Bilateral Symmetrical Upper-Lobe Opacities*

An Unusual Presentation of Bronchiolitis Obliterans Organizing Pneumonia

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A 45-year-old man was admitted with nonresolving fever, cough, and dyspnea 2 months after a common cold. His chest radiograph demonstrated bilateral symmetrical upper-lobe opacities reminiscent of tuberculosis. Transbronchial biopsy revealed inflammatory nonspecific alveolar lesions suggestive of bronchiolitis obliterans organizing pneumonia, which responded well clinically and radiologically to oral corticosteroids. Here, the case of a previously unreported radiographic manifestation of bronchiolitis obliterans organizing pneumonia is presented. (CHEST 2000; 118:863–865)

Key words: corticosteroid therapy; nonresolving “pneumonia-like” illness; symmetrical upper-lobe opacities

Abbreviation: BOOP = bronchiolitis obliterans organizing pneumonia

Bronchiolitis obliterans organizing pneumonia (BOOP), or cryptogenic organizing pneumonia, is a specific clinicopathologic syndrome characterized by a “pneumonia-like” illness and a chronic peribronchiolar inflammation accompanied by an excessive proliferation of granulation tissue within small airways and alveolar ducts. The most common radiographic abnormalities are patchy airspace opacities that are often multiple and bilateral. A peripheral distribution has been noted, very similar to that considered to be “virtually pathognomonic” for chronic eosinophilic pneumonia. Solitary opacities may also occur, and bilateral interstitial infiltrates and honeycombing mimicking interstitial pneumonias may be seen. Herein, an unusual case of BOOP is presented in which symmetrical upper-lobe opacities were primarily suggestive of tuberculosis.

CASE REPORT

A 45-year-old, previously healthy man with a 4-week history of recurrent fever, chills, cough, and shortness of breath was admitted to our hospital in September, 1998. He had no recollection of contact with an ill person. Two months before admission, the patient had suffered from a common cold that subsided after 5 days, but the symptoms recurred a few days later. He repeatedly underwent antibiotic treatment without any apparent effect. Sputum specimens for mycobacteria and other pathogens were smear and culture negative.

On examination, the patient had a temperature of 38.7°C, a heart rate of 105 beats/min, a BP of 136/72 mm Hg, and a partial respiratory insufficiency with a PaO₂ of 61 mm Hg breathing room air. There were increased breath sounds and fine crackles in both lung apexes. Examinations of the heart and the abdomen were normal. His WBC count was 10.8 × 10⁹/L, with 72% neutrophils, 12% monocytes, and 16% lymphocytes. The sedimentation rate was 77 mm/h, and the C-reactive protein was 50 mg/L. Lung function and diffusion capacity were normal. Serology for Chlamydia pneumoniae showed an indirect immunofluorescent technique-IgG titer of 1:512, with a borderline IgA titer of 1:80 but no IgM antibodies. No HIV antibodies were detected. Repeated sputum cultures for mycobacteria and other pathogens were negative. A skin reaction to tuberculin (Mantoux test 1:100 and 1:10 tuberculin units) could not be induced.

An upright chest radiograph revealed symmetrical opacities in the two upper lobes (Fig 1). Chest CT showed diffuse alveolar infiltrates in both dorsal and apical segments. A trend toward honeycomb changes in the right upper lobe was also noted. Transthoracic sonography of the lung apexes revealed an irregular-shaped hypoechoic structure with air bronchograms suggestive of an infiltrate.

Transbronchial biopsies were performed in the left upper lobe posterior subsegment, along with BAL. No pathogens were cultured in the BAL fluid. In addition, DNA analysis for mycobacteria was negative. The BAL count revealed 76.4 × 10³ cells/µL with 17.9% macrophages, 39.8% lymphocytes, 38.8% neutrophils, and 3.4% eosinophils. Immunocytometry of BAL cells showed a normal CD4⁺/CD8⁺ ratio of 1.9, an increased number of total γδ-T lymphocytes with a dominance of V82 cells, and a moderately elevated number of both CD25⁺ and VLA-1⁺ lymphocytes, while other CD4⁺ subtypes (CD69⁺, CD103⁺, CD45RA⁺, CD45RO⁺) were within the normal range. Transbronchial lung biopsies revealed inflammatory alveolar lesions suggestive of BOOP.

Corticosteroid treatment was commenced (1 mg/kg body weight/d), leading to a rapid clinical improvement. Three weeks after initiation of corticosteroid treatment, arterial blood gas analysis showed a PaO₂ of 85 mm Hg, a PaCO₂ of 42 mm Hg, and a pH of 7.43. In addition, the bilateral opacities normalized over the following 8 weeks (Fig 2).

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A flu-like prodrome that is followed within 2 months by progressive cough, mild dyspnea, and patchy alveolar infiltrate is typical of BOOP (cryptogenic organizing pneumonia).\(^1\)\(^2\) The disorder is characterized by small airways damage preceding the development of intraluminal plugs and fibrous tissue that extend into and fill the alveolar spaces. This process results in unilateral or bilateral patchy airspace consolidations that are commonly localized in the lung periphery. However, interstitial infiltrates, honeycombing, cavities, and pleural effusions have also been described.\(^4\) Thus, on the basis of the clinical and radiologic presentation, a number of acute or subacute inflammatory disorders may be considered in the differential diagnosis (Table 1).

The present patient developed bilateral opacities in the apical lung segments showing an almost symmetrical distribution during the course of a flu-like prodrome. Both the clinical symptoms and chest radiographic abnormalities were highly suggestive of tuberculosis. However, there were several findings incompatible with the diagnosis of tuberculosis. First, sputum and BAL samples were both smear and culture negative for mycobacteria. Second, the Mantoux test was negative. Third, the presence of alveolar infiltrates in the absence of endobronchial or cavernous disease on CTs argues against tuberculosis. Finally, bronchoscopic transbronchial biopsy did not show granulomatous tissue but revealed pathologic features compatible with BOOP. On the basis of these findings, the diagnosis

![Figure 1](https://example.com/fig1.png)

**Figure 1.** Anteroposterior (top, A) and lateral (bottom, B) radiographs of the chest on admission, revealing symmetrical opacities in the two upper lobes.

![Figure 2](https://example.com/fig2.png)

**Figure 2.** Anteroposterior radiograph of the chest after a 2-month oral treatment with corticosteroids, showing that the bilateral abnormalities have almost completely resolved.

**Table 1—Differential Diagnosis of BOOP on the Basis of Chest Radiograph Findings**

<table>
<thead>
<tr>
<th>Findings</th>
<th>Diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary or multiple opacities</td>
<td>Infectious pneumonia, Wegener’s granulomatosis, acute interstitial pneumonitis (Hammond-Rich), ARDS (diffuse alveolar damage)</td>
</tr>
<tr>
<td>Peripherally localized opacities</td>
<td>Acute and chronic eosinophilic pneumonia</td>
</tr>
<tr>
<td>Interstitial or nodular opacities</td>
<td>Sarcoidosis, chronic beryllium disease, usual interstitial pneumonitis, hypersensitivity pneumonitis</td>
</tr>
<tr>
<td>Upper-lobe consolidations</td>
<td>Tuberculosis</td>
</tr>
</tbody>
</table>

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of tuberculosis appeared to be unlikely, and oral corticosteroid therapy was begun, leading to a rapid normalization of the symptoms and to a resolution of the radiographic abnormalities. Corticosteroids were discontinued after a 12-month treatment period, and regular clinical, radiologic, and sonographic controls failed to detect a recurrence of the disease for > 1 year.

Multiple primary disorders have been associated with pulmonary reactions and pathologic features of BOOP, including respiratory infections with various bacterial and viral agents, toxic inhalants, adverse drug reactions, or collagen vascular disease. In a large proportion of cases, however, no etiology may be apparent (idiopathic BOOP).

On the basis of the available serologic data, the patient may have had a respiratory infection, presumably caused by C pneumoniae, as has previously been observed. The present case represents an unusual radiographic manifestation of BOOP, with an almost symmetrical involvement of the two apical lung segments. Comparable abnormalities affecting both upper lobes associated with BOOP have not been reported previously. Differential diagnosis of bilateral apical consolidations is primarily suggestive of tuberculosis, which could be excluded in the patient. The case presented herein demonstrates that BOOP can both clinically and radiographically mimic tuberculosis.

## References


## Recurrent Hemoptysis Following a Systemic-to-Pulmonary Anastomosis in a Child With a Complex Congenital Cardiomyopathy*

Jose Pablo Díaz-Jimenez, MD, PhD; Alicia N. Rodríguez, MD; and Martín Anselmo Andres, MD

A 14-year-old boy with a history of congenital cardiopathy is presented. At age 4, a left systemic-to-pulmonary fistula was performed, using a tubular prosthesis to Anastomose the left subclavian artery to the left pulmonary artery. Following this procedure, he developed recurrent episodes of hemoptysis, cough, and left upper lobe consolidation. Treatment resulted in clinical but no radiologic resolution. At age 6, a new right systemic-to-pulmonary anastomosis was needed, as the left one was no longer functioning. After placement of the second shunt, the hemoptysis disappeared. At age 14, flexible bronchoscopy revealed a foreign body granuloma at the left secondary carina. Rigid bronchoscopy and laser photoresection showed it to be the left vascular prosthesis, placed 10 years before. Surgery failed to remove it.

(CHEST 2000; 118:865–867)

Key words: foreign body; hemoptysis; laser photoresection; vascular prosthesis

**Abbreviation:** LUL = left upper lobe

Hemoptysis is a frequent complication in children with congenital cardiopathies undergoing surgery. We present an unusual case of hemoptysis in a 4-year-old child after the performance of a systemic-to-pulmonary anastomosis secondary to a severe congenital cardiopathy. The possible cause of the hemoptysis was found 10 years later, after a flexible bronchoscopy.

## Case Presentation

A 14-year-old boy with history of single ventricle, left type, left pulmonary artery stenosis, and left great vessels transposition, diagnosed by cardiac catheterization during the postnatal period, was sent to the Pulmonary Department for chest radiograph abnormalities.

At age 4, the patient developed worsening cyanosis and decreased exercise tolerance. A cardiac catheterization was performed, confirming the previous diagnosis and showing the development of collateral circulation, in the form of a great number of vessels branching from the descending aorta toward both lungs, particularly the left one. Bronchial circulation was poor bilaterally, particularly in the left lung where it was almost absent. A left systemic-to-pulmonary anastomosis was performed (from the left subclavian artery to the left pulmonary artery; Fig 1), using a tubular 6-mm polytetrafluoroethylene prosthesis (Gore-Tex; W.L. Gore; Flagstaff, AZ). In the immediate postoperative period, a new catheterization showed increase in blood flow to the left lung.

Nine months after the surgery, the patient presented an episode of cough and hemoptysis, and chest radiography showed consolidation and atelectasis on the left upper lobe (LUL). The patient was treated with antibiotics, and aspirin was discontinued. The picture improved both clinically and radiologically, although a small opacity persisted in the LUL in the following chest radiographs. This abnormality was further investigated by CT of the chest, which only showed lung consolidation. Similar clinical

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