Transbronchial Needle Aspiration in the Diagnosis of Sarcoidosis*

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A total of 258 patients with suspected sarcoidosis underwent transbronchial needle aspiration lymph node biopsies and forceps bronchial biopsies during rigid bronchoscopy. Transbronchial needle aspiration biopsies revealed noncaseating granulomas in 66.3 percent of patients. When transbronchial needle aspiration biopsies were combined with forceps bronchial biopsies, the positive rate increased to 77.7 percent. No major complication occurred when using transbronchial needle aspiration. Rigid bronchoscopy with transbronchial needle aspiration biopsies appears to offer a sensitive and specific alternative to more invasive techniques used in the diagnosis of sarcoidosis.

A positive histologic diagnosis of sarcoidosis is frequently desired in the patients suspected of having this disorder. Despite the onset of new biologic markers such as angiotensin converting enzyme and bronchoalveolar lymphocytosis, the assessment of noncaseating granulomas remains essential for the confirmation of the diagnosis.

The choice between the different diagnostic procedures—flexible fiberoptic bronchoscopy, rigid bronchoscopy, mediastinoscopy, open lung biopsy—must be made according to the risk vs the diagnostic yield. Fiberoptic bronchoscopy is an attractive initial procedure; however, the histologic confirmation is not obtained in all cases. Lymph node transbronchial needle aspiration through a rigid bronchoscope was introduced in the 1950s by Brouet et al. and Euler et al. Some authors are still using needles which permit cytologic diagnosis only. Histologic or cytologic diagnosis depends on needle length and diameter. In 1962, Schiessle described the technique of transbronchial needle aspiration biopsy for the diagnosis of mediastinal tumors and adenopathy.

This technique was studied in the diagnosis of sarcoidosis in 193 patients.

Materials and Methods

Patients

The study included 193 patients, 112 men and 81 women, with clinical and roentgenographic features of sarcoidosis: 60 patients had previously undergone a nondiagnostic flexible fiberoptic bronchoscopy; 133 patients underwent rigid bronchoscopy before the occurrence of flexible fiberoptic bronchoscopy. The mean age was 29.2 years with an age range from 18 to 58 years. Patients are grouped according to their chest roentgenograms into stage 1, i.e., hilar adenopathy alone (152 cases); stage 2, hilar adenopathy combined with parenchymal infiltrates (37 cases); stage 3, parenchymal infiltrates alone (four cases). In all cases, even in patients without histologic diagnosis, the clinical and roentgenographic survey was later able to assess the diagnosis of sarcoidosis.

Methods

The aspiration biopsy needle used was 23 mm in length and 1.5 mm in diameter, and attached to a hollow cylindrical shaft 45 cm in length. A 50-ml syringe is then attached by means of a 20-cm flexible connecting tube to the hub of the needle. For transtracheal biopsy, a bent needle is sometimes used. A negative pressure is exerted by retracting the syringe piston while the bronchoscopist moves the needle to and fro, after its tip has been pushed between two cartilaginous rings outside the bronchial wall. The needle is removed, and its contents are expelled into formaldehyde solution and examined after hematoxylin-eosin staining. If no material is obtained with a first puncture, a second needle aspiration is made in the same area. In some patients, two transbronchial needle biopsies are performed in two different accessible areas; thus, 258 transbronchial needle aspirations were carried out in 193 patients.

The transbronchial needle aspiration biopsy specimens were obtained from the paratracheal region and the peribronchial tissues adjacent to the right and left upper lobe spurs. In some individual cases, transbronchial punctures were made in the subcarinae area and in the middle lobe or basal lobe spurs. In all patients undergoing transbronchial needle aspiration, at least three forceps biopsy specimens were also obtained (using the Stortz forceps).

Results

Results of Transbronchial Needle Biopsy in Relation to Number and Sites of Punctures, Number of Patients, and Stage of Sarcoidosis

Transbronchial needle aspiration biopsies were positive in 139 out of the 258 punctures (53.9 percent) and in 128 out of the 193 patients (66.3 percent). Negative results correspond to cases in which adequate tissue fragments were not obtained and/or cases in which no positive histologic diagnosis could be assessed (Table 1).

Transbronchial biopsies were positive in 110 out of 152 patients (72.3 percent) with stage 1 disease and only in 15 out of 37 patients (40.5 percent) with stage 2 disease and three out of four with stage 3 disease (Fig 1).
There was no significant difference in the incidence of positive transbronchial aspirations according to the side of the upper lobe spur (Table 2).

**Comparative Efficiency of Transbronchial Needle Aspirations and Bronchial Biopsies**

As bronchial mucosal biopsies were routinely performed in all cases, we could compare the incidence of histologic confirmation of sarcoidosis obtained with mucosal biopsies alone, transbronchial aspiration biopsies alone, and combination of these two techniques (Fig 1).

Results of transbronchial needle aspirations were positive alone in 73 out of 193 patients (37.8 percent), whereas biopsies were positive alone in 22 out of 193 patients (11.4 percent). In only 55 patients (28.5 percent), did these procedures give positive results together.

Thus, the addition of the results of these two methods allows rigid bronchoscopy to give positive confirmation of sarcoidosis in 150 out of 193 patients (77.8 percent). Moreover in stage 1, the positive histologic diagnosis was obtained in 79.6 percent of cases with rigid bronchoscopy (Fig 1). The same percentage (80 percent) was obtained in the 60 patients (mainly stage 1) who had previously had a nondiagnostic investigation by flexible bronchoscopy.

**Complications**

There were no significant complications from the procedure. At some of the puncture sites, minimal bleeding occurred that always resolved spontaneously.

**DISCUSSION**

In evaluating the patients suspected of having sarcoidosis, histologic confirmation of the diagnosis is generally desired, particularly if the diagnosis can be obtained with minimum morbidity. Rigid or flexible bronchoscopy offers a number of advantages over mediastinoscopy and open lung biopsy in this regard.

As early as 1962, Schissel et al pointed out that needle aspiration provides a means of establishing diagnosis in patients with mediastinal or hilar lymphadenopathy. More recently, this technique has been used successfully in the diagnosis of malignancies with mediastinal involvement both by histologic or cytologic examinations.3-9

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**Table 1—Rate of Positivity of Transbronchial Needle Aspiration According to the Stage of Sarcoidosis**

<table>
<thead>
<tr>
<th>Stage</th>
<th>No. of Procedures</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>206</td>
<td>115</td>
<td>55.8</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>21</td>
<td>43.7</td>
</tr>
<tr>
<td>1 + 2 + 3</td>
<td>139</td>
<td>139</td>
<td>53.9</td>
</tr>
</tbody>
</table>

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**Table 2—Rate of Positivity of Transbronchial Needle Aspiration According to the Sites Aspirated**

<table>
<thead>
<tr>
<th>Sites Aspirated</th>
<th>No. of Procedures</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right lobar carinae</td>
<td>160</td>
<td>89</td>
<td>55.6</td>
</tr>
<tr>
<td>Left lobar carinae</td>
<td>85</td>
<td>47</td>
<td>55.3</td>
</tr>
<tr>
<td>Paratracheal</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>10</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

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**Figure 1. Comparative efficiency of transbronchial needle aspiration and bronchial biopsy.**
With regard to sarcoidosis, most of the authors could demonstrate that rigid bronchoscopy with large and numerous biopsies was successful in 60 percent of the cases. According to the data of Schiessle et al., the association of transbronchial needle aspiration with bronchial biopsies raises the efficiency of the rigid bronchoscopy up to 80 percent. Atay and Brandt, using a fine needle aspiration through the flexible bronchoscope, obtained cytologic diagnosis of sarcoidosis in 94 percent of the cases. However, it can be stated that the finding of single giant cells instead of tissue fragments with granuloma organization, may not necessarily allow the diagnosis of sarcoidosis.

At the moment, the first technique of investigation used is flexible fiberoptic bronchoscopy with regard to its comfort. With that technique, the histologic confirmation by bronchial biopsies alone is obtained in only 50 percent of the cases. By associating transbronchial lung biopsies, the rate of positivity can reach up to 90 percent. However, risks associated with transbronchial biopsies are not negligible, even if the deaths reported did not occur in investigating sarcoidosis. Our experience demonstrates that transbronchial needle aspiration is a safe means of diagnosis of sarcoidosis, since only minor incidents, such as slight bleeding have ever been observed. Its innocuousness added to its reliability can make it a more suitable method than mediastinoscopy or open lung biopsy in cases where flexible bronchoscopy has failed. The latter remains the least invasive procedure if transbronchial lung biopsies are not associated. It will always be the initial choice, since it requires neither neurolept analgesia or general anesthesia often used for the patient's comfort in rigid bronchoscopy.

However, among the nonsurgical methods, it seems that it is rigid bronchoscopy associated with transbronchial needle biopsies that offers the best rate of positivity.

REFERENCES