

A Study on Prevalence and Clinical Features of Tuberculous Pleural Effusion in Rural Medical College

Surya Pavan Reddy¹, S. Srinivas², CRPS Krishna^{2*}

¹Professor, Department of Medicine, Apollo Institute of Medical Sciences & Research, Chittoor, AP, India.

²Professor, Department of Medicine, Geetanjali Medical College & Hospital, Udaipur, Rajasthan, India.

ABSTRACT

Background: Pleural effusion is a very common respiratory disorder in India and worldwide. The prevalence of tuberculosis is very high in developing countries like India, Bangladesh, Myanmar, and African countries like Ethiopia, Zimbabwe, Dr Congo. Pleural effusion is one of the complications of tuberculosis. It is commonly seen in young men. And usually, tuberculous pleural effusion is unilateral. The common symptoms are cough, shortness of breath, fever and chest pain.

Aim of the Study: To study the clinical features, prevalence and diagnosis of tuberculous pleural effusion in a rural medical college.

Materials and Methods: This study has been conducted for 9 months from 2021 February to September 2021. We have included 75 total patients out of these 75, 53 are male patients, 22 are female patients. The age group is between 20 years and 60 years. Pleural effusion due to other than tuberculosis is excluded from this study. This study has been conducted in the department of General Medicine in Association with Pulmonology department in Geetanjali Medical College Udaipur.

Results: We have examined 75 total no. of patients out of these 75, males are 53 and 22 are females. The common age group is between 20 years and 40 years, males patients are

more commonly affected than female patients. Some patients had bilateral tuberculosis lesions in our study.

Conclusion: Tuberculosis is one of the common infectious diseases with high mortality and morbidity. In India, the prevalence is very high in rural areas where medical facilities are inadequate. In our study, we observed that males are commonly affected than females and early diagnosis and treatment can prevent complications like fibrothorax and emphysema.

Keywords: Pleural Effusion, Tuberculosis, Shortness of Breath, Emphysema, Pneumonia, Fever.

*Correspondence to:

Dr. CRPS Krishna,
Professor, Department of Medicine,
Geetanjali Medical College & Hospital,
Udaipur, Rajasthan, India.

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INTRODUCTION

Pleural effusion is a collection of fluid in the pleural space. (between parietal and visceral pleurae) tuberculosis pleural effusion is caused by mycobacterium tuberculosis. The disease primarily affects the lungs and causes pulmonary tuberculosis. Tuberculosis remains as a major global health problem, during the year 2013 an estimated one million people developed TB.¹ Most of the cases occurred in Asia (56%) and African regions (29%). Out of these one million cases 1.3 lakhs (13%) were HIV positive. In India in 2013 nearly 26 lacs people were affected by tuberculosis infection. And the mortality in absolute number has reduced from 3.3 lacs to 2.4 lacs annually.²

In India tuberculosis is more prevalent in adults than in children. It affects adults in the most productive age group (15 – 54 years). More than 80% of TB cases are in this age group. Tuberculosis bacteria can affect the lungs, bones, Intestine, kidney, brain, heart, and skin. There is a constant movement of fluid from

parietal pleural capillaries into the pleural space at a rate of 0.01 ml/Kg body wt/hr. Absorption of pleural fluid occurs through parietal pleural lymphatics. The resultant homeostasis leaves 5 to 15ml of fluid in the normal pleural space.³ Tuberculosis pleural effusion mostly causes unilateral. The common symptoms include of Cough, Shortness of breath, fever and chest pain. Physical findings are usually absent in small effusions. The causes of pleural effusion can be divided into transudate and exudate. The mechanism of pleural effusion includes 1) Increased production of fluids in the setting of normal capillaries due to increased hydrostatic or decreased oncotic pressure, 2) Increased production of fluid due to abnormal capillary permeability 3) decreased lymphatic clearance of fluid from the pleural space 4) Infection in the pleural space (empyema) 5) Bleeding into the pleural space (haemothorax). Parapneumonic pleural effusions are exudate that accompanies bacterial pneumonia.⁴

The Criteria for transudate effusion are 1) Glucose is <120 mg/dl 2) proteins < 3.0 gr/dl 3) cells <100 for micro liter. The criteria for exudate is 1) proteins >3.0 gr/dL 2) cells are > 100 to several hundred thousands/ micro liter. The common causes of exudate effusion are 1) Tuberculosis 2) Pneumonia 3) Malignancy 4) Infections (Viral, Bacterial, Fungal). 5) Sarcoidosis.

MATERIALS AND METHODS

We have included a total of 75 numbers of patients in this study out of these 75 males are 53 and female are 22. The age group involved is between 20 years and 60 years. The common age group involved is between 20 years and 40 years. In males 36 patients (out of 53) in females 14 patients out of 22 are in this age group.

After careful history taking and clinical examination, we have collected the data systemically and computerized by using Ms office only. The suspected cases of transudate causes like cirrhosis and chronic renal failure and malignancy were excluded from this study. This study has been conducted for 9months from 2021 February to September 2021 in the department of general medicine in informed consent was taken from all the patients in the local language. This study has been conducted in the department of General Medicine in Association with Pulmonology department in Geethanjali Medical College Udaipur. The investigations advised were complete blood. Picture, random blood sugar, LFT, sputum for AFB, X-Ray chest PA view and lateral decubitus, and CT Scan chest for few cases. Pleural fluid ADA has been advised.



Fig 1: Right sided pleural effusion on x.ray chest PA view

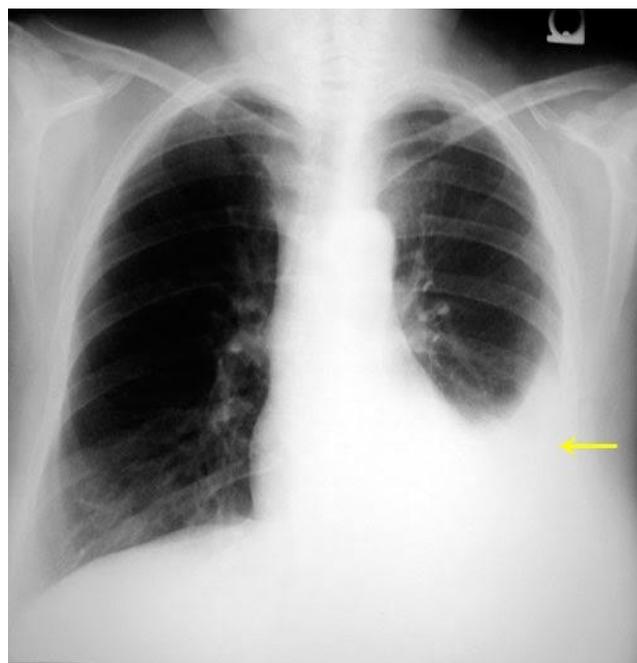


Fig 2: Left sided pleural effusion on X-Ray Chest PA View

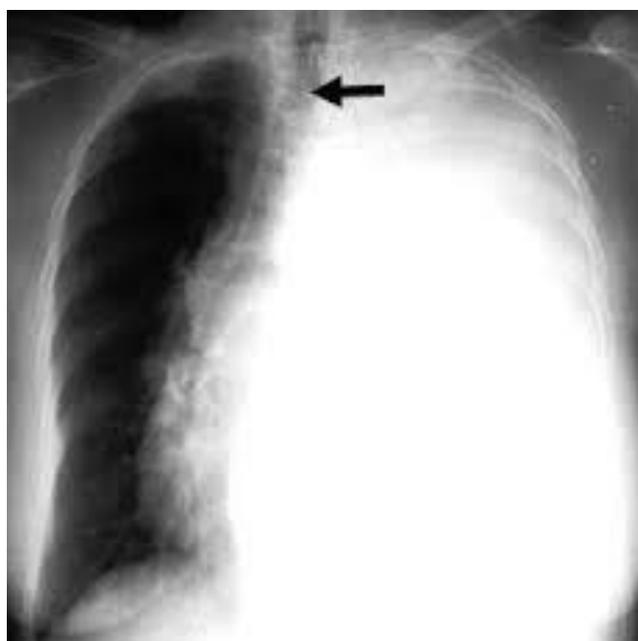


Fig 3: Massive left sided pleural effusion on X-Ray Chest PA View

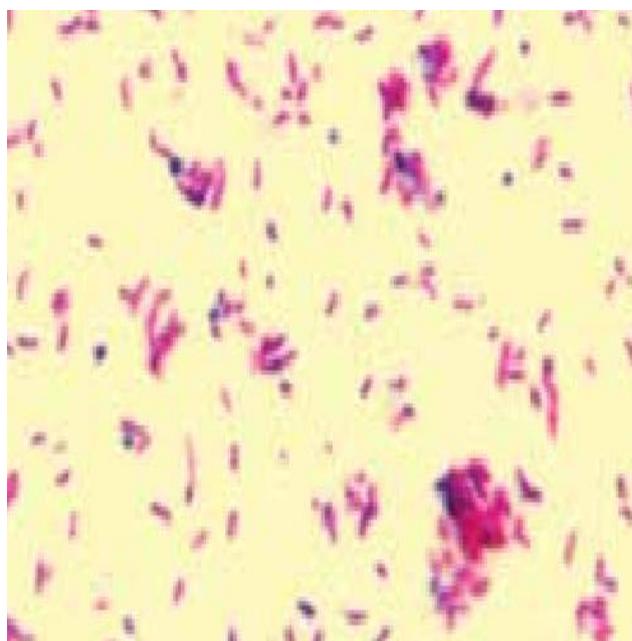


Fig 4: Mycobacterium-tuberculosis bacillus

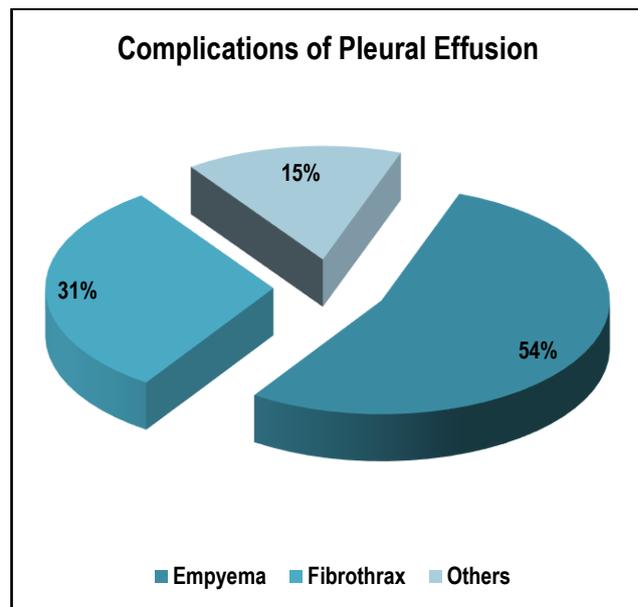
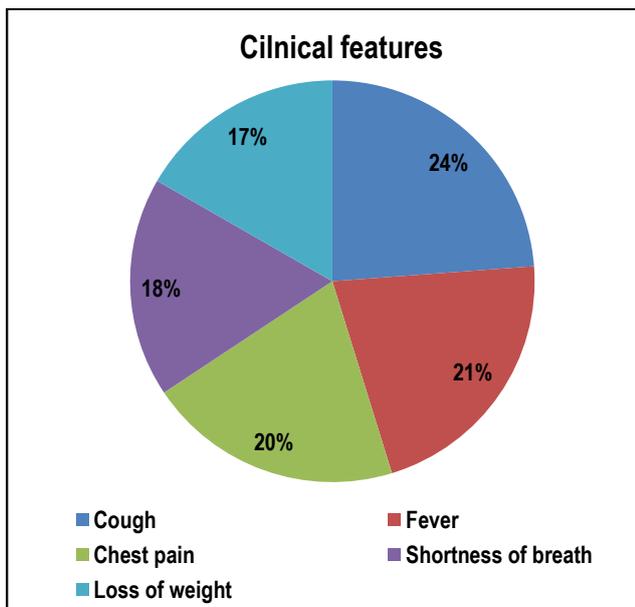
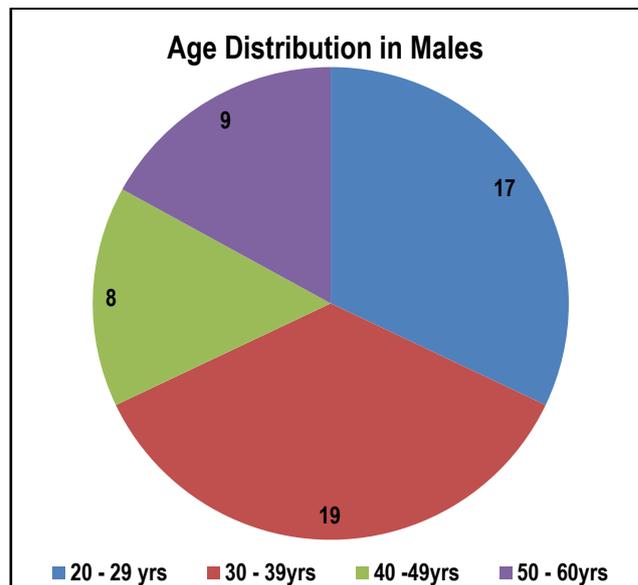
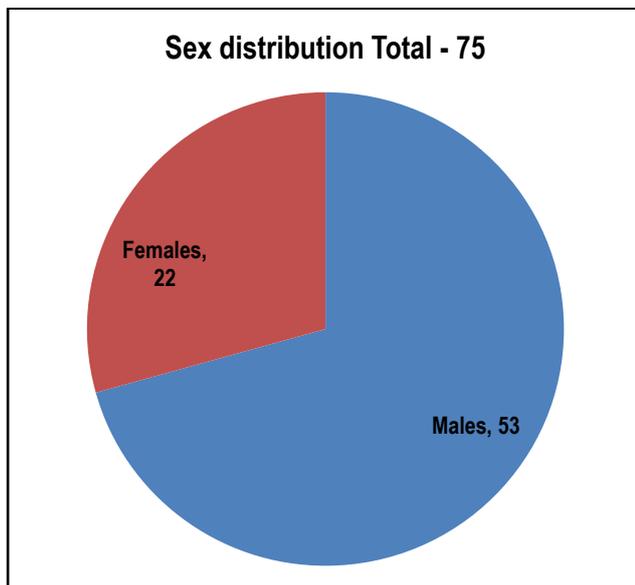


Table I: Age and sex wise distribution of patients.

S.no	Age in years	No. of Total pts in Male	Percentage (%)	No. of Total pts in Female	Percentage (%)
1	20 – 29	17	32.07%	8	36.35%
2	30 – 39	18	35.84%	6	27.54%
3	40 – 49	8	15.25%	4	18.18%
4	50 – 60	9	16.98%	4	18.18%

Table II: Pleural Fluid analysis.

S.no	Investigation	Males (53%)	Females (22%)
1	Proteins	3.0 to 4.3gr/l	51(96.22%)
2	Sugars	70mg to 110mg%	20(90.90%)
3	Cells	5000 to 12000 culms	49(92.95%)
4	ADA	>70u/L	19(86.36%)
			16(72.72%)
			21(95.95%)

Tables III: Different Socio- Economic Status

S.no	Socio- Economic Status	Males (53%)	Females (22%)
1	Slumdweller < 5 th Standard	23(43.35%)	9(40.90%)
2	Rural area < 10 th stands	13(24.52%)	5(22.72%)
3	Semi urban area < 12 th Standard	9(16.98%)	5(22.72%)
4	Urban area graduation	8(15.25%)	3(13.63%)

Table IV: Treatment of pleural effusion.

S.No	Mode of treatment	Males total Pts (53%)	Females total pts (22%)
1	With thoracocentesis and ATT	31(58.49%)	8(36.36%)
2	With out thoracocentesis and ATT	22(41.51%)	14(63.63%)

Table V: Different sides of Pleural effusion.

S.No	Sides	Males (Total no of 53)	No. Of Females (22)
1	Right Side	28(52.53%)	9(40.55%)
2	Left Side	29(54.71%)	11(50.0%)
3	Bilateral	4(7.54%)	2(9.44%)

Table VI: Different sizes of Pleural effusion.

S.No	Sides	Males (Total no of 53)	No. Of Females (22)
1	Mild	18(33.96%)	7(31.81%)
2	Moderate	21(39.62%)	10(15.5%)
3	Massive	14(26.41%)	5(22.75%)

RESULTS AND DISCUSSION

The total number of cases included in our study are 75(M-53 and F-22). The common age group involved is between 20 and 40 years (67.75%) in males and (61.35%) in females. The study conducted by Berger et al shows between 20 and 30 years 59.36%.⁵ In few studies right-sided effusion was observed in 42 – 44% and left-sided effusions were in 38 – 42% and bilateral effusions were observed in 5 to 7%. In our study, right-sided effusions were seen in 28 cases in males (52.83%) and 9 cases in females (40.55%). Tuberculosis pleural effusion was most commonly seen in men than women almost M:F ratio is 2:1. Bilateral effusion is seen in 4 cases in males 2 cases in females. The population residing in slumareas and rural is more than 50% and literary is more than 70% are below 10th standard very low literary.⁶ TB effusion is one of the most common sites of extra pulmonary TB. Although the incidence varies between regions. The incidence of pleural involvement in non-endemic areas is 3-5%. In TB endemic areas it is 25% - 28%.⁷

Mild pleural effusion was noted in 45% of patients, moderate effusion was noted in 33% of patients and massive effusion was seen in 22% of patients. In the diagnosis, pleural fluid analysis is very important to differentiate exudate from transudate. In tuberculous effusion cell count is usually increases and mostly lymphocytes, sugar levels will not be increases. Whereas proteins will be more than 2.8gr% and the most important investigation is pleural fluid ADA, when it is less than 70U/L will rule out tuberculosis origin. In our study proteins are 3.0 to 4.3gr% range is 96% of patients and ADA levels are more than 70U/L in 92.5% of cases.

The study conducted by Ethaer J. et al shows 89% and 91.25% respectively.⁸ And ATT was started in 41% in males and 63% in females. Thoracocentesis and ATT were started at 59% in males and 37% in females. Studies show by Sibley JC et al almost similar results.⁹

Tuberculous pleural effusion is caused by Mycobacterium tuberculosis. Pleural fluid accumulation occurs when pleural fluid formation exceeds pleural fluid absorption. Normal fluid enters the pleural space from capillaries in the parietal pleura and it is removed via the lymphatics in the parietal pleura. The frequency of tuberculosis as a cause of pleural effusion depends on the prevalence of TB in a particular population. Pleural effusion is

believed to occur secondary to the rupture of subpleural caseous focus in the lungs.¹⁰

Rupture of such focus allows the tuberculosis protein to enter the pleural space and generate hypersensitivity reaction is responsible for most clinical manifestations. Delayed hypersensitivity rather than a TB infection per se, plays an important role in the development of TB pleural effusion. Tuberculosis pleural fluid is rich in several potentially immunoreactive cells and substances that contribute to vigorous local cell-mediated immune response.

In our study, pleural effusion is seen predominantly in males (65.25%) and most number of the cases involved in young age group, between 20 years and 40 years (68.25%) our observations are nearly correlating with the studies conducted by L Valdes et al.¹¹

Tuberculosis pleural effusion usually unilateral sometimes it may be bilateral also. In our study, we observed 94.25% of cases of Unilateral pleural effusion. And 5.75% bilateral effusion. The common clinical features includes fever, non-productive cough, chest pain, and shortness of breath. Cough is present in 89.25% of patients; fever present in 82.50% of patients; chest pain in 74.15% of patients and shortness of breath in 68.45% of patients. Our observations are almost similar to the studies conducted by HW Berger Et al fever 88.5%; cough 68.65%, chest pain 79.25%, and shortness of breath 63.6%.

The investigation done in our study are complete blood picture with total count and differential count, X-Ray Chest, a pleural fluid analysis which includes, Proteins, sugars, cell count, and finally ADA levels. Lymphocytes count will increase up to 50% of the total count and in early stages, neutrophils may be predominant. (10% Lymphocytes 70% neutrophils).¹² Estimation of ADA levels is not frequently used in most of the rural areas. More than 70 U/L is considered to be diagnostic for tuberculous pleural effusion. In our study, more than 90% of cases were diagnosed. Our results are correlating with the studies conducted by M. Goto et al.¹³

X-ray chest advised for all the patients 96.5% of patients were having unilateral pleural effusion and nearly 4% cases were having bilateral pleural effusion massive and moderate effusion patients were treated with thoracocentesis plus ATT and Mild pleural effusion were treated with ATT only.

CONCLUSION

Tuberculosis is very common in India and 25%-30% of tuberculous patients may develop pleural effusion. Young males were commonly affected. Still, ADA levels are not available in most of the centers. We can diagnose Tuberculous pleural effusion safely with other parameters like clinical features, sputum examination and x-ray chest.

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