



Branching tubular opacities

Edson Marchiori¹ , Bruno Hochhegger² , Gláucia Zanetti¹ 

A 58-year-old male patient presented with difficult-to-control bronchial asthma and a productive cough. During the investigation, a chest CT scan showed branching tubular opacities at the lung bases (Figure 1).

Branching tubular opacities, also known as the “finger-in-glove” sign, are seen in vascular/bronchial processes or in thickened portions of the peribronchovascular sheath. Branching tubular opacities arising from vessels can be caused by congenital malformations, such as arteriovenous malformations, or by neoplastic vascular infiltration, such as that occurring in endovascular metastasis. Peribronchovascular thickening can be identified in diseases with a lymphatic distribution, such as sarcoidosis and lymphangitic carcinomatosis. The most common possibility, however, is filling of the bronchi with material that is denser than air.

A finding of branching tubular opacities can be indicative of a number of conditions. In bronchial atresia, mucoid impaction is seen when secretion accumulates in the distal segment of the atretic bronchus. A similar aspect can be seen in patients with bronchiectasis, cystic fibrosis, bronchial obstruction by a foreign body, endobronchial neoplasms, broncholithiasis, or allergic bronchopulmonary aspergillosis (ABPA). The CT scan of our patient had a very useful aspect for the differential diagnosis among these diseases: the branching opacities were denser than were the adjacent soft tissue structures, such as the

heart and aorta. This finding of high-density branching opacities is characteristic of ABPA.

The cause of ABPA is a hypersensitivity reaction to fungal species of the genus *Aspergillus*. This form of aspergillosis is caused by the presence of plugs of thickened, fungus-containing mucus. Clinically, it presents as recurrent wheezing, cough with expectoration of mucus plugs, fever, and weight loss. Patients with chronic ABPA may also present with recurrent pneumonia.^(1,2)

The radiological manifestations of ABPA include central bronchiectasis, most often involving segmental and subsegmental bronchi, and mucoid impaction, associated with “plugging” of the airways with hyphal masses, which are characterized on imaging as branching, “finger-in-glove” tubular opacities involving mainly the upper lobes. Isolated lobar or segmental atelectasis occurs in some cases. The mucus plugs in ABPA are usually hypodense. However, in approximately 30% of patients, the impacted mucus has high attenuation or shows frank calcification on CT. The high-attenuation mucus plugs contain macrophages, eosinophils, fungal hyphae, desquamated epithelium, and calcium oxalate crystals. The hyperdensity is attributed to the presence of calcium oxalate crystals.^(1,2)

In conclusion, the presence of branching tubular opacities, corresponding to dilated bronchi containing hyperdense mucus, is considered a characteristic—if not pathognomonic—finding of ABPA.

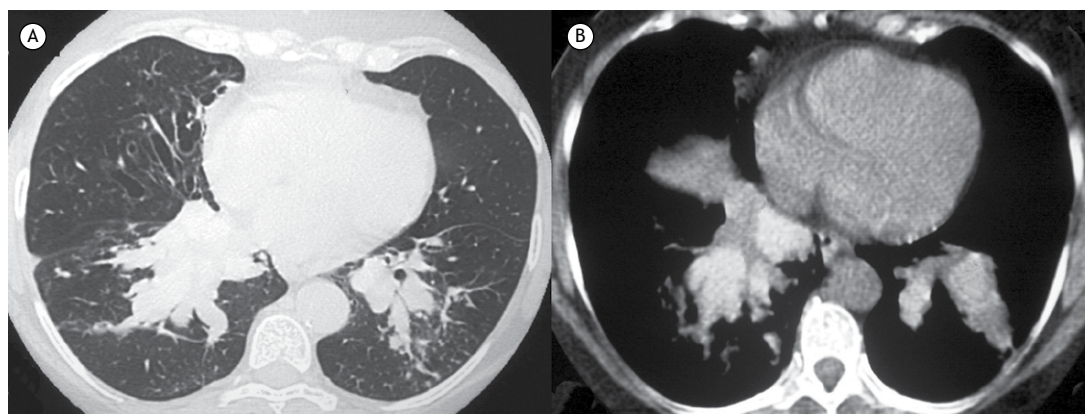


Figure 1. Chest CT scan in lung and mediastinal windows (A and B, respectively) showing branching tubular opacities in both lower lobes. Bronchiectasis is also seen anteriorly. Note in B that the density of the branching opacities is greater than is that of the heart.

REFERENCES

1. Franquet T, Müller NL, Giménez A, Guembe P, de La Torre J, Bagué S. Spectrum of pulmonary aspergillosis: histologic, clinical, and radiologic findings. *Radiographics*. 2001;21(4):825-837. <https://doi.org/10.1148/radiographics.21.4.g01j03825>
2. Agarwal R. High attenuation mucoid impaction in allergic bronchopulmonary aspergillosis. *World J Radiol*. 2010;2(1):41-43. <https://doi.org/10.4329/wjvr.v2.i1.41>

1. Universidade Federal do Rio de Janeiro, Rio de Janeiro (RJ) Brasil.
2. Universidade Federal de Ciências da Saúde de Porto Alegre, Porto Alegre (RS) Brasil.