



Thank you to Dr Stephen Allwright from PRP Northern Beaches for contributing this issue.

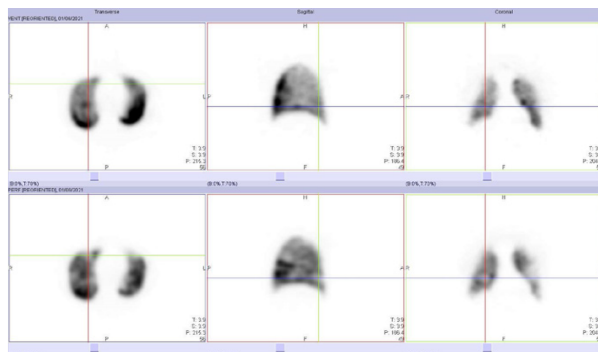
DETECTING PULMONARY EMBOLI WITH V/Q SCAN

CLINICAL HISTORY

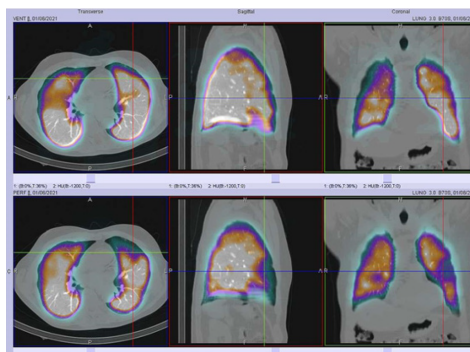
An 81-year-old male presented with a saddle embolus on computed tomography pulmonary angiogram (CTPA) 1 year ago. Follow-up CTPA 4 months later showed complete resolution and he is currently asymptomatic. He presents for a ventilation/perfusion (V/Q) scan prior to ceasing the non-vitamin K antagonist oral anticoagulant (NOAC) rivaroxaban.

IMAGE FINDINGS

His V/Q scan showed multiple bilateral pulmonary embolic defects of indeterminate age. These were deemed to probably be older as they appeared partially reperfused.



SPECT Top Row – Ventilation slices; Bottom Row – Perfusion slices with mismatched defects



SPECT CT Fusion Images. Top Row – Ventilation slices; Bottom Row – Perfusion defects

DISCUSSION

Pulmonary embolism is a relatively common condition especially in high-risk groups such as following hip and knee surgery, leg injury, in the presence of malignancy and other prothrombotic conditions, and after any period of prolonged immobility, including travel. It carries with it the risk of sudden death and, in chronic situations, of pulmonary hypertension.

Pulmonary embolism is difficult to differentiate clinically from the many other causes of dyspnoea, chest pain, tachycardia and other symptoms. Thus, the main tools of investigation are V/Q scans and CTPA, with CTPA being regarded by many as the first-line investigation. However, many clinicians are unaware of the recent significant advances in how V/Q scans are performed on modern SPECT CT hybrid scanners, thereby providing accurate diagnosis with less radiation.

PRACTICE POINTS

- This case study demonstrated the usefulness of V/Q scans in investigating patients with prior pulmonary embolism.
- Because V/Q scans with SPECT CT can show a high incidence of residual perfusion defects after therapy, they are frequently advised to establish a new baseline for future comparison at 3–4 months. It is easier to differentiate new from old emboli when comparing V/Q scans than on serial CTPA imaging.

ADVANCES IN V/Q SCANS

The development of TechnegasTM in Australia in the 1980s revolutionised ventilation imaging in most parts of the world, with a notable exception of the USA where it is only now undergoing 'fast track' assessment 30 years later. In 2011, Swedish researchers also showed that SPECT tomographic V/Q imaging greatly reduced the non-diagnostic rate of V/Q scanning to 3%, providing a much more binary result. The addition of SPECT CT with co-registration of low-dose CT further increased the specificity while maintaining almost 100% sensitivity, allowing the detection of other lung pathology in addition to emboli.

Importantly, the V/Q scan can detect subsegmental emboli as well as segmental emboli and also has high interobserver agreement. It does this at a significantly lower radiation dose than CTPA scanning, which is especially significant for radiation-sensitive breast tissue.

While CTPA is able to detect larger emboli, it is less reliable at detecting subsegmental emboli. However, one advantage of CTPA is its ability to detect other lung pathology and, in the presence of underlying lung disease, CTPA may be the preferred test.