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BRONCHIAL ATRESIA

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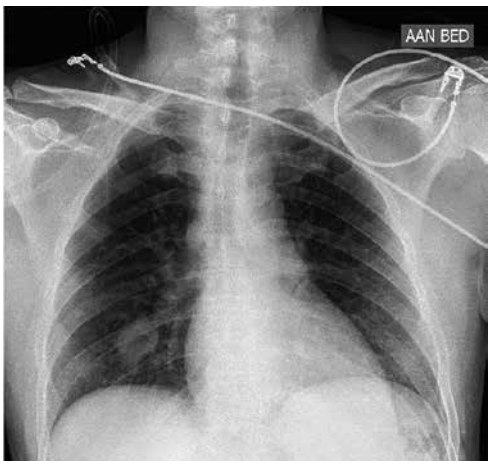
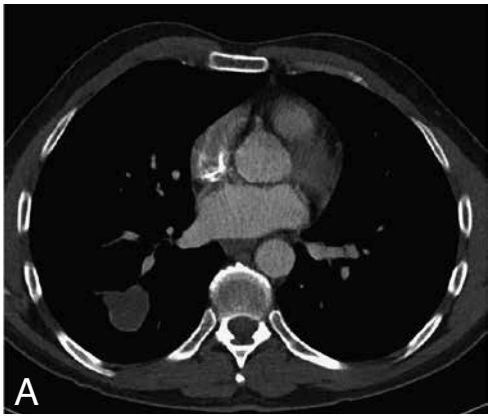
Key-word: Bronchi, abnormalities

Background: A 48-year-old male smoker with no significant previous medical history presented to the emergency department with acute respiratory distress, characterized by dyspnea and non-specific chest pain. Laboratory findings and electrocardiography (ECG) were normal.





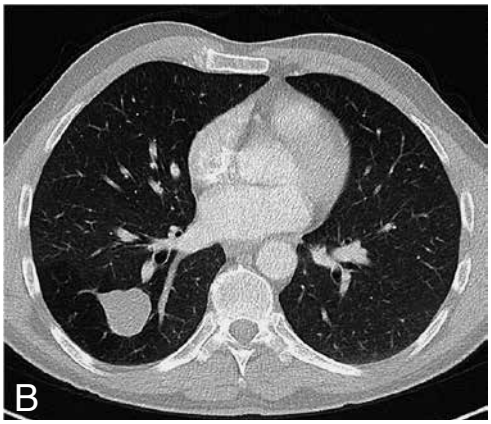


Fig. 1 / 2A / 2B

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Work-up

Bedside conventional radiography of the chest (AP view) (Fig. 1) shows a well-defined focal nodular opacity in the right lung base.

CT scan of the thorax (Fig. 2) shows on A (axial contrast-enhanced CT scan, mediastinal window setting) confirmation of a well-defined nodular branching mass in the posterobasal segment of the right lower lobe. The lesion has a relatively low attenuation (approximately 20 HU) and shows no evident contrast enhancement. These characteristics are compatible with a mucocele. No communication can be seen between this lesion and the hilum.

On axial contrast-enhanced CT scan, pulmonary window setting (B), there is hyperlucency of the surrounding lung parenchyma due to hyperinflation. Paucity of pulmonary vessels (focal oligemia) contributes to the hyperlucency in this region.

Radiological diagnosis

Based on the characteristic imaging findings, the diagnosis of *bronchial atresia* was made.

Discussion

Bronchial atresia is a congenital anomaly of the tracheobronchial tree, comprising a focal obliteration of a lobar, segmental or subsegmental bronchus. The etiology is believed to be secondary to a traumatic event during fetal life, such as a intrauterine bronchial ischemic insult, or a separation of a cluster of cells from the bronchial bud.

The airways distal to the atretic segment maintain a normal development. However, the loss of communication with the central airway and the preserved ventilation via collateral pathways leads to air-trapping and hyperinflation. The bronchus distal to the area of atresia becomes filled with secretions and forms a bronchocele. The apicoposterior segmental bronchus of the left upper lobe is most often affected, followed by segmental bronchi of the right upper, middle, and lower lobes.

Bronchial atresia is generally asymptomatic and is often discovered incidentally on imaging studies, performed for other reasons. However, some patients may present with mild nonspecific symptoms, such as dyspnea, persistent cough or recurrent respiratory infections. Physical examination may reveal decreased breath sounds over the affected portion of the lung. The disorder is more predominant in men (M: F = 2: 1), and the mean age at diagnosis is 17 years.

The classic radiographic finding of bronchial atresia is a branching tubular or nodular area of increased opacity near the hilum. This finger-in-glove sign represents the bronchocele, which results from bronchial mucus impaction distal to the atretic lumen. The associated hyperlucency of the surrounding lung parenchyma results from the combination of air-trapping leading to dilated air spaces, and focal parenchymal oligemia that is secondary to a combination of intrapulmonary vascular compression and hypoxic vasoconstriction.

CT is the current imaging modality of choice, since it is more sensitive in demonstrating the typical features of bronchial atresia, including segmental hyperinflation and paucity of pulmonary blood vessels. The mucus-filled bronchocele is seen as a parahilar, well-defined, branching, hypoattenuated, nonenhancing mass. CT is superior to chest radiography for differentiating among other conditions associated with mucus impaction, such as allergic bronchopulmonary aspergillosis, cystic fibrosis, intrapulmonar bronchogenic cyst, or bronchogenic carcinoma. The presence of a mucocele with adjacent hyperinflation helps narrow the differential diagnosis. Both the absence of enhancement and feeding arteries or draining veins, may help exclude a vascular cause such as intralobar sequestration or arteriovenous malformation.

Bronchial atresia is a benign, mostly asymptomatic condition. Therefore, treatment is usually not necessary. Surgical excision is reserved for those with complications secondary to the atretic bronchus, such as recurrent infections or encroachment of normal pulmonary structures.

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