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Beware COVID-19 on VQ scans (Ventilation/Perfusion Scintigraphy)

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A 69 year-old, type-2 diabetic male was admitted with shortness of breath and new renal impairment, creatinine 299 micromol/L. He was afebrile and RT-PCR for SARS-CoV2 was negative. Arterial pO₂ 7.9 kPa (>10.5) on air, pCO₂ 3.5 kPa (4.3-6.4). Chest radiograph was normal (fig. 1 A).

Since CTPA was contra-indicated due to renal impairment a VQ scan (⁸¹Kr/^{99m}Tc-MAA) was performed the next day, 30 hours after CXR, to investigate for pulmonary embolic disease. This demonstrated peripheral, wedge shaped matched defects in lung ventilation and perfusion (fig 1B). The ventilation defects were unexpected, so an unenhanced CT was immediately performed. (GE 670 CZT SPECT/CT). The unenhanced CT scan revealed multifocal ground glass in a peripheral distribution with relative apical sparing. The appearances are those of classical COVID-19 viral pneumonitis (fig 1C). In this case COVID 19 pneumonitis was not suspected prior to the VQ scan as the CXR was normal and RT-PCR was negative.

Repeat RT PCR swabs for SARS-COV-2 were positive.

COVID -19 remains a global public health threat. Clinical and imaging features of COVID-19 change rapidly and CT has high sensitivity, in comparison with either CXR or viral PCR testing (1,2). COVID-19 is additionally associated with thromboembolic disease (3,4).

Isotope ventilation perfusion imaging remains an important tool in the diagnosis of thromboembolic disease especially in patients with impaired renal function. There have been limited case reports of the appearances of COVID -19 pneumonitis on VQ imaging (5). In the COVID -19 pandemic some authorities discourage the use of ventilation images during isotope ventilation perfusion scintigraphy due to the potential risk of spread of infection to staff and other patients (6). In this case, had the patient only undergone perfusion scintigraphy, without ventilation images or CT imaging, the combination of wedge shaped perfusion defects with a normal chest radiograph might have been misinterpreted as being caused by thromboembolic disease rather than viral pneumonitis.

Learning point for clinicians

Lung scintigraphy remains an option for the evaluation of pulmonary embolism. Beware the use of a normal CXR as a surrogate for normal ventilation if Q scans are performed without ventilation studies, and have a low threshold for contemporaneous CT imaging, particularly in the context of the current COVID-19 pandemic.

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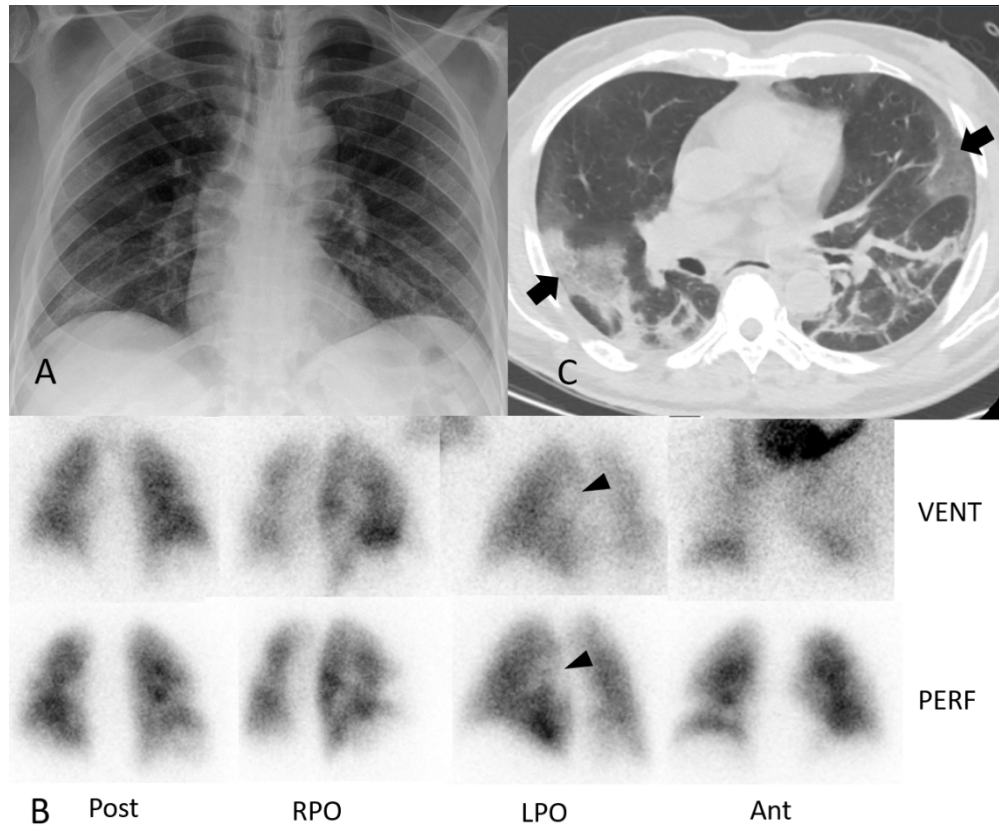
A. Normal AP Chest radiograph

B. Anterior, Posterior, RPO and LPO scintigraphy of pulmonary ventilation and perfusion. Multiple peripheral wedge defects are present, matched between the components (arrow heads).

C. Representative CT slice, acquired with SPECT/CT camera. This shows classical appearance of viral pneumonitis with multiple peripheral areas of 'ground-glass' change (arrows), not apparent on the radiograph 30 hours previous.

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- C. Representative CT slice, acquired with SPECT/CT camera. This shows classical appearance of viral pneumonitis with multiple peripheral areas of 'ground-glass' change (arrows), not apparent on the radiograph 30 hours previous.