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Q/V-SPECT CT in times of COVID-19: Changing the order to improve safetywithout sacrificing accuracy

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The institutional ethics committee approved this case presentation and the patientsigned a written informed consent.

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TO THE EDITOR: Various nuclear medicine associations and colleagues (*1-6*) discussed whether a ventilation examination should be carried out at all when performing V/Q scans for diagnosis of pulmonary embolism in the SARS-CoV-2 pandemic situation. This consideration was prompted by the concern that a ventilation scan may be an aerosol-prone manoeuvre and, thus, carry a potential infection risk of the personnel. Usually the V/Q scan procedure starts with a ventilation scan (V), followed by a perfusion (Q) scan and eventually closed up with a low-dose CT if available. The sequence is traditionally chosen for a V/Q scan because it is easier to surpass the ventilation activity with the perfusion marker than vice versa. Instead of completely eliminating the ventilation scan resulting in specificity reduction (*7*) with all its negative consequences - like bleeding events due to unnecessary anticoagulation-, we suggest to modify the workflow in pandemic times to start routinely with the perfusion SPECT (somewhat lower administered activity than usual associated with increased acquisition time) and proceed with a low-dose CT if applicable. A ventilation SPECT (somewhat higher administered activity than usual associated with decreased acquisition time) is only performed when perfusion deficits are present that are not sufficiently explained by structural findings on low-dose CT. When the patient is SARS-CoV-2-positive or if there are COVID-like findings on low- dose CT, it remains the discretion of the physician whether a ventilation scan is performed under appropriate security measures. By doing so we can reduce the number of ventilation scans and avoid the aforementioned discussion held by various nuclear medicine associations and colleagues (*1-6*).

Figure 1 shows a representative example of the proposed approach in an 80-year-old, recently bed-ridden lady, who was referred from an external hospital with dyspnoea, thoracic pain and increased D-dimer to rule out pulmonary embolism (PE). We started by injecting about 45 MBq 99mTc-MAA and performed a perfusion SPECT/CT. Since we found relevant perfusion deficits and an unremarkable low-dose CT we subsequently also performed a ventilation SPECT with about 88 MBq 99mTc- Technegas (net ventilated activity, calculated from the projection data). The ventilation and perfusion studies show mismatch findings typical for pulmonary embolism (*figure 1A*). In combination with the normal low-dose CT examination (*figure 1B*), we were able to detect PE with the highest degree of certainty

according to Gutte et al (7).

Overall, we believe that the suggested routine reversal of the traditional workflow helps to minimise aerosol-prone and potentially infectious manoeuvres without compromising the accuracy of PE diagnostics.

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Figure legend

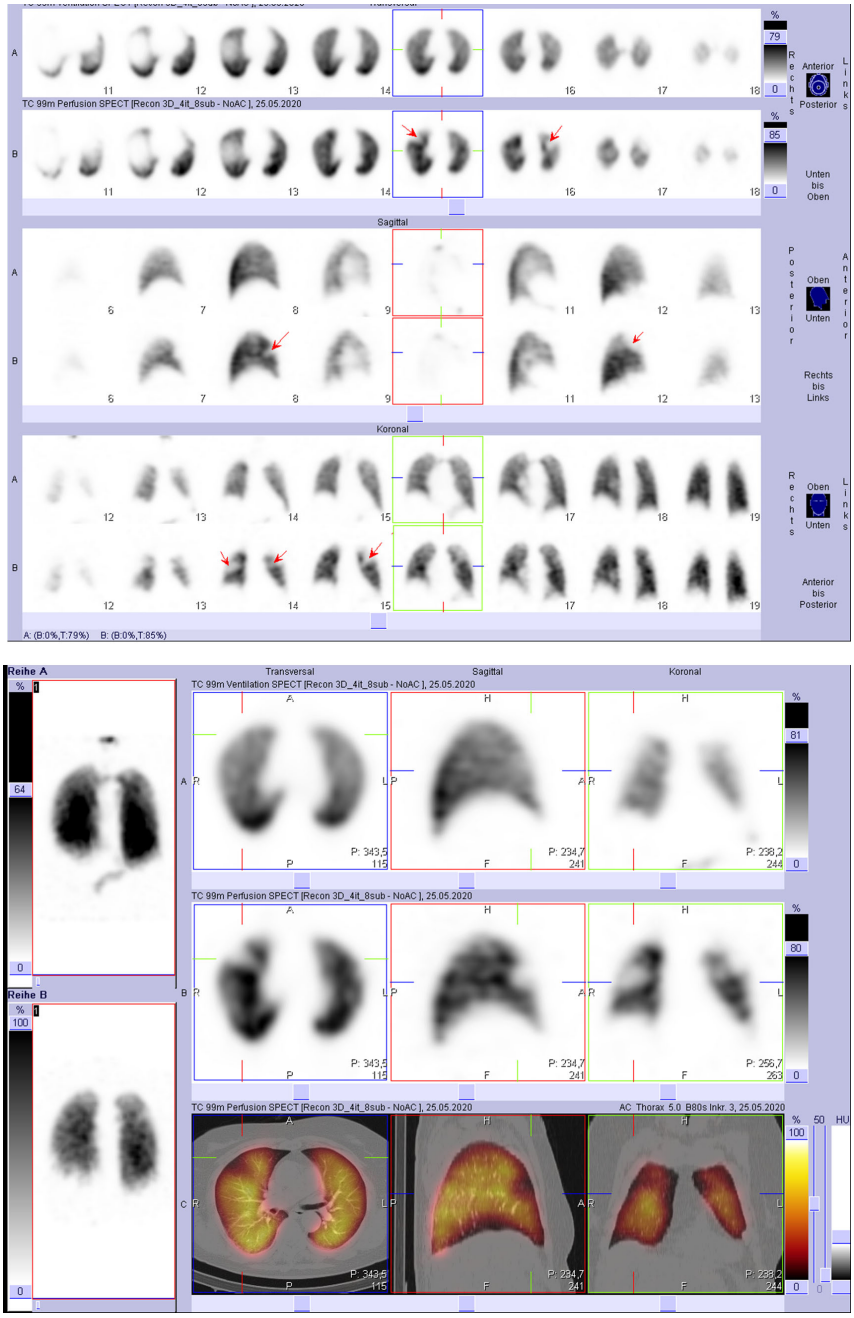

Figure 1. Q/V-SPECT CT of a 80-year-old lady. (*A*) Slice by slice comparison of ventilation and perfusion SPECT showing mismatch findings in both lungs (see arrows). Image noise is higher in the perfusion images due to the lower administered activity in the inverted workflow protocol. (*B*) Combining the SPECT data with the low dose CT proves pulmonary embolism in absence of structural alterations.