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**Hybrid SPECT/CT augmented lung perfusion scintigraphy for pulmonary  
thromboembolism diagnosis: Assessment of superiority over  
conventional planar imaging and comparative evaluation of  
interpretation criteria (Modified PIOPED II and PISAPED)**

Cardiovascular Clinical Science Posters

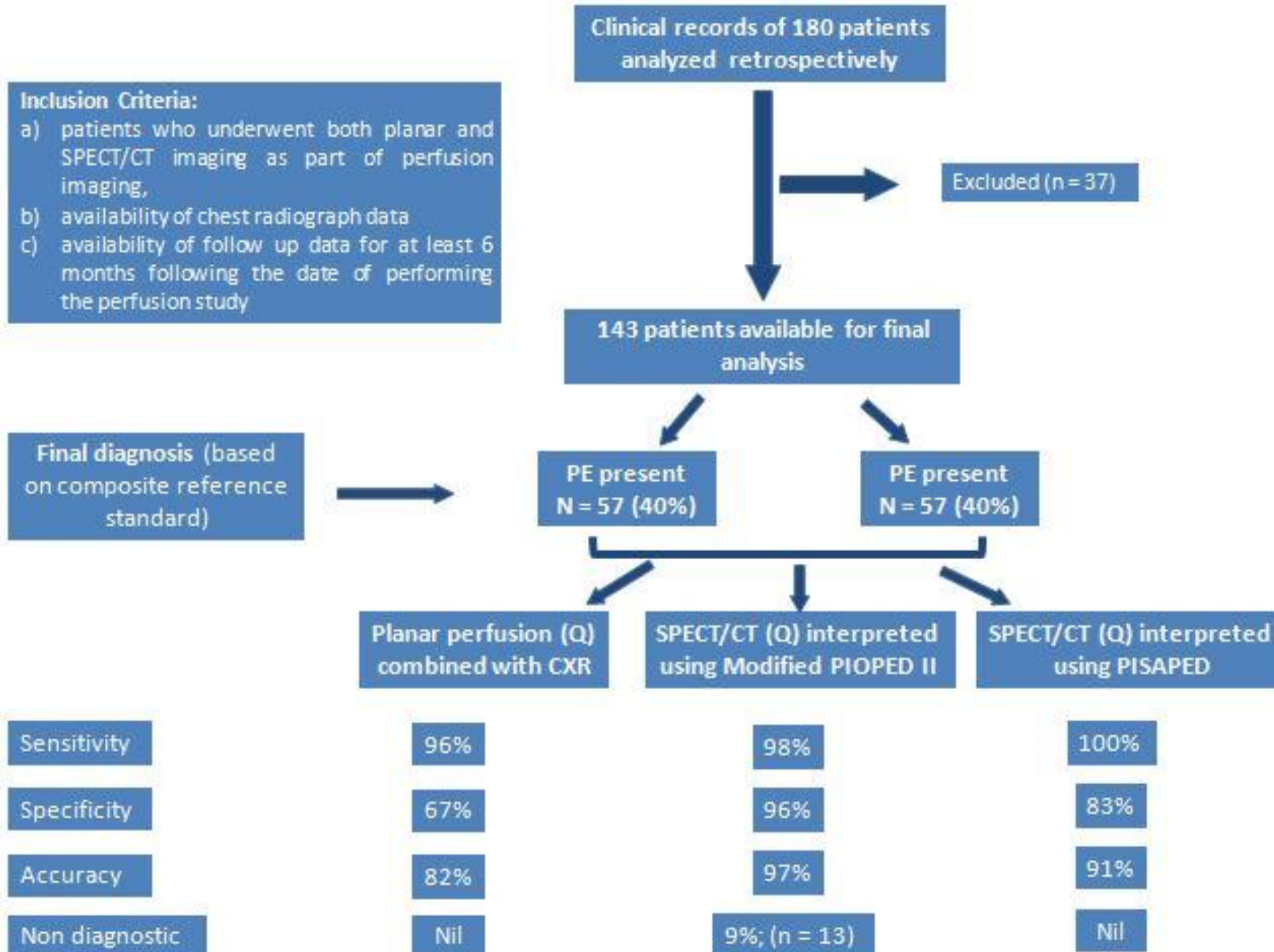
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# BACKGROUND

- Ventilation–perfusion (V/Q) scintigraphy is an established diagnostic test for suspected PTE but high frequency of non-diagnostic results, limited availability and low specificity are its major limitations.
- Ventilation scans are performed to improve the specificity of perfusion study. However due to the laborious procedural requirements, ventilation scans were slowly replaced by chest radiographs (CXR) and low dose CT scans.
- Hybrid (SPECT/CT) imaging can provide simultaneous assessment of perfusion and ventilation.

# METHODS



# IMAGING PROTOCOL

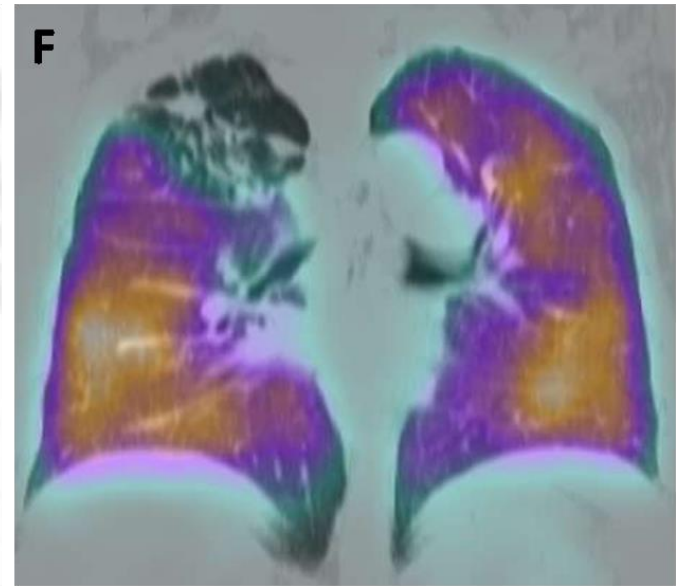
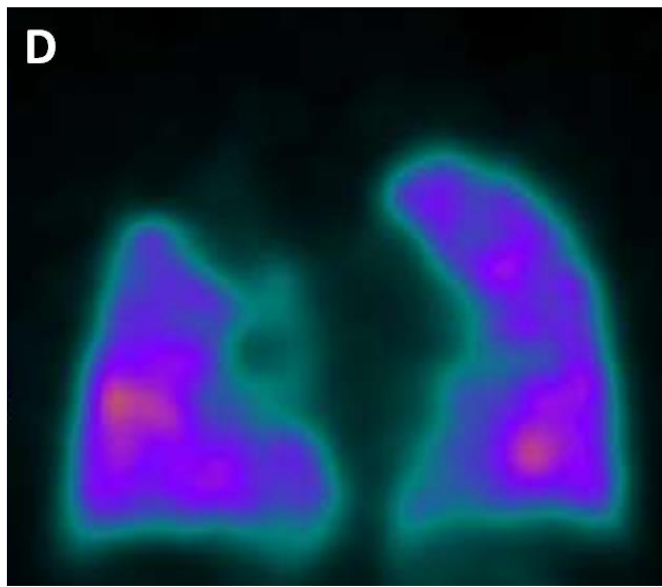
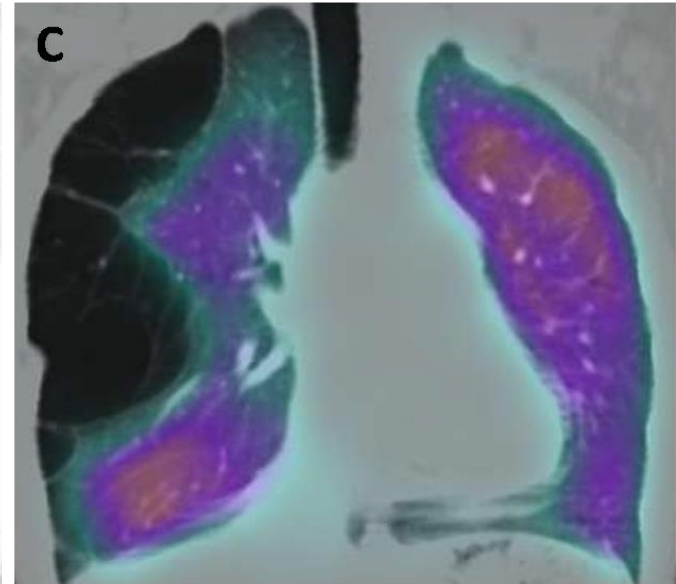
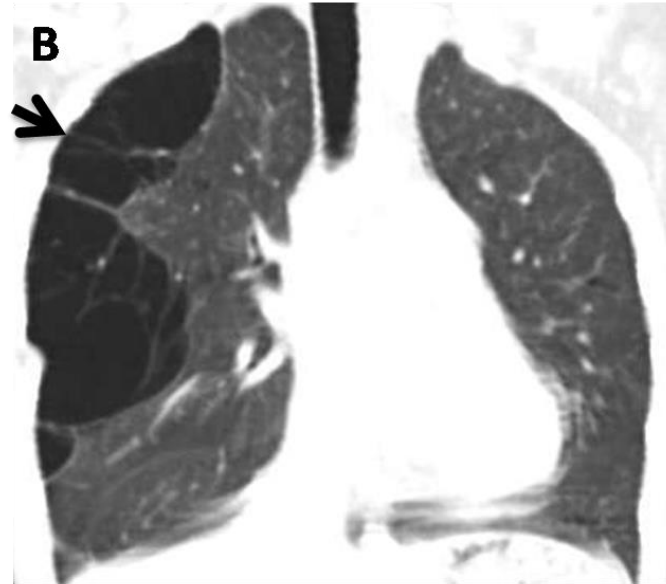
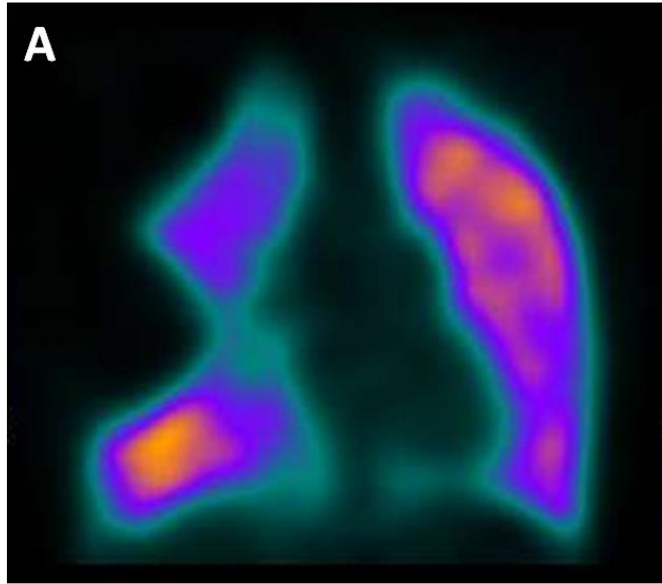
- Perfusion scintigraphy was performed using albumin macro-aggregates labeled with radioactive technetium ( $^{99\text{m}}\text{Tc}$ -MAA).
- Wedge shaped areas of reduced perfusion without corresponding morphological changes were considered true perfusion defects.
- Comparison with a composite reference standard (consisting of Wells' criteria, D-dimer, lower extremity Doppler ultrasonography, CT pulmonary angiography and clinical follow up).

Single segmental wedge shaped perfusion defect in the anterior segment of RUL with no definite morphological abnormality on CT (**mismatched defect**). The scan is positive for PE according to PISAPED criteria and non-diagnostic according to modified PIOPED II criteria.

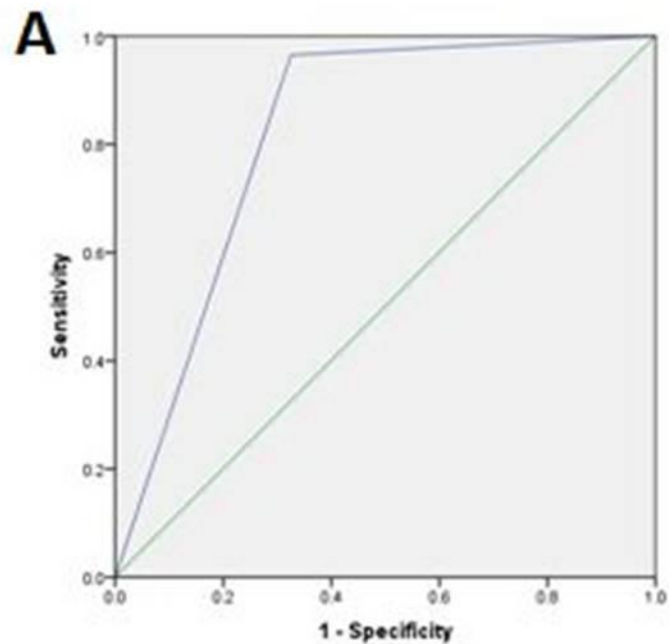




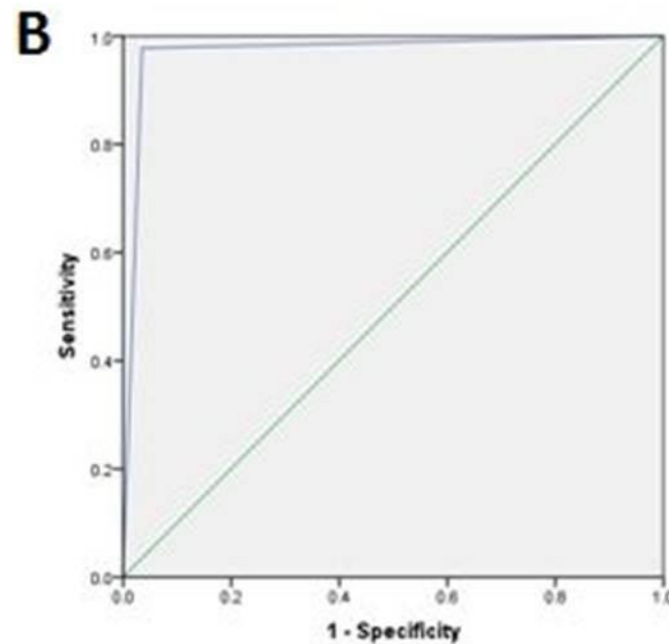
Wedge shaped **matched** perfusion defects with corresponding CT showing emphysematous (**upper panel**) and fibrotic changes (**lower panel**). Thus low dose CT improved the specificity of perfusion study.



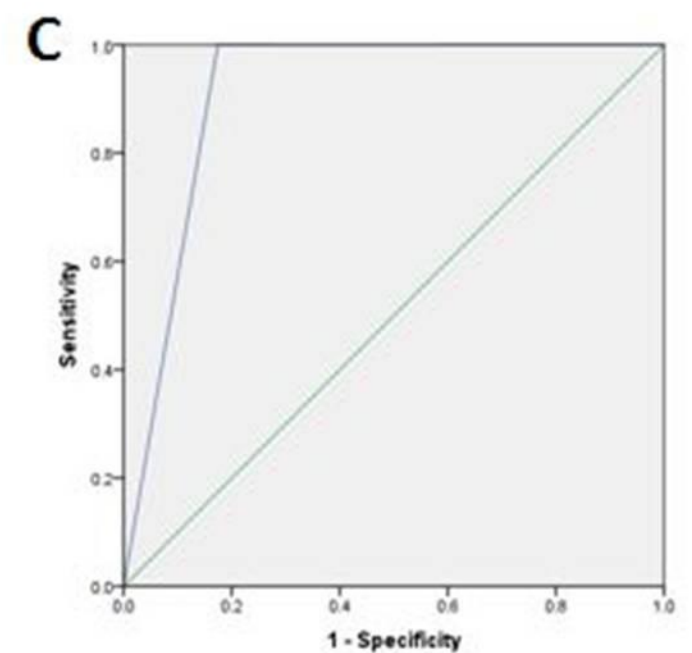
ROC curves showed superior diagnostic performance SPECT/CT (Q) interpreted using Modified PIOPED II criteria (B) over planar scintigraphy (A) and SPECT/CT interpreted with PISAPED criteria (C).



Planar perfusion scintigraphy  
read with CXR



SPECT/CT interpreted using  
Modified PIOPED II



SPECT/CT interpreted using  
PISAPED

# CONCLUSIONS

- Hybrid SPECT/CT (Q) imaging has a high diagnostic accuracy for detecting PE than planar (Q) scans read with chest radiographs.
- Low dose CT used in SPECT/CT was able to identify other non-embolic pathologies thereby increasing the specificity.
- The principal difference between modified PIOPED II and PISAPED criteria is more non-diagnostic results with the former, making PISAPED criteria more clinically useful.