

Spanish consensus for the management of pulmonary thromboembolism[☆]



Consenso español sobre el manejo de la tromboembolia de pulmón

We read the comment by Ciampi-Dopazo et al. with interest and we would like to thank them for their contributions to the recently published consensus¹. The objective of the consensus as a clinical guideline was to provide recommendations for the optimal management of patients with pulmonary embolism (PE), generated from a systematic review of the evidence and an assessment of the risks and benefits of each intervention.

The consensus document recommends full-dose systemic fibrinolysis as a reperfusion treatment of choice in patients in whom it is not contraindicated. It suggests catheter-directed treatment or low-dose systemic fibrinolysis in patients with absolute or relative contraindications for full-dose systemic fibrinolysis¹.

There are two rationales behind these recommendations:

- 1 Meta-analyses (from clinical trials) evaluating the efficacy and safety of systemic fibrinolysis (compared with anticoagulation) in more than 2000 patients with acute PE have shown statistically significant reductions in mortality². In contrast, only 1 clinical trial has been published that evaluated the efficacy and safety of catheter-directed treatment (ultrasound-enhanced fibrinolysis) in 59 patients with acute PE and right ventricular dilatation on echocardiography³. The trial used an echocardiographic event as an endpoint, but it lacked statistical power to detect differences in clinical events (mortality, recurrent venous thromboembolism, or bleeding). Although clinical records provide useful medical information and can be used to generate hypotheses, they are subject to numerous biases and confounding factors, and should not be used routinely to assess the efficacy and safety of medical interventions.
- 2 The authors have extensive experience in the clinical management of patients with PE and in the application of catheter-directed treatments, but this is not the case for most clinicians and centers that routinely see patients of this type.

Ongoing (NCT04088292, NCT03389971) or pending clinical trials may provide robust evidence of the efficacy and safety of different reperfusion treatments for patients with PE. In the

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Bronchial Artery Aneurysm and Pseudoaneurysm: Which Endovascular Treatment?



Aneurisma y pseudoaneurisma de la arteria bronquial: ¿qué tratamiento endovascular?

Dear Editor:

We appreciated the paper of Recalde-Zamacona et al., entitled: Bronchial Artery Pseudoaneurysm and Mediastinal Hematoma after EBUS-TBNA.¹ The authors have well illustrated the first case of bronchial artery pseudoaneurysm as complication of Endobronchial Ultrasound-Transbronchial Needle Aspiration (EBUS-TBNA) treated by the endovascular embolization. Only limited numbers of cases of bronchial artery aneurysm and pseudoaneurysm have been described in literature using endovascular

meantime, this consensus provides an updated framework of information that will help clinicians make the most appropriate decisions for each individual patient.

Conflict of interests

The authors declare that they have no conflict of interest.

References

1. Lobo JL, Alonso S, Arenas J, Domènech P, Escribano P, Fernández-Capitán C, et al. Multidisciplinary consensus for the management of pulmonary thromboembolism. Arch Bronconeumol. 2021. <http://dx.doi.org/10.1016/j.arbres.2021.01.031>. S0300-2896(21)00056-9.
2. Marti C, John G, Konstantinides S, Combes C, Sanchez O, Lankeit M, et al. Systemic thrombolytic therapy for acute pulmonary embolism: a systematic review and meta-analysis. Eur Heart J. 2015;36:605–14.
3. Kucher N, Boekstegers P, Müller O, Kupatt C, Beyer-Westendorf J, Heitzer T, et al. Randomized controlled trial of ultrasound-assisted catheter-directed thrombolysis for acute intermediate-risk pulmonary embolism. Circulation. 2014;129:479–86.

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approaches without an indication/guide line of the various techniques available.^{1,2}

Bronchial artery aneurysm and pseudoaneurysms are a very rare vascular event, but potentially life-threatening.^{1–3} So, they must be treated as quick as possible in urgent setting. Iatrogenic, vascular wall trauma and inflammation are the main etiologies of bronchial artery aneurysm and pseudoaneurysm.^{1–3} Nowadays, endovascular approach is considered the first-line method for most aortic branch artery pathology; as performed by Recalde-Zamacona et al. with endovascular embolization in one of the few cases of bronchial artery pseudoaneurysm described in the literature.^{1–5} Skills in endovascular procedures and good knowledge of materials are mandatory to approach these challenging clinical situations. The various endovascular techniques can be applied individually or in combination with each other, since every case can be different from the other.^{1–5} Aim of our editorial is to complete and to give a

possible indication of the three possible endovascular therapeutic techniques for bronchial artery aneurysm and pseudoaneurysm: (a) isolation embolization, (b) packing embolization and (c) stenting deployment.

- a) Isolation embolization technique characterized by the complete embolization of efferent (distal) and afferent (proximal) branch arteries of the aneurysm or pseudoaneurysm sac. This method is generally the most commonly used. It is performed when the aneurysm or pseudoaneurysm sac involves the distal tract of the bronchial artery and has multiple vessels involved. Generally coils and micro-plugs are used as embolized agents. But for smaller and distal terminal vessel micro-particles or liquid embolized agents are used. Isolation embolization technique is equivalent to surgical vascular ligation. The main disadvantage of this technique is that occlude the treated artery segment with blood flow interruption. But, the possible risk of ischemic lesion of downstream territory is very low due artery vascular compensation network over time by bronchial, intercostal and mammary collateral artery vessels.^{3–5}
- b) Packing embolization technique is characterized by filling the aneurysm or pseudoaneurysm sac by metallic coils or liquid embolization agent device. This method can be performed only when the aneurysm or pseudoaneurysm sac involves a straight tract of the bronchial artery without collateral branches and it has a small neck, which guarantees the absence of migration out of the embolized agent from the sac into the main bronchial artery segment. The main advantage of this technique is that guarantee patency of the bronchial artery treated segment.^{3–5}
- c) Stenting deployment technique, using covered or flow-diverter devices, has the same aim packing embolization of guarantee aneurysm or pseudoaneurysm sac exclusion and to ensure blood perfusion to distal bronchial artery branch vessels. This type of endovascular approach is more theoretical than practical due to two main limitations: tortuosity and small size of bronchial artery that can limits the navigability of stent device, and the need of an adequate bronchial artery distal and proximal neck for stent deployment (no always present).

The main limitation of endovascular embolization is the subsequent imaging follow-up, especially with Multi Detector Computed Tomography (MD-CT). On MD-CT especially coils or high-density liquid embolic devices create artifacts, which may not highlight a possible endoleak at the level of the treated bronchial artery segment. In these case angiography has to be used to evaluate treated aneurysm or pseudoaneurysm over time.

In conclusion, patients affected by bronchial artery aneurysm or pseudoaneurysm are very rare.¹ But this potentially life-threatening pathology needs an appropriate multidisciplinary discussion having attention on pseudoaneurysm anatomical location, characteristics, extension, and patient's hemodynamic status to determine the specific treatment for each individual case.

Conflicting interest

Authors do not has any conflicts of interest, financial or otherwise, relating to the content here.

References

- Recalde-Zamacona B, Ezponda A, Zulueta JJ, Marín-Oto M, Alcaide AB, Campo A, et al. Bronchial Artery Pseudoaneurysm and Mediastinal Hematoma after EBUS-TBNA. *Arch Bronconeumol*. 2021;57:142–3.
- Koirala A, Thapa A, Mahat S, Sapkota S, Sosa O. A rare case of ruptured bronchial artery pseudoaneurysm and its nonsurgical management with interventional techniques. *Cureus*. 2020;17:e10502.
- Walker CM, Rosado-de-Christenson ML, Martínez-Jiménez S, Kunin JR, Wible BC. Bronchial arteries: anatomy, function, hypertrophy, and anomalies. *Radiographics*. 2015;35:32–49.
- Ferro C, Rossi UG, Seitun S, Scarano F, Passerone G, Williams DM. Aortic branch artery pseudoaneurysms associated with intramural hematoma: when and how to do endovascular embolization. *Cardiovasc Intervent Radiol*. 2013;36:422–32.
- Leoncini G, Rossi UG, Ferro C, Chessa L. Endovascular treatment of pulmonary sequestration in adults using Amplatzer® vascular plugs. *Interact Cardiovasc Thorac Surg*. 2011;12:98–100.

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Reply to “Bronchial Artery Aneurysm and Pseudoaneurysm: Which Endovascular Treatment?”



Respuesta a “Aneurisma y pseudoaneurisma de la arteria bronquial: ¿qué tratamiento endovascular?”

Dear Editor,

We really appreciate the letter written by Rossi UG¹ referring to our paper entitled “Bronchial artery pseudoaneurysm and mediastinal hematoma after EBUS-TBNA”, published in *Archivos de Bronconeumología*.² We take the chance to briefly review the vascular anatomy of the airway and the bronchial abnormalities that can be encountered during bronchoscopy.

Knowledge of the vascular anatomy of the airways is imperative to recognize the vascular abnormalities involving the bronchial arteries during bronchoscopy. These abnormalities can result from primary airways disorders or from other diseases which lead to the involvement of the airway vasculature. As hemoptysis is the main clinical manifestation, its recognition is essential for the appropriate management in life-threatening situations.

The lung is supplied by two vascular systems, the pulmonary and systemic (bronchial) arteries, which are connected through microvascular anastomoses at the level of the respiratory bronchioles and alveoli. The bronchial arteries usually originate from the proximal descending thoracic aorta, between the superior endplate of the T5 vertebral body and the inferior endplate of the T6 vertebral body. These are called orthotopic bronchial arteries. The term ectopic is employed when these arteries originate elsewhere in the aorta or from other vessels (i.e., intercostal or internal mammary