



## Clinical and Etiological Profile of Patients with Pleural Effusion in A Tertiary Care Centre

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### Abstract

**Background:** Pleural Effusion is defined as the accumulation of fluid in the pleural space. A pleural effusion is always abnormal and its presence indicates an underlying disease. Pleural effusion is one of the commonest respiratory problems with which patients are admitted. Diseases of the pleura, lung, heart, liver, kidney, or other multisystem illness can lead to pleural effusion. Hence, a detailed clinical evaluation including history taking, physical examination and relevant diagnostic tests are essential to identify the cause of pleural effusion, which is essential for arriving at the treatment decision.

**Materials and Methods:** This study included 100 cases of pleural effusion admitted in the Department of Medicine, Government TD Medical College, Alappuzha over a period of 1 year. A detailed history and physical examination was carried out along with chest radiograph and diagnostic thoracentesis. The effusions were then appropriately classified as transudative and exudative and further evaluated.

**Results:** Of the 100 cases, the commonest cause of pleural effusion was tuberculosis, followed by malignancy. The commonest presenting symptom was dyspnoea. Most of the pleural effusions were right sided and were mild. Pleural fluid ADA was sensitive for the diagnosis of tuberculous effusion. Adenocarcinoma of the lung was the commonest malignancy causing pleural effusion.

**Conclusions:** Pleural effusion is more commonly seen in males than in females. The commonest causes were Pulmonary tuberculosis followed by malignancy. Least common cause was collagen vascular disease. Parapneumonic effusions were typically mild in severity.

**Keyword:** Pleural effusion.

### Background

Pleural effusion is defined as abnormal accumulation of fluid in the pleural space. A pleural effusion is always abnormal and its presence indicate an underlying disease. It has been found that pleural effusion is one of the most

common respiratory symptoms for which patients are admitted and evaluated.

The normal pleural space contains 7 to 14 ml fluid<sup>1</sup>. An increased amount of fluid accumulates in the pleural space when the rate of formation exceeds the rate of removal. Increased formation

occurs when there is an increase in the net hydrostatic pressure gradient (transudate) or an abnormal increase in permeability of the pleural vessels<sup>1,2</sup>. In addition, pleural fluid can collect via leakage across the diaphragm from the abdomen<sup>1</sup>. Decrease in the removal occurs due to decreased lymphatic drainage.

Chest radiographs can fail to detect small effusions and do not attain 100 percent sensitivity, even when decubitus views are included, until the amount of pleural fluid exceeds 500ml<sup>3</sup>.

To treat pleural effusion appropriately, it is important to determine its cause. With the knowledge of pleural fluid cytology, biochemistry and clinical presentation, an etiological diagnosis can be established in approximately 75%<sup>4</sup>.

The clinical presentation of pleural effusion depends upon the amount of fluid present and the underlying cause. Many patients have no symptoms at the time a pleural effusion is discovered. Possible symptoms include pleuritic chest pain, dyspnoea and a dry, unproductive cough. The chest pain associated with pleural effusion is caused by the pleural inflammation of the parietal pleura resulting from the ovement related friction between the two surfaces<sup>5</sup>. Pleuritic chest pain may be local or referred. The pain eases with strapping of the chest or on accumulation of fluid. Because dyspnoea and chest pain are non specific symptoms, a careful history and physical examination are important in narrowing down the differential diagnoses.

History provides information about the possible etiology of pleural effusion and guidelines for the necessary investigations. A history of fever suggests a parapneumonic effusion, either complicated or uncomplicated. Older age, weight loss and a history of smoking points towards diagnosis of malignant pleural effusion. A history of cardiac, renal or hepatic impairment indicates a transudative pleural effusion. Recent swelling or deep vein thrombosis may cause effusion related to pulmonary embolism.

Physical examination findings like ascites may indicate a cirrhosis or Meigh's syndrome<sup>6</sup>. Post

cardiac injury syndrome may be considered in cases of fever, dyspnoea and pleuritic chest pain up to 3 weeks post cardiac surgery<sup>7</sup>. History and findings suggestive of connective tissue disease, and certain long term medications like amiodarone<sup>8</sup>, methotrexate, phenytoin, Nitrofurantoin and Isoniazid<sup>9</sup> suggests that as a possible etiology<sup>10</sup>.

Physical findings are signs of volume gain, reduced tactile vocal fremitus, dullness on percussion, shifting dullness and diminished or absent breath sounds. Shifting dullness will be absent in loculated effusions and massive effusions. Massive pleural effusion presents with respiratory embarrassment and signs of mediastinal shift. Other findings may be related to associated systemic disease.

Standard posteroanterior and lateral chest radiography remains the most important technique for the initial diagnosis of pleural effusion. The amount of fluid to be evident on posteroanterior film is 200ml, whereas costophrenic angle blunting can be appreciated on a lateral film when approximately 50mL of fluid has accumulated. Classically, a homogeneous opacity is seen with the obliteration of the costophrenic angle and a curved upper border, ie, Elie's S shaped curve. This is a radiological illusion and occurs as a medial radiological density due to the presence of partially aerated lung between the anterior and posterior fluid layers, whereas laterally the density is higher due to the presence of fluid only.

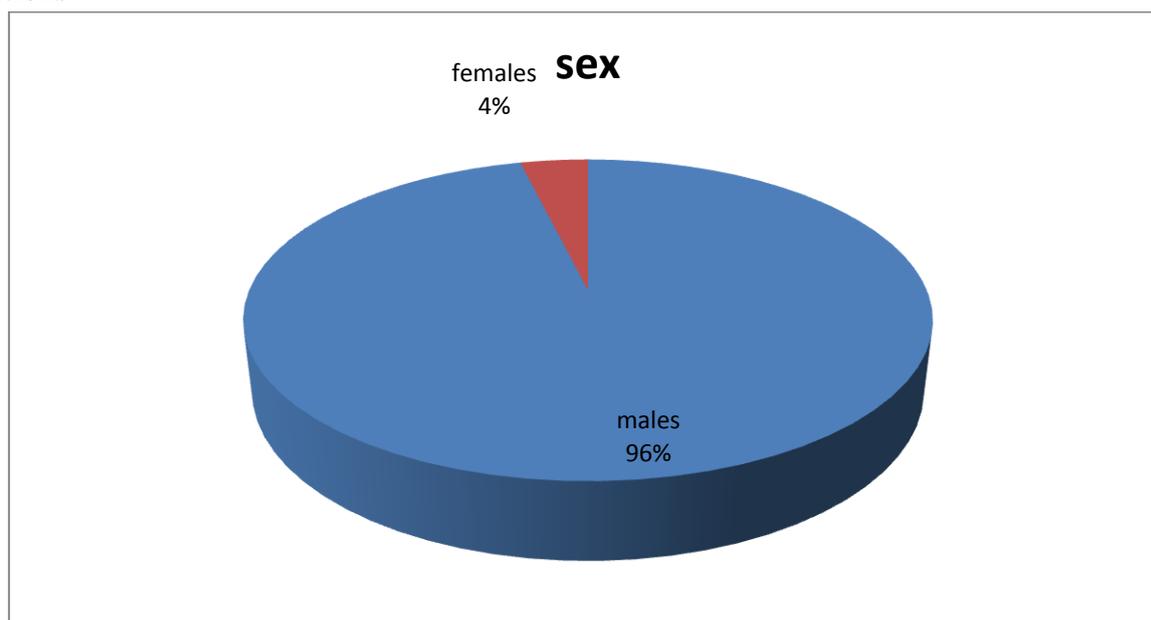
Even small amounts of pleural effusion can be detected accurately by ultrasonography. The ultrasonographic image of pleural effusion is characterized by an echo-free space between the parietal and visceral pleura. Ultrasonography can be helpful in cases of loculated pleural effusion for confirmation of the diagnosis and for marking the site for thoracentesis. In the presence of hemithorax opacification on chest radiography, ultrasonography is also helpful in distinguishing between fluid filled and solid lesions<sup>11</sup>.

Computed Tomography (CT) scanning with its cross sectional images can be used to evaluate

complex situations in which the anatomy cannot be fully assessed by plain radiography or ultrasonography<sup>12</sup>.

Thoracocentesis should be performed in all patients with more than minimal pleural effusion (larger than 1 cm in height on lateral decubitus radiography, ultrasonography or CT) of unknown origin. Aspiration should not be performed for bilateral pleural effusions in a clinical setting strongly suggestive of a transudate, unless there are atypical features or the patient fails to respond to therapy<sup>13</sup>. Diagnostic pleural tap with biochemical, cytological and microbiological examination of the fluid is needed for correct diagnosis. Differentiation between transudate and exudates is crucial before further tests undertaken. A percutaneous pleural biopsy may be needed in case of exudative effusion for definitive diagnosis. Colour, odour and character of fluid are occasionally helpful in narrowing the differential diagnosis. Hemorrhagic effusions can be differentiated from traumatic pleural tap by observing serial samples. The routine pleural fluid evaluation usually includes determination of protein, pH, LDH, Glucose and albumin levels, with adenosine deaminase and cell count for differential and cytological examination<sup>14</sup>.

### Observations



**Figure 1:** Sex distribution of the 100 cases of pleural effusion

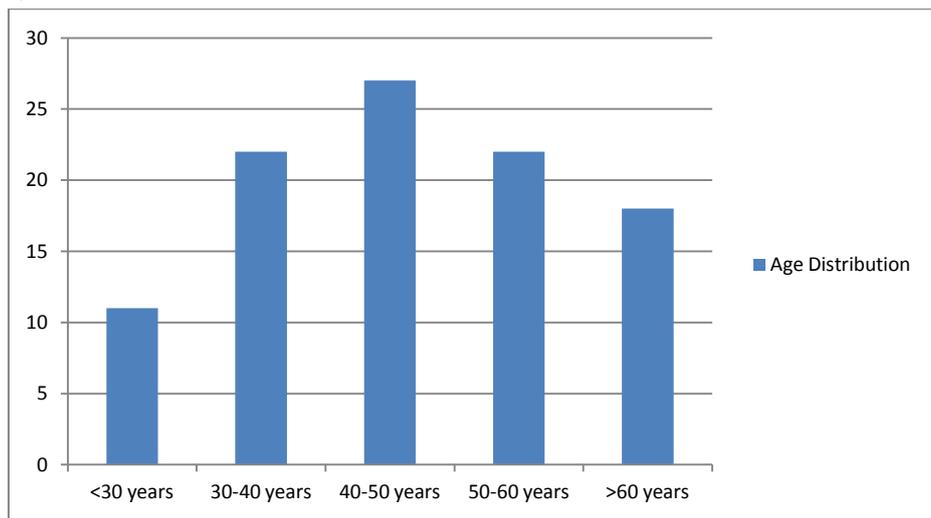
Hence, a detailed clinical evaluation including history taking, physical examination and relevant diagnostic tests are essential to identify the cause of pleural effusion, which is essential for arriving at the treatment decision. A study was conducted in a tertiary care centre in South Kerala to know the clinical profile of patients with pleural effusion.

### Materials and Methods

The study was conducted in the Government TD Medical College, Alappuzha in the year 2015-16. It was a hospital based observational study and included 100 cases of pleural effusion admitted in the Department of Medicine. A structured interview was carried out in all cases of pleural effusion and diagnostic paracentesis was carried out in those satisfying the inclusion criteria. Lights criteria was applied and the patients were classified into transudative and exudative and further investigations were carried out appropriately.

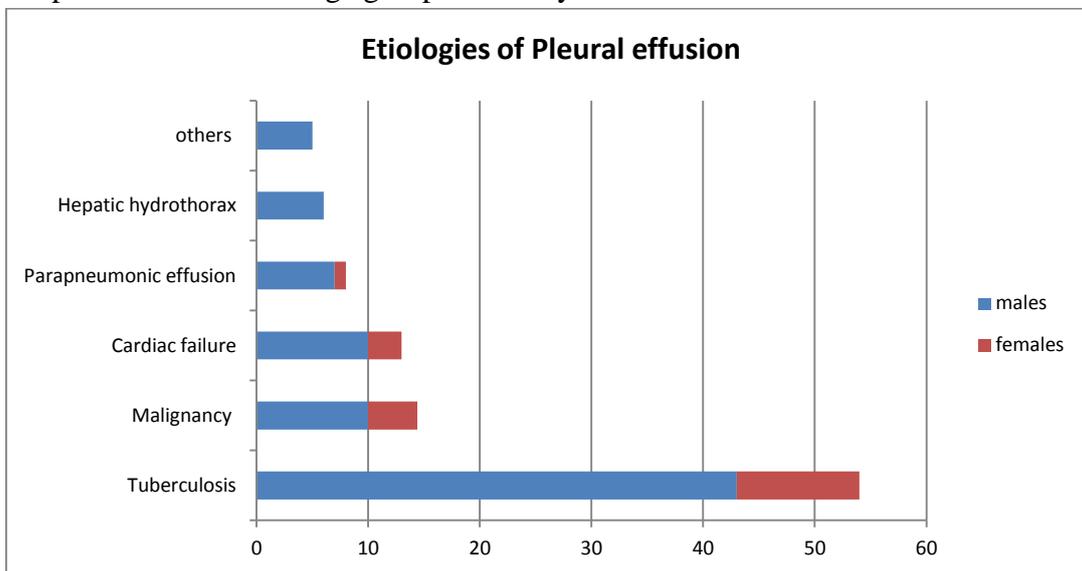
All individuals above 12 years of age with a diagnosis of pleural effusion who were willing to participate in the study after obtaining a written consent were included in the study

Of the 100 patients, 81 were males and 19 were females.



**Figure 2:** Age distribution of the cases

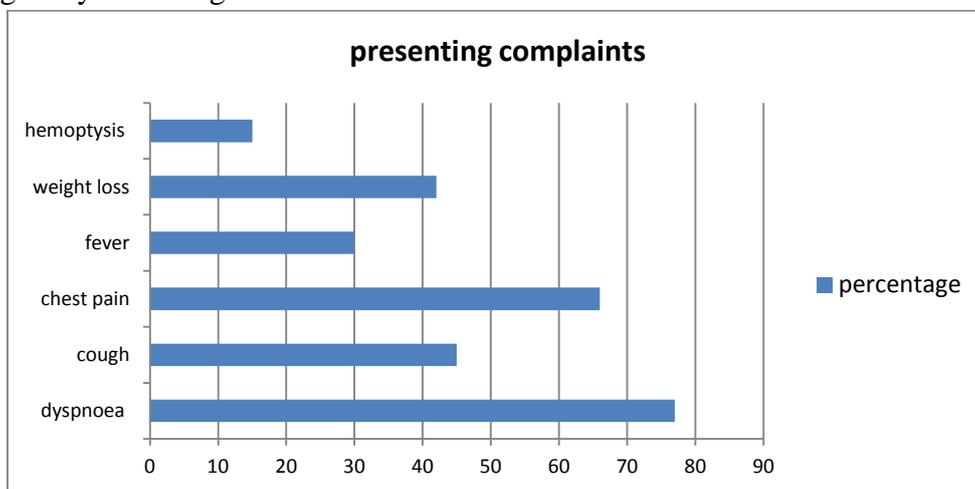
Majority of the patients were in the age group of 30-60years with a mean of 46.49 and SD 13.5



**Figure 3:** Etiologies of Pleural effusion

The most common cause of pleural effusion was Tuberculous followed by malignancy. The most common malignancy causing effusion was

carcinoma of the lung. All the etiologies of pleural effusion showed a male preponderance.



**Figure4:** Presenting complaints of the cases of pleural effusion

Among the 100 patients, the most common symptom was dyspnoea (77%), followed by pleuritic chest pain (66%).

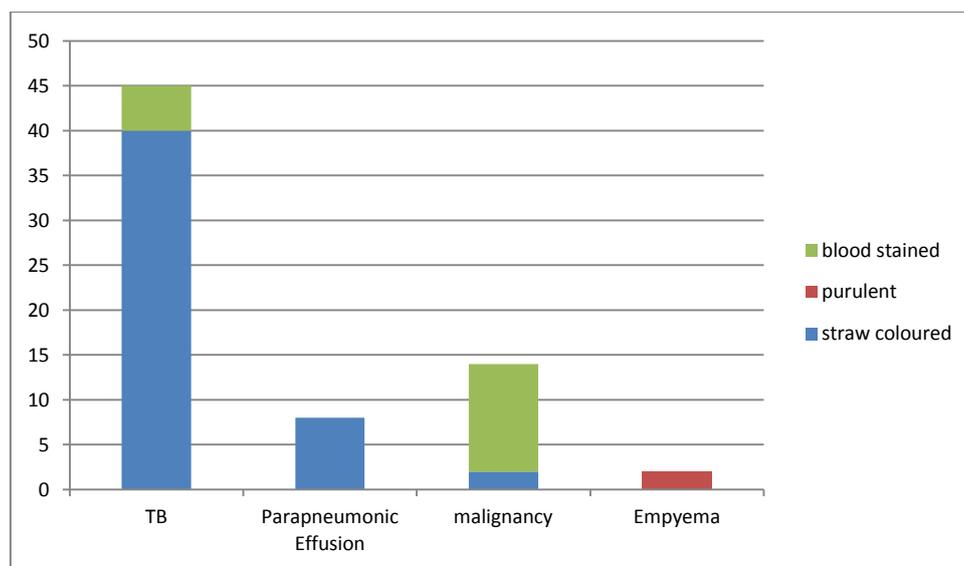
Pallor was present in 24 cases of tuberculous effusion (p value 0.000) and all 14 cases of malignant effusion (p value 0.001).

Clubbing had a significant association with malignant effusions (p value 0.000) and empyema (p value 0.012).

5 out of 14 patients with malignant effusion had significant lymphadenopathy (p value 0.000).

86% of the subjects had ESR > 80 mm fall in the first hour.

Out of the 100 patients, 66 had right-sided effusion, 28 had left-sided and 6 had bilateral effusion. 52 of the 100 patients had mild pleural effusion, clinically and radiologically.



**Figure 5:** Gross appearance of pleural fluid

49 out of 54 tuberculous effusions had straw coloured effusion and 12 out of 14 malignant effusions were blood stained. (p value 0.000).

94.4% of the tuberculous effusions had a pleural fluid lymphocyte of 80-100% (p value 0.000). 87.5% of the parapneumonic effusions had pleural fluid polymorphs between 80-100%. (p value 0.000).

44.4% of tuberculous effusions had pleural fluid protein >5 gm% (p value 0.000).

Pleural fluid ADA was > 40 IU/ml in all cases of Tuberculous effusion. (p value 0.000). Most of the malignant effusions had a ADA level of <30.

Pleural fluid cytology was positive in 1 out of 14 cases of malignant effusion. (p value 0.015)

Tuberculin skin test was positive in 61.10% cases of tuberculous effusion. (p value 0.000).

Sputum was negative for Acid Fast Bacilli in 88.9% of Tuberculous pleural effusions. (p value 0.000).

The most common malignancy was Adenocarcinoma lung, followed by squamous cell carcinoma and mesothelioma.

### Conclusions

Pleural effusion was more commonly seen in males. Tuberculosis followed by malignancy were the major causes of pleural effusion. Among the clinical signs, pallor had a significant association with tuberculous and malignant effusions. Clubbing was significantly associated with malignancy and empyema. Lymphadenopathy had an association with malignant effusion. Most of the patients with pleural effusion had a high ESR. Most of the tuberculous effusions were straw coloured, whereas malignant effusions were blood stained with a significant association. Lymphocyte predominance in pleural fluid was significantly associated with tuberculous effusion. ADA was very sensitive in ruling out Tuberculous effusion.

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