radiologists referral guidelines (Ref. 1), CTPA is the investigation of choice in patients with a high clinical suspicion of pulmonary embolus and in those with pre-existing pulmonary disease.  A normal CTPA result alone has been shown to safely exclude PE in all patients in whom CTPA was requested to rule out this disease (Ref 2). Patients with a good quality negative CTPA do not require further investigation or treatment for PE (Ref 3). Compared with isotope scanning, CTPA is quicker to perform, rarely needs to be followed by other imaging, may provide the correct diagnosis when PE has been excluded, is available in most hospitals, and is easier to arrange urgently out of hours.

## The Cycle

**The standard:**

1. CTPA should be used to investigate suspected pulmonary embolism unless contra-indicated or an alternative investigation is indicated according to local guidelines (Ref.1). There should be agreed referral criteria in place including assessing pre-test probability and the use of D-Dimer estimation if there is an unlikely two level PE Wells score (Ref 3).

2. Referrals should be in line with agreed local protocol for referral.

3. According to published studies conducted at regional centres CTPA should detect pulmonary emboli in between 15.4 & 37.4% of patients, with alternate diagnoses noted in up to 56%.

**Target:**

1.100%

2.100%

3. Pulmonary emboli in at least 15%, with alternate diagnoses in at least a further 50%.

## Assess local practice

**Indicators:**

1. Existence of local protocol for referral of patients for CTPA.

2. Referral details for all patients who underwent CTPA for a suspected pulmonary embolus.

3. Percentage of patients undergoing CTPA with:

a) confirmed pulmonary embolus

b) alternative diagnosis

c) no abnormal radiological diagnosis

**Data items to be collected:**

1. List of patients referred for investigation of suspected pulmonary embolism.

2. Patient age and gender

3. Referral source (department and grade of referrer) –  see Ref. 4

4. Clinical referral information and adherence to local protocol

5. Preceeding CXR result

6. D-dimer result if done

7. Positive findings of CTPA scan

8. Alternative diagnoses

**Suggested number:**

50 consecutive CTPA examinations depending on departmental size.

**Suggestions for change if target not met:**

1. If the percentage of patients with a diagnosis of PE or other abnormality is below or significantly above the target range, discussions with fellow radiologists and referring clinicians is recommended to develop or refine referral guidelines for suspected pulmonary embolus.2. To reduce number of negative CTPA examinations in those without a history of trauma, recent surgery or pregnancy.

**Resources:**

data collection - 3 hours

data analysis - 4 hours

report writing - 1 hour

**References:**

1. iRefer / Making best use of a Department of Clinical Radiology, Eighth  Edition 2017, The Royal College of Radiologists, London.
2. Mos IC, Klok FA, Kroft LJ, DE Roos, Dekkers OM and Huisman MV. Safety of ruling out acute pulmonary embolism by normal computed tomography pulmonary angiography in patients with an indication for computed tomography: systematic review and meta-analysis. J Thromb Haemost. 2009 Sep;7(9):1491-8. Epub 2009 Jun 22.
3. Venous thromboembolic disease; diagnosis, management and thrombophilia testing, 2020. NICE guideline 158

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