in 27 patients, cough in 16 patients, dyspnea in 16 patients, and fever in 10 patients. Hemoptysis, the least common symptom, was present in three patients. All but one of the six patients in the study of Gourin et al. with mediastinal bronchogenic cysts had progressive symptoms, such as dyspnea, but none of the patients had hemodynamic compromise.

The current case extends the observations on mediastinal bronchogenic cyst by demonstrating that bronchogenic cyst may result in life-threatening cardiovascular compromise. The sudden deterioration may have occurred secondary to fluid shifts within the mass secondary to rupture of an internal septum, as demonstrated at surgery. This change in cyst morphologic features could have resulted in compression of vital surrounding structures—the pulmonary arteries and left atrium—creating a tamponade-like presentation.

St. Georges et al. recommended that all presumed bronchogenic cysts in adults be resected, because the majority of patients will become symptomatic or develop complications. The case presented herein further supports this contention by showing that bronchogenic cyst may result in acute cardiovascular compromise.

REFERENCES

Interferon-Related Bronchiolitis Obliterans Organizing Pneumonia*

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We present an unusual case of a patient with chronic hepatitis C who experienced dyspnea, fever, and cough after 2/3 months’ treatment with interferon. His radio-graph demonstrated diffuse pulmonary infiltrates and bronchoalveolar lavage fluid showed an increase in lymphocytes, especially CD8-positive cells. The lung biopsy findings were bronchiolitis obliterans organizing pneumonia (BOOP). The pulmonary symptoms disappeared and the chest radiograph became normal after interferon therapy was discontinued and corticosteroid therapy was given. Interferon is suspected to be responsible for the BOOP.

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**BOOP=bronchiolitis obliterans organizing pneumonia**

Drug-induced pulmonary diseases present a wide variety of clinicopathologic findings such as cough, fever, bronchospasm, noncardiac pulmonary edema, pulmonary effusion, interstitial pneumonia, and pulmonary fibrosis. Various kinds of drugs have been reported to be the causative agents. Recombinant alpha interferon has been developed and is now clinically used in patients with chronic type non-A, non-B hepatitis. However, several side effects have been reported. These include fever, myalgias, leukopenia, and nephritis. Herein we present a patient with chronic hepatitis C who experienced bronchiolitis obliterans organizing pneumonia (BOOP) after 2/3 months’ treatment with recombinant alpha interferon.

**CASE REPORT**

A 64-year-old man who had a history of blood transfusion in 1953 was first suspected of having liver damage by chance in January 1992. He was diagnosed as having chronic hepatitis C by serologic findings and was treated with glycyrrhizin. However, his serum transaminase levels were worsening; aspartate aminotransferase was 244 IU/L, and alanine aminotransferase was 253 IU/L. His diagnosis of chronic active hepatitis was established by liver biopsy specimen in September 1992. He then received recombinant human alpha interferon (alpha-2b): 10 million units/d for 11 weeks, 6 days a week for the first 2 weeks and 3 days a week for 9 weeks, starting from the end of September. After 1 month, his serum transaminase levels decreased to within the normal range. In late November, he developed dyspnea, fever, and nonproductive cough.

No remarkable abnormality was found in the laboratory data except for an enhanced erythrocyte sedimentation rate (45 mm/ h). The white blood cell count was 5,900/mm³ (segmented 38 percent; stab, 1 percent; lymphocytes, 40 percent; monocytes, 12

**Table 1—Lung Function Tests and Arterial Blood Gas Studies**

<table>
<thead>
<tr>
<th></th>
<th>Before Therapy</th>
<th>After Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC, L (%)</td>
<td>1.99 (66)</td>
<td>3.09 (100)</td>
</tr>
<tr>
<td>FEV1, L (%)</td>
<td>1.98 (99)</td>
<td>2.42 (82)</td>
</tr>
<tr>
<td>PaO2, mm Hg</td>
<td>86.2</td>
<td>100.9</td>
</tr>
<tr>
<td>PaCO2, mm Hg</td>
<td>47.3</td>
<td>44.2</td>
</tr>
</tbody>
</table>

Interferon-Related BOOP (Ogata, Koga, Yagawa)
percent; eosinophils, 9 percent). Rheumatoid factor was negative. 
Serum aspartate aminotransferase (53 IU/L), alanine aminotransferase (18 IU/L), and IgE (5.4 U/ml) were within normal limits. 
The lung function tests showed a reduced vital capacity and 
normal FEV₁ percent (Table 1). An arterial blood gas analysis 
revealed moderate hypoxia. A fine crackle was audible 
diffused in both lungs. A chest radiograph demonstrated bilateral patchy infiltrates and reticulonodular opacities that had not been seen 
prior to the treatment with interferon (Fig 1). Cultures of sputum 
and bronchial washing were negative for bacteria, fungi, and 
acid-fast bacilli. The total cell count in the bronchoalveolar lavage fluid was 1.7×10⁶/ml and the cell population consisted of 
macrophages (56 percent), neutrophils (1 percent), lymphocytes 
(40 percent), and eosinophils (5 percent). The ratio of CD4/CD8 
was 0.10. Lung tissue was obtained by a thoracoscopic biopsy, and 
the pathologic findings indicated bronchiolitis obliterans with 
interluminal polyps and organizing pneumonia in the alveolar 
ducts (Fig 2).

Administration of interferon was interrupted and treatment 
with prednisolone (40 mg/d) was started. The clinical symptoms 
of dyspnea and the radiographic infiltrates subsequently dis- 
ppeared promptly within a week, and lung function returned to 
normal (Table 1). Neither interferon nor any other treatment was 
given again, but his transaminase levels have remained within the 
normal range.

**FIGURE 1.** Chest radiograph showing bilateral patchy infiltrates and reticulonodular opacities

**FIGURE 2.** Lung biopsy specimen demonstrating bronchiolitis obliterans and organizing pneumonia (hematoxylin-eosin, original magnification X50).

**DISCUSSION**

Epler et al,³ in 1985, provided the first description of 
BOOP as a clinicopathologic entity. Pathologic findings were 
granulation tissue plugs within the lumens of the small 
airways extending into the alveolar ducts and the 
alveoli. They classified BOOP as idiopathic or related to 
some disorder such as a viral infection, a connective tissue 
disease, focal, cocaine abuse, drug reaction, human immu-

nedeficiency virus infection, myelodysplastic syn-
drome, or radiation therapy.⁴ Various therapeutic drugs 
have been reported to be responsible for causing BOOP. 
These have included acetebutol, amiodarone, bleomycin, 
cephalosporin, cocaine, gold, cyclophosphamide, meth-

otrexate, mitomycin-C, penicillamine, sulfametopyrazine, 
sulfasalazine, and sulindac.¹⁵

Recombinant human alpha interferon is a protein with 
165 amino acid residues. It has an antiviral activity and is 
currently being used in the treatment for chronic viral 
hepatitis. Recently, acute interstitial nephritis was re-
ported as a side effect of such interferon use.⁵ Though 
several other minor side effects have also been reported, to 
our knowledge, there is no report describing the involve-
mation of the lungs.

Our patient presented with chronic hepatitis C treated 
with interferon and developed dyspnea, fever, and cough 
with diffuse pulmonary infiltrates on chest radiographs. All 
these symptoms disappeared after the suspension of inter-
feron therapy and treatment instead with prednisolone. He 
did not have any other medical disorders that could be 
associated with BOOP. We conclude that interferon itself is 
the suspected cause of the disorder, though we have no 
direct proof. The present report is the first (to our knowl-
edge) to give additional attention to the use of interferon 
as possibly responsible for BOOP.

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