Heterogeneity of Bronchoalveolar Lavage Cellularity in Stage III Pulmonary Sarcoidosis*

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Three cases of stage III pulmonary sarcoidosis are presented. Bronchoalveolar lavage (BAL) revealed normal cell differential counts in the right middle lobe of each patient, but high-intensity lymphocytic alveolitis in the right upper lobe. These findings suggest that BAL should be done in multiple segments of the lung to obtain a truly representative picture of the intensity of the alveolitis in stage III pulmonary sarcoidosis.

Pulmonary sarcoidosis is a lung disease characterized by an elevated proportion of T-lymphocytes and granulomas within the interstitial and alveolar space of the involved lung. The technique of bronchoalveolar lavage (BAL) has been advocated as a useful method to assess the intensity of alveolitis, progression of the disease, and the need for therapy.

The usefulness of BAL in this context is based on the assumption that a particular segmental lavage reflects the process of a diffuse homogenous alveolitis throughout both lungs. This assumption has been studied in a few patients with interstitial lung disease by doing BAL in different lung segments of the same patient. The results of these studies revealed only minor differences in BAL cellularity at different lavage sites of three stage II pulmonary sarcoidosis patients.

Pulmonary sarcoidosis, while often a roentgenographically diffuse process, may appear as localized pulmonary infiltrates on chest x-ray film. We present three cases of pulmonary sarcoidosis with inhomogenous roentgenographic infiltrates and marked cell count variations at different BAL sites of each patient.

**CASE REPORTS**

**CASE 1**

The chest x-ray film of a 26-year-old nonsmoking male with persistent cough revealed predominantly upper lobe infiltrates without hilar lymphadenopathy (Fig I). A bronchial biopsy specimen revealed noncaseating granulomas. Sputum cultures for TB and bacterial and fungal disease were sterile. The 5- and 250-TU tuberculin skin tests were negative. The diagnosis of stage III sarcoidosis was made, and BAL carried out with the bronchoscope wedged in a segmental bronchus of the right middle lobe (RML). Phosphate buffered saline (150 ml) was infused and aspirated. The BAL fluid was immediately centrifuged at 500 g for ten minutes, and cells counted on an hemocytometer. A Wright-Giemsa stained slide of the BAL

![Figure 1](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21346/ on 06/26/2017)

**Figure 1.** Roentgenogram of a patient (case 1) with stage III sarcoidosis. Predominantly upper lobe bilateral infiltrates and relative sparing of RML.
Table 1—Clinical Data*

<table>
<thead>
<tr>
<th>Patient</th>
<th>BAL Site</th>
<th>Date</th>
<th>Cells/ml × 10^-3</th>
<th>Macrophages, %</th>
<th>Lymphocytes, %</th>
<th>PMN, %</th>
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<tr>
<td>1</td>
<td>RML</td>
<td>2/8/82</td>
<td>2.9</td>
<td>93</td>
<td>4</td>
<td>0</td>
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<tr>
<td></td>
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<td>55</td>
<td>44</td>
<td>1</td>
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<td>2/26/82</td>
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<td>94</td>
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<td>0</td>
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<tr>
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<td>79</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
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<td>97</td>
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<td>0</td>
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<td>10/15/82</td>
<td>1.3</td>
<td>50</td>
<td>49</td>
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</table>

*RML = right middle lobe; RUL = right upper lobe.

cells obtained after centrifugation in the cytopsin chamber revealed a surprisingly normal differential cell count. A second BAL was done three days later in the right upper lobe (RUL) and reflected a high-intensity lymphocytic alveolitis (Table 1). The patient improved receiving steroid therapy.

**CASE 2**

A 54-year-old nonsmoking woman was first seen for cough and sputum production. A chest x-ray film revealed predominantly upper lobe infiltrates without hilar lymphadenopathy. All sputum, bronchoscopic, and gastric aspirate cultures were negative for TB and bacterial and fungal disease. The 5- and 250-TU tuberculin skin tests were negative. A transbronchial biopsy specimen showed noncaseating granulomas. Stage III sarcoidosis was diagnosed, and BAL performed in the RUL revealed a normal differential cell count. A second BAL, done three days later in the RUL, since this lung field seemed more involved in the chest x-ray film, showed a definite increase in the relative number of lymphocytes (Table 1).

**CASE 3**

A 31-year-old male smoker had stage II sarcoidosis diagnosed by a mediastinal lymph node biopsy specimen revealing noncaseating granulomas. Seven years later, a chest x-ray film showed a predominantly upper lobe infiltrate without hilar lymphadenopathy. Sputum, bronchoscopic, and gastric aspirate cultures were negative for TB and bacterial and fungal disease. The 5- and 250-TU tuberculin skin tests were negative. Stage III pulmonary sarcoidosis was diagnosed; a BAL done in the RML was normal. A second BAL, done five days later in the most heavily involved lung field of the chest x-ray film, the RUL, reflected an intense lymphocytic alveolitis (Table 1). The patient improved receiving steroid therapy.

**DISCUSSION**

These three patients had biopsy-proved pulmonary sarcoidosis without evidence of a superimposed pulmonary infection. All had inhomogeneous infiltrates on the chest x-ray film, with predominantly upper lobe involvement. Each patient underwent an initial RML bronchoalveolar lavage which gave a normal cellular differential count. The BAL was repeated in the area most involved on the chest x-ray film, and each BAL then revealed a very different cell count, with high relative numbers of lymphocytes.

The time interval between the initial and second BAL was from three to five days, and the differences in cell counts likely cannot be explained by progression of the alveolitis. Also, the multiple sterile sputum, bronchoscopic, and gastric aspirate cultures, coupled with the clinical and roentgenographic improvement during steroid therapy, do not support the possibility of upper lobe superinfection to explain BAL variations between lavage sites.

These findings suggest that the alveolitis of stage III pulmonary sarcoidosis is not always a diffuse process, and that it may occasionally be more intense in certain lung areas. The BAL cellularity, thought to be a reliable measure of the intensity of the alveolitis in sarcoidosis,7-30 should be interpreted with caution if the chest x-ray film reveals inhomogenous infiltrates. Multiple lung segments, including those most heavily involved on the chest x-ray film should be lavaged to obtain a truly representative picture of the intensity of the alveolitis.

**REFERENCES**


Bronchoalveolar Lavage Cellularity in Stage III Sarcoidosis (Cantin et al)