

A Study of Etiology and Clinical Profile of Patient with Pleural Effusion in a Teaching Hospital

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Abstract:

Objective – Abnormal collection of fluid in pleural cavity is pleural effusion. Aim of this study was to provide a systematic approach to investigate the patients of pleural effusion in respect to etiology and clinical profile.

Material and Method:

A prospective observational study was conducted in 100 consecutive cases of pleural effusion. Detailed history, clinical examination. Thoracentesis followed by pleural fluid analysis were done in each cases. Pleural biopsy, Fiberoptic bronchoscopy, CT scan were done where indicated.

Results – Most of the cases were male (65%) and were in the age group of 31-40 years(36%). Exudative pleural effusion was commonest (93%). Tuberculosis was the most common cause of pleural effusion (58%) followed by malignancy (20%). Cough was the most common symptom followed by dyspnea. There was 3% cases of undiagnosed pleural effusion.

Conclusion:

The study revealed Tuberculosis as the predominant cause of pleural effusion. There is an upward trend of malignancy as a cause of pleural effusion. Cell block study was more yielding than conventional smear examination for diagnosis of malignant pleural effusion. Thoracoscopy should be done in undiagnosed pleural effusion.

Key words – Pleural effusion, Tuberculosis, Malignancy, Pleural fluid analysis, Pleural biopsy.

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I. Introduction

Abnormal accumulation of fluid in pleural cavity is called pleural effusion. A large number of diseases may cause pleural effusion. Primarily they are classified as exudative and transudateive effusion according to light's criteria. The causes of pleural effusion may be of Pulmonary or extrapulmonary origin Common Causes of transudative effusion are CCF, Cirrhosis of liver, CKD where as exudative pleural effusion are commonly caused by Tuberculosis and other infections, neoplastic disease, collagen tissue disease. In a study from Qatar it was found that most frequent causes of pleural effusion were Tuberculosis, followed by Pneumonia, Cancer and Cardiac failure¹. Bilateral pleural effusion is strongly suggestive of transudative effusion and thoracentesis generally not performed unless otherwise indicated². Pleural biopsy is useful mainly in the diagnosis of malignant Pleural Effusion, but also helpful in diagnosing Tubercular pleural effusion. The percentage of positive pleural biopsy in Malignant Pleural Effusion is 39% to 75%³.

Main objectives of the study is 1) To study the clinical profile of patients with pleural effusion. 2) To study different etiological factors behind Pleural Effusion.

II. Material and Methods

This study was conducted in the department of pulmonary medicine, Calcutta National Medical College, Kolkata.

Total 100 adult patients of both sexes were selected for the study.

Inclusion Criteria:

Adult patients with radiological and / or sonological evidence of Pleural Effusion, where at least 10ml of pleural fluid could be aspirated.

Exclusion Criteria:

Patient of Pleural Effusion where at least 10ml of pleural fluid could not be aspirated.

Detailed clinical examination including history and systemic examination was conducted in every patient. Routine laboratory investigation such as complete blood count, sugar, urea, creatine, LFT were carried out in each patient.

Diagnostic thoracentesis was done in all patients. Fluid was sent for cell count, cell type, protein, sugar, Adenosine Deaminase (ADA), M-cell, LDH, gram stain, c/s, AFB stain. At the same time blood sample was sent for serum protein, LDH. In suspected malignant Pleural Effusion, cell block study of pleural fluid was done.

Pleural biopsy was carried out where necessary for histopathological examination. Pleural tissue also sent for mycobacterial culture in indicated cases.

Pleural fluid CBNAAT examination, CT thorax, Fibreoptic bronchoscopy (FOB) were done where indicated. Additional investigation like collagen profile was done in relevant cases.

III. Results

Among 100 patients studied 65 (65%) were male, 35 (35%) were female with a Male to Female ratio 1.8:1. Mean age was 38.71 ± 12.97 . Majority of the patients were in the age group of 31-40 years (Table-1). Out of 100 patients 93 (93%) had exudative pleural effusion and 7 (7%) had Transudative pleural effusion.

Among exudative Pleural Effusion Tuberculosis Predominated 58 (58%) followed by malignancy 20 (20%) (Table -2)

Analysis of clinical symptoms revealed cough was the most common symptom and was present in 74 (74%) patient followed by dyspnoea in 66 (66%) patient (Table-3).

Table 4 shows Right sided Pleural Effusion was the predominated site of involvement seen in 64(64%) patient and was the predominant site in both Tuberculosis (62%) and malignancy (55%). Almost 63% patient had moderate Pleural Effusion (Table 5).

Pleural fluid ADA was the most significant parameter for diagnosing TB Pleural Effusion. In 91.4% patient of TB Pleural Effusion pleural fluid ADA was more than 40 (Table 7).

In 10 patients pleural fluid ADA was in the range of 30 to 40 and where no diagnosis could be made by other investigations. Pleural fluid CBNAAT and pleural biopsy were done in all these cases. CBNAAT was positive in 2 cases and pleural biopsy was suggestive of TB in 4 cases and malignancy in 3 cases. CT scan followed by Fibre Optic Bronchoscopy (FOB) was done in 1 patient which established the diagnosis of malignancy. In this study while comparing pleural biopsy with pleural fluid cytology in Malignant Pleural Effusion, pleural biopsy was positive in 18 (90%) case, cell cytology was positive in 12(60%) cases (Table 8). None was inconclusive in pleural biopsy where 2 (10%) cases were inconclusive in cell cytology. Despite all investigations the causes of Pleural Effusion remained undiagnosed in 3 cases (3%).

IV. Discussion

In our study 65 (65%) patients were male and 35 (35%) patients were female with a male to female ratio of 1.8:1. This finding is comparable to the studies of Maldhure (2.13:1) and Valdes (1.6:1)^{4,5}.

Majority of the patients were of the age group of 31 to 40 years. In our study it was evident that Tuberculosis was the most common cause of Pleural effusion (58%). Similar results were found in the studies of Laim and Prabhudesai^{6,7}.

In general Tuberculosis Pleural Effusion is younger than Parenchymal TB and usually unilateral. In our study mean age of TB Pleural Effusion was 35.28 ± 8.17 . Similar results were found in studies of Kalaajieh WK et al and Ibrahim WH et al^{8,9}.

In our study the second most common cause of pleural effusion was malignancy (20%). This was supported by a study done by Parikh et al¹⁰.

Similar results were found in studies of Dambal A¹¹ and in a study from Czech republic¹².

In our study the mean age in Malignant Pleural Effusion was 46.7 ± 17.27 . It was comparable with studies by Sharma et al¹³. In many reports from different countries, a majority of these patients were over 50 years of age^{6,7,14}.

It was found in our study that cough was the most common symptom (74%) followed by Dyspnoea (66%). Similar results were found in studies of Kausal et al and Godwin et al^{15,16}.

In our study Right sided Pleural Effusion was the commonest site of involvement (64%) and was the predominant site in both TB (62%) and malignancy (55%). This was supported by studies done by Laim et al, Dambal et al and Marel et al^{6,11,12}.

It was seen in our study that in 91.4% of patient of TB Pleural Effusion pleural fluid ADA was more than 40. The higher the level the more likely of TB. It was supported by studies of Liang et al¹⁷.

In association with lymphocytic pleural effusion ADA has 95% sensitivity and 89% specificity in TB Pleural Effusion.¹⁸

While comparing pleural biopsy with pleural fluid cytology in Malignant Pleural Effusion, it was found in our study that pleural biopsy was positive in 90% cases, cell cytology was positive in 60% cases. Similar results were found in studies of Beuno et al, Jarvi et al^{19,20}.

The cytological yield in Malignant Pleural Effusion is higher when smear and cell blocks are used^{21,22}. In our study the undiagnosed Pleural Effusion was 3%. In a study by Kendall et al it was found to be 8%²³

V. Conclusion

The study revealed Tuberculosis as the predominant cause of Pleural Effusion followed by malignancy. There is an upward trend of malignancy as a cause of Pleural effusion. There is also an increasing trend of malignant pleural effusion to be found in younger age group. Cell block study was more yielding than conventional smear examination for diagnosis of malignant Pleural Effusion. Thoracoscopy should be done in undiagnosed pleural effusion. This study was intended to provide a systematic approach to investigate the patient of Pleural Effusion so as early necessary treatment can be initiated without delay in etiological diagnosis.

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Table -1: Age & Sex wise distribution of pleural effusion

Age	No.of Patients		Total	Percentage (%)
	Male	Female		
12-20	5	3	8	8
21-30	10	5	15	15
31-40	22	14	36	36
41-50	17	9	26	26
51-60	7	3	10	10
>60	4	1	5	5
Total	65	35	100	100

Chart -1 : Showing Sex distribution

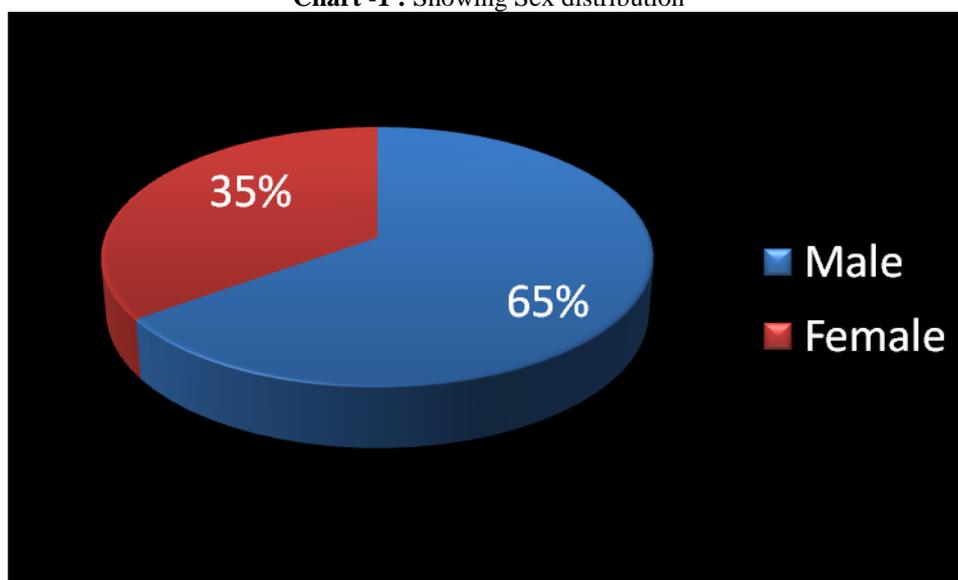


Chart -2: Showing age distribution

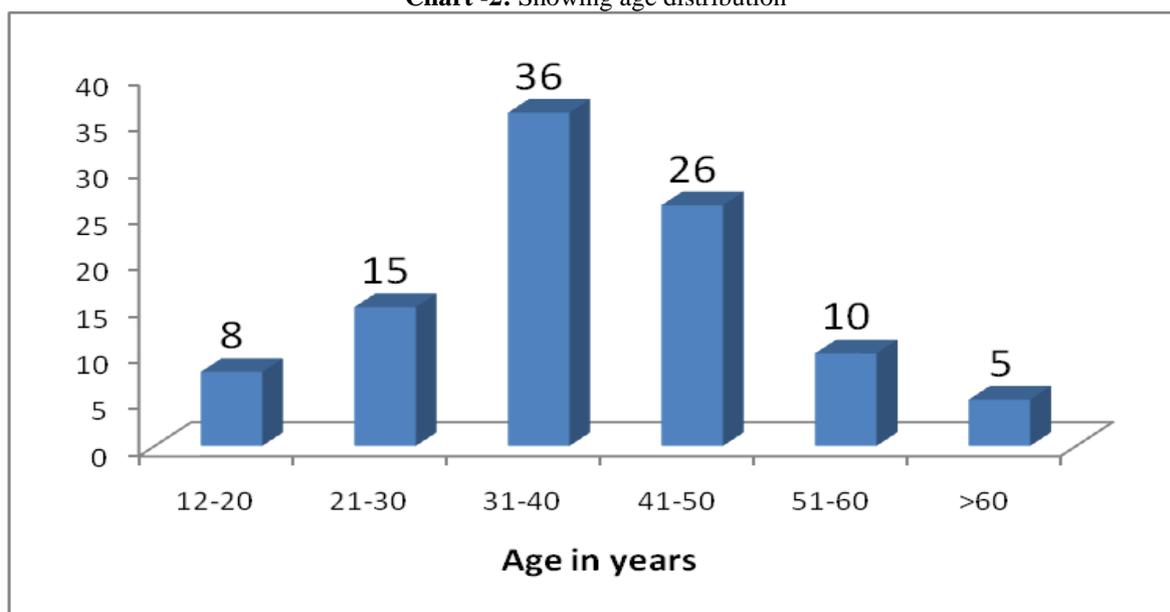


Table – 2 Etiology of pleural effusion

Diagnosis	No.of Patients		Percentage (%)	Total
	Exudative	Transudative		
TB	58		58	58
Malignancy	20		20	20
Para-Pneumonic	9		9	9
RA	1		1	1
Empyema	2		2	2

CCF		4	4	4
Cirrhosis		2	2	2
CKD		1	1	1
Undiagnosed	3		3	3
Total	93	7		100

Table -3Symptomatology

Symptoms	No. of Patients	Percentage (%)
Fever	58	58
Dyspnoea	66	66
Cough	74	74
Chest Pain	40	40
Weight loss	46	46

Table -4:Site of involvement

Anatomical	No. of Patients	Percentage (%)
Rt	64	64
Lt	28	28
B/L	8	8

Table -5Radiological extent of Pleural Effusion

Severity	No. of Patients	Percentage (%)
Mild	21	21
Moderate	63	63
Massive	16	16
Total	100	100

Table -6Pleural fluid Cytology in different etiology

	Total cell count in mm ³			Neutrophilic predominate	Lymphocyte predominate
	<200	200-500	>500		
TB (58)	8	33	17	8	50
MPE (20)	3	12	5	2	18
PPE (9)	1	2	6	8	1
CCF (4)	4	0	0	0	4

Table -7 Pleural fluid ADA level in relation to various pleural effusion

Diagnosis	Total	Range of ADA					
		<40		40-70		>70	
		No.	%	No.	%	No.	%
TB	58	5	8.6	38	65.5	15	25.8
Malignant Pleural Effusion	20	18	90	2	10	0	0
Parapneumonic Effusion	9	5	55.5	4	44.40	0	0
Empyema	2	0	0	0	0	2	100
CCF	4	4	100	0	0	0	0

Table -8 Comparison of pleural biopsy and pleural fluid cytology results in Malignant Pleural Effusion.

Results	Pleural fluid cytology	Pleural biopsy
Positive	12 (60%)	18 (90%)
Negative	6 (30%)	2 (10%)
Inconclusive	2 (10%)	0
Total	20	20

Table -9 Cell cytology

Study	Predominant	Etiology of effusion
Present study	Lymphocyte	86.2% of Tubercular Effusion 90% of malignant effusion
Kaushal et al ¹⁵	Lymphocyte	97% of TB effusion 77% of malignant effusion

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