Vol 7 | Issue 2| 2017 | 111-114.

e-ISSN 2248 – 9142
print-ISSN 2248 – 9134

International Journal of
Current Pharmaceutical & Clinical Research

www.ijcpcr.com

TO STUDY CLINICAL CHARACTERISTICS AND UNDERLYING DISEASES AND OF TUBERCULOUS PLEURAL EFFUSION IN DIABETES MELLITUS PATIENTS

Abdul Majid Khan[1], M. Sumanth Babu[2*]

[1]Associate Professor of General Medicine, Sankaracharya Institute of Medical Sciences, Bhilai, India.
[2]Assistant Professor of General Medicine, Mahavir Medical college,Vikarabad,Telangana, India..

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ABSTRACT

Tuberculous pleural effusion (TPE) is one of the most common forms of extrapulmonary tuberculosis. In addition, the hyperlink between TB and DM has been validated, and these conditions may complicate every other at numerous degrees.The objective of this study the role of tuberculous pleural effusion in diabetes mellitus patients. A total 100 patients with exudative pleural effusion with predominant lymphocytosis that is supported by medical case file, the patient's history, physical parameters, chest radiographs and laboratory tests raised pleural ADA levels. Accuracy of the MNC/LEU ratio at the optimal cutoff value for TBP diagnosis was also evaluated. TBP group consisted of 78males and 43 females with a median age of 51years. The non-TBP group consisted of 159 males and 45 females with a median age of 62years. The median age of TBP patients was notably lower than that of non-TBP patients.Diabetes might interfere with the use of citric acid as a metabolomic biomarker for tuberculous effusion and MNC/LEU ratio determination of pleural effusion is effortless, perfect and practical, it is commendable of further confirmation and encouragement.

Key words: Diabetes mellitus, pleural effusion, tuberculosis, mononuclear cell/leukocyte ratio, citric acid.

INTRODUCTION

Tuberculosis (TB) is one of the top ten reasons of dying worldwide and has been the leading motive of dying because of a single infectious ailment because 2007.[1]On the alternative hand, 25% of adults can suffered from extrapulmonary TB, which particularly involves the lymph nodes and pleura however can affect the central nervous system (CNS), cardiovascular machine, and gastrointestinal (GI) tract[.2] The most frequent form of extrapulmonary TB is contamination of the pleura. In an affected person who presents with undiagnosed pleural effusion, the prognosis of TB pleuritis has to be taken into consideration. Pleural effusion, as an isolated manifestation of TB, can be self-restricted and of little immediately difficulty, but untreated, it could lead to severe sickness many years later.

Nowadays Tuberculosis (TB) and diabetes mellitus (DM) are both vital international health issues. In addition, the hyperlink between TB and DM has been validated, and these conditions may complicate every other at numerous degrees. Concerning the epidemiology, approximately 70% of diabetics stay in TB endemic international locations[3] and the World Health Organization (WHO) stated that approximately 10% of TB cases international are associated with DM.[4]

The pathogenesis of TB pleural effusion is idea to be associated with the rupture of a subpleural caseous awareness in the lung into the pleural area.

*Corresponding Author: - **Dr. Perolyadav Meruva,** Email: drvrvkk@gmail.com

The basis for this become the remark that a caseous TB recognition can be tested within the lung, contiguous with the diseased pleural, in 12 to 15 sufferers with TB pleuritis.[5]Tuberculous pleural effusions are idea to end result from a delayed hypersensitive reaction reaction to mycobacteria and Mycobacteria antigens inside the pleural area. The ensuing inflammation produces lymphocytic pleuritis, which decreases the amount of fluid that may be absorbed from the pleural space. The combination of the more fluid produced by using the inflammation and the reduced lymphatic clearance leads to the buildup of pleural fluid.

Recent advances within the diagnostic techniques for Mtb have accelerated the yield from pleural fluid and tissue, increasing our know-how of the pathogenesis of the sickness.[6] A minority of sufferers progress thru the lymphocytic segment of the disease to a second neutrophils predominant section, indicating the presence of complications of continual pleural contamination which include a loculated effusion or frank empyema. Not quite, those patients have a higher fee of way of life positivity for Mtb. The cutting-edge have a look at become designed to increase the cutting-edge know-how with the aid of the function of tuberculous pleural effusion in diabetes mellitus patients.

MATERIAL AND METHODS

The present study was conducted at Sankaracharya Institute of Medical Sciences, Bhilai,, India for one and half year during the period of October 2020 to April 2022. A total 100 patients with exudative pleural effusion with predominant lymphocytosis that is supported by medical case file, the patient's history, physical parameters, chest radiographs and laboratory tests raised pleural ADA levels and investigation was reviewed in order to obtain maximum information about the type and severity of TB. In addition,demographic factors, life style includes smoking habit and alcohol use and clinical characteristics were recorded. Among clinical characteristics, co-morbid medical complications such as diabetes mellitus, HIV, asthma and chronic obstructive pulmonary disease COPD, medications for therapy and therapeutic outcomes were recorded, based on Chi-square and Odds ratio were included in the study. Absence of pleural biopsy by thoracoscopy or pleural histopathological results; (2) Undetermined etiology of pleural effusion; (3) Incomplete clinical data were excluded in the study.

RESULTS

The clinical data of 506 patients with pleural effusion of unknown cause were reviewed. Of these patients, 181 were excluded according to the exclusion criteria and 325 were included according to the inclusion criteria. According to the histopathological results of pleural biopsy, 121 patients were confirmed with TBP.

Table 1 Clinical characteristics and underlying diseases of 325 subjects.

Characteristic	Tuberculous pleural effusion (n=121)	Non-tuberculous pleural effusion(n=204)	P value
Age	51.(26-62)	62(52-70)	0.000
Gender			**0.341**
Male	78(64.4%)	159(78%)	0.356
Female	43(36%)	45(22%)	0.259
Underlying disease			
Alcohol consumption	53(43.8%)	42(20.5%)	0.25
Smoking	52(42.9%)	60(29.4%)	0.212
Diabetes	110(90.9%)	29(14.2%)	0.641
hypertension	62(51.2%)	32(15.6%)	0.255
arrhythmia	36(29.7%)	9(4.4%)	0.508
Coronary heart disease	5(4.1%)	2(0.98%)	1.000
Chronic gastritis	12(5.6%)	1(0.49%)	0.643
Brain infraction	9(4.2%)	3(1.47%)	1.078
COPD	51(42.1%)	7(3.43%)	1.000
Bronchial asthma	29(23.9%)	21(10.2%)	0.440
Hyperthyroidism	31(25.6%)	11(5.3%)	1.000
Rheumatic disease	14(11.5%)	9(4.4%)	
Chronic hepatitis B	25(20.6%)	14(6.8%)	0.451
Malignant tumor	3(2.4%)	9(4.4%)	0.916
Previous TB infection history	6(4.9%)	6(2.9%)	0.002
Prior hormonal therapy	13(10.7%)	16(7.8%)	0.064
HIV infection	21(17.3%)	8(6.61%)	0.668
Prior TB treatment	28(23.1%)	9(4.4%)	0.227

TBP group consisted of 78males and 43 females with a median age of 51years. The non-TBP group consisted of 159 males and 45 females with a median age of 62years. The median age of TBP patients was notably lower than that of non-TBP patients ($Z = 5.256$, $P < 0.001$). There was no considerable difference in gender between the two groups ($X^2 = 0.968$, $P = 0.531$). However, the incidences of underlying diseases such as diabetes and coronary heart disease were significantly higher in the TBP group than in the non-TBP group. In the TBP group, there were 5 cases with affiliated pulmonary TB.

Table 2 Etiological classification and composition of 325 subjects

Disease classification	Number	Percentage
TBP	121	37.2%
TBP with pulmonary tuberculosis	7	5.7%
Non-TB	**204**	
Malignant pleural effusion	58	28.4%
Parapneumonic effusions	62	30.3%
Empyema	23	11.2%
Chylothorax	11	5.3%
Pulmonary embolism	5	2.4%
Pulmonary contusion	3	1.4%
Liver cirrhosis	26	12.7%
Microscopic polyangiitis	2	0.9%
Acute glomerulonephritis	5	2.4%
Constrictive pericarditis	1	0.49
Cardiac insufficiency	5	2.4%
Hypoproteinemia	3	1.4%

In the non-TB group, there were 62 cases () Parapneumonic effusions 58cases (55.6%) with malignant pleural effusion, 26 cases()with liver cirrhosis 23 cases (12.1%) with empyema, 28 and 12 cases (9.7%) with pleural effusion of other causes.

Table 3: Comparison of observed level of citric acid to controls in both tuberculous effusion and diabetes

scenario	Citric acid compared to controls
Tuberculous effusion	0.41-1.36
Diabetes	1.54-2.43
Both tuberculous effusion and diabetes	1.78-3.86

There is no overlapping among citric acid level in tuberculous effusion and diabetes (0.41-1.36vs. 1.54-2.43). For synergy in case with both tuberculous effusion and diabetes, the simulated magnitude of change of citric acid is 1.78-3.86times.

DISCUSSION

In present study showed that the median age of patients was lower in the TBP group than in the non-TBP group. This is correlated with the Chakrabarti and Davies et al study[7]showed that TBP was more prevalent in adolescents and young adults than in the elderly. In addition, we found that the non-TBP group had higher incidences of chronic diseases at baseline than the TBP group. But, Mamaev et al.[8] reported that the incidence of pleurisy was lower in TB patients without diabetes than in those with diabetes, suggesting that diabetes had an effect on the development of TBP. On the other hand, the effect of coronary coronary heart disease on TBP is currently doubtful and could therefore need to be in addition investigated.

The number of lymphocytes and monocytes was reported to be appreciably increased in TBP effusion. The LYM/LEU ratio and MONO/LEU ratio have demonstrated certain diagnostic value in TBP. The diagnostic specificity of MONO/LEU ratio was notably improved when used in combination with the pleural effusion ADA test. These findings recommended those MONO/LEU ratios are useful markers for TBP diagnosis.

In general, metabolic problem is common and observed in any countries around the world. Diabetes is one of the most frequent metabolic diseases. For diabetes, there are also specific metabolomes in this medical disorder.[10] Here, Lou YB, et al showed that there are common metabolomes between tuberculous effusion and diabetes. The identified common metabolome is citric acid. Which is helped for to differentiate tuberculous effusion from other effusion, one has to beware of the interference from diabetes. Without diabetes, the decrease in citric acid might be observable in tuberculous effusion, and this might be helpful in differential diagnosis.the other remained specific metabolomes seen in tuberculous effusion Including L-alanine and creatine ought to be taken into consideration as biomarkers for discrimination of pleural effusion.

CONCLUSION

In conclusion, our study highlighted the heterogeneous manifestation of TPE and specified the characteristics of the respective TPE status. Diabetes might interfere with the use of citric acid as a metabolomic biomarker for tuberculous effusion and MNC/LEU ratio determination of pleural effusion is effortless, perfect and practical, it is commendable of further confirmation and encouragement.

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