



## CLINICAL PROFILE OF PLEURAL EFFUSION IN PATIENTS ATTENDING IN THE DEPARTMENT OF RESPIRATORY MEDICINE, AGMC & GBP HOSPITAL

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### ABSTRACT

Pleural effusion is collection of fluid in the pleural cavity. Pleural fluid is produced primarily by the parietal pleural vessels and reabsorbed via the pleural lymphatic through stomata present in the parietal pleura. Pleural effusion has varied etiological factors and it constitutes one of the major causes of morbidity. Evaluation of the patient with pleural effusion is important for differential diagnosis as it includes both benign and life-threatening malignant conditions. **Objectives:** To assess the clinical profile, microbiological and pathological indices of pleural fluid in the patients attending Respiratory Medicine Department of AGMC & GBPH, Agartala, Tripura West. **Methodology:** Cross-sectional hospital based observational study was conducted for a period of one and half years from February 2021 to July 2022 at AGMC & GBP Hospital in the Department of Respiratory Medicine. All new cases of pleural effusion attending OPD and IPD of Respiratory Medicine Department are included in the study. The patients were subjected to detail clinical history and underwent general physical examination and systemic examination, underwent pleural fluid aspiration. **Results:** The study found that the higher number of patients had exudative pleural effusion [133 (88.7%)]. ( $p < 0.00001$ ), ( $z = 13.3945$ ). 97 (ninety seven) patients (64.7%) had straw coloured pleural fluid ( $p < 0.00001$ ), 133 (one hundred thirty three) patients (88.7%) had sterile fluid. It was found that 113 (75.3%) patients had moderate pleural effusion ( $p < .000001$ ). A significant weight loss 63 (42.0%) and chest pain 52 (34.7%) were found among the cases. **Conclusion:** Our study showed 116 (77.3%) number of male patients. Majority of the patients were smokers [113 (75.3%)] and it was statistically significant. A significant number of patients had fever [117 (78.8%)]. It was found that most of the patients had right sided 94 (62.7%). 70 (46.7%) had moderate effusion and had exudative effusion. It was also found that 133 (88.7%) had sterile fluid on microbiological examination.

**KEYWORDS :** Pleural effusion, exudative effusion, transudative effusion.

### INTRODUCTION

Pleural effusion is collection of fluid in the pleural cavity which is lined by the two layers of pleura, the visceral and parietal pleura.<sup>1</sup>

Pleural fluid accumulation is a result of disruption in the balance between production and absorption. It is produced primarily by the parietal pleural vessels and reabsorbed via the pleural lymphatic through stomata present in the parietal pleura. In healthy individuals, the pleural cavity contains approximately 0.3 ml per Kg of fluid.<sup>2</sup> A pleural effusion occurs either when production exceeds reabsorption or when the mechanisms of reabsorption have been disrupted, the latter being more common.

Pleural effusion has varied etiological factors and it constitutes one of the major causes of morbidity in India as well as other parts of world. Evaluation of the patient with pleural effusion is challenging because the differential diagnosis is broad and includes both benign and life-threatening malignant conditions.<sup>3</sup>

Pleural effusions are categorized into two types based on protein level in the pleural fluid, transudative and exudative effusion. A transudative occurs when systemic factors influencing formation and absorption of pleural fluid (hydrostatic and oncotic pressure) are altered, e.g.: The effusion of heart failure and hypoalbuminemia in PEM and an exudative occurs when pleural surfaces or adjacent lung show increased vascular permeability due to an insult following inflammation or blockage in the exit route of flow of lymphatic drainage.<sup>3</sup> Lung cancer is the most common cause of malignant pleural effusion, followed by breast cancer.<sup>4</sup>

Many infectious, benign, and malignant diseases can cause pleural effusion. Lung cancer is the most common metastatic tumour to the pleura in men, while breast cancer is the most

common tumour in women.

Many patients with pleural effusion attend in the OPD of our Respiratory Medicine Department, AGMC & GB Pant Hospital and as in the past no analytical study has been undertaken to find out the various aetiologies of pleural effusion in the state of Tripura, therefore in this regard I had done my thesis work on this topic for future references.

### Aim & Objectives

1. To study the clinical presentation of pleural effusion in patients attending Respiratory Medicine Department of AGMC & GBPH.
2. To determine the biochemical, microbiological and pathological indices of pleural fluid

### MATERIALS & METHODS

The present study was a Cross sectional Observational study carried out in Respiratory Medicine Ward and OPD, Department of Respiratory Medicine, AGMC & GBP Hospital, Agartala, Tripura for a period of one and half years.

The study included all the new cases of pleural effusion that fulfil the inclusion criteria and attending in the Department of Respiratory Medicine of AGMC & GBP Hospital during the study period.

**Sampling Technique:** Census sampling. All the patients attending the Department of Respiratory Medicine diagnosed as pleural effusion during the study period was included in this study.

**Study Tools:** A predesigned proforma was used to collect relevant information, medical history, clinical features, demographic data, for each individual patient using a standard questionnaire.

### Inclusion Criteria

1. All new cases of pleural effusion attending OPD and IPD of Respiratory Medicine Department.
2. Age of 18 years and above.
3. Patient who has given valid consent.

**Exclusion Criteria**

1. Haemodynamically unstable Patients.
2. Patients with bleeding diathesis.
3. Patients who are not willing to undergo pleural tapping.

**Method**

All the new cases of pleural effusion, who attended in the Department of Respiratory Medicine and fulfilled the inclusion and exclusion criteria were included in this study. All the patients were subjected to detail clinical history and underwent general physical examination and systemic examination. All routine investigations, estimation of blood LDH and along with Chest X-Ray (PA view) was done for all the patients. Special investigation like lateral decubitus view of Chest X-ray and USG Thorax and CT Thorax was done whenever required. All patients who have consented underwent pleural fluid aspiration. In undiagnosed exudative pleural effusion of moderate to massive pleural effusion especially with recurrence & haemorrhagic effusion they underwent unguided pleural biopsy for HPE on prior consent from the patient and the accompanied patient party.

The pleural fluid was sent for biochemical, pathological and microbiological evaluation into the respective department of AGMC & GBP Hospital for all patients.

The samples were collected and sent for investigation in different vials as per the guidelines. The guidelines are as follows:<sup>5</sup> 1. Sterile vial for: Biochemical analysis. 2. Blood culture bottle for: Pleural fluid Culture.

Light's criteria<sup>2</sup> was used to differentiate exudative from transudative effusion,

Data management & analysis: All data collected was tabulated on a grand chart and analysed using a statistical software 'SPSS version 25'.

Ethical consideration: Study was conducted after getting approval from the Institutional Ethics Committee, AGMC

**RESULTS**

**Table 1: Distribution of Age in Group**

Age in group	Frequency	Percent
18-30	20	13.3%
31-40	38	25.3%
41-50	35	23.3%
51-60	29	19.3%
61-70	12	8.0%
71-80	7	4.7%
>81	9	6.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

Table 1 shows that 20 (13.3%) patients were 18-30 years of age, 38 (25.3%) patients were of 31-40 years of age, 35 (23.3%) patients were of 41-50 years of age, 29 (19.3%) patients were 51-60 years of age, 12 (8.0%) patients were 61-70 years of age, 7 (4.7%) patients were 71-80 years of age and (6.0%)

patients were >81 years of age. The value of z is -5.0124. The value of p is < 0.00001.

**Table 2: Distribution of Sex**

Sex	Frequency	Percent
Female	34	22.7%
Male	116	77.3%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In Table 2 there were 34 (22.7%) female patients and 116 (77.3%) male patients. The value of z is -9.4685

The value of p is < .00001

**Table 3: Distribution of Smoking**

Smoking	Frequency	Percent
Non-Smoker	37	24.7%
Smoker	113	75.3%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 113 (75.3%) patients were smokers.

**Table 4: Distribution of Fever**

Fever	Frequency	Percent
No	33	22.0%
Yes	117	78.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 117 (78.0%) patients had fever.

**Table 5: Distribution of Dyspnoea**

Dyspnea	Frequency	Percent
No	45	30.0%
Yes	105	70.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 105 (70.0%) patients had dyspnoea.

**Table 6: Distribution of Cough**

Cough	Frequency	Percent
No	18	12.0%
Yes	132	88.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 132 (88.0%) patients had cough.

**Table 7: Distribution of Chest pain**

Chest pain	Frequency	Percent
No	98	65.3%
Yes	52	34.7%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 52 (34.7%) patients had chest pain

**Table 8: Distribution of Weight Loss**

Weight Loss	Frequency	Percent
No	87	58.0%
Yes	63	42.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 63 (42.0%) patients had weightloss..

**Table 9: Distribution of Site**

Site	Frequency	Percent
BL	8	5.3%
Left	48	32.0%
Right	94	62.7%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 8 (5.3%) patients had bilateral (BL), 48 (32.0%) patients had left side and 94 (62.7%) patients had right side.

**Table 10: Distribution of Extent of Effusion Radiology**

Extent of Effusion on Radiology	Frequency	Percent
Mild	48	32.0%
Moderate	70	46.7%
Massive	32	21.3%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 32 (21.3%) patients had Massive, 48 (32.0%) patients had Mild and 70 (46.7%) patients had Moderate effusion. The value of z is -4.6314. The value of p is <.00001. The result is significant at p < .05.

**Table 11: Distribution of Types of Effusion**

Types of effusion	Frequency	Percent
Exudative	133	88.7%
Transudative	17	11.3%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 133 (88.7%) patients had exudative and 17 (11.3%) patients had transudative effusion.

**Table 12: Distribution of Physical Characteristics of Pleural Fluid**

Physical characteristics of pleural fluid	Frequency	Percent
Clear	17	11.3%
Cloudy	12	8.0%
Haemorrhagic	24	16.0%
Straw	97	64.7%
Milky	0	0.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

The present study shows 17 (11.3%) patients with clear pleural fluid, 12 (8.0%) patients with Cloudy pleural fluid, 24 (16.0%) patients with Haemorrhagic pleural fluid, 97 (64.7%) patients with Straw pleural fluid and 0 (0.0%) patients with Milky pleural fluid.

**Table 13: Distribution of Microbiological Examination**

Microbiological exam	Frequency	Percent
AFB	7	4.7%
GNB seen, klebsiella	3	2.0%
GNB seen, pseudomonas	4	2.7%
GPC seen, staphylococcus	3	2.0%
Sterile	133	88.7%
KOH	0	0.0%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In the present study, 7 (4.7%) patients had AFB, (2.0%) patients had GNB seen klebsiella, 4 (2.7%) patients had GNB seen, pseudomonas, 3 (2.0%) patients had GPC seen, staphylococcus, 133 (88.7%) patients had sterile and 0 (0.0%) patients had KOH.

**Table 14: Distribution of Comorbidities**

Comorbidities	Frequency	Percent
CAD	12	8.0%
CAD, T2DM	5	4.3%
CKD	6	4.0%
CLD	3	2.0%
HTN	15	10.0%
No	73	48.7%
T2DM	24	16.0%
T2DM, CKD	1	0.7%
T2DM, HTN	11	7.4%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

In our study, 12 (8.0%) patients had CAD, 5 (4.3%) patients had CAD, T2DM, 6 (4.0%) patients had CKD, 3 (2.0%) patients had CLD, 15 (10.0%) patients had HTN, 24 (16.7%) patients had T2DM, 1 (0.7%) patients had T2DM, CKD and 11 (7.4%) patients had T2DM, HTN.



**Table 15: Distribution of Etiology**

Etiology	Frequency	Percent
CCF	9	6.0%
CRF	2	1.3%
CVD [Rheumatoid Effusion]	2	1.3%
CVD [SLE]	1	0.7%
DCLD	4	2.7%
Malignancy	25	16.7%
Others	4	2.7%
Post CABG	1	0.7%
Post-op Atelectasis	2	1.3%
PPE	11	7.3%
PPE [Tubercular Empyema]	1	0.7%
Tuberculosis	86	57.3%
Uremia	2	1.3%
Total	150	100.0%

In our study, 9 (6.0%) patients had CCF 4 (2.7%) patients had DCLD, 25 (16.7%) patients had Malignancy, 4 (2.7%) patients had others, 11 (7.3%) patients had PPE and 86 (57.3%) patients had TB.

**Table 19: Distribution of Mean Age (Yr.)**

	Number	Mean	SD	Minimum	Maximum	Median
Age (Yr.)	150	47.5467	16.1231	19.0000	101.0000	47.0000

In above table showed that the mean age Mean ± S.D) of patients was 47.5467 ± 16.1231.

**DISCUSSION**

The present study was a Cross sectional and Observational study. This Study was conducted for One and half years at Department of Respiratory Medicine, AGMC & GBP Hospital, Agartala, Tripura. Total 150 patients were included in this study. We have found that, significantly higher number of patients had exudative pleural effusion [133 (88.7%)].(p< 0.0001), (Z=-10.8151)

In our study, the mean age of patients was 47.5467 ± 16.1231,.

We have found that out of 150 patients most of the patients were 31-40 years old [38 (25.3%)] which was statistically significant.

We have observed that, majority of the patients had Moderate [113 (75.3%)] effusion and it was statistically significant (p<.00001)

Our study showed higher number of patients had Cough [132 (88.0%)]. It was statistically significant (p<0.0001).

In our study, most of patients were Male [116 (77.3%)]. It was statistically significant (p<0.0001).

In our study, majority of the patients were Smoker [113 (75.3%)] and it was statistically significant (p<0.0001).

Porcel JM et al <sup>6</sup> (2006) suggested that the first step in the

evaluation of patients with pleural effusion is to determine whether the effusion is a transudate or an exudate. An exudative effusion is diagnosed if the patient meets Light's criteria. Manu Mohan K et al<sup>7</sup> (2012) examined that etiological diagnosis of Pleural effusion (PE) is really challenging to physician. Knowledge of common aetiologies of pleural effusion helps us in planning the approach when such a case is encountered. PE occurred more among males (68%) and in the age group between 46 to 60 years (33%).

Zahid M et al <sup>8</sup>(2020) observed that tuberculosis (TB) remains one of the top 10 causes of death globally. Main symptoms in decreasing order were cough (77%), fever (56%), and chest pain (54%). Zhao T et al <sup>9</sup> (2020) revealed that analysis of the occurrence factors and disease characteristics of tuberculous pleural effusion (TPE) dominated by neutrophils.

Ghosh BK et al <sup>10</sup> (2019) suggested that abnormal collection of fluid in pleural cavity is pleural effusion. Cough was the most common symptom followed by dyspnoea. Saini N et al <sup>11</sup> (2022) showed that unilateral pleural effusion is a challenge for a physician as the differential diagnosis is varied; sparse epidemiological data are available from India on this subject. Most common presenting symptoms were shortness of breath (56%), fever (53.4%), cough (52.5%), chest pain (35.3%), anorexia (34.5%) and weight loss (18.9%).

Nair RS et al <sup>13</sup> (2018) conducted a study to determine the clinical features of the patient, and pleural fluid characteristics of malignant pleural effusion cases attending a tertiary care centre and to determine the mode of diagnosis in these cases. Mean age was 62.08 (SD 13.83). 16% were current smokers. Agrawal A et al <sup>12</sup> (2015) observed that malignant pleural effusion is a major clinical problem associated with primary and metastatic pleural malignancies. Male to female ratio was 2.5:1. The major primary cancers were lung cancer (135), lymphoma (40), breast cancer (36), female genital tract (30), gastrointestinal (21), and others (8).

According to Manu Mohan K et al <sup>14</sup>(2012) majority of the cases (95%) were having exudative effusion. de Aguiar LM et al<sup>15</sup> (2008) showed that tuberculosis and cancer are the main causes of pleural effusion. Thirty patients with tuberculosis (14) or malignancy (16) were studied.

**CONCLUSION**

In our study, out of 150 patients most of the patients were in the age group 31-40 years old 25.3%. This was statistically significant. Most of patients were male 116 (77.3%). It was statistically significant. Majority of the patients were smoker 113 (75.3%) and it was statistically significant. A significant number of patients had fever 117 (78.8%). A higher number of patients with pleural effusion had cough 132 (88.0). Overall, in our study we found that, lower number of the patients had chest pain 52 (34.0%) . In our study pleural effusion was mostly right sided 94 (62.7%). 70 (46.7%) had moderate effusion and had exudative effusion. It was also found that 133 (88.7%) had sterile fluid on microbiological examination. In our study, 8 (32.0%) patients had Indeterminate, 5 (20.0%) patients had Malignant Cell and 10 (40.0%) patients had Tubercular Granuloma. We found that, significantly higher number of patients had tuberculous pleural effusion, 86 (57.3%).

**Limitations Of The Study :** In spite of every sincere effort, my study has a lacuna. The notable short-comings of this study are:

1. The sample size was small. Only 150 cases are not sufficient for this kind of study.
2. The study has been done in a single centre.
3. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out.

**Conflict Of Interest:** There is no conflict of interest in this study.

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