

2014

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## Recommended Citation

Harris K, Chalhoub M. Endobronchial ultrasound as a confirmatory tool for the diagnosis of pulmonary embolism. . 2014 Jan 01; 9(2):Article 2300 [ p.]. Available from: <https://academicworks.medicine.hofstra.edu/articles/2300>. Free full text article.

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Ann Thorac Med. 2014 Apr-Jun; 9(2): 127–128.

doi: [10.4103/1817-1737.128863](https://doi.org/10.4103/1817-1737.128863)

PMCID: PMC4005160

PMID: [24791178](https://pubmed.ncbi.nlm.nih.gov/24791178/)

## Endobronchial ultrasound as a confirmatory tool for the diagnosis of pulmonary embolism

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Sir,

Pulmonary embolism (PE) is a life-threatening condition that requires prompt diagnosis and treatment to achieve a favorable outcome. In cases where imaging study of the chest is essential to make the diagnosis of PE, computed tomography angiography (angio-CT) is the preferred imaging modality which is based on locating a filling defect inside one of the pulmonary arteries and has the advantage of diagnosing other possible chest abnormalities.[1] Ventilation perfusion scan is Another method of diagnosing PE, and ultrasounds provide images of the thrombus inside a vessel in real time. Such ultrasounds enable diagnosticians to identify the extension of the thrombus as well as to observe the degree of vascular obstruction. Convex probe endobronchial ultrasound (CP-EBUS), first described in 1992, has become broadly useful. Not only are these types of ultrasounds applicable in staging and restaging lung cancers, CP-EBUS have also recently been used in diagnosing mediastinal and extra-mediastinal lesions.

The tracheal and bronchial walls lay in proximity to mediastinal vascular structures, particularly the pulmonary arteries. Due to this anatomical fact, the use of CP-EBUS in evaluating the pulmonary arteries for the presence of clots and other vascular abnormalities seems appropriate.[2] Aumiller, *et al.*[3] evaluated 32 patients in the intensive care unit who were diagnosed with PE using angio-CT of the chest. Angio-CT was followed by CP-EBUS, which allowed for the diagnosis of PE in all patients and identified 97 out of 101 thrombi. In this study, CP-EBUS provided the means to locate all central thrombi; the four missed thrombi were in the middle lobe artery and left upper lobe artery. The diagnosis of PE was not affected by the instances of the CP-EBUS not locating the thrombi in these patients, since one thrombus at any pulmonary arterial site is sufficient to make the diagnosis of PE.

Egea Santaolalla, *et al.*[4] reported a case where CP-EBUS identified a left main pulmonary artery thrombus that was not seen on images obtained using angio-CT. Casoni, *et al.*[5] also used CP-EBUS to differentiate between pulmonary artery thrombus and vascular sarcoma, therefore confirming the diagnosis of PE.

Our own experience using CP-EBUS to confirm a diagnosis of PE further supports the notion that CP-EBUS is a useful confirmatory diagnostic tool. An elderly patient was referred to our service with an abnormal angio-CT performed as part of an out-patient work-up for dyspnea on exertion [Figure 1]. The angio-CT was officially read to show the right hilar abnormality, which can represent right main PE, rather than a right hilar mass draping over the pulmonary artery. Under moderate sedation, we performed CP-EBUS (using the model BF-UC160F-OL8; Olympus, Tokyo, Japan), which revealed a clot in the proximal

right pulmonary artery and thus excluded hilar lesions as a diagnosis [Figure 2]. The procedure time was about 5 min and there were no complications.

Based on our own experience as well as the preponderance of other reports supporting the usage of CP-EBUS in diagnostic confirmations, we can conclude that CP-EBUS is a safe, useful tool in diagnosing PE especially in patients who are unstable to be transferred for diagnostic imaging. CP-EBUS can be performed at bedside in the intensive care unit. In occasional incidences, CP-EBUS can be successfully used as a confirmatory test when the diagnosis of central PE is highly suspected based on angio-CT of the chest. A new vascular mediastinal role ought to be counted as one of the most promising applications of CP-EBUS.

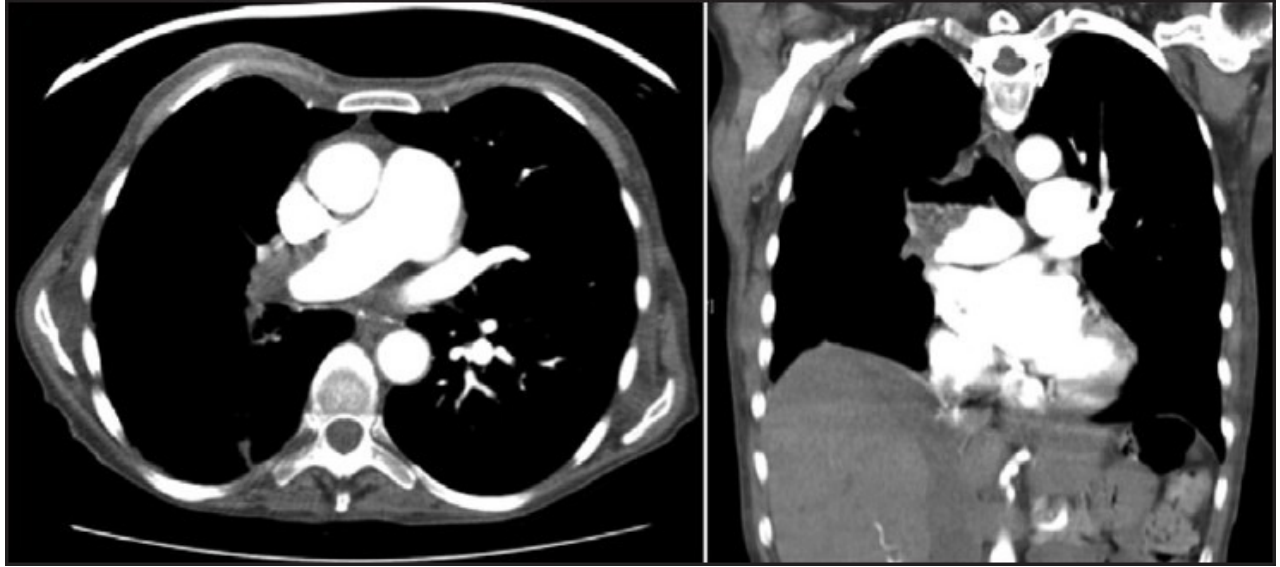
## References

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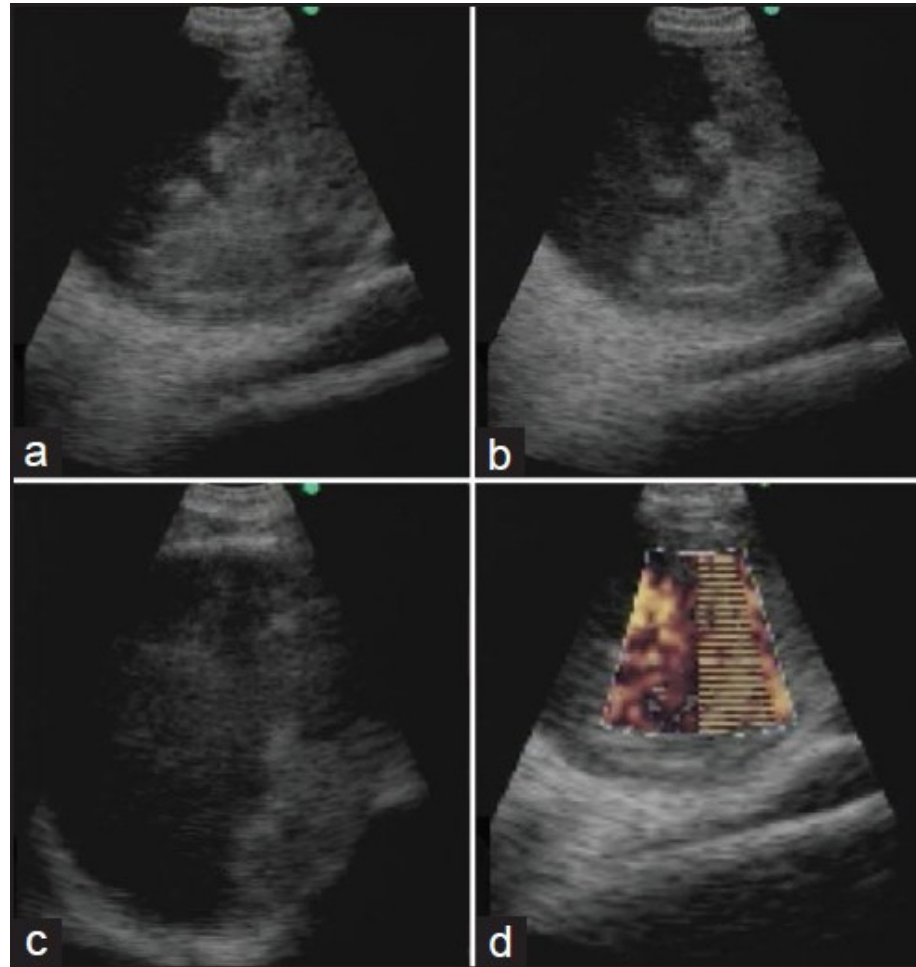
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## Figures and Tables

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**Figure 1**

Axial angiography-computed tomography (CT) of the chest showing right hilar abnormalities described as right pulmonary artery thrombus versus a hilar lesion draping over the pulmonary artery (left image). Coronal angiography-CT of the chest (right image)

**Figure 2**

Convex probe endobronchial ultrasound (EBUS) image with the scope at the level of the right main stem bronchus showing a clot in the proximal right pulmonary artery (a-c). EBUS image with Doppler mode of the right pulmonary artery (d)

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