Bronchogenic Cyst Causing a Unilateral Ventilation-Perfusion Defect on Lung Scan*

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A 37-year-old woman had pleuritic chest pain, dyspnea, and normal findings on chest roentgenogram. Lung scan showed markedly diminished perfusion to the right lung with a matched ventilatory defect. Further evaluation revealed a bronchogenic cyst. After resection, the lung scan was normal. To our knowledge, this is the first report of a bronchogenic cyst causing a reversible, unilateral ventilation-perfusion defect on lung scan.

Bronchogenic cysts often present as an incidental finding on chest roentgenogram. Less common presentations have included superior vena cava syndrome, unilateral obstructive emphysema, and a report of a cyst mimicking a pulmonary varix. When symptomatic, patients may complain of cough, chest pain, dyspnea, or hemoptysis.

**Figure 1A.** Anterior perfusion scan showing markedly decreased perfusion to the right lung. B. Corresponding ventilation scan showing a matched, but less severe defect. Postoperative normalization of perfusion (C) and ventilation (D).
We report a case of bronchogenic cyst in a patient whose initial evaluation raised the possibility of pulmonary embolism.

CASE REPORT

A 37-year-old hispanic woman was admitted for evaluation of a five-day history of pleuritic chest pain and shortness of breath. Previous medical history was remarkable for a recent infertility evaluation, including a reportedly uncomplicated dilation and curettage two months prior to admission. There was no history of fever, chills, cough, sputum production, or hemoptysis. The patient denied the use of oral contraceptives. She had smoked 1½ packs of cigarettes per day for ten years. On the day of admission, the patient was afebrile with a normal respiratory rate, a regular pulse at 79 beats per minute, and a normal blood pressure. Physical examination was unrevealing including normal chest and cardiac exams.

Complete blood count and serum electrolyte values were normal as were the ECG and chest roentgenogram. Arterial blood gas values were as follows: pH, 7.42; Pco2, 36 mm Hg; and Po2, 103 mm Hg.

A six-view perfusion scan, performed with macroaggregated albumin labeled with 99mTc, was obtained to evaluate the possibility of pulmonary embolism. The scan revealed markedly reduced perfusion of the entire right lung; no contralateral perfusion defects were seen. The admitting medical staff initiated an intravenous heparin infusion. Two days later, a complete ventilation-perfusion scan, performed with krypton-81m, showed no change in the perfusion defect along with matched, but less severely diminished ventilation to the entire right lung (Fig 1, A and B). Given the matched defect on lung scanning, heparin was discontinued. Pulmonary function tests revealed normal air flow and lung volumes.

Further evaluation with computerized tomography (CT) of the chest showed a 4 cm, well circumscribed soft tissue density in the subcarinal area compressing the right main pulmonary artery. The mainstem bronchi were fully patent (Fig 2). These roentgenographic findings were felt to be most consistent with a bronchogenic cyst. At thoractomy, a 7.0 x 3.0 cm subcarinal mediastinal cyst was resected. Pathology revealed columnar, ciliated epithelial lining consistent with a bronchogenic cyst. A repeat ventilation-perfusion scan performed five days postoperatively showed significant improvement in both perfusion and ventilation of the right lung (Fig 1, C and D).

DISCUSSION

Our patient presented with five days of pleuritic chest pain, shortness of breath, and a normal chest roentgenogram. Despite normal arterial oxygenation, the diagnosis of pulmonary embolus was entertained. Initial evaluation included a perfusion scan which revealed hypoperfusion of the entire right lung. Unilateral absence of pulmonary artery perfusion on lung scan has been associated with a variety of etiologies. Pulmonary embolism is an infrequent cause of unilaterally absent perfusion, especially without contralateral perfusion defects.4,5 Bronchogenic carcinoma is the most frequently reported cause of unilateral hypoperfusion, while parenchymal lung disease, congenital heart disease, and hyperlucent lung syndrome have also been implicated.4,5 Our patient’s normal chest roentgenogram made these diagnoses less likely. Since it is known that centrally located mass lesions can cause disproportionately large perfusion defects, an inapparent mass was suspected. Chest CT revealed a subcarinal cystic lesion compressing the right main pulmonary artery; accounting for the unilateral hypoperfusion.

A matched decrease in ventilation to the entire right lung was also observed but was less severe than the decrease in perfusion. The decreased ventilation was most likely secondary to decreased perfusion since the large airways appeared of normal caliber on chest CT scan. Moreover, ventilation normalized after the cyst was resected and perfusion was restored. A secondary decrease in ventilation may have been due to reflex bronchoconstriction. Diminished delivery of CO2 to the underperfused area resulting in alveolar hypcapnia has been shown to cause local bronchoconstriction in dogs.7

Bronchogenic cysts may become symptomatic when they increase in size, usually due to hemorrhage or infection.8 Neither was present on pathologic examination in this case. The cause of our patient’s chest pain and shortness of breath remains unexplained.

To the best of our knowledge, this is the first case of bronchogenic cyst reported to cause unilateral hypoperfusion and hypoventilation. Bronchogenic cyst should be added to the list of lesions responsible for unilateral hypoperfusion identified on lung scanning.

REFERENCES
5 Tomssick TA, Holder LE. Unilateral absent perfusion of the lung. JAMA 1975; 234:89-90

Fig 2. A contrast-enhanced chest CT scan showing a well-circumscribed soft tissue density compressing the right pulmonary artery.