



## Study of Socio- Clinical Profile and Aetiology of Pleural Effusion

Authors

**Dr Gursimran Singh<sup>1</sup>, Dr Jyoti Landge<sup>2</sup>, Dr Harpreet Singh<sup>3</sup>**

<sup>1</sup>Junior Resident, Dept of Medicine, Dr D Y Patil Medical College, Pimpri, Pune

<sup>2</sup>Assistant Professor, Dept of Community Med, Dr D Y Patil Medical College, Pimpri Pune

<sup>3</sup>DM Gastroenterology, Amritsar

### Abstract

**Introduction:** Pleural effusion is an abnormal, collection of fluid in pleural space resulting from excess of fluid production or decreased absorption. Exudates are produced by variety of inflammatory conditions and require more extensive evaluation and treatment than transudates. Laboratory testing (albumin, glucose, pH, LDH, cell counts) helps to reach the aetiology of pleural exudates. Present study was conducted to find out socio-clinical profile of plural effusion and to find out aetiology by using various laboratory tests.

**Aims and Objectives:** To study socio-clinical profile and aetiology of pleural effusion.

**Material and Methods:** Descriptive and Cross sectional study was conducted in Dept. of General Medicine, Dr. D.Y. Patil Medical College, Pune from Sept 2013 to Aug 2015. Institute Ethics committee approvals obtained before the start of study. Total 50 cases were collected by convenient sampling method. Age more than 15 years were included. Patients on AKT or ART, Age less than 15 years, pregnant women, post traumatic effusion and critically ill patients of pleural effusion on ventilator were excluded from study.

**Results:** Maximum 29(58%) patients were in age group of 30-45 years, M:F= 2.3:1. Mean age was 37.34 years and in range of 17-67 years. More commonly presenting symptoms were pain in chest, fever and dyspnoea. Typical features of pleural effusion i.e. diminished movements, dull percussion note and absent breath sounds were observed in 40 (80%). Out of 50 cases 30 were exudative pleural effusion, and maximum 18 cases out of 30 were Tuberculosis as a cause for pleural effusion.

**Keyword:** Clinical profile, aetiology, Pleural effusion

### Introduction

Pleural effusion is an abnormal, collection of fluid in pleural space resulting from excess of Fluid production or decreased absorption.<sup>1</sup> The small amount of fluid is maintained through balance of hydrostatic and oncotic pressure and lymphatic drainage, a disturbance of which may lead to pathology.<sup>2</sup> Pleural effusion is a sign of disease and not a diagnosis in itself.<sup>3</sup> The effects of

accumulation of fluid in pleural space depend upon cause and an amount of fluid. Small effusions are often symptomless, even large effusions if they accumulate slowly, may cause little or no discomfort to the patient. If the effusion is due to inflammatory disease, it often starts with pleuritic pain that may be relieved as fluid accumulates. The usual symptom of a large effusion is shortness of breath, often accompanied

by dull ache on the affected side, this is especially light if effusion is due to malignant disease of pleura. Recurrent dry cough is frequently present especially if fluid is accumulated quickly.<sup>4</sup> An accurate diagnosis of the cause of effusion, transudate versus exudates relies on comparison of the chemistries in the pleural fluid to those in blood using light's criteria.<sup>5</sup>

Exudates are produced by variety of inflammatory conditions and require more extensive evaluation and treatment than transudates. Laboratory testing (albumin, glucose, pH, LDH, cell counts) helps to reach the aetiology of pleural exudates. However certain types of exudative pleural effusion might be suspected simply by observing the gross characteristics of the fluid obtained through thoracentesis like frankly purulent fluid indicates empyema. A putrid odor suggests an anaerobic empyema, a milky opalescent fluid suggests chylothorax, resulting from lymphatic obstruction by malignancy or thoracic duct injury by trauma or surgical procedure. Straw colored suggests tubercular whereas grossly bloody fluid may result from trauma, malignancy, postpericardiotomy syndrome or asbestos related effusions and needs hematocrit test of the sample. Pleural fluid hematocrit level of >50% of peripheral haematocrit defines haemothorax and needs thoracostomy.<sup>6</sup>

Present study was conducted to find out socio-clinical profile of plural effusion and to find out aetiology by using various laboratory tests.

### **Aims and Objectives**

To study clinical profile and aetiology of pleural effusion.

### **Material and Methods**

Descriptive and Cross sectional study was conducted in Dept. of General Medicine, Dr. D.Y. Patil Medical College, Pune from Sept 2013 to Aug2015. Institute Ethics committee approvals obtained before the start of study. Total 50 cases were collected by convenient sampling method. Patients with pleural effusion diagnosed clinically

having symptoms like pleurisy chest pain, breathlessness, cough and Confirmed by imaging (x ray chest) and Age more than 15years were included. Patients on AKT or ART, Age less than 15 years, pregnant women, Post traumatic effusion and critically ill patients of pleural effusion on ventilator were excluded from study.

### **Diagnostic Work Up**

Thorough history and physical examination was carried out in each patient and entered onto a standard proforma.

Chest x-ray was done in all patients who were included in the study.

Thoracentesis was performed in all patients unless the clinical picture was strongly suggestive of a transudative effusion as in congestive cardiac failure, chronic kidney disease, chronic liver disease, etc.) And was avoided in patients with a clinical diagnosis of pulmonary thromboembolism, acute pancreatitis and post surgery cases who improved on treating the underlying condition.

Pleural fluid tapping was done under aseptic conditions, using a 16 gauze needle.

Minimum of 80 ml of fluid was aspirated and its appearance was noted and sent for the routine investigations which include Total count, differential count, sugar, protein, LDH, Gram stain, AFB, ADA, culture and cytology.

At the same time, blood samples were taken for determination of glucose, protein, LDH, and ESR.

In warranted patients, pleural biopsy was sent to the microbiology and histopathology laboratories for the diagnosis of TB and malignant pleural effusions.

Additional investigations such as 2D echo was done in cases suspected to have congestive cardiac failure. RFT and LFT were monitored in chronic kidney disease and chronic liver disease patients. Also HIV and CD4 counts were done in indicated cases. Other investigations such as bronchoscopy, USG-Abdomen, CT-Abdomen, bone marrow biopsy, bone scan, fine needle aspiration of pulmonary mass or lymph nodes were done in warranted cases.

**Exudative effusion:** by Light's criteria <sup>4</sup>

- Pleural fluid protein divided by serum protein >0.5
- Pleural fluid LDH divided by serum LDH >0.6
- Pleural fluid LDH more than two-thirds the upper limits of normal serum LDH

**Transudative effusion:** by Light's criteria <sup>4</sup>

- Pleural fluid protein divided by serum protein <0.5
- Pleural fluid LDH divided by serum LDH <0.6
- Pleural fluid LDH less than two-thirds the upper limits of normal serum LDH

**Statistical analysis**

Data analysis done by entering the data in Microsoft excel and analysed by using Epi info3.5.4 version. Quantitative variables summarised using mean and standard deviation (SD). Qualitative variables will be summarised using proportions.

**Results**

Maximum 29(58%) patients were in age group of 30-45 years, out of 50, 15(30%) were female and 35(70%) were male (M:F= 2.3:1). Mean age for cases were 37.34years and in range of 17-67years. Out of 50 cases 36 (72%) were residing in urban slum of pune and were migrated from rural Maharashtra and other states. More commonly presenting symptoms were pain in chest, fever and dyspnoea in 42 (84%), 39(78%) and 35 (70%) cases respectively. Cough was also an important manifestation and was in 34 (68%) of cases. Weight loss, loss of appetite, night sweats, haemoptysis were seen in 22(44%), 15 (30%), 12 (24%) and 5 (10%) of the cases respectively. History of smoking were given by 19 (38%) cases and all smokers were male only.

Typical features of pleural effusion i.e. diminished movements, dull percussion note and absent breath sounds were observed in 40 (80%). Bronchial breathing detected in 35 (70%) of the cases. Anaemia was very common finding seen in 30 (60%) of cases. However, hepatomegaly,

lymph adenopathy, ascitis was observed in 10 (20%), 11 (22%), 12 (24%) cases respectively. Out of 50 cases 30 (60%) had exudative pleural effusion according to Light's Criteria.

Mean value for BSL, Protein and LDH were 103.92mg/dl, 67.58mg/dl and 202.46 IU respectively. The mean ESR was 52.98mm in first hour and in range of 26-82mm. The mean hemoglobin concentration was 11.4gm/ and in range of 6.5- 14.3gm/dl. The mean value for haematocrit was 51.9% and in range of 22-89%.

Out of 50 cases, 45 (90%) had lymphocyte predominant, there was no significant association between differential count predominance and exudative and transudative pleural effusion (p value >0.05)

Cytological examination of pleural fluid revealed mean TLC count was 119.26/Cu mm and in range of 23-263/Cu mm. TLC count for exudative pleural fluid was >100.

Mean value for Pleural fluid Glucose, Protein, LDH and ADA were 52.86mg/dl, 37.82mg/dl, 202.46IU/L and 47.66 U/L respectively. Range for Pleural fluid Glucose, Protein, LDH and ADA was 12-124mg/dl, 5-72mg/dl, 29-468IU/L and 11-88U/L respectively.

Out of 50 cases only 6 (12%) were gram stain positive, Out of 50 cases only 02 (4%) showed Zn –staining positive. PCR was done among 5 cases having suspected diagnosis of TB effusion, out of which 03(60%) cases found PCR positive. Pleural biopsy was done in 05 doubtful cases. In whom 03(60%) turned out to be tubercular and 02(40%) was having non-tubercular pathology.

**Table 1:** Distribution of cases as per age and sex

Age group in years	Female	Male	Total
15-30	4(36.4%)	7(63.6%)	11
31-44	9(31%)	20(69%)	29
46-60	2(28.6%)	5(71.4%)	7
>60	0	3(100%)	3
<b>TOTAL</b>	15(30%)	35(70%)	50

**Table 2:** Naked Eye Appearance of Pleural Fluid

Colour of fluid	No. of cases	%
Straw Colored	36	72
Haemorrhagic	6	12
Yellow Colored	8	16

**Table 3:** Age Wise Distribution of Exudative and Transudative Pleural Effusion According To Light's Criteria

Age group in years	Exudative	Transudative	TOTAL
15-30	7(63.6%)	4 (36.4%)	11
31-45	19(65.5%)	10(34.5%)	29
46-60	3(42.9%)	4(57.1%)	7
>60	1(33.3%)	2(66.7%)	3
<b>TOTAL</b>	30(60%)	20(40%)	50

**Table 4:** Distribution of Sex in Transudative and Exudative Pleural Effusion According To Light's Criteria

Pleural Effusion	Male		Female		Total
	No.	%	No.	%	No.
Transudative pleural effusion	14	70	6	30	20
Exudative pleural effusion	21	70	9	30	30
Total	35	70	15	30	50

\*(p value>0.5, chi square test) no significant difference between sex and transudative and exudative pleural effusion.

**Table 5:** Etiological Diagnosis Pleural Effusion

Etiological Diagnosis Pleural Effusion	No. of cases	%
<b>Transudative pleural effusion (n=20)</b>		<b>40%</b>
• Congestive heart failure	5	25.0
• Renal disease	2	10.0
• Cirrhosis of liver	12	60.0
• Hypoproteinemia/drug allergy	1	5.0
<b>Exudative pleural effusion (n=30)</b>		<b>60%</b>
• Tubercular pleural effusion	18	60.0
• Non tubercular pleural effusion		
- Malignant pleural effusion	3	10.0
- Parapneumonic	6	20.0
- Pancreatitis	2	6.6
- Collagen vascular disease	1	3.3

### Discussion

The first step in determining the etiology of pleural effusion is detailed history and clinical examination. Next step is the classification of effusion into transudative and exudative pleural effusion, because transudative pleural effusion has few possible causes which along with supporting history/examination do not require restoring to diagnostic techniques that are necessary to distinguish amongst the many possible causes of exudative pleural effusion.<sup>7</sup>

### Age and Sex of Cases

In our study it was seen that patients with pleural effusion were in the age group of 17-67 years. The mean age was 37.34 years. As compared to sibley series 1950 of 200 patients where the mean age was 20 years.<sup>8</sup>

Out of 50 Maximum 29(58%) patients were in age group of 30-45 years. This age group represent disease affecting most economical age group of society. This replicate high morbidity and mortality because of plural effusion among this age group, affecting economic burden indirectly. Berger et al (1973) reported 20 out of 49 patients were above the age of 35 years i.e. 40.82% and 8 (19.04%) patients were above the above of 50 years.

The male suffered 2.3 times more than the females, out of 50 cases of pleural effusion 35 (70%) were males and 15 (30%) were females.

### Symptoms and Physical Findings

Pleuritic chest pain was the most common presenting symptom among 42 (84%) cases. The next common symptoms were fever 39 (78%) and dyspnoea 35 (70%). The pain was usually on the site of effusion and disappear when effusion develops. The other symptoms were cough, weight loss, loss of appetite and night sweats. Haemoptysis and pain abdomen each was seen in 5 (10%) patients of the cases. These are comparable to A. Basu study (2012) which shows pleuritic chest pain, dyspnoea and fever in 86.81%, 81.60% and 68.4% cases respectively.<sup>9</sup> Most of the patients (80%) of pleural effusion have typical features of pleural effusion i.e. diminished movements of chest, dull percussion note, absent breath sounds. Other important clinical signs seen in different patients of pleural effusion are anemia 30(60%), hepatomegaly 10(20%), ascitis 12(24%) and acute abdomen in 2(4%) raised JVP was seen in patients of massive pleural effusion. Ramayalakshami et al showed, Among 250 cases The predominant presenting complaint was dyspnea (73.6%), dry cough (62%), fever (58.8%), pleurisy(48.8%), loss of weight (22.4%), hemoptysis (1.6%) pleural

effusion associated with diabetes (22%), tuberculosis (9.2%), CKD (4.4%), CAD/CLD (3.2%), retropositive state (2%), hypothyroidism (2%), malignancy (1.6%), and Rheumatoid arthritis (1.2%).<sup>10</sup>

### Etiological Diagnosis (Table 5)

Out of 50 cases of pleural effusion 30 were exudative effusion and 20 were transudative effusion according to Light's criteria. Among exudative effusion cases maximum 18 (60%) were diagnosed as tubercular pleural effusion followed by 6(20%) were parapneumonic effusion. Among transudative effusion cases maximum 12(60%) were diagnosed as cirrhosis of liver followed by 5(25%) were congestive heart failure. In a study by Souvik Ray et al Pleural effusion was found in 29 out of 430 patients with CKD (6.7%), Heart failure was the single most common cause (41.9%, 13 of 31). Tuberculosis (TB) (n=8, 25.8%) and uraemic effusions (n=6, 19.4%) were responsible for the majority of exudates.<sup>11</sup>

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