

Scintigraphic Evidence for Overdiagnosis of Small PE on CT Pulmonary Angiography

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Abstract A 68-year-old man with recent history of a fall presented with dyspnea on exertion, and underwent computed tomography pulmonary angiography (CTPA) for possible pulmonary embolism (PE). The CTPA was first read by the radiology resident as nondiagnostic for segmental PE. Subsequent planar perfusion (Q) images were normal; meanwhile, the attending radiologist revised the CTPA results as subsegmental PE in the left upper lobe. Further Q-SPECT images were obtained and fused with CTPA for clarification, which showed normal perfusion in the region of PE. The patient was monitored without anticoagulation treatment and remained uneventful for 12 months. This case illustrates that CTPA can lead to overdiagnosis and overtreatment of nonocclusive subsegmental PE.

Keywords Pulmonary embolism · Computed tomography pulmonary angiography · V/Q scan · Perfusion SPECT/CT · Overdiagnosis

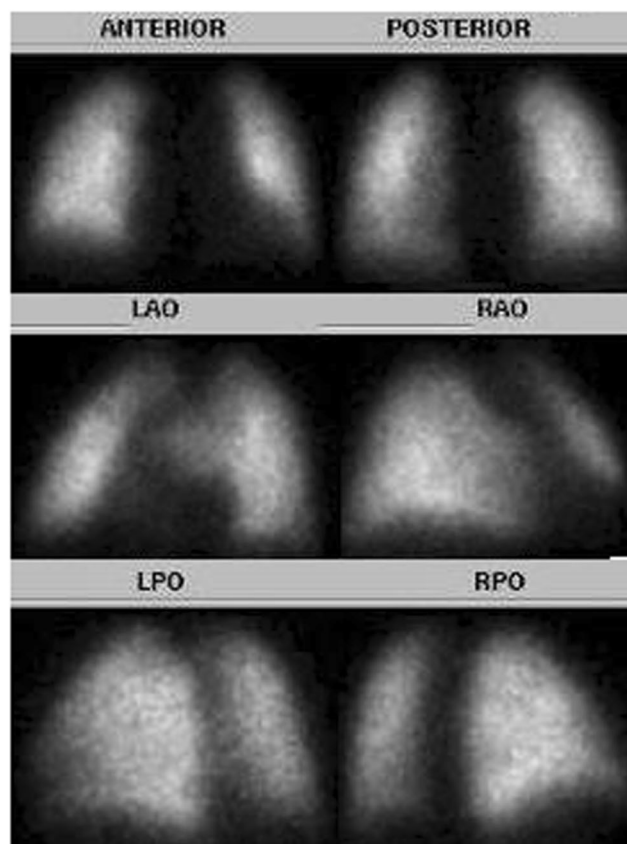


Fig. 1 A 68-year-old man with history of a fall 2 weeks previously, presented with dyspnea on exertion and oxygen saturation of 87 % on room air. To rule out possible PE, CTPA was ordered and initially read by the oncall radiology resident as “non-diagnostic for segmental or subsegmental PE.” To obtain definitive diagnosis, further planar perfusion (Q) images were obtained about 1 h later and showed normal perfusion in both lungs

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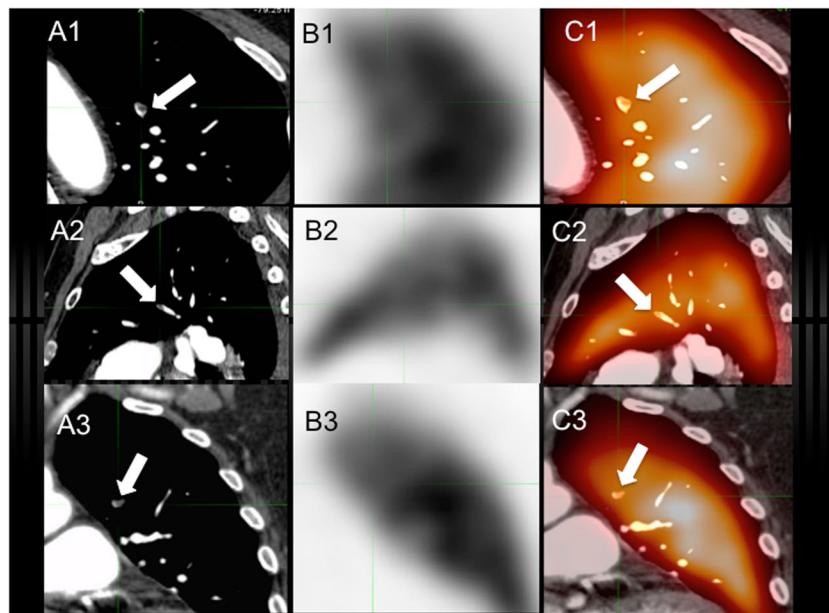


Fig. 2 Just before completion of planar Q scans, the oncall attending radiologist overrode the resident's report as "positive for subsegmental PE in the left upper lobe" (white arrows in A1-A3: triangulated CTPA; A1 axial, A2 sagittal, A3 coronal). Further perfusion single-photon emission computed tomography (Q-SPECT) images (B1-B3; B1 axial, B2 sagittal, B3 coronal) were obtained and fused with CTPA through software. There was no corresponding perfusion defect on Q-SPECT/CTPA in the region of known small PE (white arrows in triangulated C1-C3: Q-SPECT/CTPA; C1 axial, C2 sagittal, C3 coronal). The patient's oxygen saturation reached 93 % on room air at the end of Q-SPECT with

symptom improved. Also, given the patient's recent history of a fall, the decision was made to monitor without anticoagulation treatment. The patient has remained uneventful for 12 months, until now. As reported in a multiyear nationwide analysis [1], the introduction of computed tomography pulmonary angiography (CTPA) was associated with overdiagnosis and overtreatment of pulmonary embolism (PE): rising incidence, minimal change in mortality, and lower case fatality. CTPA can overdiagnose small subsegmental, nonocclusive PE [2], which may not require treatment, especially when patients have bleeding risk, as in this case

Compliance with Ethical Standards

Conflict of Interest Yang Lu declares that he has no conflict of interests

Ethical Statement All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No identifiable patient information was included in this case report. Informed consent was waived as per IRB policy on this retrospective case report. The manuscript has not been published before or is not under consideration for publication anywhere else and has been approved by all co-authors.

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