



ORIGINAL RESEARCH PAPER

Pulmonary Medicine

STUDY OF CLINICAL AND ETIOLOGICAL PROFILE OF PATIENTS PRESENTING WITH PLEURAL EFFUSIONS TO A TERTIARY HOSPITAL

KEY WORDS: Pleural effusion, tuberculosis, congestive cardiac failure, adenosine deaminase(ADA)

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ABSTRACT

Introduction:- Pleural effusion is an abnormal collection of fluid in pleural space resulting from excess fluid production or decreased absorption or both. Excess fluid results from disruption of equilibrium that exists across pleural membranes. It constitutes one of the major causes of morbidity in India as well in other parts of world. Because of the various etiologies that can cause pleural effusion, it often presents a diagnostic problem, even after extensive investigations. The study was done to identify common etiologies of Pleural effusion in a tertiary hospital, their clinical profile and comparison with western profile of pleural effusion.

Objectives: To determine the clinical and etiological profile of patients presenting with pleural effusion .

Material And Methods: A Observational study (Cross Sectional) was carried out on 100 patients with pleural effusion from April 2016 to April 2017 at Department of Respiratory medicine, Mahatma Gandhi Medical College, Jaipur.

INCLUSION CRITERIA:

1. All cases of Pleural effusion.
2. Age 18 years or more

EXCLUSION CRITERIA:

1. Age < 18 years.
2. Hemodynamically unstable patients.
3. Patients with bleeding disorders or diathesis

Results:- In our study, Out of 100 patients 75 were males and 25 females (Mean age :40.55), 56% of cases were in 21-40 year of age. 58% patients had right sided effusion .85% patients had exudative effusion. Tubercular effusion (66.7%) remains the commonest etiology of all exudative effusions, where as Congestive cardiac failure (70%) remains commonest cause among transudative effusions.

Tubercular effusion affects most commonly young (Mean age 35 years) & is associated with cough and fever as most common presenting symptom. Malignant effusions were seen in older age group with cough and dyspnea as predominant symptoms. Pleural Fluid appearance in maximum patients (55%) was straw coloured. Pleural fluid ADA >70 IU/L was associated with maximum patients with diagnosis of tuberculosis whereas others with ADA levels 40 to 70 IU/L with clinicoradiological correlation were suggestive of tubercular effusion.

Introduction:-

Pleural effusion is an abnormal collection of fluid in the Pleural space. The pleural space lies between the lung and chest wall and normally contains a very thin layer of fluid, which serves as a coupling system. Excess fluid results from the disruption of equilibrium that exists across pleural membranes. Pleural space is lined by mesothelium containing about 0.1-0.2ml/kg of clear colourless fluid which is an ultrafiltrate derived from the capillaries of the parietal pleura. It is reabsorbed through the lymphatic and venules of visceral pleura. Pleural fluid has a specific gravity of 1.010-1.026, pH of 6.8-7.6, protein of 1.5g/dL with an albumin 50-70% and globulin of 30-45%.

Pleural effusion is an indicator of a pathologic process that may be of primary pulmonary origin or of an origin related to another organ system or occasionally the first evidence of some other systemic disease. Occurrence of pleural effusion [PE] is a common finding, with higher incidence of effusions secondary to non-infective pathology in the western studies and infective pathology in India. Diagnosing etiology of pleural effusions clinically with certainty is a difficult task . With recent developments in field of medicine and with advent of various diagnostic aids like pleural fluid analysis, pleural fluid cytology, pleural biopsy, ultrasonography, bronchoscopy, thoracoscopy, serological tests like ANA, ADA, Rheumatoid factor, CT thorax helps the physicians to arrive at a diagnosis at an earlier course of disease. Hence we decided to perform this study to help develop a better diagnostic and therapeutic approach in managing such effusions.

Aims And Objectives:- There are not many studies done to know Clinico- etiological profile of patients with pleural effusion from a tertiary hospital of our region .

1. To study the clinical profile of patients with pleural effusion.
2. To study the aetiology of pleural effusion.

Materials and Methods:-

STUDY PLACE:- Department of Respiratory Medicine, Mahatma Gandhi Medical College and Hospital, Jaipur .

STUDY DURATION: Study was done from April 2016 to April 2017.

STUDY DESIGN: Cross-sectional study.

INCLUSION CRITERIA:

1. All cases of Pleural effusion.
2. Age 18 years and above.

EXCLUSION CRITERIA:

1. Age < 18 years.
2. Hemodynamically unstable patients. .
3. Patients with bleeding disorders or diathesis

Patients admitted in Mahatma Gandhi Medical College and Hospital, Department of Respiratory Medicine, Jaipur with pleural effusion fulfilling inclusion and exclusion criteria were taken into study after obtaining written informed consent. In all patients, detailed clinical history regarding their presenting complaints, other symptoms like breathlessness, chest pain, cough with sputum production, fever, weight loss, loss of appetite were enquired. Other symptoms of cardiac, liver or renal failure like swelling of feet, abdominal distension, oliguria were also enquired.

Past history of previous intake of anti-tuberculosis treatment, history of diabetes or any other significant illnesses, contact history with tuberculosis patients were obtained. Detailed clinical examination was carried out and routine investigations were done for all patients. Chest X ray PA view, Lateral decubitus view were also taken. All the patients were subjected to Diagnostic Thoracentesis.

Under aseptic precautions about 50 ml of fluid was aspirated and subjected to pleural fluid analysis –Biochemical, Microbiological, Pathological analyses were done. Pleural fluid cell count, cell type, Sugar, Protein, ADA, LDH and AFB stain and sputum AFB were done for all patients. Pleural fluid gram staining and Culture were carried in necessary patients. We classified the effusions into a transudate or an exudates based on the Light's criteria, the effusion was said to be an exudative if they meet at least one of the following and transudates meet none of these criteria:(1)-Pleural fluid protein /serum protein > 0.5 (2)-Pleural fluid LDH / serum LDH > 0.6 (3)-Pleural fluid LDH more than two-thirds of normal upper limit for serum .Prior informed consent was obtained for all the invasive procedures. USG chest was done if effusion was very small, loculated and difficult to aspirate.

Patients with clinical suspicion of parenchymal lesions or other associated diseases of lung, CT scan of thorax was taken for those who could afford the cost.Other investigations like Echocardiography, USG whole abdomen were done in relevant cases only. All patients were evaluated thoroughly.

Results:- A total of 100 patients who had pleural effusion & reported to Department of Respiratory Medicine and MG Medical college were studied from April 2016 to April 2017.

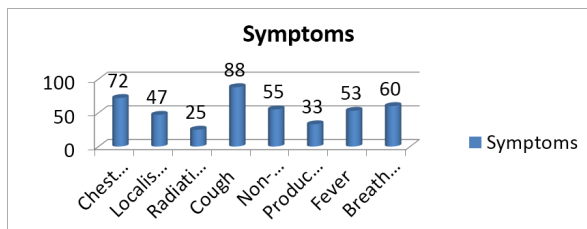
Tabulated as follows:-

Age group in relation to gender profile

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
18-20	1	1.3	3	12	4	4
21-40	42	56	14	56	56	56
41-60	28	37.3	5	20	33	33
>60	4	5.1	3	13.6	7	7
Total	75	100	25	100	100	100

Maximum patients 56% were in age of 21-40 years

Spectrum of Symptoms in Patients with Pleural Effusion



Cough (88) was the most common symptom followed by Chest pain/Discomfort (72) and Breathlessness (60)

Radiological Spectrum of patients with pleural effusion as per Laterality

Side	No	Percentage
Right	58	58%
Left	32	32%
Bilateral	10	10%
Total	100	100%

Maximum 58% of patients with pleural effusion had right hemithorax involved while 32% had left and 10% of patients had bilateral pleural effusion.

Classification of Transudative and Exudative Pleural effusion

(N-100)

Etiology	No. of cases (n=100)	Percentage
Transudative effusion	15	15
Exudative effusion	85	85
Total	100	100

Maximum patients (85%) had exudative type of effusion while (15%) had transudative effusion.

Etiological Profile of Patients With Exudative Pleural Effusion

(N-85)

Etiology	Number of Cases	Percentage %
Tubercular	57	67
Parapneumonic	11	13
Malignancy	9	10.5
Empyema	8	9
Total	85	100

Out of total 85 patients with exudative effusion, Tuberculosis 57 (67%) was most common etiology followed by PNP effusion 11 (12.9%), Malignancy 9 (10.5%), Empyema (Pyogenic) 8 (9.4%).

Etiological Profile Of Patients With Transudative Pleural Effusion

(N-15)

Etiology	Number of Cases	Percentage %
Cardiac Disease	10	66.6
Renal Disease	3	20
Hepatic Disease	2	13
Total	15	100

Out of total 15 patients with transudative effusion Cardiac disease 10(66.6%) was the most common etiology followed by Renal Disease 3 (20%), Hepatic Disease 2(13.3%).

Profile Of ADA Levels & Association with Etiology (N-100)

Diagnosis	<30 IU/L	30-40 IU/L	40-70 IU/L	>70 IU/L
TB Effusion	0	5	20	32
PNP Effusion	8	3	0	0
Malignancy	7	2	0	0
Empyema	2	5	1	0
CCF	10	0	0	0
Renal Disease	5	0	0	0
Hepatic Disease	0	0	0	0

In our study pleural fluid ADA >40 IU/L was taken as diagnostic cut off. For Tubercular effusions 32(56.1%) who were diagnosed as tubercular had ADA >70, 22 (38.5%) had ADA 40-70IU/L, 5 (8.7%) had ADA <30 IU/L. In PNP & Malignant effusions all patients had ADA <40 IU/L, In Transudative effusions all patients had ADA <30 IU/L

DISCUSSION:

The present study was contemplated on 100 patients with pleural effusion, Out of 100, 75 were males and 25 females with M:F ratio of 3:1, which was consistent with Subhakar.K et al² - 77.5% males and 22.5% females with a ratio of 3.44:1 while others, Luis Valdes³- 62.5% males and 37.5% females with a ratio of 1.6:1, Al Quorian.⁴ - 145 males(72%) and 56 females(27.9%) with a ratio of 2.58:1. Youngest patient in our study was of 18 years old ,oldest 67 years old .

Maximum cases presented in 21-60 year of age probably because people are exposed to occupation hazards, smoking and infections, as they are more physically active.

Mean age in our study for cases of tubercular effusion was 32 years consistent with Luis Valdes et al (34 years)³. S. K. Sharma et al

(33 years)⁵ and Subhakar. K et al² (31 years). Earlier studies done in United States by Epstein et al and Aho K et al showed a mean age of 54 and 28 years respectively.

Patients with malignant pleural effusion were older, around 60 years (mean 62 years) compared to study by Sharma et al.⁵ (Mean age 47 years) and Subhakar et al.² (mean age 51 years) but consistent with reports from the western countries (65 years)³. It is well known that Indian patients with malignancy are 15 years younger as compared to the west as observed by Pathak et al.⁶. Most patients in our study belonged to lower socioeconomic class which is consistent with the fact that tuberculosis is a disease more commonly seen among people living in crowded, unhygienic conditions of lower socioeconomic class. A disease related to poverty.

Out of total 85 patients with exudative effusion, Tuberculosis 57 (67%) was most common etiology followed by PNP effusion 11 (12.9%), Malignancy 9 (10.5%), Empyema (Pyogenic) 8 (9.4%). This is similar to observation by Maldhure et al⁷, where tubercular effusions constituted 76% of effusions. There is a high prevalence of tuberculosis in India and southeast Asian countries. In India tubercular effusion is the commonest cause of all exudative effusions. This observation is different from western studies, where incidence of parapneumonic effusion and malignant effusion are much higher compared to tubercular effusion⁸.

Most common symptom in patients with Tubercular effusion was Cough 42 (73.6%) followed by Chest pain /discomfort 36 (63.1%), Fever 32 (56.1%), Breathlessness 22 (38.5%) studies done earlier by Arun Gopi et al⁹ where most common symptoms were chest pain (75%) and dry cough (70%). Patients with malignant effusion had Breathlessness (51%) and Cough (48%) as predominant symptoms followed by chest pain (28.6%) which was similar to a study by Chernov B et al¹⁰, where breathlessness (57%) and cough (43%) were predominant symptoms followed by chest pain (23%). Most of the patients with synpneumonic effusion, had complaints of a short duration with an acute onset, whereas those with tuberculous effusion and malignancy had complaints of a longer duration.

Out of total 15 patients with transudative effusion Cardiac disease 10 (66.6%) was most common etiology followed by renal disease 3 (20%), hepatic disease 2 (13.3%). Congestive heart failure was the most common cause in our study. Cough (100%) and breathlessness (100%) were major symptoms respectively which is nearly consistent with the Lights description¹¹ of congestive heart failure.

In our study 32 patients with tubercular effusion had ADA level >70 IU/L, 20 patients with ADA level between 40-70 IU/L and 5 patients with ADA level between 30-40 IU/L in tubercular pleural effusion, pleural fluid adenosine deaminase level (ADA) has a good diagnostic index after excluding other causes of raised ADA levels. Although a pleural fluid ADA above 70 IU/L is diagnostic of tuberculosis it has to be considered if the pleural fluid ADA is between 40 IU/L and 70 IU/L. An ADA level less than 40 IU/L very much unlikely of pleural tuberculosis. But different authors have used different cut off levels for pleural fluid ADA ranging between 33 IU/L to 50 IU/L^{2,12}. In our study pleural fluid ADA >40 IU/L was taken as diagnostic cut off for tuberculous effusion. All malignant effusions in our study 7 patients had pleural fluid ADA less than 30 IU/L out of 8 empyema cases, 5 cases had ADA values between 30- 40 IU/L rest all had ADA <30 IU/L.

Majority of patients had Straw coloured (55%) effusion among which tubercular effusion (90%) was most common cause, hemorrhagic effusions (9%) of which maximum 7% were associated with malignant etiology rest 2% remained undiagnosed, (15%) had clear fluid were transudative, Turbid (13%) seen in PNP effusions, Pus (8%) was associated with empyema in comparison with the study Victoria villena et al¹³ majority of effusions were straw coloured of which Tuberculosis (74%) and transudates (67%) were predominant and 34% of malignant effusions were hemorrhagic.

Conclusion:

- Most common cause of pleural effusion was Tuberculosis followed by parapneumonic & malignancy. Tubercular effusion was more common in 21 to 40 years with a mean age of 32 years while malignant effusions were more common in older age.
- Right sided pleural effusion was more common in tuberculosis, while bilateral pleural effusion was more common in patients with CCF. Majority of patients with malignant pleural effusion had large effusion.
- Tubercular pleural effusion had straw colour, malignant pleural effusion had hemorrhagic fluid.
- Pleural fluid ADA has good diagnostic index with high sensitivity & specificity, specially in tubercular effusions.

Study recuperates understanding aetiological, clinical & demographic patterns of pleural effusion as most effusions tend to resolve with treatment of underlying cause.

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