

## Scientific letter

### Use of Endobronchial Ultrasound in the Diagnosis of Second Episode Asymptomatic Acute Pulmonary Embolism



#### *Uso de la ecografía endobronquial en el diagnóstico del segundo episodio embolismo pulmonar agudo asintomático*

Dear Editor:

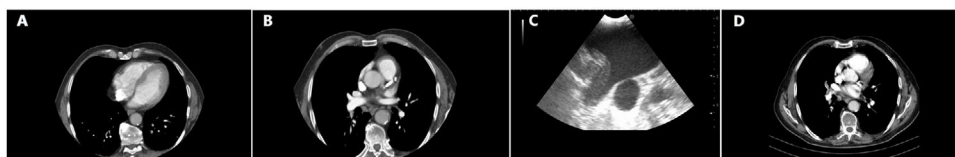
Venous thromboembolism involves the formation of thrombi in the venous territory which frequently fragment or detach, ending up in the pulmonary arterial territory and encompassing both deep venous thrombosis (DVT) and pulmonary embolism (PE).<sup>1</sup> Depending on the signs and symptoms presented by the patient, we will apply a diagnostic algorithm based on clinical probability scales like the Geneva and Wells' scores. The certainty diagnosis of PE given by pulmonary arteriography however, with the appearance of computed tomography chest angiography (CTA) chest scan, its use has declined. Lung scintigraphy is useful in patients with a contraindication for CTA chest scan. Ultrasound of the lower limbs at the femoral and popliteal level also helps us to rule out, with 90% sensitivity and 95% specificity, the presence of DVT.<sup>2</sup>

A 74-year-old male patient with no relevant history went to the emergency room due to sudden II/IV mMRC dyspnea with no other accompanying symptoms. On physical examination, he presented with crackling sounds in the right lung base, and his lower extremities displayed signs of chronic venous insufficiency, without other findings of interest. Given the clinical suspicion of PE, a D-dimer of 8870.00 ng/ml (0–500 ng/ml), a Doppler ultrasound of the lower limbs with findings compatible with DVT in the lower left limb and a CTA chest scan (General Electric Healthcare Revolution CT<sup>®</sup>) were requested (repletion defect in the lobar branch of the left upper lobe, with extension to segmental branches, including segmental branch of the left lower lobe, and several mediastinal lymphadenopathies with a diameter smaller than one centimeter) (Fig. 1A and B). The patient was admitted and started anticoagulant treatment with low molecular weight heparins (tinzaparin

12 000 IU/0.6 ml/24 h) and an outpatient study of mediastinal lymphadenopathy using EBUS.

After seven days, the patient attended the test on an outpatient basis without referring to clinical changes. Endobronchial Ultrasound (EBUS, Pentax Medical EB19-J10U<sup>®</sup>, Hitachi HI VISION Avius<sup>®</sup>) revealed the presence of multilevel mediastinal lymphadenopathy in the 7.8 mm × 6.3 mm adenopathic 4R territory and in the 6 mm × 15 mm territory 7, as well as the presence of an anechoic lesion without the presence of vascularization after endobronchial Doppler analysis at the bifurcation of the right pulmonary artery (10R territory), which was not present in the previous CTA chest scan (Fig. 1C). With the suspicion of a new episode of pulmonary embolism, the patient was admitted for optimization of anticoagulant treatment (enoxaparin 80 mg every 12 h subcutaneously) and complementary tests (Doppler echo of lower limbs with partial thrombosis in recanalization in the left lower extremity), CTA chest scan showing repletion defect in the right interlobar branch with extension to segmental branches of the middle lobe and right lower lobe, compatible with acute PE (Fig. 1D) not described in the previous CTA chest scan (Fig. 1B) and consultation with the hematology department (study of antiXa: without alterations). In the absence of hemodynamic instability, the patient was discharged with enoxaparin without having presented new episodes of thrombosis.

EBUS is one of several techniques used for the diagnosis of mediastinal lesions and allows careful observation of vascular structures (aorta artery, right and left main pulmonary artery, superior vena cava) and the use of the Doppler mode to characterize their behavior, making it possible to visualize abnormalities.<sup>3</sup> EBUS could detect PE in central pulmonary vessels, so it can be considered as a diagnostic alternative in cases where imaging tests are not available and there is hemodynamic stability. The involvement of peripheral vessels is not assessable by EBUS, and complementary imaging studies are necessary.<sup>4</sup> In our case, it was an incidental finding during mediastinal staging in a patient with a previous PE episode on anticoagulant treatment. Systematic assessment of central pulmonary vessels during EBUS procedures could diagnose PE



**Figure 1.** (A, B) CTA chest scan showing repletion defect in the lobar branch of the left upper lobe, with extension to segmental branches, including segmental branch of the left lower lobe, and several mediastinal lymphadenopathies with a diameter smaller than 1 cm. (C) Anechoic lesion without the presence of vascularization after endobronchial Doppler analysis at the bifurcation of the right pulmonary artery (10R territory) in EBUS view C 2°. (D) CTA chest scan showing repletion defect in the right interlobar branch with extension to segmental branches of the middle lobe and right lower lobe.

in asymptomatic patients. In conclusion, EBUS could be a useful tool in the diagnosis of EP, although more studies are needed in this regard.

#### **Informed consent**

Informed consent was obtained from the patient for the publication of his clinical data and the use of diagnostic images.

#### **Conflict of interest**

None of the authors has any conflict of interest of any type.

#### **Authors' contributions**

All the listed authors have made substantial contributions to all areas as outlined therein.

#### **Funding**

The authors declare that no funding was received for this article.

#### **References**

1. Konstantinides SV, Meyer G, Becattini C, Bueno H, Geersing G-J, Harjola VP, et al. 2019 ESC guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). *Eur Heart J*. 2020;41:543–603, <http://dx.doi.org/10.1093/eurheartj/ehz405>.
2. Perrier A, Bounameaux H. Ultrasonography of leg veins in patients suspected of having pulmonary embolism. *Ann Intern Med*. 1998;128:243–5, <http://dx.doi.org/10.7326/0003-4819-128-3-199802010-00015>.
3. Casoni GL, Gurioli C, Romagnoli M, Poletti V. Diagnosis of pulmonary thromboembolism with endobronchial ultrasound. *Eur Respir J*. 2008;32:1416–7, <http://dx.doi.org/10.1183/09031936.00075208>.
4. Aumiller J, Herth FJ, Krasnik M, Eberhardt R. Endobronchial ultrasound for detecting central pulmonary emboli: a pilot study. *Respiration*. 2009;77:298–302, <http://dx.doi.org/10.1159/000183197>.

Eduardo Solís García \*, Blanca de Vega Sánchez,  
David Vielba Dueñas, Carlos Disdier Vicente

*Pulmonology Department, Hospital Clínico Universitario de Valladolid, Valladolid, Spain*

\* Corresponding author.

*E-mail address:* [solisariego@gmail.com](mailto:solisariego@gmail.com) (E. Solís García).