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COVID-19 and Pulmonary Embolism: Diagnostic Imaging Trends

Sedighe Karimzadeh [1], Akshay Raut [2] and Nguyen Tien Huy [3, *]

[1]School of Medicine, Sabzevar University of Medical Sciences, Sabzevar, Iran
[2]R.C.S.M. Government Medical College, Kolhapur 41002, Maharashtra, India
[3]Institute of Research and Development, Duy Tan University, Da Nang 550000, Vietnam.
[4]School of Tropical Medicine and Global Health, Nagasaki University, Nagasaki, Japan
* Correspondence: Nguyen Tien Huy, School of Tropical Medicine and Global Health, Nagasaki University, Nagasaki, Japan (Email: tienhuy@nagasaki-u.ac.jp)

A recently published editorial by Lionel S. Zuckier and colleagues (1) titled “Diagnostic Evaluation of Pulmonary Embolism During the COVID-19 Pandemic” suggested reverting to a non-ventilation approach for the evaluation of pulmonary embolism to minimize potential exposure of aerosolized secretions in the nuclear medicine suite.

Although the authors have provided a novel approach to mitigate the risk of aerosolized transmission from COVID-19 patients, there are some key points which need to be considered to improve the diagnostic efficacy of the algorithm mentioned. Firstly, the authors have mentioned reducing the numbers of ventilation scans by the rigorous assessment of pretest probability using the well-known diagnostic scoring systems including Wells’ criteria, Pulmonary Embolism Rule-out Criteria (PERC) and the Geneva scoring system. Although these scoring systems are commonly used to predict PE in the outpatient population, they might not be an appropriate and valid tool to predict the risk of PE in COVID-19 patients who are critically ill or admitted in the intensive care unit (ICU), which is attributed to the higher mortality rate (2-4). In this context, if cardio thoracic pulmonary angiography (CTPA) is not contraindicated, it is recommended as the instant diagnostic tool regardless of chest x-ray findings (5). Consequently, considering patients' hemodynamic instability is crucial before approaching the mentioned algorithm. In the setting of SARS-COV2 infection and CTPA contraindication, respiratory distress in COVID-19 patients may preclude optimal V/Q scan procedure. We recommend in such cases that reverting to Perfusion-only scintigraphy or Bedside critical care ultrasound as a real-time POC examination in limited availability to scintigraphy scan along with modified scoring system, clinical judgment and D-dimer assay can be beneficial. Although a positive value for D-dimer does not significantly predict the risk of PE, a negative D-dimer test (<500 ng/ml) has a high negative predictive value in low or intermediate pre-test likelihood (6-8) and can reduce the number of imaging techniques leading to minimized aerosolized secretions in V/Q scan. Abnormal coagulation parameters including markedly elevated D-dimer, fibrin degradation products, and fibrinogen levels are correlated with higher mortality rate in COVID-19 patients (3, 9). With increasing hypercoagulability state in COVID-19 patients in the absence of major predisposing factors in scoring assessment such as previous proven deep vein thrombosis (DVT) or PE, recent major surgery or trauma, pregnancy, or cancer which result in low risk probability of PE as per the scoring systems, these patients can still probably have PE. Secondly, studies have suggested that the diagnostic value of perfusion scintigraphy according to Prospective Investigative Study of

Acute Pulmonary Embolism Diagnosis (PISA-PED) criteria is inferior to combined V/Q scintigraphy in patients with low pretest probability for PE (10) which occurs and is expected more frequently in COVID-19 patients as explained earlier. Ultimately a negative perfusion-only scintigraphy cannot reliably exclude Pulmonary Embolism in all COVID-19 patients and other imaging studies along with clinical judgment and laboratory testing might be reconsidered to efficiently diagnose PE in these patients.

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