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Pulmonary embolism recurrence diagnosed by endobronchial ultrasound

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Lung cancer is a significant risk factor for pulmonary embolism (PE) and early detection is essential for improving treatment and survival outcomes.[1]

We present the case of a 69-year-old man, a heavy smoker (84 packs-per-year), with controlled hypertension using olmesartan, who presented with dyspnea (mMRC1), left pleuritic chest pain (rated 5/10 on an analog scale), and minor hemoptysis over the past 36 h. Upon arrival at the hospital, he was clinically stable. A Wells score of 7 prompted the initiation of anticoagulation therapy with subcutaneous low-molecular-weight heparin (LMWH). A diagnostic computed tomography pulmonary angiography (CTPA) revealed the presence of occlusive filling defects in the left lower lobe artery, a triangular peripheral pleural-based consolidation in the left lower lobe (indicative of pulmonary infarction), as well as a 23 mm spiculated solid pulmonary lesion in the right upper lobe and enlarged right mediastinal and hilar lymph nodes. A diagnosis of acute PE was confirmed, and deep vein thrombosis was excluded. Upon discharge, the patient refused long-term anticoagulant treatment with subcutaneous LMWH and started rivaroxaban instead.

Endobronchial ultrasound (EBUS) was delayed for 4 weeks after the PE event and rivaroxaban was withheld 24 h before the exam. On the day of the procedure, the patient reported mild discomfort in the right hemithorax. Vital signs and physical examination were normal. Laboratory testing and EKG were also within the normal range.

During EBUS all mediastinal structures were systematically assessed. Heterogeneous hypoechoic finger-like and nodular floating endovascular images were observed in the right pulmonary vessels (Video 1 and Video 2). Transbronchial needle aspirations (TBNA) were performed in lymph node stations with a size of $\geq$ 5 mm (2R, 4R, 7 and 10R). Afterward, the patient underwent a new CTPA, which confirmed the presence of arterial occlusion and vascular filling defects consistent with a pulmonary thrombus in the right pulmonary artery and its multiple segmental branches. A diagnosis of lung adenocarcinoma was made (cT1N2, PD-L1 100%). LMHW was restarted and later changed to

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apixaban, again according to the patient's preference, and reported efficacy compared to LMWH.[2] There has been no recurrence of PE for the last 15 months.

This case highlights the increased risk of PE in lung cancer patients (6 times more likely compared to healthy individuals)[3] and the high risk of recurrence after a first event.[4,5] Guidelines recommend that patients with active cancer continue secondary thromboprophylaxis anticoagulation.[1] It is important to be aware that patients may still experience a thromboembolic event while on anticoagulants, which may necessitate an increase in dosage or a switch to different drugs.

When an invasive procedure is necessary for a patient with lung cancer-associated PE, the operator must carefully assess the risks and decide whether anticoagulation should be paused or continued. While EBUS-TBNA is a low-bleeding-risk procedure, it was performed on a patient with an increased risk for thromboembolic disease (PE $<$ 3 months), making it crucial to minimize the time without anticoagulation. Since there are no randomized trials regarding the safety of EBUS-TBNA while maintaining treatment with direct oral anticoagulants, the medication was suspended 24 h before the procedure.

In lung cancer patients, EBUS may play a crucial role not only in diagnosis and staging but also in evaluating mediastinal vascular structures.[6] Bronchoscopists must undergo appropriate training to assess and recognize PE ultrasonographic features. It is important to note that endosonography findings should be confirmed by CTPA, as it allows for a comprehensive diagnosis. CTPA may only be omitted in specific cases, such as in the presence of contrast allergy, or renal insufficiency, or a difficult-to-transport patient, where EBUS may serve as a valid alternative for diagnosing central PE.

Informed consent

Patient informed consent was obtained for publication purposes.

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Declaration of Competing Interest

None.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.pulmoe.2023.12.004.

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