

Lung Perfusion SPECT-CT BEYOND COVID-19

VA



U.S. Department of Veterans Affairs

Veterans Health Administration
VA North Texas Health Care System

Chiara M. Thompson MD, Rosinda Castanon MD, Bernard Kamara CNMT,
Sussie DeMello CNMT, and Irfan Farukhi MD

INTRODUCTION

Venous thromboembolism is a major cause of morbidity, mortality and hospitalizations. A significant number of people with this disease have pulmonary embolic events, some of which are lethal. The majority of pulmonary embolism studies are performed by CT angiography. However, V/Q scans remain useful in patients with renal failure or contrast allergies. The utilization of Lung Perfusion SPECT-CT has significantly increased over the past year due to the coronavirus pandemic and inability to perform the ventilation phase of the exam due to aerosolization.

PURPOSE

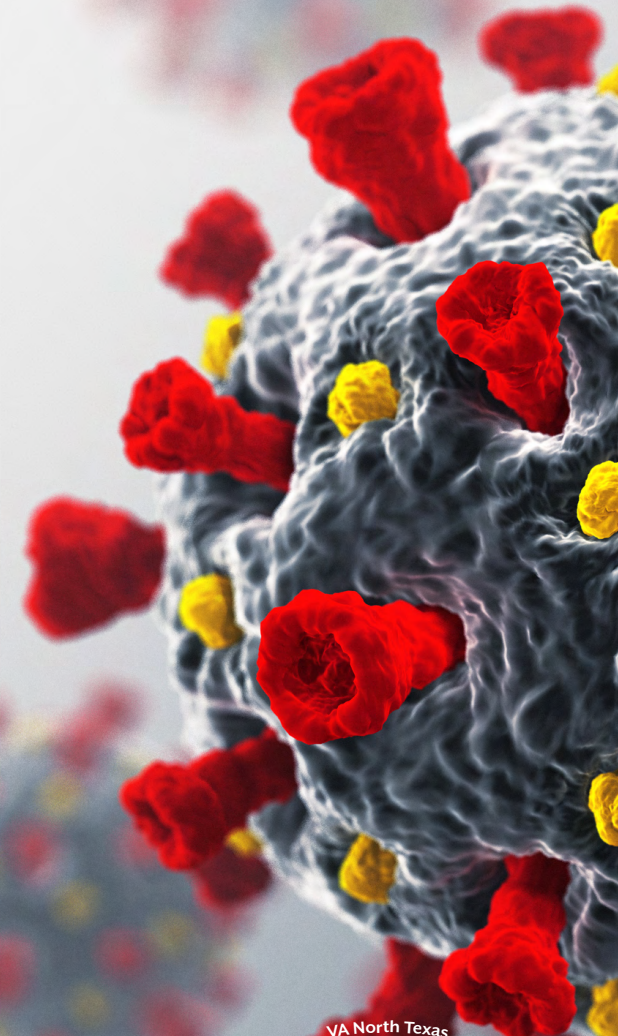
This educational exhibit will review the process of Lung Perfusion SPECT-CT during the coronavirus pandemic and the benefit of continued utilization after the pandemic subsides.

DISCUSSION

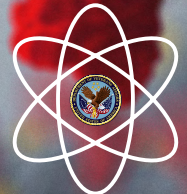
The evaluation for pulmonary embolism with Lung Perfusion SPECT-CT has increased sensitivity and specificity when compared to conventional planar imaging, particularly in patients with other lung diseases. There has been increased demand for this study during the coronavirus pandemic over the past year since the ventilatory phase has been eliminated from the exam. Several institutions are exploring how this imaging technique can be used for additional clinical benefit.

CONCLUSION

Lung Perfusion SPECT-CT is a viable diagnostic tool in the evaluation of pulmonary embolism. This technique allows accurate diagnosis even in the presence of other lung disease processes, which is often a challenge with traditional planar imaging. There may be additional clinical benefits to this imaging technique that will also be discussed in this presentation.



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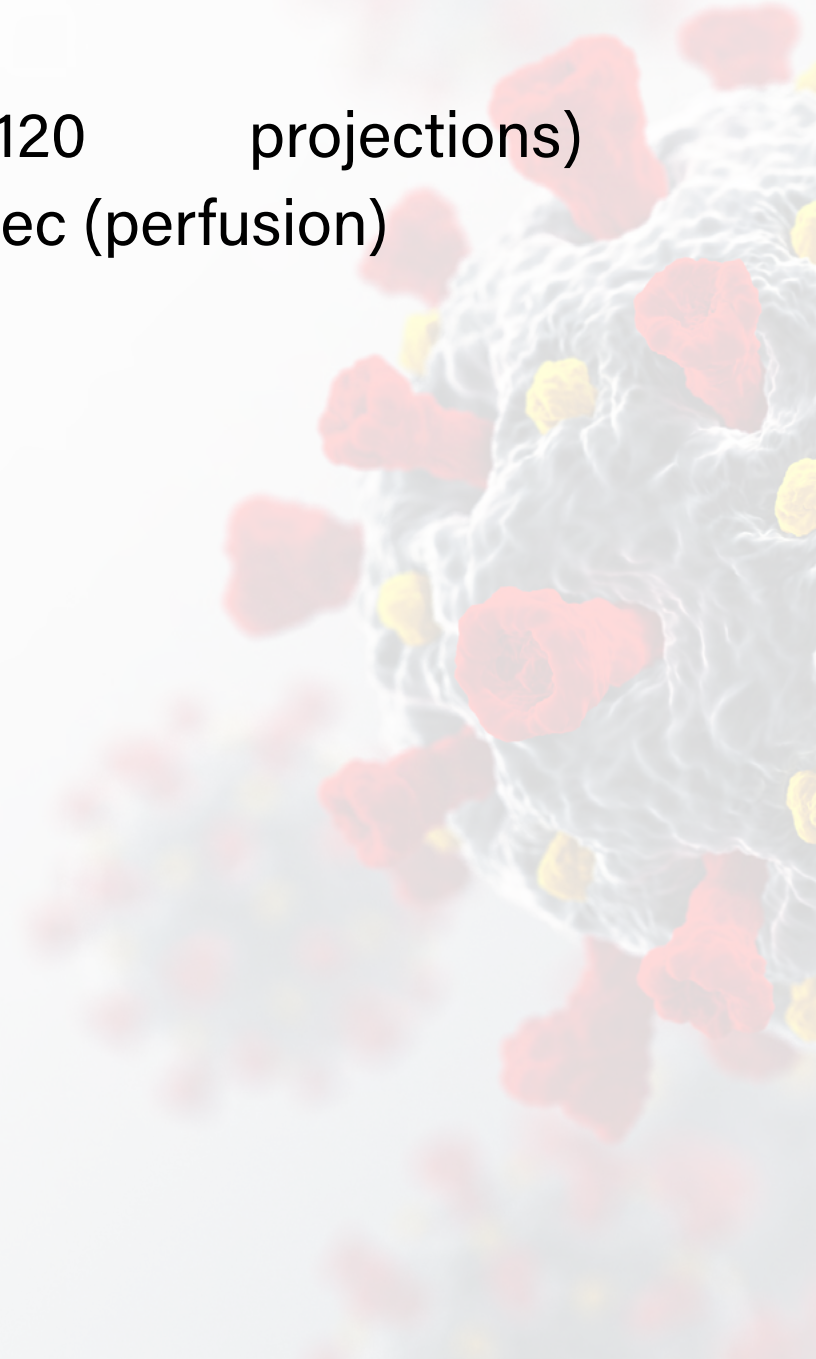


NUCLEAR MEDICINE SERVICE

SPECT/CT Acquisition Protocol

SPECT/CT Imaging Parameters

- Degrees of rotation: 360°
- Number of images: 60 rotational steps (120 projections)
- Time per image: 15 sec (ventilation); 10 sec (perfusion)
- Collimator: LEHR
- Matrix Size: 64*64
- 120 kVp, Smart mA (min 64, max 150)
- Slice Thickness: 2.5mm



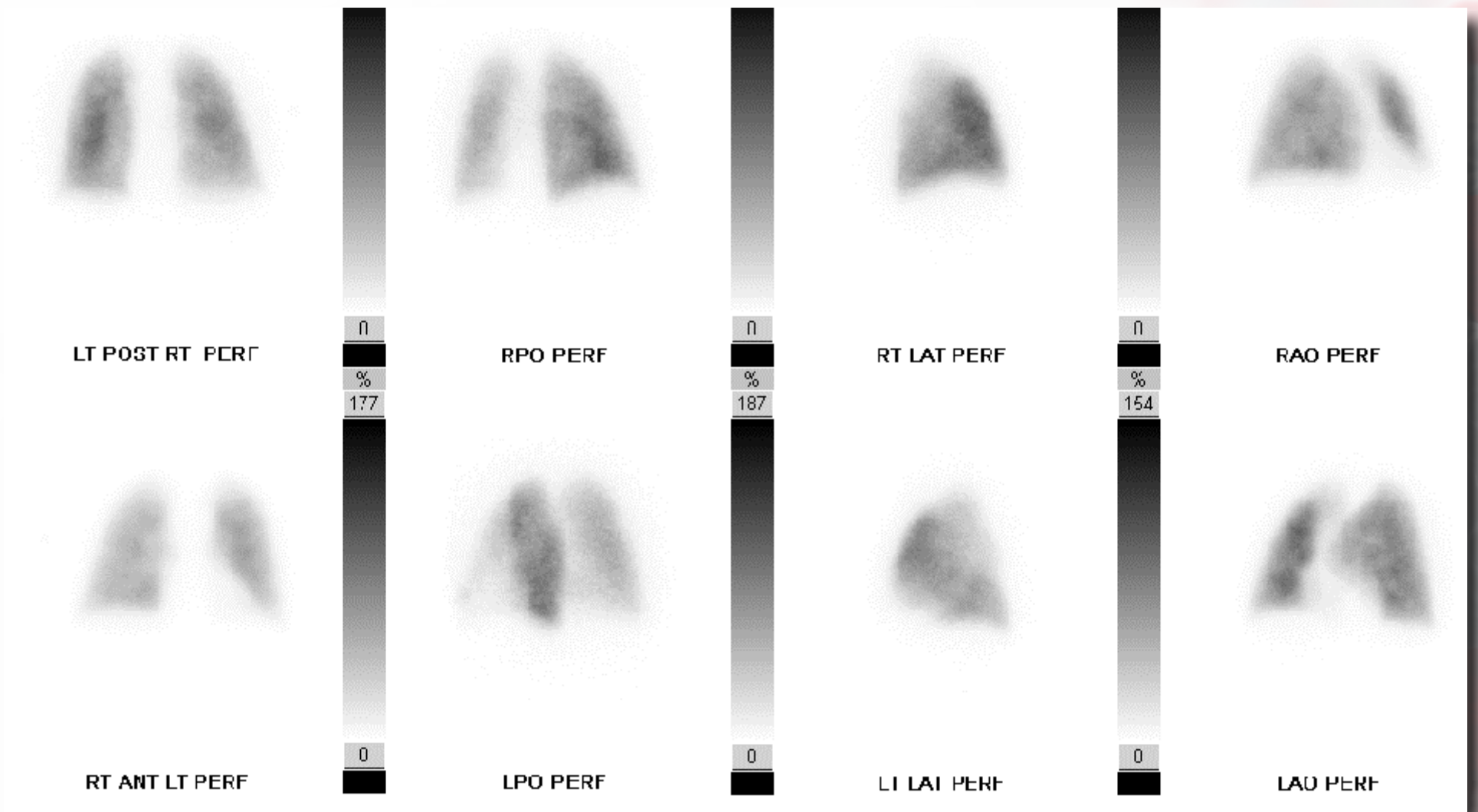


Fig 1. 73 yo male with history of acute myelogenous leukemia and severe anemia with dyspnea and hypoxemia.

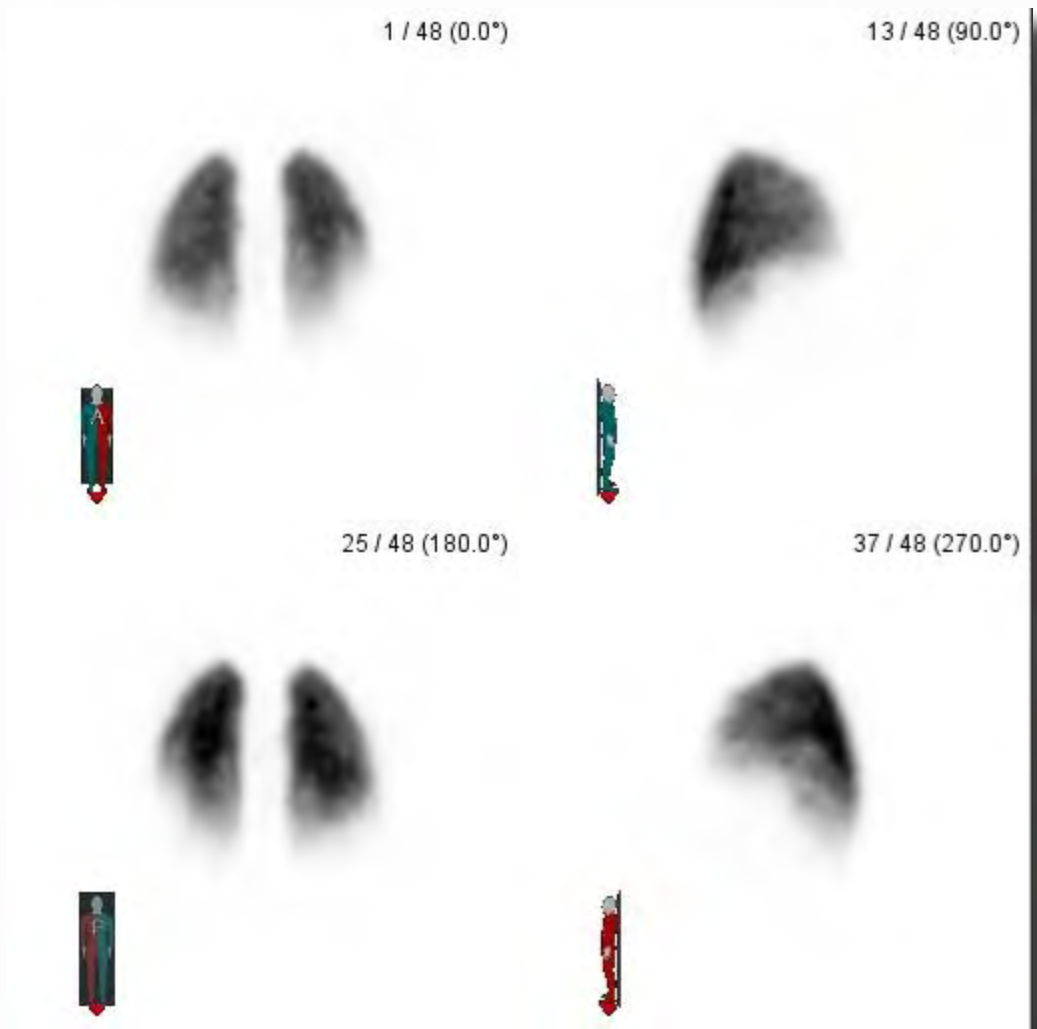


Fig 2a. Maximum Intensity Projection image demonstrates no segmental perfusion defects to suggest acute PE

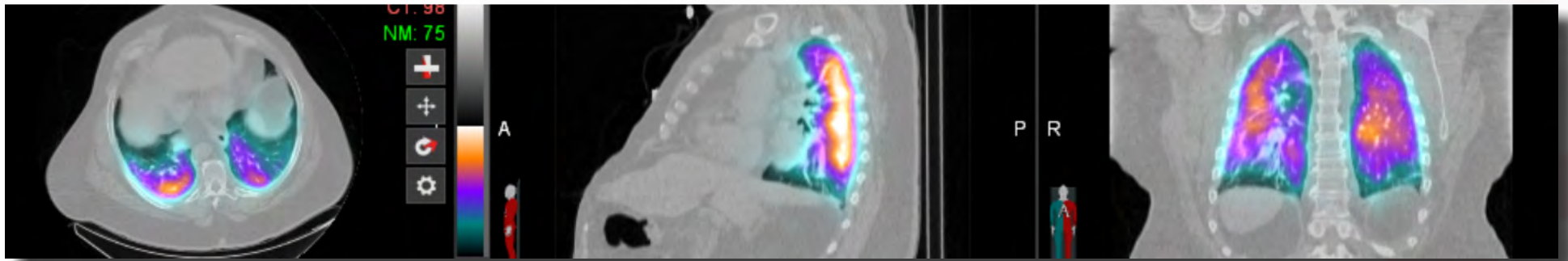


Fig 2. Lung Perfusion fused SPECT-CT images in axial, sagittal, and coronal views demonstrate no evidence of acute pulmonary embolism.

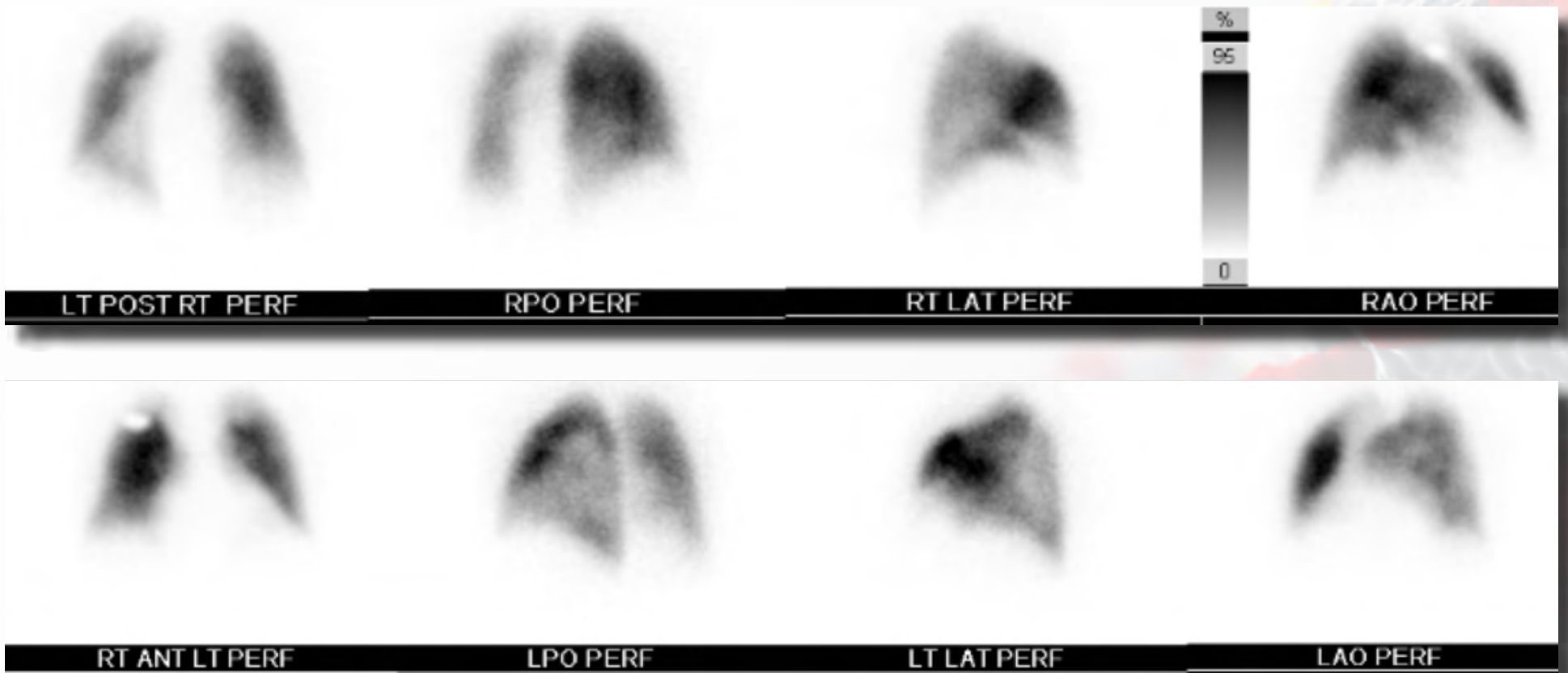


Fig 3. 69 yo male admitted with elevated D-Dimer, cough and SOB presents for evaluation of acute pulmonary embolism. There is a wedge-shaped, segmental perfusion defect in the right lower lobe (blue arrow) seen to best advantage in the Right Lateral Projection.

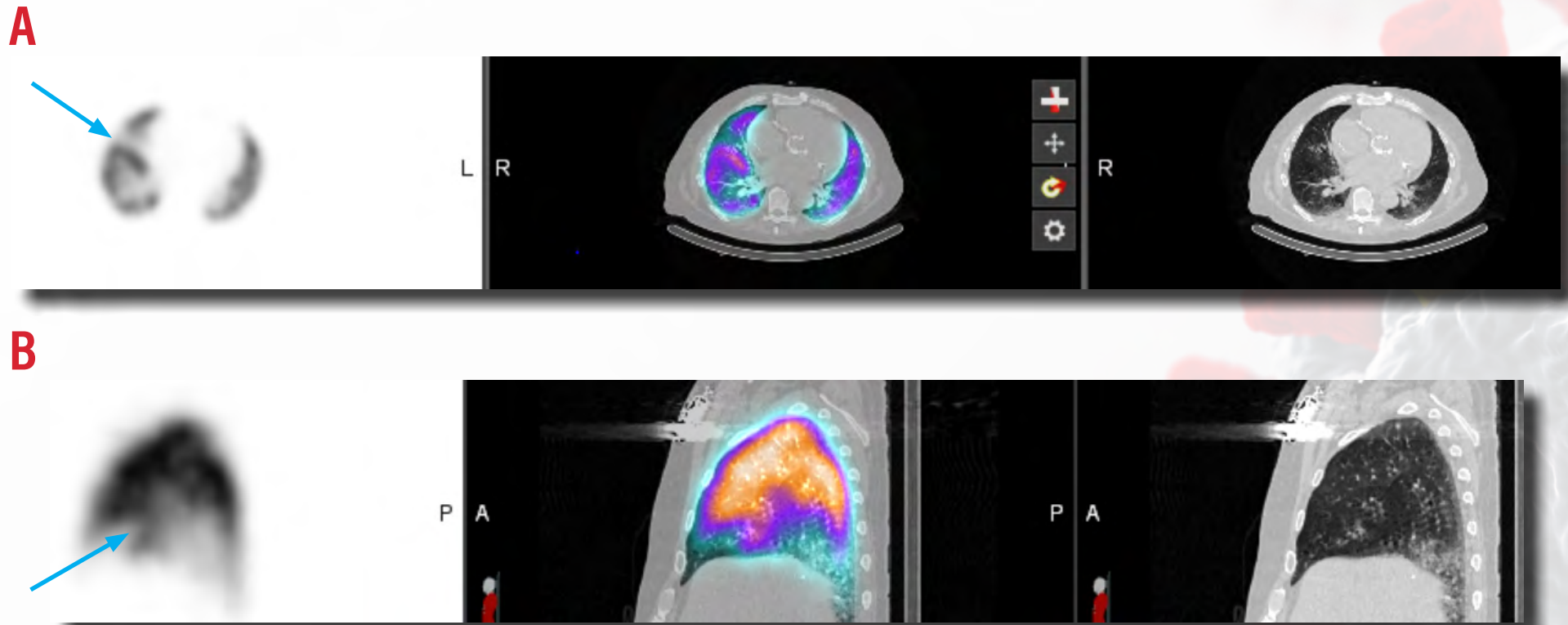


Fig 4. Lung Perfusion SPECT, Fused SPECT/CT and CT images in A) Axial and B) Sagittal projections show the perfusion defect to correspond to expected decreased tracer accumulation adjacent to the right major fissure. This must be taken into consideration during the interpretation of these exams.

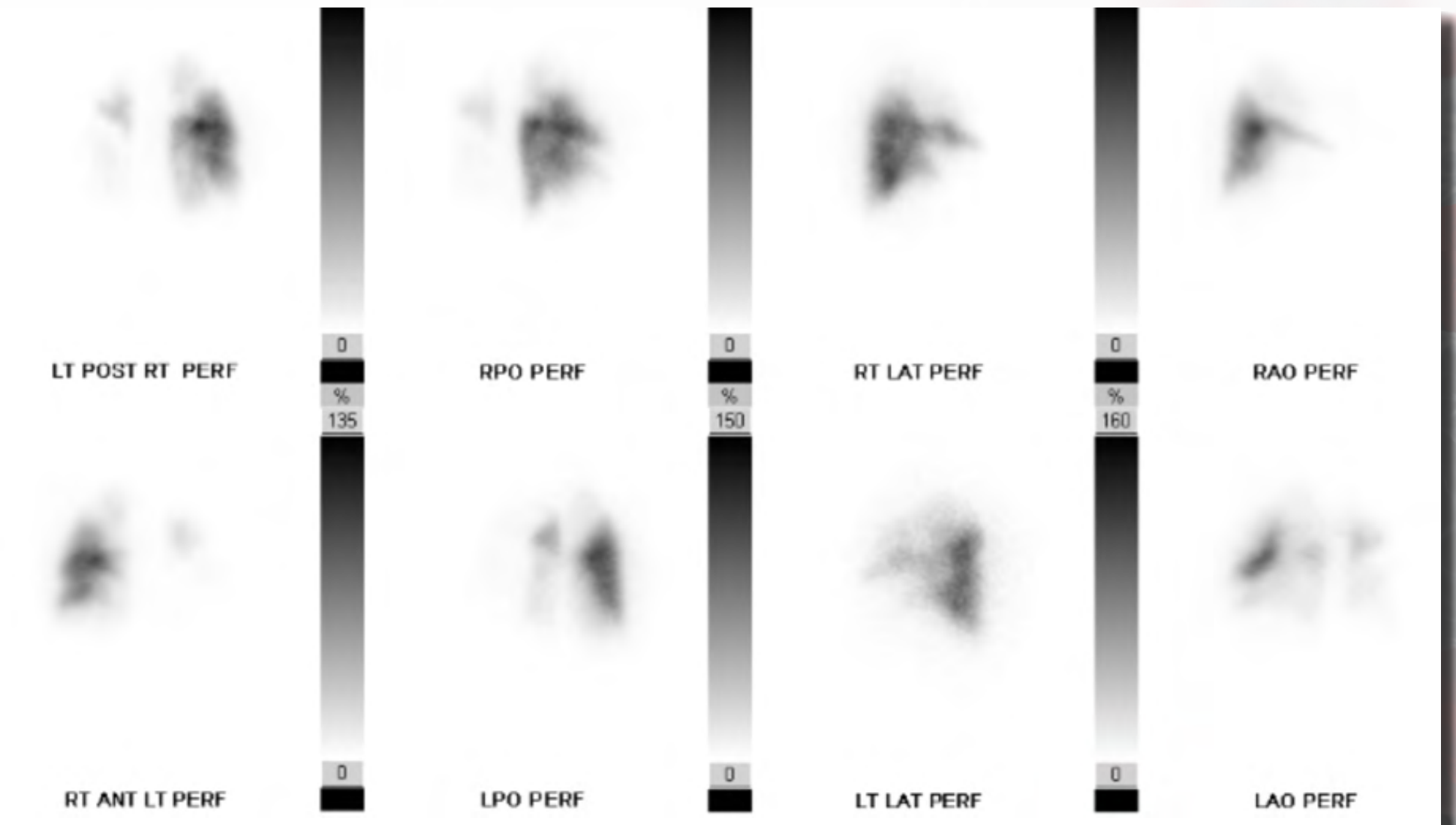
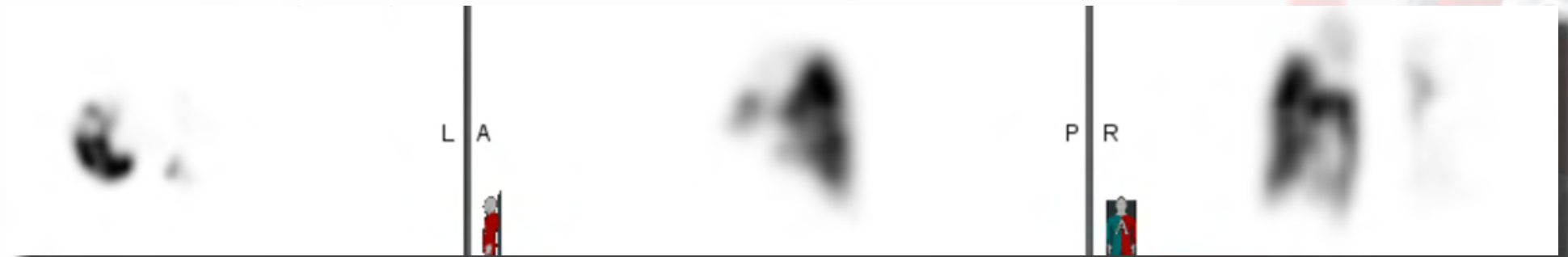


Fig 5. 59-year-old paraplegic male with acute hypoxemic respiratory failure, concerning for acute pulmonary embolism. Planar images in multiple projections demonstrate multiple segmental perfusion defects in the right lung. Significantly diminished perfusion throughout, especially in the left lower lobe, raising the possibility of a saddle type embolus.

A



B

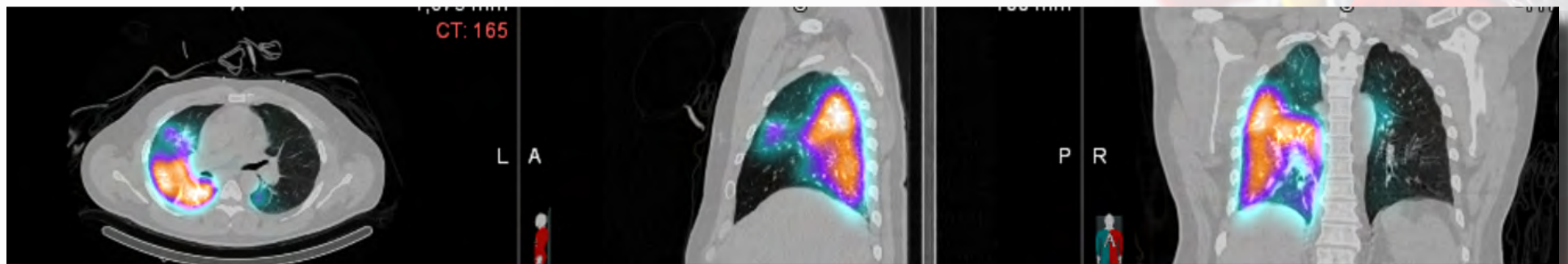


Fig 6. Lung Perfusion A) SPECT and B) Fused SPECT/CT images confirm extensive perfusion defects visualized on planar images.