Film quiz: a 59-year-old man presented with shortness of breath
照片猜謎：一個 59 歲的男子出現呼吸急促

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Case

A 59-year-old man, with history of right pneumonectomy done for carcinoma of lung 2 months ago, presented with shortness of breath for 2 days. Urgent computed tomography (CT) scan of thorax with intravenous contrast (Figure 1) was performed.

Questions

1. Describe the CT findings in Figure 1.
2. What are the radiological diagnoses?
3. What is/are the management(s) for the patient?

Figure 1.

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Answers

1. There were evidences of right pneumonectomy with absence of right lung, truncated right main bronchus, and large amount of fluid and air filling the right hemi-thorax. A filling defect was detected over the stump of right main pulmonary artery. There was no obvious filling defect detected in the left pulmonary arteries. Consolidation was noticed over the left lung base (see Figure 2).
2. Right pulmonary artery stump thrombosis and left lung base pneumonia.
3. A filling defect in the pulmonary arterial stump after pneumonectomy in CT scan is generally thought to be an in-situ thrombosis and often an incidental finding in the follow-up imaging of patient after pneumonectomy. However, emboli in other pulmonary arteries have to be identified in patient with respiratory symptoms. Other causes of respiratory distress, e.g. pneumonia, should also be looked for and treated accordingly.

Discussion

Pulmonary complications are common after pneumonectomy. Early complications include pulmonary oedema, chylothorax, haemothorax, bronchopleural fistula, empyema, and rarely cardiac herniation; while post-pneumonectomy syndrome or oesophagopleural fistula usually occurs as late complication.\(^1\) Thrombus formation within the pulmonary artery stump is also a recognised complication after pneumonectomy.

Two large retrospective studies on post-pneumonectomy pulmonary artery stump thrombosis had been conducted in which the reported incidences were both approximately 12% (11 in 89 patients in the study by Kwek and Wittram\(^2\) and 18 in 147 patients in the study by Kim et al\(^3\)). According to the Virchow’s triad of the pathogenesis of thrombosis, intravascular thrombosis is formed in the presence of endothelial injury, stasis of blood flow and

![Figure 2](image-url). Evidences of right pneumonectomy, including absence of right lung, truncated right main bronchus and large amount of fluid and air filling the right hemi-thorax, were shown. A concave-shaped filling defect was detected over the stump of right main pulmonary artery (black arrow). No obvious filling defect was detected in the left pulmonary arteries (white arrows). There was consolidation over the left lung base (arrow head).
hypercoagulability. All these factors are present in the pulmonary artery after pneumonectomy. Thrombus occurs mostly in long vascular stump. In addition, owing to the anatomical features, the vascular stump after a right pneumonectomy is much longer than that after a left pneumonectomy and stump thrombosis had been reported more frequently on the right.3

With the increasing use of post-operative computed tomography, vascular stump thrombosis is often detected incidentally in asymptomatic patients in the follow-up imaging. The importance of pulmonary stump thrombosis remains unknown but the risk of embolus migration is believed to be low. Data about the incidence of pulmonary embolism (PE) in patients with post-pneumonectomy stump thrombosis is limited in the literature. Kim et al1 reported one case of PE in 18 cases of post-pneumonectomy stump thrombosis (5.6%) while Kwek and Wittram2 also found only 1 case of PE in 11 such cases (9.1%). However, the association between PE and the thrombus in the pulmonary arterial stump was uncertain in these two cases. In the study by Kwek and Wittram, the follow-up CT scan of 5 patients without PE at presentation did not reveal propagation of the thrombus outside the stump.2 In the study by Kim et al, 13 of 18 patients had post-pneumonectomy stump thrombosis on the initial CT scans and the thrombus in more than half of them remained stable for up to 34 months of follow-up.3

It is still controversial for anticoagulation therapy in patients with post-pneumonectomy stump thrombosis. Kwek and Wittram suggested using the shape of the filling defect in CT scan to assess the stability of the thrombus and convex-shaped thrombus was believed to be more acute and possibly less stable.2 Thomas et al reported a 51-year-old man with a pulmonary artery stump thrombosis diagnosed ten years after pneumonectomy with previous negative scans. The patient developed pulmonary hypertension due to chronic microemboli requiring prolonged course of anticoagulation therapy.4 Joshi et al reported another case of delayed formation of pulmonary artery stump thrombosis in a patient with right pneumonectomy done for lung cancer ten years ago. CT scan showed a convex-shaped thrombus in the right pulmonary artery stump. The patient had a declining pulmonary status and died two and a half months after the diagnosis of...

Currently, there is no consensus about anticoagulation therapy for post-pneumonectomy pulmonary artery stump thrombosis. The CT finding is generally believed to be an in-situ thrombus and not related to PE. However, anti-coagulation therapy may be considered for unstable thrombus (convex-shaped filling defect in CT scan).6

Our patient’s condition improved with antibiotic therapy. Anticoagulation therapy was not initiated as there was no evidence of emboli in other pulmonary vasculature and the concave-shaped stump thrombus represented a stable in-situ thrombus.

References