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.

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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 UG[1] 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 arteries).

Bronchial arteries supply oxygenated blood to the tracheobronchial tree up to the terminal bronchioles, to the visceral pleura and irrigates some mediastinal structures including hiliar lymph nodes or esophagus.

Bronchial artery malformations can present as aneurysms or pseudoaneurysms, which are difficult to distinguish clinically and bronchoscopically. Although most patients are asymptomatic, the condition may result in massive hemoptysis.

Dilated bronchial arteries have >2 mm in diameter and a frequent tortuous mediastinal course. Pulmonary artery obstruction or parenchymal lung diseases cause chronic pulmonary ischemia leading to hypertrophy or enlargement of bronchial circulation in an effort to maintain blood flow to the affected lung and gas exchange through systemic-pulmonary arterial anastomoses. Among the conditions associated with bronchial enlargement we find congenital disorders (Tetralogy of Fallot or ALCAPA syndrome) or acquired diseases, including infections, chronic thromboembolic disease, Takayasu arteritis, fibrosing mediastinitis, trauma, lung cancer or bronchiectasis.

Congenital anomalies in the pulmonary venous system and cardiac malformations with prolonged pulmonary venous hypertension lead to bronchial vessel dilatation and variceal formation. These conditions present in childhood with recurrent pneumonia and hemoptysis. Mucosal hyperemia, tortuous airway vasculature and varices are typical findings in the bronchoscopy.[3]

Chronic airways diseases such as bronchiectasis, asthma, chronic obstructive pulmonary disease or sarcoidosis produce changes in the pulmonary vasculature. Bronchiectasis is the most common cause of hemoptysis since bronchial artery enlarge, with even aneurysm or pseudoaneurysm formation.[4] CT detection of these vascular lesions is important to avoid procedures in the affected areas during bronchoscopy. Vascular changes in asthma have been described in the bronchial microcirculation and include angiogenesis, dilation and hyperpermeability.[5] Collagen vascular disorders like Marfan syndrome or Bechet's disease can also produce bronchial aneurysms.

Although vascular patterns observed during bronchoscopy in the different mentioned disorders may not be specific, its recognition help to determine the underlying pathophysiology and to choose the appropriate management.

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Need for Epidemiological Studies on Chronic Obstructive Pulmonary Disease in Rural Spain

Necesidad de estudios epidemiológicos en enfermedad pulmonar obstructiva crónica en la España rural

Dear Editor,

We have read with great interest the article on the prevalence and determinants of COPD in Spain (EPISCAN II), which offers the best information on the epidemiology of the disease in our country.[1] Two of the study's results stand out: the spirometrically-defined prevalence of COPD in Spain is 11.8%, and the underdiagnosis of the disease is 74.7%. The authors acknowledge that one of the limitations of the study is that it was conducted essentially in an urban setting. There is a significant lack of knowledge on the epidemiology of chronic respiratory diseases in general, and COPD in particular, in rural areas of our country. Studies carried out in the USA have found rural-urban disparities in the prevalence of COPD, which is higher in rural areas.[2] The reason is likely to be multifactorial: tobacco use is higher and access to smoking cessation programs is limited in rural populations. Lower socioeconomic status could also be a risk factor for COPD in this population. Finally, environmental biomass smoke exposure is higher in this setting.[2] This is a recognized risk factor for COPD, even in developed countries.[3] Therefore, the global prevalence of COPD found in EPISCAN II might underestimate the disease burden in rural population.

Furthermore, it is plausible that underdiagnosis rates are higher in rural than in urban areas. Clinical guidelines strongly emphasize the association between tobacco smoke and COPD, and the diagnosis may be delayed in non-tobacco-related COPD. Future analyses of EPISCAN II will likely explore whether there is a relationship between smoking history and underdiagnosis of the disease. Access to spirometry may also be limited for rural residents, and this is another credible source of underdiagnosis in this setting. The On-Sint study, carried out in our country, revealed that being followed-up in a rural setting was associated with an inadequate diagnosis of COPD.[4]

Acquiring accurate information on the epidemiology of COPD in rural Spain becomes highly desirable in view of the results of a recently published study: while mortality attributable to chronic lower respiratory disease in urban areas of the USA is declining, it is increasing in rural areas, widening the rural-urban gap in mortality.[5] This is in contrast to cardiovascular disease-related mortality, which is decreasing both in rural and urban areas.[5] It is currently speculative if a similar trend could be found in mortality from COPD in Spain.

It is obvious that confirming possible differences in the prevalence, impact or underdiagnosis of COPD in rural areas would have policy implications, aimed at increasing support to improve prevention, diagnosis and treatment of the disease in this set-