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## A rare case of community acquired *Serratia* lung abscess in a patient with cardiac bronchus

The authors declare no financial disclosure

### Abstract

The incidence of lung abscess caused by *Serratia marcescens* is extremely low and is only reported in the immunocompromised population. We present a previously healthy woman with *Serratia* lung abscess in close proximity with an accessory cardiac bronchus. The patient was treated with appropriate antibiotics which led to complete resolution of the lesion. Our case highlights that individuals without medical co-morbidities may develop atypical lung infections like *Serratia* when associated with anatomic anomalies.

**Key words:** accessory cardiac bronchus, *Serratia* lung abscess

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### Introduction

Previously, *Serratia* was considered a harmless nonpathogenic organism. However, over the past three decades, its importance as a causative agent for nosocomial and opportunistic infections has increasingly been recognized [1]. In the community setting, infections by *Serratia marcescens* are usually associated with immunosuppression or other serious medical comorbidities but are otherwise rarely seen [2]. This report describes a case where a rare congenital anomaly in a 64-year-old immunocompetent female was likely the predisposing factor for a *Serratia* lung abscess. To the best of our knowledge, *Serratia* lung abscess in a healthy individual without serious co-morbidities has not been reported in literature.

### Case report

We present a case of a previously healthy 64-year-old female patient, who presented with fever and hemoptysis of two weeks duration. The fever was documented to be 38°C at home. Hemoptysis was mild in quantity and described as fresh red streaks of blood mixed with the sputum. There was no history of night sweats, weight loss, or anorexia. There was no recent travel, sick contacts, or exposure to tuberculosis. She did not have history of any previous medical illnesses. She was a lifelong smoker, however she denied any illicit drug use. Patient sought medical attention prior to presentation, and completes a course of oral azithromycin without improvement.

On presentation, the patient was alert and communicative. She was not in acute distress.

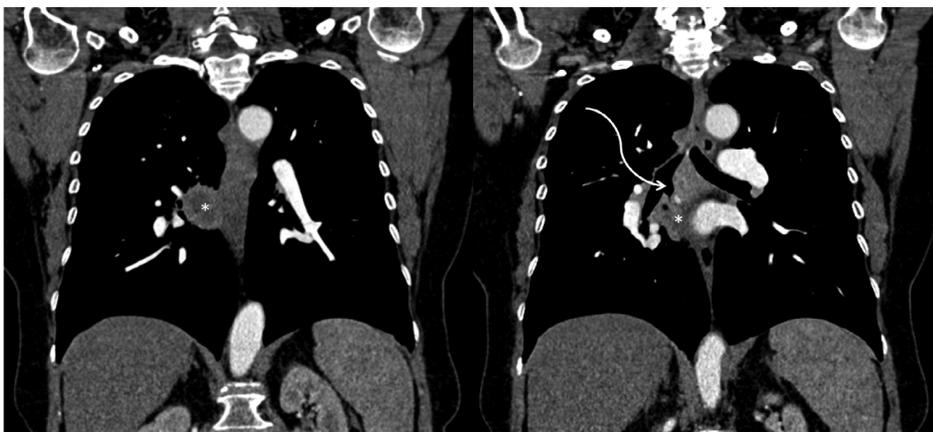
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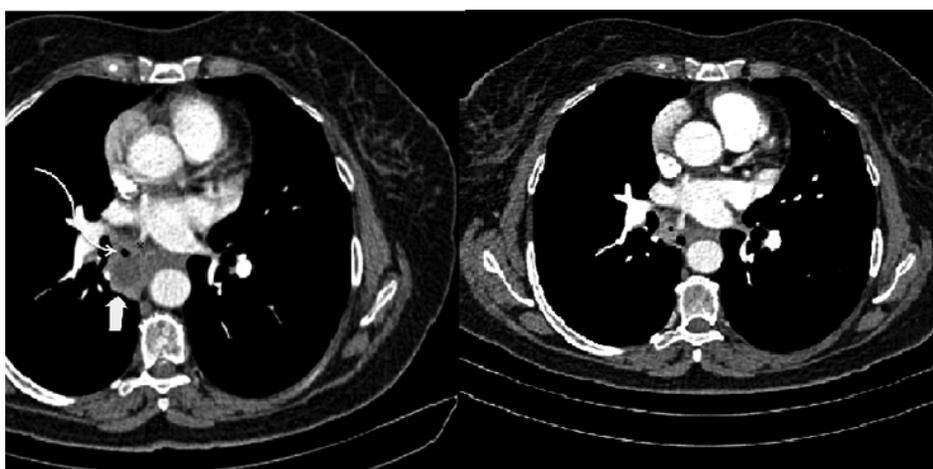
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**Figure 1.** Coronal contrasted computed tomography (CCCT) shows a lobulated mass (asterisk) with hypo-attenuating center and thick peripheral contrast enhancement in the medial aspect of the superior segment of right lower lobe. The mass (asterisk) communicates with bronchial tree by an accessory cardiac bronchus arising from the medial wall of bronchus intermedius (curved arrow)



**Figure 2.** Left image: Axial CECT shows the cardiac bronchus (curved white arrow) with an associated focal consolidation (white arrow). There is also accessory pulmonary vein (asterisk) draining to left atrium. Image to the right shows a follow-up axial CECT showing near-complete resolution of the consolidation after one-month

Her temperature was 36.9 degree Celsius orally, blood pressure was 104/62 mm Hg with a heart rate of 79 bpm, and oxygen saturation SpO<sub>2</sub>: 95%. Her lungs were clear to auscultation bilaterally with no added wheezes or crackles. Laboratory workup revealed a white count of 9,100/ $\mu$ L with normal differential, hemoglobin of 13.2 g/dL and platelet count of 411,000/L. Kidney function test and liver function tests were within normal. C-reactive protein level was elevated (at 22.4 mg/L).

Computed tomography (CT) of chest with contrast was performed which revealed a 3.2  $\times$  3.5 cm lobulated mass with hypo-attenuated center and thick peripheral contrast enhancement in the medial aspect of the superior segment of right lower lobe (Fig. 1). The mass had a communication to the bronchus intermedius by a small

accessory bronchus arising from its medial wall. The accessory bronchus extended medially with distal tapering compatible with cardiac bronchus (Fig. 1). The mediastinum was remarkable for mildly enlarged subcarinal lymph node and an accessory pulmonary vein (Fig. 2) draining the posterior segment of right upper lobe and coursing along the posterior and medial walls of what appeared to be a cardiac bronchus to left atrium.

Bronchoscopy revealed an obstruction of the right medial basilar segment orifice. Endobronchial brush and biopsy samples were normal. EBUS (Endo Bronchial Ultrasound) guided-fine needle aspirate from the suspicious mass and the enlarged subcarinal lymph nodes showed numerous acute inflammatory cells. BAL (broncho-alveolar lavage) culture grew *Serratia*

*marcescens*, which was sensitive to piperacillin, cefixime, ceftazidime, ceftriaxone, cefipime, aztreonam, ertapenem, imipinem, meropenem, and ciprofloxacin. She was treated with intravenous ertapenem for 2 weeks followed by oral levofloxacin for 2 weeks with significant clinical improvement. A Follow up chest CT a month later showed near complete resolution of the abscess (Fig. 2). She has had no recurrence since this presentation.

## Discussion

This is a case of hemoptysis due to pulmonary lung abscess caused by *Serratia marcescens* and concomitant accessory cardiac bronchus found incidentally. *Serratia marcescens* is a gram-negative bacillus which belongs to the family Enterobacteriaceae [3]. It is a well-recognized nosocomial pathogen and rarely occurs in the community [1]. In the nosocomial setting, *Serratia* is usually transmitted by contaminated medical devices, fluids and cleaning solutions, or contact transmission via hospital staff [4]. In the community, it occurs mainly in illicit drug users, immunocompromised patients or those with severe medical comorbidities, such as diabetes mellitus, renal failure, steroid use, or malignancy [5–7].

*Serratia* infections have a quite low incidence of about 10.8/100,000 people every year [8]. Lung abscesses caused by *Serratia marcescens* are even rarer, with previous report indicating that only one of seventy four patients with *Serratia marcescens* have lung abscesses [9]. We found very few cases in the literature that described lung abscess due to *Serratia*, all of which occurred in individuals who were immunocompromised or had significant co-morbidities as described above [10, 11]. Hence, it is very rare to diagnose a lung abscesses caused by *Serratia* in an immunocompetent patient.

Formation of pulmonary abscesses is hastened by several factors including the local conditions, host resistance and infecting agents. Pulmonary abscesses are usually caused by aspiration, a prior pneumonia, alcohol abuse, bronchiectasis, immunosuppression or an endobronchial obstruction [12]. In our case, the accessory cardiac bronchus most likely led to the development of the *Serratia* lung abscess. Accessory cardiac bronchus is a rare congenital anomaly of the trachea-bronchial tree. It originates from the intermediate bronchus opposite to the origin of the right upper lobe bronchus or from the medial wall of the right main bronchus, and it runs medially and caudally toward the heart [13, 14].

Most patients with accessory cardiac bronchus have no symptoms, and it is discovered incidentally during bronchoscopy or imaging studies conducted for evaluation of other thoracic problems. [13, 14]. However, an accessory cardiac bronchus can become symptomatic through hemoptysis, and recurrent infections especially if it is long or has an accessory lobe [13–15]. An explanation for these symptoms is the accumulation of secretions in the accessory cardiac bronchus, leads to inflammation, extensive neovascularization and hemoptysis [14, 15]. In our patient's case, the accessory cardiac bronchus led to the formation of *Serratia* lung abscess. No treatment is required in asymptomatic and incidentally detected cases. However if it leads to recurrent infections or hemoptysis, the accessory cardiac bronchus should be resected [14].

## Conclusions

This report describes a rare case of a community acquired *Serratia* lung abscess in an immunocompetent patient likely due to the presence of an accessory cardiac bronchus. *Serratia marcescens* should always be a differential for lung abscess, especially in the correct context, ie. patients with attenuated immunity or structural abnormalities.

## Conflict of interest

The authors declare no conflict of interest.

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