



Congenital bronchial atresia: a case report

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Abstract

We present the case of a 12-year-old boy with congenital bronchial atresia exacerbated by recurrent pulmonary infections. Born prematurely at seven months, the patient experienced recurring respiratory symptoms and persistent chest pain. Despite a month of broad-spectrum antibiotics, his symptoms persisted, and imaging tests, including computed tomography, revealed bronchial atresia. Reviewing the patient's imaging results and clinical course underscores the importance of considering congenital abnormalities when treating patients with chronic pulmonary symptoms that do not respond to traditional treatment. Early recognition of congenital bronchial atresia is vital for implementing timely therapeutic interventions. This proactive approach can help patients avoid complications, improve respiratory function, and achieve better long-term health outcomes.

Keywords

bronchial atresia, congenital anomaly, bronchocele, hyperinflation

Introduction

Congenital bronchial atresia is a rare developmental anomaly characterized by a blind-ending bronchus with associated mucus-filled bronchoceles and adjacent emphysematous changes.^[1] It predominantly affects the upper lobes of the lungs, especially in asymptomatic individuals, but can present with recurrent respiratory infections. We report a case of bronchial atresia in a 12-year-old boy presenting with persistent respiratory symptoms, which was initially misdiagnosed as recurrent pneumonia.

Case report

A 12-year-old boy, born prematurely at 7 months gestation via emergency C-section due to maternal eclampsia, presented with recurrent episodes of chest pain, productive cough, and yellowish sputum. He was initially treated with amoxicil-

lin-clavulanate for suspected pneumonia, but his symptoms persisted. Two weeks later, he presented again with worsened chest pain and cough.

On January 29, 2019, the patient was admitted to his local hospital, where a chest X-ray revealed a right-sided pneumonic infiltrate. Despite treatment with broad-spectrum antibiotics (ceftriaxone, amikacin, and meropenem), follow-up X-rays on days 6 and 10 showed no improvement. He was then referred to the University Hospital for further evaluation.

On admission, the patient was in a mildly deteriorated general condition. Physical examination revealed slightly decreased breath sounds in the right axillary region, while the rest of the examination was unremarkable. Laboratory results showed a marked inflammatory response, with leukocytosis ($17.6 \times 10^9/L$), elevated C-reactive protein (60 mg/L), and erythrocyte sedimentation rate (31 mm). A chest X-ray revealed right-sided pneumonic infiltrates as well as hyperinflation of the right upper lobe, which persisted on repeat

imaging despite broad-spectrum antibiotic therapy with ceftriaxone and amikacin (Fig. 1).

Results

Given the lack of clinical improvement, a CT scan of the chest was performed, which demonstrated evidence of congenital bronchial atresia (Fig. 2). Specifically, there was a lack of a normal bronchial tree in the right upper and middle lobes, with mucus-filled dilated bronchi (bronchocoeles) and emphysematous changes in the surrounding lung parenchyma.

Pulmonary angiography confirmed the presence of hypovascularization, as well as displacement of the vessels in the surrounding segments on the ipsilateral side. Emphysema was also noted (Fig. 3).

The patient received continued supportive care, including respiratory physiotherapy, a combination of antimicrobial agents (ceftriaxone and clindamycin), and mucolytics (ambroxol hydrochloride). Surgical intervention was delayed due to social factors, including the patient being cared

for by a single grandparent. However, continued medical management and close follow-up were recommended.

Discussion

Ramsay's 1953 paper provided the first comprehensive description of bronchial atresia.^[2] The age at diagnosis for this condition can vary widely, ranging from two days to 41 years, with neonatal onset being a rare exception.^[3] Congenital bronchial atresia frequently manifests asymptotically and is often diagnosed incidentally during imaging studies. In symptomatic cases, patients typically present with recurrent respiratory infections, as seen in this patient.^[4] The characteristic imaging findings include hyperinflation of the lung segment distal to the atretic bronchus, mucus-filled bronchi, and areas of air trapping.^[5] Misdiagnosis, as in this case, is common due to the similarity of the radiologic findings to pneumonia or lung abscess.

Bronchial atresia is more commonly found in males and tends to affect the upper lobes of the lungs, with the left upper lobe being the most frequently involved, followed by

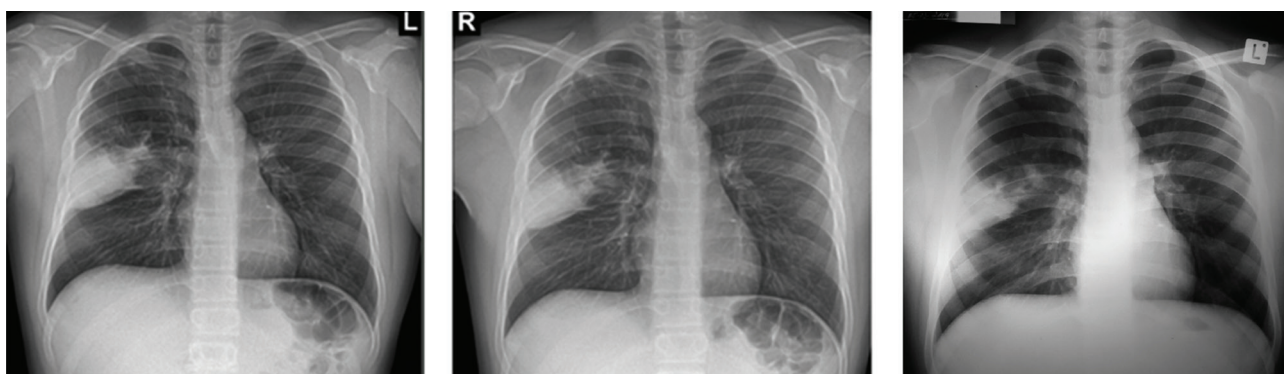


Figure 1. Chest X-ray: right-sided pneumonic infiltrates and hyperinflation of the right upper lobe.

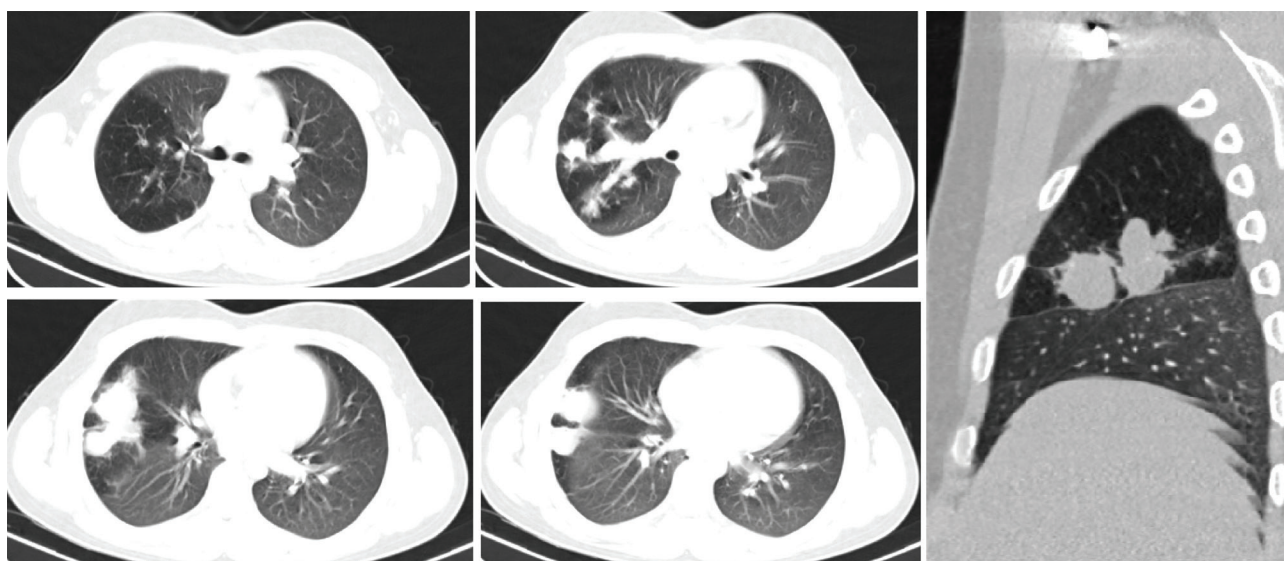


Figure 2. CT scan of the chest: evidence of congenital bronchial atresia.

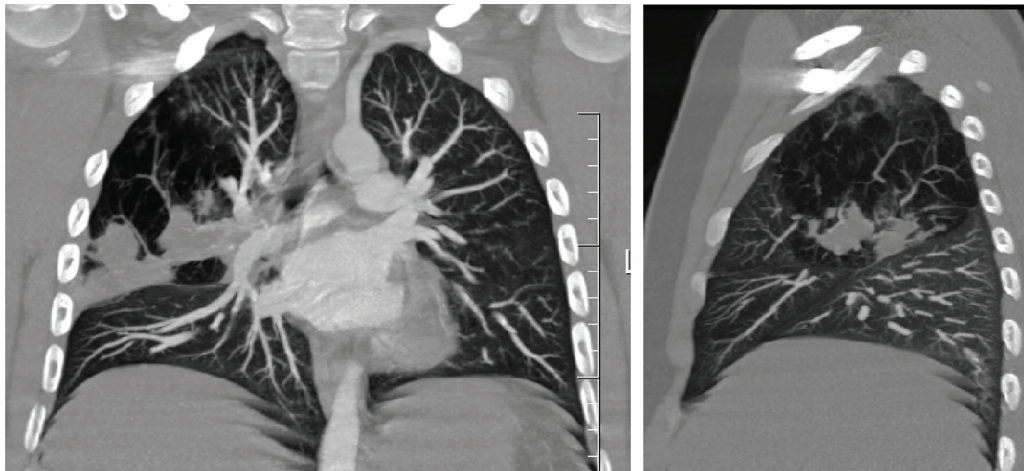


Figure 3. Pulmonary angiography: hypovascularization and displacement of the vessels in the surrounding segments on the ipsilateral side.

the right upper lobe. This pattern is well-documented in radiological and clinical studies on the condition, where its association with hyperinflation of lung segments and bronchocele formation is often observed.^[6,7] The pathogenesis involves disruption of bronchial development during gestation, with subsequent mucus accumulation and hyperinflation due to collateral ventilation through the pores of Kohn.^[8] The key to establishing the diagnosis is the presence of bronchocele along with hyperinflation of the affected segment or lobe.

The mainstay of treatment for symptomatic patients is surgical resection of the affected bronchus. However, in patients with mild or asymptomatic disease, conservative management with regular monitoring is often sufficient.^[9] Certain healthcare providers choose to perform surgery in asymptomatic patients to prevent possible long-term issues, such as compression and damage to the surrounding healthy lung tissue.^[10] In this case, the decision for conservative management was influenced by the patient's social circumstances and the lack of acute deterioration.

Conclusion

Based on the case described, we urge pediatricians to integrate congenital anomalies into their clinical thinking, particularly in children with persistent respiratory symptoms. Awareness and prompt recognition of these conditions can lead to early diagnosis and better health outcomes for children. Appropriate management is essential to prevent complications associated with this rare condition. In this case, the patient's condition was managed conservatively.

However, surgical resection may be necessary in the future to mitigate the risk of recurrent infections.

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