Puzzling Bronchi

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Case Report

A 44-year-old man with pulmonary tuberculosis presented with progressive left lung atelectasis after 11 months of treatment with antituberculous medications. Flexible bronchoscopy was performed due to suspected endobronchial tuberculosis (EBTB). Bronchoscopic finding revealed near total obstruction of the left main bronchus by fibrostenosis subtype of EBTB \cite{1}. On the right, there was a bronchial orifice (labeled as A in fig. 1) arising from the lateral wall of the proximal right main bronchus, about 8 mm from the carina. In addition, there were 2 bronchial orifices arising lower down in the right main bronchus, one from the lateral wall (labeled as B in fig. 1) and the other from the medial wall (labeled as C in fig. 1). The former was located about 20 mm from the carina and further divided into 2 segmental branches. The latter appeared as a short, blind-ending diverticulum approximately 6 mm long. The remaining bronchi were normal.

Question

What are the names of the bronchi labeled as A, B and C in figure 1?
**Answer**

Bronchus A is a displaced right preeparterial bronchus, bronchus B a normal right upper lobe bronchus and bronchus C an accessory cardiac bronchus.

Multidetector computed tomography (CT) scan of the chest (fig. 2a) clearly demonstrated that the origin of the bronchus labeled as A in figure 1 originated from the lateral wall of the proximal right main bronchus. It supplied the apical segment of the right upper lobe and was considered to be a displaced right preeparterial bronchus. The bronchi labeled as B and C in figure 1 were found to be a normal right upper lobe bronchus and an accessory cardiac bronchus (ACB), respectively. The normal right upper lobe bronchus further bifurcated into the anterior and posterior segmental branches.

A displaced preeparterial bronchus is considered to be a variant of a tracheal bronchus that encompasses a spectrum of bronchial anomalies arising from the trachea or main bronchus and is directed to the upper lobe territory [2]. Two theories have been proposed for the development of a tracheal bronchus: (1) a failure to regression of the tracheal buds in utero and (2) a result of interruption of normal embryogenesis [3]. An anomalous bronchus that originates proximal to the origin of an upper lobe bronchus is termed preeparterial on the right side and prehyparterial on the left side [2].

In the present case, the bronchus labeled as A was considered to be a displaced right preeparterial bronchus because it represented an anomalous right apical segmental bronchus that originated above the origin of the right upper lobe bronchus and the right apical segmental bronchus was missing from the normal right upper lobe bronchus.

An ACB is a true supernumerary bronchus that may arise from the medial wall of the right main bronchus or bronchus intermedius [2, 4, 5]. It is lined by normal bronchial mucosa and has normal cartilage within its wall. This helps distinguish it from an acquired fistula or a diverticulum. Most ACBs are of diverticular types with a blind extremity, while some may end in undeveloped or ventilated lobules [5].

In the present case, we performed balloon dilation for the left main bronchial stricture. After successful dilation of the stenotic bronchus, normal bronchial branching to supply the left lung was identified.

In summary, we have demonstrated a rare case of complex congenital bronchial anomalies in a patient with acquired left main bronchial stenosis from EBTB. Although congenital anomalies of the tracheobronchial tree are rare and usually found incidentally at either bronchoscopy or CT, recognition of these anomalies is important in order to avoid confusion during bronchoscopic examination, inadvertent endotracheal intubation into the anomalous bronchi and for appropriate planning for interventional or surgical procedure. Chest CT helps provide accurate anatomic details especially when complex bronchial abnormalities are present.
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Key Words

Congenital bronchial anomalies • Tracheal bronchus • Accessory cardiac bronchus • Bronchoscopy • Virtual computed tomographic bronchoscopy

References

1 Chung HS, Lee JH: Bronchoscopic assessment of the evolution of endobronchial tuberculosis. Chest 2000; 117: 385–392.
2 Ghaye B, Szapiro D, Fanchamps JM, Don-delinger RF: Congenital bronchial abnormalities revisited. Radiographics 2001; 21: 105–119.
3 Gonlugur U, Efeoglu T, Kaptanoglu M, Ak-kurt I: Major anatomical variations of the tracheobronchial tree: bronchoscopic obser-vation. Anat Sci Int 2005; 80: 111–115.
4 McGuinness G, Naidich DP, Garay SM, Da-vis AL, Boyd AD, Mizrachi HH: Accessory cardiac bronchus: CT features and clinical significance. Radiology 1993; 189: 563–566.
5 Mangiulea VG, Stinghe RV: The accessory cardiac bronchus: bronchologic aspect and review of the literature. Dis Chest 1968; 54: 433–436.