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Clinical Etiological and Radiological Presentation of an Exudative Pleural Effusion in a Tertiary Care Center.

Suvarna Lakshmi Kalli*, Sachin Kumar Dole, Kundan Mehta, and Nitin Gaikwad.

Department Of Pulmonary Medicine, D.Y. Patil Medical College, Pimpri, Pune, Maharashtra, India.

ABSTRACT

Pleural effusion is common clinical entity in day-to-day clinical practice. Common causes of pleural effusion are congestive heart failure, tubercular pleural effusion, parapneumonic and malignant effusion. The purpose of this study was to evaluate clinical characteristics and etiology of exudative pleural effusion. The main objective of this study is to find out the various causes of exudative pleural effusion, and their clinical and radiological presentation. The retrospective study was done in the department of pulmonary medicine of a tertiary care centre in Pune from june2019 to july2020.Total 100 cases diagnosed with exudative pleural effusion were studied. All patients were subjected for routine blood investigations and pleural fluid analysis. In a total of 100 patients, 68 were male and 32 were female patients. The most common presenting symptom was dyspnea (86%), cough (84%), fever (80%), chest pain (62%), loss of appetite (48%) and loss of weight (40%). The most frequent cause of exudative pleural effusion is tuberculosis(42%), malignancy(29%),para pneumonic effusion (23%) and diagnosis was unknown in 6 patients. Pleural fluid analysis is the diagnostic method to determine etiology of exudative pleural effusion. Our study concluded that the most common cause of exudative pleural effusion is tuberculosis followed by malignant and parapneumonic effusion.

Keywords: Exudative Pleural Effusion, Tuberculosis, malignancy.

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Corresponding author

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INTRODUCTION

Pleural effusion is a collection of pleural fluid between parietal pleura and visceral pleura. It is rarely a primary disease phase, but it is typically secondary to other diseases [1]. Pleural fluid accumulates when the rate of pleural fluid formation exceeds the rate of pleural fluid absorption. Normally, 0.13 mL/kg of body weight of fluid is present in pleural space. This small amount of fluid acts as a lubricant to allow the smooth sliding of parietal and visceral pleura during respiration.[2] Normal amount of fluid is maintained by the balance between hydrostatic, oncotic pressure of pleural capillaries and intrapleural pressure, oncotic pressure of pleural fluid. Any imbalance of the above mechanism will lead to excess fluid accumulation in pleural space. [3] Pleural effusions were either transudative or exudative, Light's criteria[4] are commonly used to differentiate exudative effusion from transudative effusion. Pleural fluid is exudative if it meets any one of the following criteria-pleural fluid protein/serum protein ratio >0.5 or pleural fluid lactate dehydrogenase (LDH)/serum LDH ratio >0.6 or pleural fluid LDH level greater than two-thirds the upper limit. The common causes of transudative pleural effusions are congestive heart failure ,nephrotic syndrome, hypoproteinemia and hepatic hydrothorax.[5] Common causes of exudative effusion include tuberculosis, parapneumonic effusion, malignancy,and viral infections.[6] Other causes include hypothyroidism, pulmonary embolism with infarction, connective tissue disorders, pancreatitis, esophageal rupture (Boerhaave's syndrome), collagen vascular disorders, chylothorax, and hemothorax.

On chest radiograph, pleural effusion is usually seen as an area of homogeneous opacity with obliteration of costo-phrenic angle. Computed Tomography detects pleural abnormalities more readily and it distinguish lung parenchymal and extra pleural disease than standard radiograph. [7] Ultrasonography is more sensitive than chest radiograph, it is used in quatification of fluid, identification of septations and appropriate location for an attempted thoracocentesis, pleural biopsy or chest tube placement. It is safe, low cost and there is no radiation comparing to CT. [8]

A provisional diagnosis is usually made in over 90% of patients based on clinical features and pleural fluid analysis. [9] However, definitive diagnosis is usually made by either identification of malignant cells, pleural biopsy or identification of a specific organism in pleural fluid. Thoracentesis is indicated in all patients with suspicion of exudative pleural effusion with thickness >10 mm in lateral chest radiograph, ultrasound, or in CT scan. The first step is to differentiate between transudative from exudative pleural effusion which is routinely done by pleural fluid analysis.

The purpose of this study was to evaluate etiological, clinical and radiological manifestations of pleural effusion.

MATERIALS AND METHODS

Study design: Retrospective hospital-based study.

Study setting: Department Of Pulmonary Medicine, D.Y. Patil Medical College, Pimpri, Pune.

Study duration: June2019 to july2020

Sample size: 100

All the patients fulfilling the inclusion and exclusion criteria during the study period were included in the study.

Inclusion Criteria

- Chest x-ray showing evidence of pleural effusion.
- Age more than 12 years.
- Patient who have given informed consent.

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Exclusion Criteria

- Minimal effusion without clinical and x-ray findings.
- Hemodynamically unstable patients
- Patient already undergone Thoracocentesis and on treatment

All patients were interviewed for a detailed background and were thoroughly examined in accordance with a structured protocol. A total of 100 cases had been included in the study. All of them were subjected to physical examination and detail history were recorded in a predesigned proforma. The initial step in assessing a pleural effusion is to ascertain whether it is a transudate or exudate. After observing the physical appearance of the fluid it was sent for cytological (including detection of malignant cell), microbiological (Gram staining, acid-fast bacilli [AFB] staining, and culture in selected cases) and biochemical tests including estimation of adenosine deaminase (ADA) etc. Routine investigations included complete hemogram, random blood sugar, renal and liver function tests, serum proteins and others.

RESULTS

In this prospective study of 100 patients with Exudative pleural effusion, 68 were male and 32 were female patients with Mean age of study subjects was 50.1 years; and M:F ratio was 2.125:1

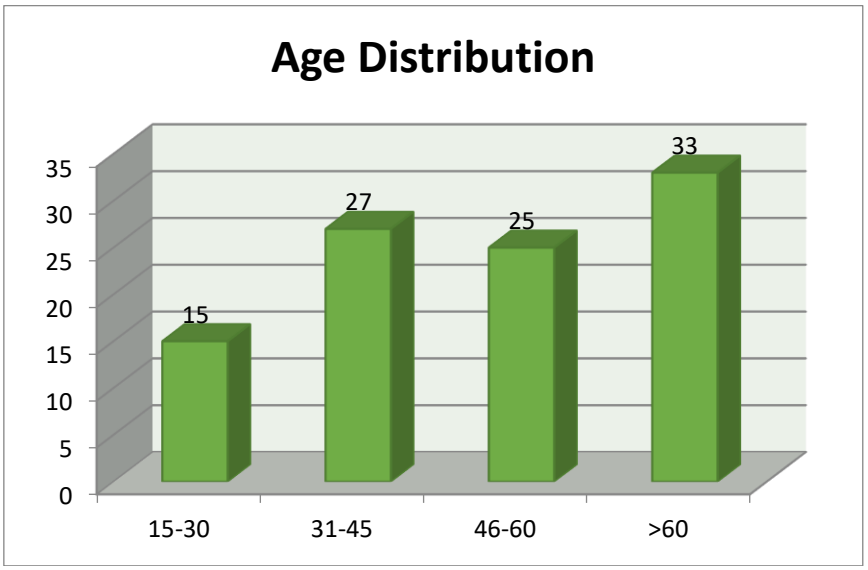
The most common presenting symptom was dyspnea (86%) followed by cough (84%), fever (80%), chest pain (62%), Loss of appetite (48%) and Loss of weight (40%).

Majority of the study population 70% had less than 4 weeks of duration of symptoms and 30% of patients had more than 4 weeks of symptom duration before coming to our institution.

On radiological evaluation, 58 cases had right sided pleural effusion ,38 patients had left sided pleural effusion while only 4 cases had bilateral effusion.

The most frequent cause of exudative pleural effusion was tuberculosis in 42% of patients, followed by malignant pleural effusion (29%), para pneumonic effusion (23%) and diagnosis was unknown in six patients.

Figure 1: Age distribution



Of the study sample of 100, the mean age was 50.1 years with a minimum of 15yrs and maximum of 84yrs and a standard deviation of 16.7. As observed from this study the incidence of pleural effusion is more in Younger age and Elder age and a relatively lower incidence in middle age group.

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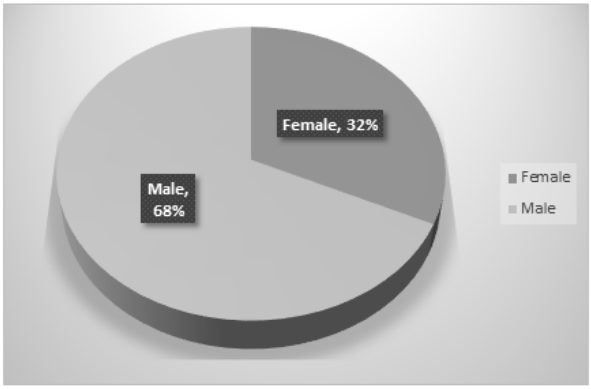
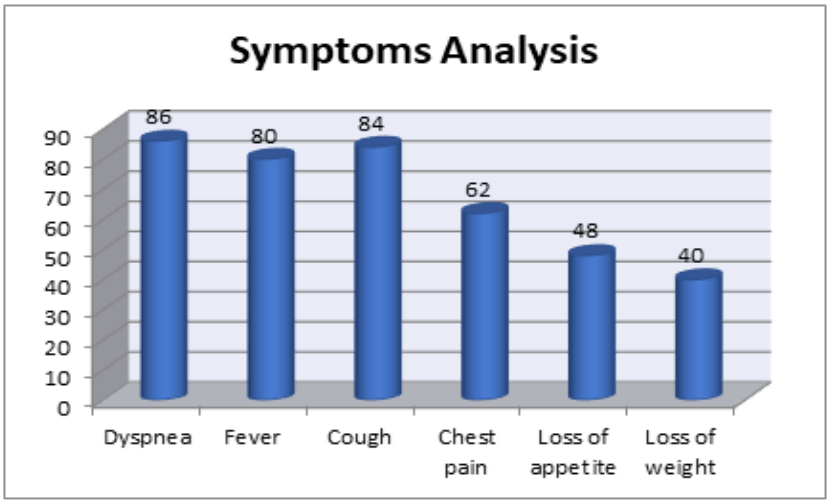
Figure 2: Gender distribution of the study population



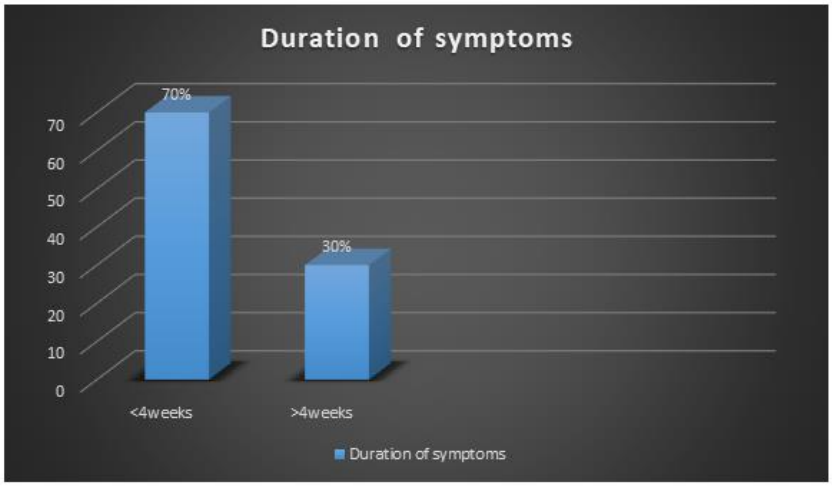
Out of 100 patients in this study 68 % were male and 32% were female with a male-female ratio of 2.125:1.

Figure 3: Symptomology of study population



The most common presenting symptom of pleural effusion, dyspnea (86%) followed by cough (84%), fever (80%), chest pain (62%), Loss of appetite (48%) and Loss of weight (40%).

Figure 4: Duration of symptoms



Out of 100 pts 70% of patients had less than 4 weeks of duration of symptoms and 30% of patients had more than 4 weeks of symptom duration.

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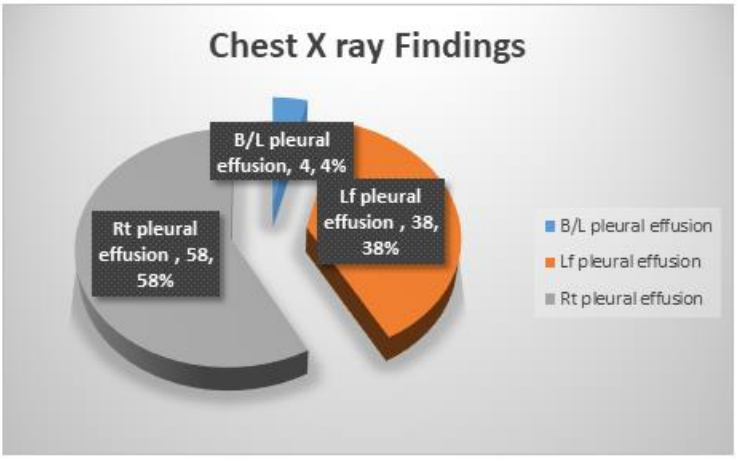
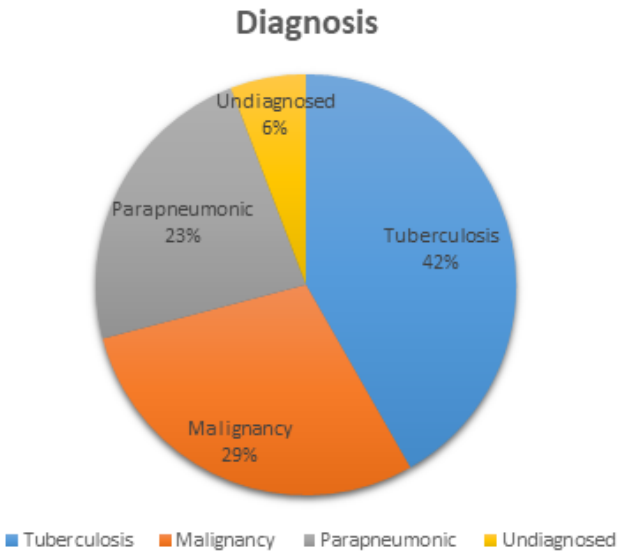
Figure 5: Chest X-Ray findings



Majority of pleural effusions were right sided (58 %) then followed by left sided (38%)and bilateral pleural effusion (4%).

Figure 6: Etiology of pleural effusion of the study population



Out of 100 study population, tubercular pleural effusion was diagnosed in 42% of patients, followed by malignant pleural effusion (29%), para pneumonic effusion (23%) and diagnosis was unknown in 6% of patients.

DISCUSSION

This prospective study was carried out to establish the most common causes for exudative pleural effusion. Of the study sample of 100, the mean age was 50.1 years with a minimum of 15yrs and maximum of 84yrs and a standard deviation of 16.7. As observed from this study the incidence of exudative pleural effusion is more in younger age and elder age and a relatively lower incidence in middle age group. Out of 100 patients, 68 % were male and 32% were female with a male-female ratio of 2.125:1.

The most common presenting symptom was dyspnea (86%) followed by cough (84%), fever (80%), chest pain (62%), Loss of appetite (48%) and Loss of weight (40%). Majority of the study population (70%) had less than 4 weeks of duration of symptoms and 30% of patients had more than 4 weeks of symptom duration before coming to our institution.

Most of the patients in the present study had right-sided pleural effusion (58%) which is fairly comparable with the study of Ambethiya (right side pleural effusion - 60%) and Dambal et al. (right side pleural effusion - 58.2%) (10,11). Majority of pleural effusions were right sided (58 %) then followed by left sided (38%)and bilateral pleural effusion (4%). These results are comparable to a study done in Ethiopia [12].

In our study, tuberculosis was the leading cause of exudative pleural effusion accounting for 42% of cases. This is in concordance with many such studies conducted in developing countries such as Iraq, Ghana, and Pakistan [13-15]. In our study, malignancy (29%) and parapneumonic effusion (23%) respectively comes next in frequency as the causes. Malignancy accounted for 29 % of our cases which is higher compared to the studies done by Ambethiya (malignancy - 18%) and Dambal et al.; Parapneumonic effusion occurred in 23% of patients which is higher compared to results from an international study by Zablockis and Nargela which showed parapneumonic causes being responsible for only 13% of exudative effusions [16,17]. In study done by Jinlin Wang on 172 patients, reported that, Malignant pleural effusions are 90 (52.3%) patients while non-malignant pleural effusions are 82 (47.7%) patients. Whereas in present study, malignant pleural effusions are 29%, nonmalignant pleural effusions are of 75%. In Jinlin Wang et al study, malignancy is the major cause of pleural effusion, whereas in present study, tuberculosis is the major cause of pleural effusion [18]. In the study by Bhavsar et al maximum number of cases of pleural effusion were tuberculous (66%) followed by malignant (18%) and parapneumonic effusion (10%) similar to present study with maximum number of cases of tubercular pleural effusion (42%)followed by malignant (29%) and parapneumonic effusion (23%). In comparison with studies done abroad, our study highlights the higher incidence of TB in a developing country.

CONCLUSION

Our study concluded that the most common cause of exudative pleural effusion is tuberculosis followed by malignancy and parapneumonic effusion. This is similar to what is being seen in many studies conducted across developing countries. Our study concluded that shortness of breath, cough, chest pain and fever are the four most common mode of clinical presentation in patients with pleural effusion. Pleural fluid analysis is the diagnostic method to distinguish exudative from transudative pleural effusion. Every case of pleural effusion should be meticulously investigated in order to arrive a diagnosis and to proceed for specific therapy, specific treatment may be started earliest.

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