Pleural Biopsy in the Diagnosis of Lymphocytic Exudative Pleural Effusion

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Pleural effusion is a common clinical problem in developed as well as developing countries. Tuberculosis and malignancy are common causes of exudative pleural effusion with lymphocytic predominance[1]. It is very difficult to diagnose the underlying cause by clinical, radiological or even pleural fluid analysis. These cases usually require pleural biopsy for definitive diagnosis[2]. Pleural biopsy is a safe ad reliable procedure ad is recomended to perform in all cases of exudative pleural effusion. Objective of this study was to list the frequency of patients with lymphocytic exudative pleural effusion diagnosed on pleural biopsy. This study was conducted at the Institute of Chest Medicine Mayo Hospital Lahore. A total of 50 patients, who fulfilled the criteria, were included in this study and underwent closed pleural biopsy. These were then investigated by histopathology. Histopathological examination of pleural biopsy was performed by department of pathology King Edwerd Medical College Lahore. A total of 50 patients underwent closed pleural biopsy. Adequate pleural tissue was obtained in 30 patients (60% of cases) the most common diagnosis made was granulomatous inflammation most likely tuberculosis. Histopathological evaluation of pleural biopsy specimens can lead to diagnosis in 46% of patients with exudative lymphocytic pleural effusion.

Key words: Pleural effusion. Pleural biopsy. Exudates and transudates. Tuberculosis.

Pleural effusion is a common clinical problem in developed as well as developing countries. Pleural effusions are grossly classified as either exudative or transudative. Pleural fluid with protein content of 3 gm% or more is defined as an exudate and with less than 3 gm% as transudate[3].

It is also termed as an exudate if it has any of these three properties[4].

1. A ratio of concentration of total protein in pleural fluid to serum more than 0.5
2. An absolute value of LDH more than 200 I.U.
3. A ratio of LDH concentration in pleural fluid to serum more than 0.6

Tuberculosis and malignancy are common causes of exudative pleural effusion with lymphocytic predominance[5]. It is very difficult to diagnose the underlying cause by clinical, radiological or even pleural fluid analysis. These cases usually require pleural biopsy for definitive diagnosis. Due to lack of diagnostic facilities, non-affordability of poor patients and all the set up; the cause of pleural effusion is presumed to be tuberculosis until proved otherwise. Definite diagnosis can be made by pleural biopsy alone in a majority of patients. If the treatment is started purely on clinical and radiological grounds, many patients may be exposed to potentially toxic drugs unnecessarily. On the other hand delay in diagnosis will result in significant morbidity.

Pleural biopsy is a safe and reliable procedure with fewer complications[6]. It is recommended to perform in all cases of exudative pleural effusion and it has greatest applicability in the diagnosis of exudative pleural effusion with lymphocytic predominance. A majority of the investigators had performed pleural biopsy in the presence of pleural fluid. A closed parietal pleural biopsy in the presence of pleural effusion was performed with Abrams needle in this study.

Pakistan, being a third world country with limited resources has a large number of cases with this condition. The purpose of this study therefore is to give some insight into the problem and provide local statistical data for comparison with international statistics and will be helpful for better management of this condition. The objective of this study was to identify the role of closed needle biopsy of the pleura in exudative pleural effusion and confirm diagnosis by histopathology in our setup.

Material and methods:

Objective of this study was to list the frequency of patients with lymphocytic exudative pleural effusion diagnosed on pleural biopsy This study was conducted at Institute of Chest Medicine Mayo Hospital Lahore. Histopathological examination of pleural biopsy was performed by the Department of Pathology King Edward Medical College Lahore in a period of six months extending from May to October 2003. Fifty hospitalized patients of either sex were included in this study.

Inclusion criteria:

Exudaitve pleural effusion according to light's criteria.
Exudative nature of pleural effusion with lymphocytic predominance.

Exclusion criteria:

Uncooperative patient
Pleural effusion less than 300 ml
Chest wall infection
Previous history of bleeding disorder

Data collection procedure:
Informed written consent was taken from all the patients. Before pleural biopsy patients were clinically evaluated. An I/V line was maintained.

Biopsy site was selected on the basis of area of maximum dullness to percussion and degree of density on the chest radiograph. The chest wall over the selected area was infiltrated with 2% plain xylocaine. Pleural biopsy was performed in a standard way, and an average of 3 samples were taken from the single site. Samples were preserved in the 10% formalin and were sent to the laboratory for histopathogy.

Findings were recorded on the proforma. At the end of the study, results compiled and analyzed with computer.

Results:
A total of 50 patients who fulfilled the selection criteria underwent closed pleural biopsy in a standard way by Abrams pleural biopsy needle. Out of these 50 patients 32(64 %) were males and 18 (36%) were females. The mean age of males was 26.19 +/- 9.49 and females 24.32 +/- 10.9.

Amongst study population, 6 patients (12%) were of less than 21years of age, 27'patients (54%) were between 21 to 40 yrs of age, 10 patients (20%) were between the age group of 41 to 60 and 7 patients (14%) were above 60 years of age.

Twenty seven patients (54%) had right sided pleural effusion, 22 patients (44%) had left-sided pleural effusion. whereas only 1 patient (2%) had bilateral pleural effusion.

In 20 patients (40 % of the total cases) the biopsy material showed skeletal muscle and fibrofatty tissue only, and the tissue was found inadequate for Histopathological diagnosis. While Adequate pleural tissue was obtained in 30 patients (60% of the total cases). Histopathological confirmed diagnosis was made in 23 patients (46% of total cases), whereas in 27 patients (54% of total cases) no histopathological diagnosis was found.

Out of all the 50 patients 26(52%) patients came from the district Lahore, 23 patients (46%) came from the different districts of Punjab while one patient (2%) came from Karachi.

Histopathology reports were conclusive in 23 (46% of the total cases) the remaining 27 (54% of total cases) were non-conclusive. Twelve patients (24% of the total cases) were labeled as granulomatous inflammation, 6 patients were labeled as chronic inflammatory, in 7 patients the Histopathological changes were of non-specific inflammation and 5 patients (10% of total cases) had malignant neoplasms; two of them (40% of malignant cases) were of adenocarcinoma, one (20% of malignant cases) was found to be undifferentiated carcinoma, one (20% of malignant cases) with small cell carcinoma while in one patient the histopathology was reported as atypical lymphoid infiltrate. All these 5 patients who were found to be with malignant histophatological changes, were male and an age of more than 50 years. In one of them pleural fluid was also positive for malignant cells.

Amongst the population in which pleural tissue was sufficient for hitopathological examination, Granulomatous inflammation (12/30 was the most common type of histopathogy followed by nonspecific chronic inflammatory (7/30). Ten out of 12 patients of granulomatous inflammation were below 30 years of age; one was of 35 years of age and one patient with granulomatous inflammation was 58 years old.

In 20 patients (40 % of total cases) pleural tissue was found inadequate for histopathological diagnosis.
In this study the pleural biopsy was performed in patients with lymphocytic predominance exudative pleural effusion. The pleural fluid protein was in a range of 3.6 to 6.7gram /dl, and the pleural fluid glucose was in the range of 35 to 92 mg /dl. Lymhocytes were in the range of 60 to 90%.

In 5 patients pleural fluid was positive for AFB on smear, four of these patients showed granulomatous inflammation on pleural biopsy while pleural biopsy was found inadequate for hsitophathological diagnosis in one patient.

Discussion:
The objective of this study was to list the frequency of patients with lymphocytic exudative pleural effusion diagnosed on pleural biopsy. Percutaneous pleural biopsy is indicated to evaluate patients with undiagnosed exudative effusion (particularly those with lymphocytic predominance) because the most frequently diagnosed disease is malignancy or tuberculosis.[7]

Multiple studies have been carried out on this topic earlier in different parts of the world with varying results. The age in our group ranged from 15-75 years (mean 25.3 ± 9.64). A similar study conducted locally, carried out by Khuram et al [8] on pleural biopsy showed a mean age of 28.1 years. Other international study showed even lower mean age like Qari et al[9] (22.5 years).

Thirty two (64%) of our patients were male. Similar trend was seen in various other studies. Gomez et al [10] reported 52% males, Yu et al[11] reported 56% males and Qari et al reported 58% male patients.

The literature reports wide range of pleural biopsy's yield, in tuberculosis it ranges from 20% to 93.5% and in malignancy from 44 to 86 %[13-15]. One study cites incidence of positive pleural biopsies in 40% [16]. In a compilation of 14 series including 2893 pleural biopsies, only 51% were diagnostic[17]. This diagnostic yield (when tuberculosis was a common cause of effusion) was based not only on pathological identification of caseating granulomas, but also on microbiological examination. Culture of pleural tissue fragments can lead to diagnosis in 11 to 60% tuberculous patients with negative histopathology[18-20]. The results of present study are comparable even when microbiological examination was not performed.

ensitivity of pleural biopsy is highest when more than six pecimens are obtained, which on average, contain more an two specimens of parietal pleura[21]. Another reason for may be that majority of biopsy specimens contained leural tissue, as 60-65% biopsies may not contain pleural ssue.

In our study tuberculosis was the most common iagnosis made with pleural biopsy, which indicate that it the commonest cause of exudative effusions in our atients. Malignant pleural involvement was found to be ue to primary neoplasms of lung i.e., adenocarcinoma, mall cell carcinoma and undifferentiated carcinoma. Malignant pleural effusions commonly co-exist with arcinoma of lung and are seen in over half of the patients ith disseminated disease. In addition to carcinoma of ng, malignant pleural effusion are commonly associated ith carcinoma of breast, ovary and stomach. We didn't ote any of these, however, we had one patient with ypical lymphoid infiltrate.

The histological finding of nonspecific pleural nflammation, and chronic inflammation are commonly bserved on pleural biopsy. In a related study of 164 atients, 57(34%) had chronic non-specific inflammation. another study of 216 patients, 33.33% had chronic nflammation. Repeated pleural biopsy i.e., second, and if ecessary a third, can increase diagnostic yield in these atients. Histological findings of non-specific nflammation and chronic inflammation in our study were en in 26% of patients.

omplications

uring performing the procedure of pleural biopsy, there ere no complications except a single case, who eveloped complaint of vomiting.

onclusion:

istopathological evaluation of pleural biopsy specimens an lead to diagnosis in 46% patients with exudative mphocytic pleural effusion.

Pleural biopsy is a safe procedure and routine chest -ray after pleural biopsy is not recommended unless the atient has symptoms such as breathlessness. Pleural iopsy should be performed in all cases of lymphocytic leural effusion to reach the final diagnosis.

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