Diagnostic yield of pleural biopsy in lymphocytic exudative pleural effusion

Rukhsana Anwar, Javaid Iqbal Farooqi

Department of Pulmonology, Khyber Teaching Hospital and Department of Medicine, Lady Reading Hospital, Peshawar

ABSTRACT

Objective: To know the diagnostic role of pleural biopsy in determining underlying etiological causes of lymphocytic exudative pleural effusion.

Methods: A total of 74 patients, aged 17 – 79 years with mean age 46 years, of either sex, with lymphocytic exudative pleural effusion underwent closed pleural biopsy with Abram’s needle in standard way. Average 3 biopsy specimens were obtained in each patient, which were examined histopathologically.

Results: Definite histopathological diagnosis on pleural biopsy was possible in 53 (71.62%) patients, including tuberculosis and malignancy, 52.71% and 18.91% respectively.

Conclusion: Pleural biopsy can determine underlying etiological causes of lymphocytic exudative pleural effusion in 71.62 with precision. (Rawal Med J 2004;29:61-64)

KEY WORDS: Pleural Biopsy, Exudative Pleural Effusion, Tuberculosis, Mesothelioma

INTRODUCTION

Lymphocytic exudative pleural effusion is a common clinical and diagnostic problem. It is caused by tuberculosis, malignancy, rheumatoid pleurisy, fungal pleurisy, sarcoidosis and even parasitic diseases such as echinococcus granulosus. Diagnostic workup includes clinical examination, x-rays, pleural fluid analysis and pleural biopsy; the latter is the investigation of choice in such cases with reported diagnostic yield of 50 to 75%.
De Francis and coworkers first pioneered pleural biopsy in 1955, and this was followed three years later by introduction of Abrams and Cope pleural biopsy needles.\textsuperscript{7-9} Diagnostic yield of pleural biopsy depends upon patient population, biopsy technique, number of biopsy specimens, the expertise of operator and histopathological analysis.\textsuperscript{4} This study was carried out underlying causes of lymphocytic exudative pleural effusion in our setting, as determined by percutaneous pleural biopsy.

**PATIENT AND METHODS**

The study was conducted at Pulmonology Department of Khyber Teaching Hospital Peshawar and Medical A Unit of Lady Reading Hospital Peshawar from January to December 2003. Seventy four patients with lymphocytic pleural effusion undergoing pleural biopsy were included. Fever, weight loss and chest pain were main complaints of patients. Exclusion criteria were contraindications for pleural biopsy including an uncooperative patient, inadequate volume of pleural effusion, uncorrectable coagulopathy or local cutaneous lesions like herpes zoster or pyoderma.

Prior to pleural biopsy, patients were clinically evaluated and available records such as x-rays, reports of pleural fluid, sputum AFB were reviewed. After explaining procedure to the patient, he/she was seated on a couch, leaning forward with arms across the chest placed on shoulders, for ease of access to operator of the posterior chest wall. Biopsy site was selected two intercostal spaces below the fluid level demonstrated on physical examination. Local infiltration of 2\% lignocaine was used to anesthetize skin, subcutaneous tissue, muscle and parietal pleura. Skin incision was made with pointed surgical blade parallel to ribs. Two to four, on average three, biopsy specimens were obtained in each patient using Abrams pleural biopsy needle in standard way, and placed in 10\% formaldehyde. In cases of large effusion, therapeutic drainage was also performed. Biopsy site wounds were sealed with sterilized dressing technique afterward. A follow up chest x-ray, and hemodynamic monitoring was done in every case to look for complications. Repeat biopsy was performed in four patients, in whom initial biopsy’s report was inconclusive.
RESULTS

This study included 74 patients, 49 (66.22%) males and 25 (33.78%) females, with mean age of 46 years (table-1). The results are arranged under two headings of Group I (definite histopathological diagnosis) and Group II (inconclusive report).

Table-1
Distribution of histopathological lesions on pleural biopsy

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Male (n = 49)</th>
<th>Female (n = 25)</th>
<th>Total (n=74)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculosis</td>
<td>25 (64.10%)</td>
<td>14 (35.90%)</td>
<td>39 (52.71%)</td>
</tr>
<tr>
<td>Mesothelioma</td>
<td>07 (87.50%)</td>
<td>01 (12.50%)</td>
<td>08 (10.81%)</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>03 (100%)</td>
<td>0 (-)</td>
<td>03 (04.05)</td>
</tr>
<tr>
<td>Metastatic disease</td>
<td>01 (100%)</td>
<td>0 (-)</td>
<td>03 (01.35%)</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>01 (50.00%)</td>
<td>01 (50.00%)</td>
<td>02 (02.70%)</td>
</tr>
<tr>
<td>Non-specific</td>
<td>12 (57.14%)</td>
<td>09 (42.86)</td>
<td>21 (28.38%)</td>
</tr>
<tr>
<td>Total</td>
<td>49 (66%)</td>
<td>25 (34%)</td>
<td>74 (100%)</td>
</tr>
</tbody>
</table>

Group 1 comprised of 53 (71.62%) patients; 37 males (69.81%) and 16 females (30.19%) with mean age of 49 years. Patient in this group were divided into two subgroups, as detailed below:

Tuberculosis group comprised of 39 (52.71%) patients; 25 males (64.10%) and 14 females (35.90%) with mean age was 38 years.

Malignant group comprised of 14 (18.91%) patients; 8 patients (10.81%) with Mesothelioma, 3 patients (4.05%) with Adenocarcinoma, 2 patients (2.70%) with Lymphoma, and one patient (1.35%) with metastatic disease. The mean age was 58 years.
Group 2 comprised of 21 (28.38%) patients; 12 males (57.14%) and 9 females (42.86%) with mean age was 44 years.

None of the patients showed hemodynamic instability following pleural biopsy. Post-biopsy chest x-rays showed small pneumothorax in four patients, which subsided conservatively, none needing intervention. Seepage from biopsy site was observed only in three patients requiring stitching with silk; rest of patients did well with simple dressing.

DISCUSSION

Pleural effusions are classified as either exudative or transudative depending on the concentration of protein and LDH in the pleural fluid. Exudative pleural effusion has at least one of the following three properties: Pleural fluid/serum total protein ratio > 0.5, pleural fluid/serum LDH ratio > 0.6 and an absolute value of pleural fluid LDH > 200 IU. Exudative pleural effusion may be neutrophilic or lymphocytic; tuberculosis, \(^4,10,11\) Malignancy, \(^10,11\) lymphoma, \(^11\) sarcoidosis, \(^12\) and rheumatoid pleurisy, \(^3,4\) being the common causes of the latter type. According to Light et al, \(^13\) when exudative criteria are met by LDH alone, fluid leukocyte count is virtually never diagnostic, the diagnosis of malignancy or parapneumonic effusions should be considered.

Diagnostic yield of pleural fluid analysis of 8% in 150 patients, \(^3\) and 18% in 125 patients\(^5\) has been reported. Therefore, percutaneous pleural biopsy must be done to find out the etiological cause of lymphocytic exudative pleural effusion.\(^14,15\) A wide range of diagnostic yield of pleural biopsy has been reported in literature. A yield of 40%\(^1\) to 51% has been reported in a meta analysis of 14 studies comprising 2893
While a yield of 49% in their 120 patients was reported,\textsuperscript{4} in our series, diagnostic yield of pleural biopsy was 71.62% which is comparable with 69% yield of another local study\textsuperscript{3} in their 150 patients and is comparable with the international and other local studies.\textsuperscript{1,3,4,14,17,18} To improve the diagnostic yield of initial biopsy, it has been suggested to take four or more biopsies\textsuperscript{3} and from the lowest pleural margin\textsuperscript{19}. Also, the sensitivity of pleural biopsy is highest when more than six specimens are obtained, which on average contain more than two specimens of parietal pleura.\textsuperscript{20}

In Pakistan, the main indication for pleural biopsy is to diagnose or exclude tuberculosis and malignancy.\textsuperscript{21} A large series\textsuperscript{6} reported a diagnostic yield of 74% and 57% for tuberculosis and malignancy respectively in their review of 1893 pleural biopsies. In our series, tuberculosis was the most common cause, found in 52.71% patients, and followed by malignancy, found in 18.91% patients, comparable with other local studies with yield of 64.40% and 13.55% in 120 patients,\textsuperscript{4} and 45% and 24% in 150 patients\textsuperscript{3} respectively. Tubercle bacilli have been notoriously difficult to culture from pleural fluid, with a positive culture in only 31.5% patients.\textsuperscript{2} Therefore, diagnosis of tuberculous pleural effusion is most often established by pleural biopsy. In our country, all lymphocytic exudative pleural effusions are presumed to be due tuberculosis and many clinicians prescribe such patients anti-TB drugs without going for any further investigation. This approach needs to be reviewed, as at least 1/3\textsuperscript{rd} of such effusions are caused by malignancy in our country.\textsuperscript{3,4} Our reported diagnostic yield of 18.91% for malignancy is comparatively low as compared to international studies\textsuperscript{22,23}, which suggest a yield
ranging from 30-70%. This may be due to high prevalence of tuberculosis in our country, making frequency of malignancy relatively low.

Inconclusive histopathological reports of chronic non-specific inflammation or acute on chronic inflammation is not uncommon with range of 33% to 51% in various studies. In our series, chronic non-specific inflammation was found in 28.38% patients which is comparable with 31% chronic non-specific inflammation in another local study.

The common complications of pleural biopsy include site pain, vasovagal reaction, seepage of pleural fluid, site hematoma, pneumothorax, and pulmonary edema, with transient fever, subcutaneous emphysema, tumor seeding, especially in mesothelioma, and air embolism as less common ones. We did not come across any major complications in our series illustrating the safety of the procedure.

In conclusion, tuberculosis and malignancy are the two most common causes of lymphocytic exudative pleural effusion in our set up. Closed-needle pleural biopsy is a safe, simple and well-validated diagnostic tool that helps us to differentiate between malignancy and tuberculosis. It should be a routine diagnostic procedure in patients with exudative pleural effusion. Patients with inconclusive diagnosis on first pleural biopsy benefit from repeat biopsy.

From Department of Pulmonology, Khyber Teaching Hospital and Department of Medicine, Lady Reading Hospital, Peshawar
Correspondence: Dr. Rukhsana Anwar House No. 199, Street No. 1, Shami Road, Defence Colony, Peshawar Cantt.
Received May 22, 2004 Accepted June 29, 2004
REFERENCES


