Poster no: 64

ROLE OF POINT OF CARE ULTRASOUND (POCUS) IN COVID-19 PATIENT; PULMONARY EMBOLISM – A CASE REPORT

WENDY YR ONG[1], ZH LOO[1], MUHAMMAD SUHAIMI O[1], NOORUL HASHIMAH[1]

[1] *HOSPITAL SUNGAI BULOH, SELANGOR, MALAYSIA*

Introduction

Coronavirus disease-2019 (COVID-19) is an infection by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Recent evidence shows COVID-19 had increases risk of significant procoagulant events, including life-threatening pulmonary embolism. COVID-19 and pulmonary embolism are both associated with respiratory failure. The diagnosis of pulmonary embolism can be very elusive and, if missed, may have fatal consequences. Computed Tomography Pulmonary Angiogram (CTPA) remains the gold standard for diagnosis of pulmonary embolism however this can be a challenge in certain due to many factors – unstable patient, those with renal insufficiency, pregnancy, lack of resource. One of the modalities that can be used in emergency department to help in early diagnostic is the usage point of care ultrasound.

Case Report

40 years old lady, brought to emergency department for sudden onset worsening dyspnea for five days. Rapid Antigen Test Kit COVID-19 done prior to presentation was positive. Upon arrival, patient appeared to be in respiratory distress and hypotensive requiring supports with 2 vasopressors. Patient was intubated and put on high setting ventilator support.

Bedside echocardiography (ECHO) showed evidence of massive pulmonary embolism with presence of abnormal interventricular septal motion with dilated right atrium and right ventricle.. Blood gas shows severe respiratory acidosis, pH 6.90, PCO2 79mmHg and PO2 70mmHg. Based on these, decision was made to thrombolyse the patient. However, CTPA was not done as patient was too unstable to be sent to CT suite. She was thrombolysed with IV streptokinase after discussing with the family members on the benefits and risks. D-dimer came back showed significantly high level (more than 20000ng/ml FEU) and elevated High-sensitivity Troponin I (6787ng/L).

Figure 1: Bedside ECHO showing abnormal interventricular septal motion with dilated right atrium and right ventricle

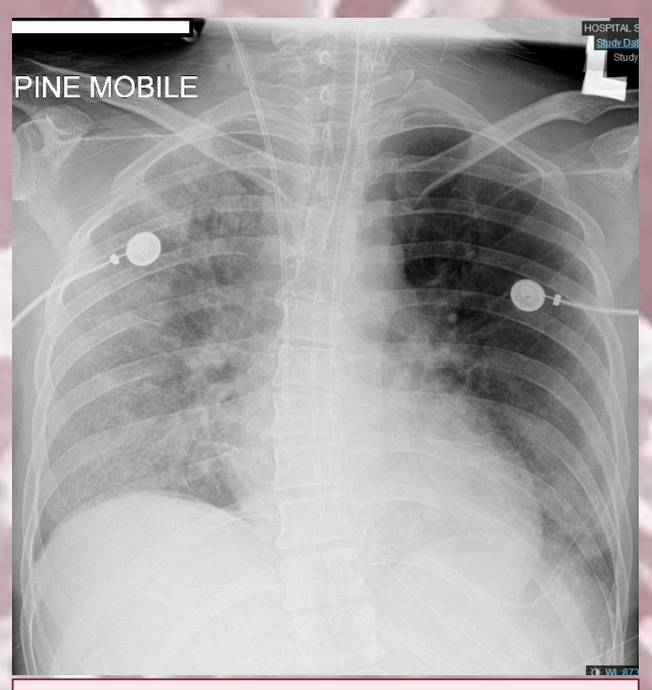

Figure 2: Chest radiograph showing ground glass opacities classical of Covid-19 infection more on right lung field

Discussion/ conclusion

Pulmonary embolism is one of potentially life-threatening complications in COVID-19 patient. Clinicians need to have high index of suspicion for patient who came in with respiratory distress, especially at the time of initial presentation as early treatment can be instituted early. Some cases tend to be under diagnosed due to patient's delayed presentation which can lead to increased mortality and morbidity.

There are three different stages in COVID- 19. The first stage is early infective phase, the second phase is due to inflammatory response with pulmonary involvement and the third stage is when patient is presented with the most severe stage of the illness manifested by systemic hyperinflammation.[1,2] In stage three, systemic inflammatory markers are elevated[2] which led to one of the complications of COVID -19 infection namely COVID- 19 associated coagulopathy (CAC). Pathophysiology of CAC are likely multifactorial including severe systemic inflammatory response.[3] Several studies stated that inflammation can promote thrombosis through various mechanism, such as activation of endothelium platelets, monocytes and tissue factor/ factor VIIa pathway; altering fibrinolysis and natural anticoagulant pathways.[3,4,5] A study by Klok et al conclude that there were 31% incidence of thrombotic complication in ICU patients with COVID-19 infection and the most common thrombotic complication is pulmonary embolism (n=25, 81%).[6]

One of the common laboratory findings of CAC are intensely elevated levels of D-dimer and fibrin.[3] The use of Point of Care Ultrasound can assist in the diagnosis of pulmonary embolism during initial presentation while awaiting CTPA to be done. Studies show that POCUS plays a role in detecting thromboembolic event especially in emergency department especially patient who are hemodynamically unstable.[7,8,9] Transthoracic echocardiography has high specificity and low sensitivity for diagnosing pulmonary embolism.[9]

Despite only on day 5 of illness, patient was presented with massive pulmonary embolism with systemic hyperinflammatory response supported by bedside investigations and positive laboratory blood results which commonly occur during the third stage of COVID 19 infection. However, this might be inaccurate as history taking was obtained from patient's next of kin whose perception on the course of presenting illness might differ slightly from patient's own experience.

Pulmonary embolism is a becoming a common complication during COVID-19 pandemic and it is associated with poor prognosis and increased risk of mortality during hospitalization. Prompt diagnosis with high index of suspicion is a must and thrombolysis can improve risk of mortality in COVID-19 patients.

Acknowledgement

No acknowledgement

Declaration of conflict for all author

No conflicts of interest.

References

1. Xu Z., Shi L., Wang Y. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir Med.* 2020 Apr;8(4):420–422. doi: 10.1016/S2213-2600(20)30076-X.
2. Siddiqi HK, Mehra MR. COVID-19 illness in native and immunosuppressed states: A clinical-therapeutic staging proposal. *J Heart Lung Transplant*. 2020;39(5):405-407. doi:10.1016/j.healun.2020.03.012
3. Mucha SR, Dugar S, McCrae K, Joseph DE, Bartholomew J, Sacha G, *et al*. Coagulopathy in COVID-19. Cleve Clin J Med 2020. doi: 10.3949/ccjm.87a.ccc024.
4. Levi M, Scully M. How I treat disseminated intravascular coagulation. Blood 2018; 131(8):845–854. doi:10.1182/blood-2017-10-804096
5. Engelmann B, Massberg S. Thrombosis as an intravascular effector of innate immunity. Nat Rev Immunol 2013; 13(1):34–45. doi:10.1038/nri3345
6. Klok FA, Kruip MJ, van der Meer NJ, et al. Incidence of thrombotic complications in critically ill ICU patients with COVID-19. Thromb Res 2020; Apr 10. doi:10.1016/j.thromres.2020.04.013
7. Kariyanna PT, Hossain NA, Jayarangaiah A, et al. Thrombus in Transit and Impending Pulmonary Embolism Detected on POCUS in a Patient with COVID-19 Pneumonia. *Am J Med Case Rep*. 2020;8(8):225-228.
8. Daley JI, Dwyer KH, Grunwald Z, et al. Increased sensitivity of focused cardiac ultrasound for pulmonary embolism in emergency department patients with abnormal vital signs. *Acad Emerg Med* 2019; **26**: 1211– 1220.