STUDY OF 200 CASES OF PLEURAL FLUID

Ramakrishna R1, Venkata Kalyan Kumar P2

1Professor, Department of Pulmonary Medicine, Katuri Medical College, Guntur.
2Associate Professor, Department of Pulmonary Medicine, Katuri Medical College, Guntur.

ABSTRACT

BACKGROUND
We have studied 200 patients of pleural fluid presenting to our tertiary care centre. Presence of cases of pleural fluid is a common presentation both in pulmonary and extrapulmonary diseases. We analysed the patients having both exudates and transudates and studied the results.

MATERIALS AND METHODS
We selected patients above 20 years of age and classified the patients with pleural fluid as having transudates and exudates. A total of 200 patients are studied in this prospective study. Diagnosis of pleural exudates is made on the basis of Light’s criteria, chest x-ray, pleural fluid analysis, CT scan in selected patients, sputum examination, bronchoscopy and bronchial washings. Moribund and non-cooperative patients and HIV positives were excluded from the study.

RESULTS
Among the 200 patients, 91% have exudates. 9% have transudates by Light’s criteria. Tuberculosis is the commonest cause of effusions (64.83%) followed by malignancy (13.73%) and sympneumonic or parapneumonic effusions (9.89%). Pleural effusions occurred predominantly in males. Prevalence of diabetes Mellitus among cases of tuberculous pleural effusions is 13.56%. Tuberculous effusions are predominantly right-sided.

CONCLUSION
Predominant cases of pleural fluid are exudates. Commonest cause of pleural effusion is Tuberculosis followed by malignancy both pulmonary and extrapulmonary and symptomatic pulmonary effusions. Prevalence of Diabetes among Tuberculous pleural effusion cases is more or less same as in general population. Cough, expectoration fever, chest pain and breathlessness are the common symptoms occurring in three fourths of the patients of tuberculous pleural effusion. Most of the cases of Tuberculous effusion are above 30 years of age. In the diagnosis of tuberculous pleural effusion, Pleural fluid ADA is very important. Pleural fluid cytology, pleural biopsy, bronchoscopy, bronchial washings and sputum examination can aid in diagnosis of aetiology. Lung cancer is the commonest cause of malignant pleural effusions. Other causes of pleural effusion though rare should be considered in selective patients.

KEYWORDS
Tuberculous Pleural Effusion, Exudates, Cytology, Bronchoscopy, Malignant Effusions.

ABBREVIATIONS

HOW TO CITE THIS ARTICLE: Ramakrishna R, Kumar VKP. Study of 200 cases of pleural fluid. J. Evid. Based Med. Healthc. 2016; 3(76), 4114-4118. DOI: 10.18410/jebmh/2016/879

INTRODUCTION: Pleural fluid arises from a number of Pulmonary and extrapulmonary problems. Pulmonary infections like Pneumonia, Tuberculosis, Malignancies of Lung and Pleura, Pancreatitis, Pulmonary thromboembolism, Oesophageal rupture, Hepatic and Splenic infections, Abdominal sepsis and Pancreatitis acute and chronic can be associated with pleural effusions.

Several malignancies like, carcinoma breast, osteogenic sarcoma, testicular and ovarian malignancies can be associated with pleural effusions. On the other hand, pleural fluid transudates are seen in congestive heart failure, cirrhosis of liver, hypoproteinaemia, sometimes in pulmonary thromboembolism secondary to atelectasis of lung. Pleural fluid aspiration and examination is a simple procedure and that can give enormous information regarding Pulmonary or extrapulmonary disease.

AIMS AND OBJECTIVES: To study the patients presenting with pleural fluid and identify the aetiology with the help of clinical radiological biochemical histopathological examination.
MATERIALS AND METHODS: We have done a prospective study on the patients having pleural fluid attending Katuri Medical College Department of Pulmonary Medicine from 2013 April to 2015 June.

Inclusion Criteria: All the patients presenting with Pleural Fluid above 20 years of age.

Exclusion Criteria: Patients of Pleural fluid with severe comorbidities like HIV, unstable patients, moribund patients and terminal malignancies, severe hypoxia. Analysed pleural fluids using Light’s criteria along with thorough clinical and radiological, haematological and biochemical examination. Sputum microscopy for AFB was done for all the patients. Pleural biopsy, bronchoscopy, bronchial washings were done selectively. Other investigations were done based on the requirement of the patients.

RESULTS:

Total number of cases of Pleural Fluid Examined 200
No. of cases of Exudates 182
No. of cases of Transudates 18

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD Cor pulmonale</td>
<td>8</td>
<td>07</td>
<td>1</td>
</tr>
<tr>
<td>Cardiac Disease with CHF</td>
<td>4</td>
<td>03</td>
<td>01</td>
</tr>
<tr>
<td>Hypoproteinaemia</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Associated with chronic renal impairment</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Associated with generalised anasarca</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Analysis of 18 Cases of Pleural Transudates

Total No. of Exudates: 182.

Analysis of tuberculous pleural effusions among 118 cases of tuberculous pleural effusion, the following criteria were used for diagnosis. Patients met with multiple criteria. All the criteria together along with clinical and radiological examination.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Symptom</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cough</td>
<td>82</td>
<td>69.49%</td>
</tr>
<tr>
<td>2.</td>
<td>Expectoration</td>
<td>59</td>
<td>50%</td>
</tr>
<tr>
<td>3.</td>
<td>Fever</td>
<td>80</td>
<td>67.79%</td>
</tr>
<tr>
<td>4.</td>
<td>Chest Pain</td>
<td>76</td>
<td>64.46%</td>
</tr>
<tr>
<td>5.</td>
<td>Haemoptysis</td>
<td>2</td>
<td>1.69%</td>
</tr>
<tr>
<td>6.</td>
<td>Breathlessness</td>
<td>78</td>
<td>66.10%</td>
</tr>
<tr>
<td>7.</td>
<td>Polyuria and Nocturia</td>
<td>9</td>
<td>7.63%</td>
</tr>
<tr>
<td>8.</td>
<td>Weight Loss</td>
<td>19</td>
<td>16.10%</td>
</tr>
<tr>
<td>9.</td>
<td>Loss of Appetite</td>
<td>26</td>
<td>22.03%</td>
</tr>
</tbody>
</table>

Table 4: Symptomatology of Tuberculous Pleural Effusion Patients

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Criteria</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clinical Features</td>
<td>96/118</td>
<td>81.35%</td>
</tr>
<tr>
<td>2.</td>
<td>Chest Radiology</td>
<td>44/118</td>
<td>37.29%</td>
</tr>
<tr>
<td>3.</td>
<td>Pleural Fluid ADA &gt;40IU/L</td>
<td>101/118</td>
<td>85.59%</td>
</tr>
<tr>
<td>4.</td>
<td>Lymphocytic Predominance in Pleural Fluid</td>
<td>84/118</td>
<td>74.20%</td>
</tr>
<tr>
<td>5.</td>
<td>Sputum Positive for AFB</td>
<td>26/118</td>
<td>22.3%</td>
</tr>
<tr>
<td>6.</td>
<td>Bronchial Washings Positive for AFB</td>
<td>18/118</td>
<td>15.25%</td>
</tr>
<tr>
<td>7.</td>
<td>Pleural Biopsy</td>
<td>6/118</td>
<td>5.8%</td>
</tr>
</tbody>
</table>

Table 3: Diagnosis of TB Pleural Effusion

Table 2: Analysis of Exudates
Amount of Pleural Effusion as assessed by clinical, radiological and ultrasonographic examination among patients of Tuberculous Pleural Effusion: Total Number of Tuberculous Pleural Effusion: 118.

### DISCUSSION:
Exudative pleural effusion poses a diagnostic challenge as several pulmonary and extrapulmonary causes lead to pleural exudates. Diagnosis exudates and transudates is routinely done on the basis of Light’s criteria, but multiple parameters have to be considered in separating exudates and transudates. Other parameters like pleural fluid albumin, cholesterol and comparison of pleural fluid and serum proteins and LDH can help in the differentiation. Some Indian authors have suggested limited criteria like cholesterol and LDH. In our study of 200 patients, exudate constituted 91%. Total male patients exceeded female patients in several Indian studies also found predominant number of exudates and more number of male patients possibly because more male patients seek medical assistance.

Manu Mohan K et al have similar observations as in our study. Tuberculosis is the predominant cause of pleural effusion in our study occurring in 64% of patients. Other important causes included sympteumonic and parapneumonic effusions and malignancy.

Analysis of tuberculous pleural effusions in our study showed clinical features combined with pleural fluid ADA and lymphocytic predominance in pleural fluid helped in the diagnosis of tuberculous aetiology. Other criteria like chest x-ray showing tuberculous shadows, sputum for AFB and bronchial lavage, fluid positive for AFB also helped in the...
diagnosis of tuberculous pleural effusion. Our study showed a male predominance, but predominant number of patients were in the above 30 years age group. Symptomatology varied in different studies. Cough, fever, chest pain and breathlessness are the predominant symptoms in our study occurring in predominant number of patients. Pleural effusion is predominantly right-sided in our study. 14% of the patients showed bilateral pleural effusions. Mohd Arif, Srivastava study had 60% of TB pleural effusions and they were in 20-40 years age group. In our study, 51% of the patients are below 39 years age. About 13.56% of our Tuberculous pleural effusions have associated diabetes mellitus, which is probably similar to prevalence of diabetes mellitus in South India.7 Predominant patients of Tuberculous effusion patients had minimal pleural effusion of less than 500 mL as assessed by chest radiology and ultrasonographic examination. This is because of better awareness of the patients and their seeking medical attention relatively early. 68% of our patients had free fluid and 32% had encysted effusion. This aspect is given attention because free fluid can be removed freely and with treatment patients have minimal pleural fibrosis and minimal restriction later on. C.H.S. Chan et al in their retrospective study found that only 6% of patients developed pleural thickening.8 In our study, we had 6.77% of patients had multiply encysted pleural effusion, which can probably responsible for pleural thickening in subsequent years. Chan study from Hong Kong showed average age of Tuberculous pleural effusion was 44 years and that pleural biopsy is a better method of diagnosis and pleural fluid AFB was negative in all subjects. Pleural fluid ADA is more than 40 IU/L 85.6% of our tuberculous pleural effusion patients. This makes it an important tool in the diagnosis though there were a few borderline cases, which were decided on other diagnostic modalities. The importance of pleural fluid ADA was stressed in a number of studies. Sravan Kumar and Ritesh Agarwal study found poor utility, sensitivity as a diagnostic tool in diagnosing tuberculous and nontuberculous pleural effusion patients in chronic Kidney disease patients compared to DNA PCR.9 Sachin Kate and B. K. Muthaa et al10 in their study found a sensitivity and specificity of 93.3% and 90% respectively when ADA levels of 40 IU/L was taken as the criteria for the diagnosis of Tuberculous pleural effusion. Dr. Prabhakarra Rao et al11 also found Pleural fluid ADA as a very sensitive and specific marker of tuberculous pleural effusion and is simple, inexpensive and rapid.

Rama Saha et al12 in their study stressed the importance of cytology of pleural fluid and histopathology of pleural biopsy specimen in the diagnosis of pleural effusions. We did pleural biopsy for only 8 patients and 6 of them were positive for tuberculosi. Among our Pleural effusions of other cause primary and secondary malignancies accounted for 13.65% and sympreneumonic and parapneumonic effusions accounted for 9.89%. Other causes of pleural effusions were chronic pancreatitis, amoebic hepatitis, post abdominal surgery effusions, chronic renal impairment and pleural effusions secondary to connective tissue disease. Malignant effusions were diagnosed by evidence of pulmonary and extrapulmonary malignant disease and analysis of pleural fluid and by pleural biopsy, bronchoscopy and bronchial washing, FNAC of lung lesions. Mohd Arif Siddiqui study showed parapneumonic effusions of 14.5% and malignant pleural effusions of 11.5% and the results in this regard are similar to our study. Arnab Maji et al13 in their study had higher percentage of malignant pleural effusions of around 28% in their study of 368 patients of exudative Pleural effusions. Lung malignancies are the commonest cause of malignant pleural effusions in our study and also in Arnab Maji study.13 Basu A Chakraborty I et al14 concluded the importance of pleural biopsy and ADA level and found that ADA levels of 70 IU/L are highly suggestive of tubercular aetiology. It requires extensive investigations when pleural effusions are found positive for secondary malignancy as a wide number of organs can cause secondary malignancy in the pleura.

Pleural effusions can also occur from obstruction of thoracic duct or pleural lymphatics secondary to malignant extension. In such cases, pleural fluid may not be positive for malignancy. Pleural effusions can occur in Chronic Kidney disease and it is necessary to differentiate Tuberculous pleural effusion from other causes. We had only small number of patients of pleural effusion associated with Chronic Kidney Disease. In a study among the CKD patients by Ray S, Mukherjee S. et al, they found a prevalence of 6.7% of pleural effusion among CKD patients. It is necessary to rule out Tuberculous pleural effusion in CKD patients.14 Massive recurrent pleural effusions can develop in asymptomatic pancreatic disease.15 Pleural effusions acute respiratory distress syndrome associated with atelectasis and hypoxia can develop in acute pancreatitis.16 Chronic massive effusions are reported with chronic pancreatitis.17 Pleural effusions of pancreatic origin are rich in pancreatic amylase.

Pleural effusion accompanying amoebic hepatitis and liver abscess is not uncommon in clinical practice. Though we have only two cases in our study group because of habit of alcoholism and high prevalence of amoebic hepatitis pleural effusion of this aetiology should be borne in mind in relevant cases. It can result because of extension of amoebic liver abscess into pleural cavity and lung18 or can be reactionary effusion. Pleural effusions are also reported postoperatively after upper abdominal surgery can result from infection, atelectasis, sodium and water retention or age-related cardiac disease.19 They do not require any specific treatment. In our series, we had four patients after abdominal surgery. Pleural effusions are also reported after CABG and cardiac valve surgery. They cause dyspnoea and chest pain and fever are uncommon, they disappear gradually over a few months.20

**SUMMARY AND CONCLUSIONS:** We have studied 200 cases of pleural fluid in our tertiary care centre. 91% of them were found to be exudates. 9% are transudates. Transudates are seen in COPD cor pulmonale, Cardiac disease with CHF, Hypoproteinaemia and Chronic renal
failure. Predominant cause of exudates is Tuberculosis occurring in 64.83% followed by primary or secondary malignancy (13.65%) and syph and parapneumonic effusions 9.89%. Other causes of pleural effusions included postoperative pleural effusions after abdominal surgeries, chronic pancreatitis, amoebic hepatitis, connective tissue disease, pulmonary thromboembolism and chronic renal failure. Tuberculous pleural effusions are diagnosed by analysis of pleural fluid by microscopy, cytology, pleural fluid ADA, proteins, LDH, sputum microscopy and in selective cases by bronchoscopy and analysis of bronchial washings. Relevant history and extensive systemic examination is necessary in nontuberculous effusions.

REFERENCES