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CLINICAL QUIZ

JCHS-CQ-01-2023
Hypercoagulability in Severe COVID Infection

Mohammed Fauzi Abdul Rani

Department of Internal Medicine, Faculty of Medicine, Universiti Teknologi MARA(UiTM), Sungai Buloh, Selangor, Malaysia

Case Presentation

A 42-year-old male, a former heavy smoker, was diagnosed with COVID-19 confirmed with PCR test. With background co-morbidities of hypertension and diabetes, his condition quickly worsened to category 5 requiring intubation. Computed tomography (CT) scan of his thorax at the time revealed presence of organizing pneumonia and pulmonary embolism (Figure 1). He was treated with intravenous methylprednisolone and anti-coagulation. He made an uneventful recovery requiring only a week of intubation. His oxygenation and exercise capacity improved to near normal before discharge. A 3-month course of Dabigatran was commenced, and a follow up appointment was arranged with a repeat CT of his chest. Upon follow up review at 3 months, he was asymptomatic and had just completed the anticoagulant treatment. Repeat chest radiograph was normal and he achieved a distance of 555 metres at 6-Minute Walk Test with no detectable oxygen desaturation. The static lung function test showed almost normal lung volume, but the gas transfer was reduced to 63.0% predicted. A repeat CT scan was done with images (Figure 2) shown below. An echocardiogram performed in light of the repeat CT scan revealed a borderline raised pulmonary arterial pressure of 19mmHg. The rest of the relevant parameters were within normal range.

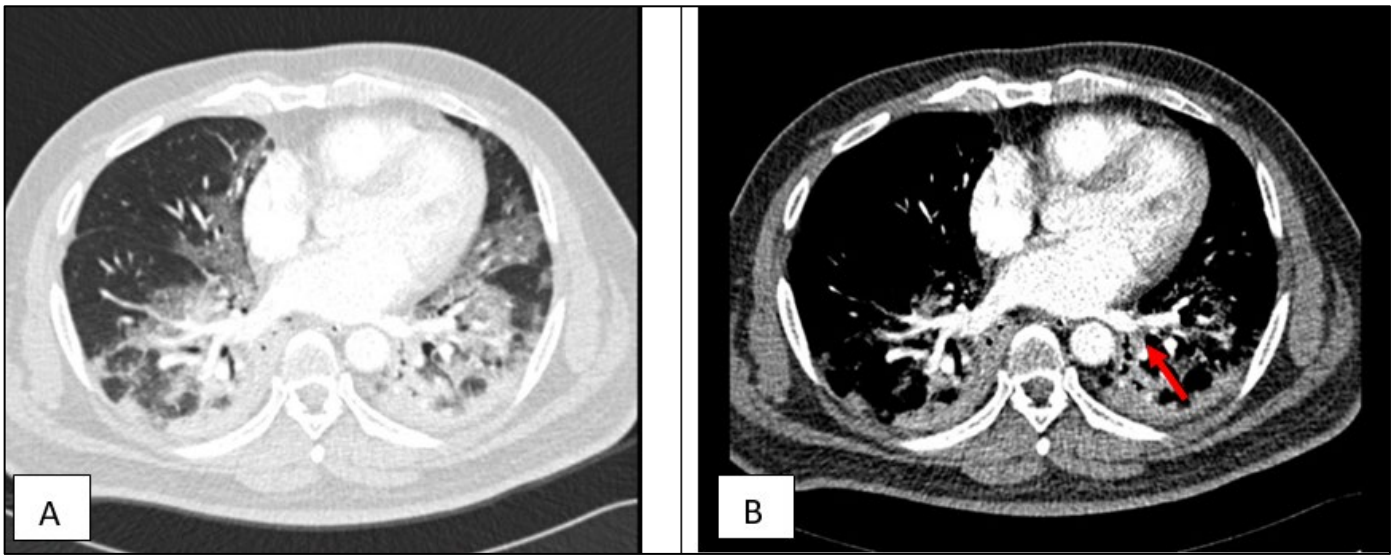

Figure 1 Selected CT Thorax demonstrating (A) lung injury with organizing pneumonia and (B) Left basal subsegmental PE (red arrow)

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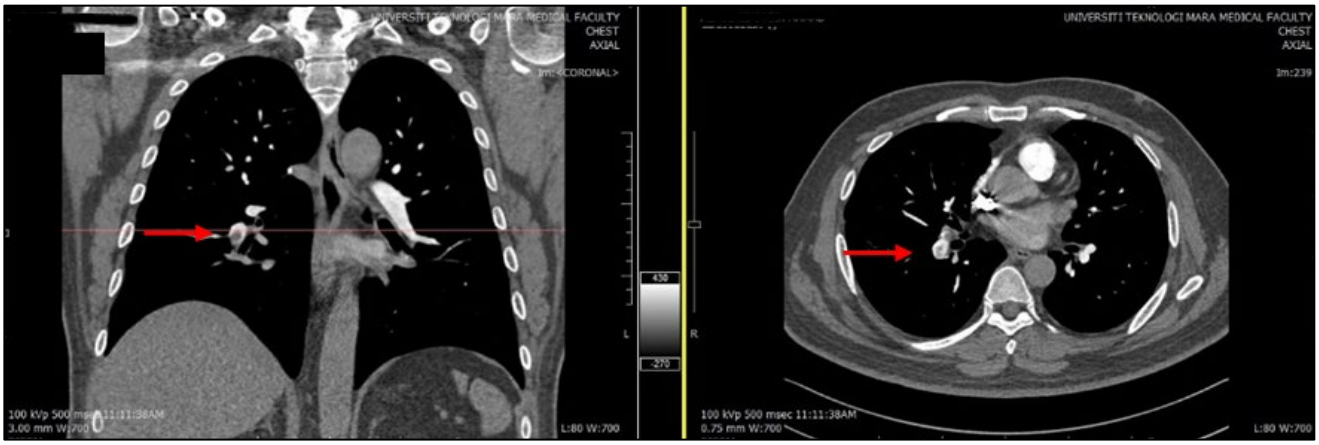

Figure 2 Selected CT images performed after COVID 19 infection at outpatient follow up review

Questions:

1. What new abnormality is seen on CT images at 3-month follow up (Figure 2)?
2. Give possible explanations for the cause of the finding on this CT?
3. What is the most reasonable treatment option following the finding on this CT?

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ANSWER TO JCHS-CQ-01-2023

Question 1

New pulmonary embolism in the visualised right lower lobe pulmonary arterial branch.

Question 2

Infection with COVID-19 may have heightened the patient's coagulability state for a protracted time resulting in recurrent pulmonary embolism or post-infection states (such as reduced mobility) have increased the overall venous thromboembolic (VTE) risks.

Question 3

The duration for anticoagulation should be extended for at least another 3 months.

Discussion

Nowadays clinicians are well aware that COVID-19 patients are at high risk of getting both pulmonary embolism (PE) and organizing pneumonia during the course of the acute infection with the incidence of both conditions increases with increasing category of the disease [1]. When a pulmonary embolism is confirmed by an imaging test such as computed tomography pulmonary angiogram, the recommended treatment by most guidelines is an anticoagulation therapy for at least 3 months [2]. In one case series looking at the fate of the pulmonary artery pressure post anticoagulation therapy, none developed detectable pulmonary hypertension when measured at 3 months despite about 30% had residual thrombosis of the affected vessel [3]. The presence of the residual thrombosis also had no impact on exercise tolerance of these patients [4] and it was not indicative of the risk of new or extension of the further pulmonary embolism [5].

In this case, the initial suspicion of the presence of a pulmonary vascular condition was the detection of the reduced transfer factor with normal static lung volume, which can be seen in chronic pulmonary embolism [6]. It can also be due to the underlying diffuse parenchymal lung disease. A new pulmonary embolism at 3 months was found despite compliance to anticoagulation therapy. Additional factors for pulmonary embolism such as history of long-distance travel, immobilisation, surgery, other medications, coagulation disorders or previous cancer were excluded at clinic review.

For patients on anticoagulation therapy, the most common reason for failure of treatment resulting in new clots is inadequate anticoagulation [7]. Inadequate anticoagulation often results from suboptimal or subtherapeutic treatment. However, through definite history of treatment compliance and the use of new anticoagulation, this was not the case for our patient.

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The most serious long-term complication of PE is chronic thromboembolic pulmonary hypertension (CTEPH) but the data and clinical recommendation on how to risk stratify and investigate CTEPH in post COVID-19 patients is lacking [8]. In cases of PE from other causes, the recommendation for the assessment of CTEPH as a possible long-term complication is done at 3 months which coincides with the follow up timing of our patient. As done in our case report, echocardiogram is the preferred initial test to confirm the presence of pulmonary hypertension. To ascribe CTEPH as the cause, a ventilation perfusion scan is required to confirm that diagnosis [9]. Otherwise, an alternative explanation should be sought [10].

The pulmonary artery pressure measured during echocardiography in our patient was borderline and relatively unremarkable. The cause of reduced percentage of gas transfer was likely to be the new PE which warranted an additional period of anticoagulation of 3 months [11] In addition, a repeat investigation for hypercoagulable risk factors is necessary.

In conclusion, it is possible that the risk for recurrent VTE is enhanced in a selected group of post COVID-19 patients despite treatment with anticoagulation for 3 months. In our patient, continuing anticoagulation therapy beyond 3-month duration is therefore a very reasonable approach in unexplained new PE as we seek to understand more of the sequelae of infection from COVID-19. Large studies are needed to confirm this risk.

Learning Points

- Pulmonary embolism is common during acute COVID-19 infection and may recur after the acute episode in absence of symptoms
- When there is persistent dyspnoea or hypoxaemia, a new pulmonary embolism must be considered an aetiology
- The recommended practice for post COVID-19 care is constantly evolving

Conflict of Interest

Authors declare none.

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Corresponding author:

Prof. Dr. Mohammed Fauzi Abdul Rani,
Department of Internal Medicine,
Faculty of Medicine,
Universiti Teknologi MARA (UiTM),
Jalan Hospital, 47000 Sungai Buloh,
Selangor, Malaysia.
Email: mohammedfauzi@uitm.edu.my

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