



ROLE OF PLEURAL BIOPSY IN UNDIAGNOSED PLEURAL EFFUSION

Respiratory Medicine

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ABSTRACT

Pleural effusion is one of the most commonly encountered clinical conditions in pulmonary practice. Prior to introduction of pleural biopsy, the diagnosis of the cause of pleural effusion was more or less empirical. In spite of good history, thorough clinical, radiological and routine examination of aspirated fluid, it is possible to establish the diagnosis in not more than 20% of the cases. The aim of this study is to find the diagnostic yield and safety of closed needle pleural biopsy in undiagnosed exudative pleural effusion. The present study was undertaken at Department of Respiratory Diseases & Tuberculosis, National Institute of Medical Sciences and Research. Fifty seven consecutive patients with pleural effusion were included and subjected to initial evaluation. Tuberculosis and metastatic carcinoma were two most common and nearly equally distributed etiological diagnoses on first closed pleural biopsy. Tuberculosis was seen in 41% and metastatic carcinoma seen in 44% of cases. Among 25 cases of carcinoma 10 cases (40%) showed adenocarcinoma and 9 cases showed Squamous cell carcinoma (36%) and 6 (24%) cases showed small cell carcinoma. In the end it is concluded that diagnostic work up of pleural effusion, closed pleural biopsy provides a very high diagnostic yield in the diagnosis of pleural tuberculosis and malignancy, the two most important causes of exudative pleural effusion.

KEYWORDS

Pleural effusion, Biopsy, Tuberculosis, Malignancy,

INTRODUCTION

Pleural effusion is one of the most commonly encountered clinical conditions in pulmonary practice. In India common causes of pleural effusion are tuberculosis, parapneumonic effusion, malignancy, congestive heart failure, renal failure, connective tissue disorders and pulmonary embolism.^{1,2}

In spite of good history, thorough clinical, radiological and routine examination of aspirated fluid, it is possible to establish the diagnosis in not more than 20% of the cases. This initial analysis has low sensitivity to detect tuberculosis and malignancy, the two most important causes of pleural effusion in India. Prior to introduction of pleural biopsy, the diagnosis of the cause of pleural effusion was more or less empirical. Despite its worldwide acceptance and availability, this investigation is not being used widely.

According to various studies,^{3,4} diagnostic yield of pleural biopsy in all cases of pleural effusion is about 60 to 80%. Various means to achieve etiological diagnosis in those with negative first pleural biopsy includes repeat pleural biopsy, CT guided pleural biopsy and lastly thorascopic pleural biopsy. CT guided pleural biopsy needs logistic support of imaging and technical manpower, it also involve radiologist's support and additional cost. Further, it can be used only when certain degree of localised pleural abnormality is seen.

The aim of this study is to find the diagnostic yield and safety of closed needle pleural biopsy in undiagnosed exudative pleural effusion.

MATERIAL AND METHOD

The present study was undertaken at Department of Respiratory Diseases & Tuberculosis, National Institute of Medical Sciences and Research. Fifty seven consecutive patients with pleural effusion were included and subjected to initial evaluation.

After giving full explanation regarding the study, written informed consent was obtained from patients. Consent form included details of the study plan. Patient's name, age, sex, race, marital status, occupation, body weight and address were recorded. Symptoms such as fever, cough, sputum, haemoptysis, dyspnoea, chest pain, weight loss, loss of appetite and night sweats were recorded and analyzed.

Past, personal and family history was also noted. Patient's general condition such as cachexia, body weight, breathlessness, and

fever were noted. Physical signs such as cervical or scalene lymph node enlargement, clubbing, erythema nodosum, SVC obstruction were also noted. Thorough respiratory system examination was done to find out features of collapse, consolidation and pleural effusion. Chest x-ray (PA) view was taken in every patient and lateral view was taken, if necessary. Contrast enhanced computerised tomography (CECT) thorax was done in some patients where suspicion of loculated effusion, empyema, malignancy or some other abnormality associated with pleural effusion in chest x-ray was noted.

Exclusion criteria for pleural biopsy:-

- Age <12 yr
- Non-cooperative patient
- Moribund patient
- Pleural fluid thickness <3cm on USG at infra scapular border
- Patients with bleeding diathesis
- Transudative effusion
- Empyema / Neutrophilic effusion
- Local skin infection

The procedure of pleural biopsy was done in sitting posture of the patient. The affected side of chest determined and the site for biopsy selected. This area was cleaned thoroughly with antiseptics and then infiltrated with local anaesthetic agent.

Confirmation of free fluid was acknowledged with aspiration by the same syringe. For the free access, small incision of size of 0.3- 0.5 cm made just above the upper border of the rib of selected site. The Abrams pleural biopsy needle was introduced through it. Multiple biopsies were taken with the needle by multiple passes from same site (four satisfactory pieces of parietal pleura). After biopsy, skin incision was sutured with a single stitch and dressed. Pleural tissue obtained was placed in vial with formalin for histopathological examination, fluid for cytology was also sent. Post-biopsy chest x-ray was taken to rule out any pneumothorax. Post procedure, patients were kept under close monitoring of vital signs for six hours.

RESULT

Table No.1 Etiology of effusion established on initial workup

Etiological diagnosis established	No. of patients
Sputum positive for AFB smear	13
Pleural fluid positive for AFB smear	16
Cytology positive for malignant cells	23

Chylothorax	5
Total patients	57

The above tables showed that out of 57 cases 16 pleural fluid were positive for AFB smear and 23 for malignant cells.

Table No. 2 Distribution of study patients according to age & sex

Age group (In Yrs)	Sex		Total
	Male (%)	Female (%)	
10-19	1 (1.00)	0 (0)	1(1)
20-29	4 (9.42)	2 (1.05)	6 (2.47)
30-39	5 (10.47)	2 (2.62)	7 (5.09)
40-49	6 (9.95)	2 (3.66)	8 (4.61)
50-59	9 (13.61)	3 (6.81)	11 (8.42)
60+	20 (27.22)	5 (13.09)	24 (15.31)
Total	45 (75.44)	14 (24.56)	57 (100.00)

The above table shows the distribution of patients according to their age and sex. There were 45 male and 14 female patients. The mean ages of male and female patients were 50.60 ± 17.72 years and 55.13 ± 15.56 years respectively. Overall male patients were outnumbered by more than two times than females. More than half of the study patients in both gender were above 50 years of age.

Table No. 3 Presenting complaints of the patients

Complaint	Number of patients	%
Chest pain	43	75.39
Shortness of breath	34	60.21
Cough	33	57.07
Fever	19	33.51
Loss of appetite	11	19.37
Hemoptysis	5	7.83
Weight loss	4	6.81

The above table shows various symptoms reported by patients at the time of presentation. Chest pain was the most common complaint (75.39%) reported by study patients. Shortness of breath (60.21%) and cough (57.07%) were reported in more than half of the patients. Fever (33.51%), loss of appetite (19.37%), hemoptysis (7.83%) and weight loss (6.81%) were the other symptoms reported by the study patients. Majority of the patients had more than one symptom.

Table No. 4 Distribution of study patients according to extent of effusion

Extent of pleural effusion	Number of patients	%
Mild	3	5.24
Moderate	40	69.11
Massive	14	25.65
Total	57	100.00

The above table shows the distribution of patients based on extent of their pleural effusion. On chest x-ray majority of the patients (69.11%) had moderate amount of effusion. Approximately 1/4th patients had massive effusion. Mild effusion was observed in only 3 out of total 57 patients.

Table No. 5 Pleural tissue on histopathological examination (HPE) on first pleural biopsy

Pleural tissue	Number of patients
Present	56 (97.38%)
Absent	1 (2.62%)
Total	57 (100%)

The above table shows that pleural tissue was present in 56/57 (97.38%) of patients, only 1/57 (2.62%) biopsy samples were reported absence of pleural tissue on histopathological examination.

Table No. 6 Etiological diagnosis after pleural biopsy procedure

Etiological diagnosis	Number of patients	Percentage
Tuberculosis	23	41
Metastatic carcinoma	25	44
Nonhodgkin's lymphoma	9	15
Total	57	100

Tuberculosis and metastatic carcinoma were two most common and nearly equally distributed etiological diagnoses on first closed pleural

biopsy. Tuberculosis was seen in 41% and metastatic carcinoma seen in 44% of cases. Among 25 cases of carcinoma 10 cases (40%) showed adenocarcinoma and 9 cases showed Squamous cell carcinoma (36%) and 6 (24%) cases showed small cell carcinoma.

DISCUSSION

This study shows that most of the patients were males. The probable reason may be because males commonly come for medical help than females and they tend to have smoking habits more than females. In the present study, pleural biopsy showed 41% cases of tuberculosis, 44% of malignancy, and 15% of nonhodgkin's lymphoma (NHL) which is similar to other studies^{4,5,6}

The diagnostic yield of this study for malignancy was 44% which is low as compared to other studies done by Menzies et al⁷ which showed a diagnostic yield of 30-70%.

This low yield of malignancy may be due to the high prevalence of tuberculosis in developing countries like India.

Among the malignancy cases, the most common malignancy was adenocarcinoma (40%) which is similar to a study done by Sanwelka N et al¹ and Bhattacharya et al⁸. A study done by Al-shimemeri AA et al⁴, James P et al⁹, Biswas A et al⁶ and Devkota KC et al¹⁰ showed that pleural biopsy was the definitive diagnosis in half of the cases, which is similar to the present study. A study done by Ahmed et al¹¹ showed tuberculosis, malignancy, and inflammation in 29.4%, 19.6%, and 17.6% cases respectively, which is contrast to the present study which showed higher cases of malignancies. The study done by Rajawat et al¹² showed malignancy (37.17%) followed by tuberculosis (32.98%) as etiology which is similar to the present study.

Common complications of the pleural biopsy were a vasovagal attack, pain at the biopsy site, hematoma at the biopsy site, seepage of fluid from the site, pulmonary edema, and pneumothorax. In the present study, pneumothorax was encountered which was resolved in a few days after insertion of intercostals drainage and mild pain at biopsy site which was treated by anti-inflammatory drugs.

This study was done at one centre only, so limited data was collected only, further studies should be done in multicentre and data then collected should be evaluated for better understanding of aetiologies.

CONCLUSION

In the diagnostic work up of pleural effusion, closed pleural biopsy provides a very high diagnostic yield in the diagnosis of pleural tuberculosis and malignancy, the two most important causes of exudative pleural effusion. In view of low cost, easy availability and low complication rates, closed pleural biopsy should always be considered as an important diagnostic tool in the work up of exudative pleural effusion.

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