

Endobronchial ultrasound for the detection of chronic pulmonary artery thrombus

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ABSTRACT

Endobronchial ultrasound (EBUS) has been shown to be able to successfully identify acute/subacute pulmonary thromboembolism (PE). Most reported cases have required confirmation by computerized tomography (CT) angiography. This report demonstrates a case where CT angiography was not conclusive and the EBUS was useful in clarifying the chronic process inside the pulmonary artery compatible with clinical diagnosis of chronic pulmonary artery thrombosis.

Key words: Bronchoscopy, EBUS, pulmonary thrombus

CASE REPORT

A 78-year-old man was evaluated for an enlarging right middle lobe nodule. Three years prior to this, he was diagnosed with stage IIIA adenocarcinoma of the left lung with mediastinal invasion and encasement of thoracic aorta and pulmonary artery. He was treated with concurrent chemotherapy and radiation (180 cGy/day × 35 days, total 6300 cGy). He developed post-radiation fibrosis in the left hilar area and several follow-up computerized tomographies (CTs) without contrast (he had renal insufficiency with serum creatinine ranging from 1.8-2.5 mg/dl) over two years had shown stable radiation fibrosis with a mass-like area abutting the left pulmonary artery. Even one CT scan with contrast during this period could not clarify if this finding represented chronic thrombus or

extra-luminal soft tissue mass or fibrosis [Figure 1]. A positron emission tomography (PET) scan to evaluate the right-sided nodule did not show any significant 18-fludeoxyglucose (FDG) uptake in this particular area of hilar opacity. The patient underwent a navigational bronchoscopy and biopsy of right middle lobe mass revealing lung adenocarcinoma. During the case, a curvilinear endobronchial ultrasound (EBUS) was used to evaluate the left hilar area and it clearly revealed a hyperechoic area within the circular wall of the left pulmonary artery [Figure 2a] with blood flow around it within pulmonary artery confirmed with Doppler [Figure 2b]. Thus the EBUS confirmed that there was chronic thrombus inside the left pulmonary artery at the location of previously seen abnormal CT findings in left hilum. As this was a stable finding over more than 2 years and did not show any FDG uptake, it was clinically felt to be compatible with chronic pulmonary artery thrombosis rather than tumor thromboembolism. Based on the patient being asymptomatic, radiological stability over >2 years, and patient preference, no anticoagulation was initiated. This case demonstrates the utility of EBUS in a clinical situation where routine imaging was not helpful or couldn't be performed optimally due inability to give intravenous contrast.

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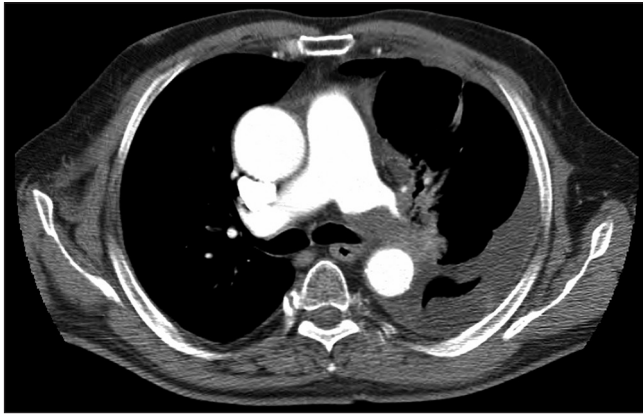


Figure 1. CT chest with contrasts showing abnormal area in left hilum around left pulmonary artery. It is not clear if there is intraluminal thrombosis or this is entirely extra-luminal fibrosis

DISCUSSION

The close proximity of the major mediastinal vessels to the central airway allows them to be visualized during an EBUS. The Doppler feature of an EBUS can aid in differentiating blood vessels from lymph nodes. The current lung cancer staging system uses vascular landmarks to demarcate several lymph node stations, thus making it important to focus on central vessels during the EBUS procedures. The above factors generated interest in the possibility of detecting pulmonary thromboembolism (PE) with EBUS. In a prospective, multicenter study, Aumiller and colleagues performed EBUS on 32 patients who had a CT angiogram confirmed diagnosis of acute PE within the previous 24 hours. They were able to detect 97 of the 101 PE (96%) with at least one PE detected in every patient, which was sufficient to make a diagnosis of central PE in all patients.^[1] Isolated case reports have also described detection of tumor thromboembolism^[2,3] and left atrial clot^[4] during EBUS procedures but the EBUS visualization was prompted by abnormalities noted on prior CT imaging. While rare case reports have described detection of unexpected acute or sub-acute PE during EBUS, these findings have needed confirmation with CT angiogram or magnetic resonance angiography (MRA).^[5,6] While it has been hypothesized that EBUS may be useful in detecting PE in patients who are unable to get intravenous contrast, no such cases have been reported. It may also not be possible to safely perform EBUS in all symptomatic patients with acute PE. Our patient was unusual, as contrast was avoided during his routine CT surveillance due to the presence of renal insufficiency, but even when CT angiography was performed with intravenous contrast, it was unable to clearly identify the clot/thrombus in the pulmonary

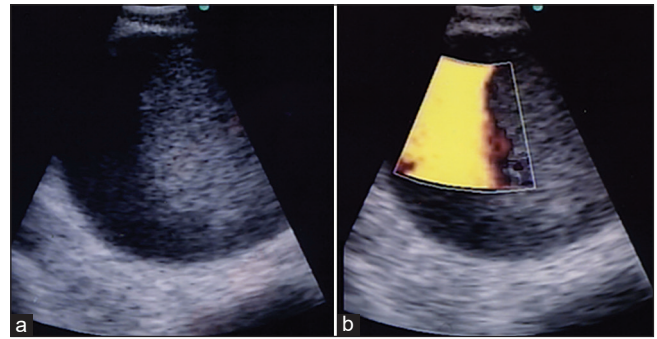


Figure 2. EBUS showing hyperechoic area inside the circular wall of left main pulmonary artery (a) with Doppler confirming blood flow in the hypoechoic area (b)

artery due to the surrounding post-radiation fibrosis and distortion of lung parenchyma around the pulmonary artery. It is not always possible or clinically indicated to obtain tissue biopsy to fully confirm such findings but the clinical scenario favored this to be a chronic pulmonary artery thrombus. Although the EBUS findings did not alter the management in this particular case, the EBUS was helpful in further clarifying the chronic process in left hilum and offered an important diagnostic insight.

This case thus demonstrates three important things: it describes the detection of a chronic pulmonary thrombus as most previously described cases were acute or sub-acute PE, it shows the use of EBUS in a patient with chronic renal insufficiency, who was not usually given intravenous contrast, and above all, this case demonstrates the utility of EBUS in detecting pulmonary thrombus in a clinical situation where CT angiography findings were ambivalent.

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