Tracheobronchopathia osteochondroplastica
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Section: Chest imaging
Area of Interest: Thorax
Imaging Technique: CT
Case Type: Clinical Cases
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Patient: 66 years, male

Clinical History:

65-year-old man with a history of recurrent respiratory infections. Previous episode of cancelled surgery due to lack of conditions for orotracheal intubation, with tracheal stenosis being diagnosed by the anaesthesiologist in the operating room. Physical examination showed no abnormalities. Pulmonary function tests demonstrated normal outputs and pulmonary volumes with a flow-volume curve typical of fixed airway obstruction.

Imaging Findings:

Multidetector computed tomography (CT) of the chest showed the trachea with irregular lumen, zones of marked calibre reduction and multiple calcified nodules that protrude into the tracheal lumen. These nodules arose from the anterolateral wall of the trachea and spared the posterior tracheal membrane, involving the whole length of the trachea and being more exuberant in the caudal two thirds.

Discussion:

Tracheobronchopathia osteochondroplastica is an uncommon idiopathic benign disorder of the large airways, typically affecting the lower two-thirds of the trachea and proximal portions of the primary bronchi. [1] The hallmark of this condition is the nodularity of the cartilaginous tracheobronchial anterolateral walls, with sparing of the posterior wall, resulting of abnormal chondrification and ossification of cartilages. [1, 2] Epidemiologically, this disease has no differences in gender distribution and presents between the fourth and the seventh decade of life. [3, 4] It can be asymptomatic or associated to nonspecific respiratory symptoms such as chronic (and productive) coughs and haemoptysis, reported as the most common. [5, 6, 7] Pulmonary function tests are affected by the location of the lesions and the degree of airway obstruction. In mild cases the results may be normal, but in symptomatic patients or in patients with more extensive disease they usually demonstrate obstructive pattern. [8, 9] According to some authors the bronchoscopy remains the gold standard for recognition of TO, allowing to evaluate the extent and severity of the disease. [10, 11] However, CT scan is an important imaging modality for the diagnosis and follow-up of these patients, being positive in about 81% of cases. [5] The characteristic CT scan findings are the presence of submucosal nodules, usually multiple, and sessiles with or without calcifications, easily identified on CT, for its protrusion into the airway lumen.
The sparing of the posterior membranous wall and the deformation of the cartilaginous tracheal rings in absence of external compression are considered pathognomonic findings. Relapsing polychondritis, a rare autoimmune disease, is one of the differential diagnoses that must be taken into account, as it shares some CT imaging findings of TO. It is characterised by smooth thickening, sometimes with diffuse calcification of the cartilaginous parts of the tracheobronchial tree, also sparing the posterior wall, but is distinguished from TO because it is not associated with the presence of submucosal nodules. Another distinguishing feature is the fact that relapsing polychondritis is often manifested by ear and nose chondritis, arthritis, eye inflammation and audiovestibular damage, manifestations absent in the clinical case presented. In the presented case, there were suspicions for this diagnosis when considering the clinical history, with it being later established by the findings in the CT. There is no specific treatment for TO, usually varying from symptomatic management, bronchoscopic intervention to operative correction depending on the severity of airway obstruction.

Take Home Message / Teaching Points
- CT is currently the noninvasive primary exam to evaluate the trachea, since it allows for the evaluation of the morphology of the wall and lumen through multiplanar images in a short span of time.
- The posterior wall of the trachea and the central bronchi are typically spared, and the presence of multiple submucosal nodules with deformation of the cartilaginous tracheal rings in absence of external compression are pathognomonic findings of TO at CT.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Tracheobronchopathia osteochondroplastica, Relapsing polychondritis, Tracheobronchial amyloidosis, Endobronchial sarcoidosis

Final Diagnosis: Tracheobronchopathia osteochondroplastica

References:


Description: Posterioanterior (PA) and lateral (L) chest radiographs show diffuse narrowing of the intrathoracic trachea. Origin: © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019
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Figure 2

**Description:** Transverse CT images in mediastinal window setting show irregular narrowing of the tracheal lumen with calcified nodules in the anterolateral walls. **Origin:** © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019
Description: Transverse CT images in mediastinal window setting show irregular narrowing of the tracheal lumen with calcified nodules in the anterolateral walls. Origin: © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019
Description: Transverse CT images in bone window setting show tracheal lumen with calcified nodules in the anterolateral walls. Origin: © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019
Description: Transverse CT images in bone window setting show tracheal lumen with calcified nodules in the anterolateral walls. Origin: © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019
Figure 4

Description: Coronal CT image in bone window setting shows irregular narrowing of the airway with calcified nodules in the anterolateral walls. Origin: © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019
Description: Sagittal CT image in bone window setting shows tracheal lumen with calcified nodules in the anterolateral walls. Origin: © Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Portugal, 2019