Case Report

# A rare bronchial anomaly presenting as a paracardiac mass

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## ABSTRACT

Abnormal bronchi arising from trachea and main bronchi are rare and usually clinically silent. These bronchial variations, however, pose a significant diagnostic challenge related to their variable presentation and perhaps the low level of awareness among clinicians and radiologists. Complications including recurrent infections, hemoptysis, and rarely malignancies may arise, if the diagnosis is delayed. We came across a patient with chronic cough in whom endoscopic and imaging evaluation, including fine-needle aspiration cytology (FNAC), proved non-diagnostic. Thorough evaluation of multidetector computed tomography (MDCT) performed in our department, however, revealed an accessory cardiac bronchus with rudimentary lung parenchyma in the paracardiac location. This case highlights the importance of meticulous airway evaluation on MDCT in all patients referred with respiratory symptoms.

**KEY WORDS:** Accessory cardiac bronchus, bronchial anomaly, computed tomography

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## INTRODUCTION

The current state of the art multidetector computed tomography is highly accurate in detecting tracheobronchial anatomy.[1] This has allowed increased detection of variant anatomy from the level of trachea to lobar or segmental bronchial subdivisions. Although latter show numerous variations, anomalous bronchi arising from major airways are rare.[1] "Tracheal" bronchus and accessory cardiac bronchus (ACB) represent major bronchial variations.[1] Understanding of these congenital bronchial anomalies has important implications for diagnosis and tracheobronchial interventions.[1]

## CASE REPORT

A 30-year-old female presented with cough associated with occasional expectoration for past 2 years. There were no episodes of hemoptysis or dyspnea. There was no significant past or family history of related illness. The occupational history of patient was non-contributory. General physical examination was unremarkable. Cardiorespiratory system examination was normal. Routine hematological, biochemical, pulmonary function tests and chest radiograph were normal. A previous contrast enhanced computed tomography (CECT) of the chest (performed 3 months back) reported a hilar/right paracardiac mass. Fiber-optic bronchoscopy (FOB) performed at the same time revealed narrowing of the bronchus intermedius. Bronchoalveolar lavage (BAL) and bronchoscopic biopsy specimens were negative for infection or malignant cells. As the patient's symptoms were not improving, patient was referred to our institute for further evaluation. CT of the chest done on a 16 detector row CT scanner (Somatom Sensation, Siemens, Germany) at presentation showed a right paracardiac mass as the most striking abnormality [Figure 1]. The soft mass was plaque like, showing internal heterogeneity with suggestion of mucus filled bronchi. No calcification or cavitation was seen. Evaluation of the airway using various post processing techniques including minimal intensity projection (MinIP) [Figure 2] and volume rendering (VR) [Figure 3] revealed an aberrant bronchus originating from the medial portion of the right main bronchus (RMB) just beyond the carina. This anomalous bronchus had a length of 8 mm and ended blindly. The right upper lobe bronchus, bronchus intermedius and lower lobe bronchi were normal. The anomalous bronchus was consistent with ACB. A repeat FOB in the light of CT findings was performed. However, the anomalous

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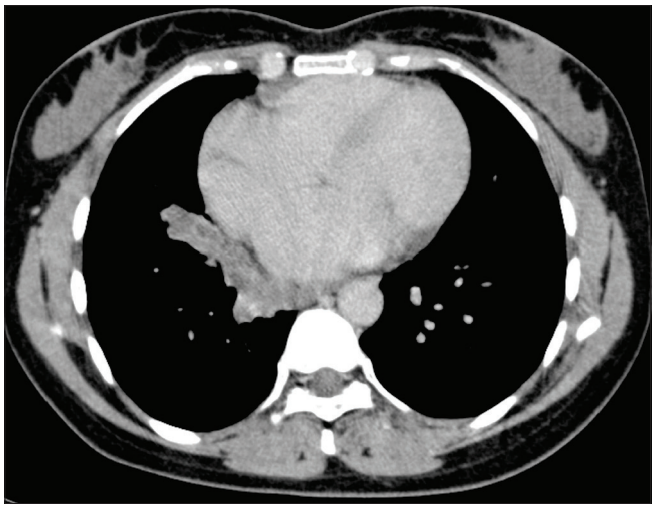

**Figure 1:** Axial image in mediastinal window setting shows right paracardiac heterogeneous plaque-like soft tissue

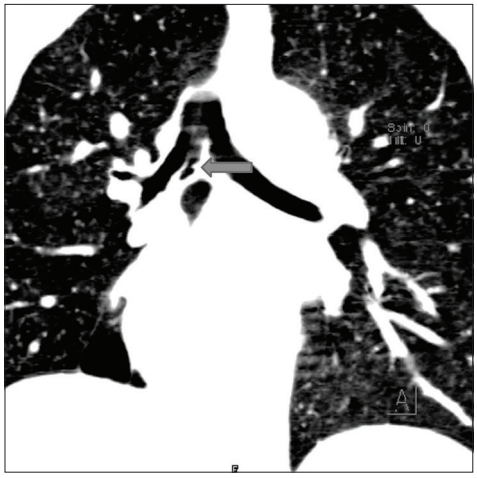

**Figure 2:** Coronal MinIP image shows a blind aberrant bronchus arising from the medial aspect of the right main bronchus

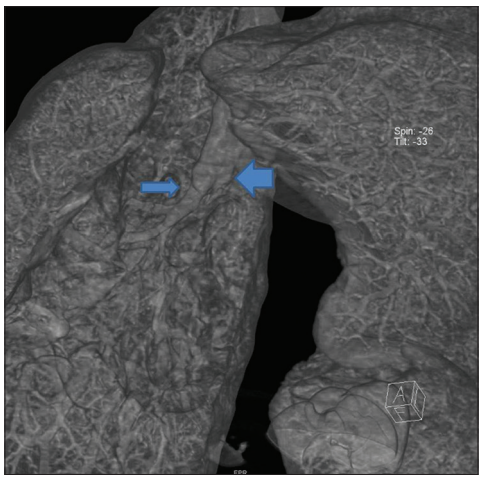

**Figure 3:** Volume rendered image depicts the relation of the aberrant bronchus (thick arrow) to the right main bronchus (arrow)

bronchus was not visualized. Similar to bronchoscopy done previously, narrowing of bronchus intermedius was reported. The condition was discussed with the patient and surgical resection was offered; however, patient opted for a close follow up. Follow-up CECT chest done 8 weeks later showed no interval change. As the patient was asymptomatic, she was kept on a clinical follow up.

## DISCUSSION

Anomalous bronchi arising from trachea and main bronchi are rare. The relatively rarity of the bronchial anomalies is contributed by their asymptomatic nature and lack of awareness among the clinicians and radiologists. Though FOB and multidetector CT are sensitive at detecting airway abnormalities, the anomalous bronchi are frequently missed at these examinations.[2] However, in a symptomatic patient, failure to detect these anomalies complicates the management (as in the present case) and predisposes the patient to potential complications including recurrent infections, hemoptysis and rarely malignancy.[3] The detection of bronchial anomalies is also essential or other reasons. This knowledge is indispensable to chest physicians during bronchoscopy, BAL, bronchoscopic biopsy and therapeutic procedures (laser therapy, stent placement and brachytherapy). Chest surgeons must be aware of these anomalies when planning lung resections/transplant. Finally, anesthetics require this information during general anesthesia in placing the endotracheal tube.

The major bronchial anomalies include ACB and tracheal bronchus. ACB arises from the medial wall of the RMB/bronchus intermedius and courses toward the heart. Tracheal bronchus on the other hand includes a variety of bronchial anomalies arising from the trachea/main bronchi and coursing toward the upper lobe. It must be noted that ACB represent a supernumerary bronchus arising from a fixed location while tracheal bronchus represents either a displaced or supernumerary bronchus.[1]

ACB is rarer compared to tracheal bronchus. It progresses for a short distance toward the pericardium parallel to bronchus intermedius. It can be distinguished from the diverticulum or fistula by the presence of normal bronchial mucosa and cartilage within the wall. Most ACB end blindly.[1] However, some ACB may develop into small bronchioles that may latter change to non-functional parenchymal tissue, cystic change or ventilated lobule.[1] Based on this, ACBs are classified into two types: Those with a cuff of lung tissue and those with no lung tissue.[2] Although ACB is mostly an isolated anomaly, rare associations include tracheal bronchus, two ACB and bronchiectasis.[1] Most patients with ACB are symptomatic. In a study by Ghaye *et al*. all the patients with ACB were asymptomatic.[1] However, symptomatic cases presenting with hemoptysis, superinfection, aspergilloma and rarely

tumor have been reported.[1] Diagnosis is based on FOB or CT. CT, particularly, the modern state of the art, MDCT provides a non-invasive modality with high sensitivity for detection. The failure to report ACB on FOB in the present case may be attributed to the lack of knowledge regarding this entity due to its relative rarity. This also reflects the potential role of the state of the art MDCT scanners and advanced CT applications including virtual bronchoscopy in detecting potentially occult anomalies. Small soft tissue in association with ACB may be attributed to collapsed lung tissue around the terminal portion of ACB. In asymptomatic and incidentally detected cases, no treatment is required. Patients presenting with recurrent infections or hemoptysis are managed by resection of ACB.[4] Management with interventional bronchoscopic procedures for ACB has not been described in the literature but may be feasible in patients in whom surgery is not a viable option.

## CONCLUSION

Meticulous airway evaluation should be done on each computed tomography examination. Key to detection of bronchial anomalies is awareness about displaced/supernumerary bronchi including tracheal bronchi and accessory cardiac bronchi. The latter is rarer and may be associated with rudimentary lung parenchyma that mimics a mass and potentially complicates the management algorithm.

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