

COMPARISON OF PULMONARY TUBERCULOSIS AND EXTRA PULMONARY TUBERCULOSIS IN A TERTIARY CARE SETTING

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Abstract

Background: Tuberculosis (TB) remains a major global public health problem. The burden of tuberculosis in India is the highest, accounting for one-fifth (21%) of the global incidence. As per the Global TB Report 2021, the estimated incidence of all forms of TB in India for the year 2020 was 188 per 100,000 population. Clinical manifestations of TB are variable and depend on a number of factors that are related to the microbe, the host and the environment. Our understanding of the role of host-related factors responsible for the occurrence of TB at extra-pulmonary sites is limited. Risk factors for pulmonary as well as extrapulmonary tuberculosis in India may be different to those in low-burden countries, but appropriate studies to investigate this are very less. The objective to study the differences between pulmonary tuberculosis (PTB) and extrapulmonary tuberculosis (EPTB) patients according to demographic, clinical and life style characteristics. **Materials and Methods:** This is a retrospective record-based cross-sectional study of patients diagnosed with both pulmonary and extrapulmonary TB. For each patient, demographic information, lifestyle factors and clinical characteristics were recorded. Data analysis was done using SPSS 18 (Trial version). Qualitative variables are expressed as standard deviation. Quantitative variables are expressed as proportion and frequency. Chi square test was used to compare categorical variables of pulmonary and extrapulmonary TB. Multivariate analysis was used to find the independent risk factor by calculating Odds ratio, 95% CI. p value < 0.05 was considered statistically significant. **Result:** Among the 45 total study subjects, 26 belonged to pulmonary TB and 19 subjects belonged to Extrapulmonary TB cases. Overall male to female ratio of TB cases during the study period was 1.25 (25/20). Mean age of study participants 53.67 (SD 19.70). Comparison was done for age distribution after categorizing the subjects into age groups showed peaking of incidence between 50 to 70 years of age. Bivariable analysis showed the association with age is significant (p 0.036, chi-square test). The habit of smoking present in 10 subjects (38.4%) out of the 26 PTB cases and 2 out of 19 EPTB cases were smokers (10.5%) and the association is significant with p value (0.036, Chi Square test). The strength of association between Smoking and Pulmonary TB compared to EPTB (odds ratio) was found to be 5.3 (Confidence Interval 1.20 – 28.02). History of diabetes mellitus was present in 17 out of 26 PTB cases (65.3%) compared to 6 out of 19 EPTB cases (31.6%). This association was found to be significantly different for PTB and EPTB groups (p value 0.025). The strength of association, odds ratio was found to be 4 with Confidence Interval 1.1 to 14.4. Contact with pulmonary TB was present for 19.2 % (5/21) of PTB cases and 15.8% of EPTB cases. TB was diagnosed microbiologically in 51% of cases (23/45) of which 81% (21/26) of Pulmonary TB cases were diagnosed microbiologically and rest clinically. Among ETPB cases 90% (17/19) cases were diagnosed clinically and rest microbiologically. **Conclusion:** In this study we have found out that age distribution showed peaking of incidence between 50 to 70 years of age, and association with age was found to be significant. The most common site of extrapulmonary TB is



lymph node. The association with diabetes mellites was found to be significantly different for PTB and EPTB groups. There was strong association between smoking and pulmonary TB as compared to extrapulmonary TB. Extrapulmonary tuberculosis is a frequent manifestation of TB. Early diagnosis and treatment of both pulmonary as well as extrapulmonary tuberculosis is essential in order to reduce morbidity and mortality. A better understanding about the differences between PTB and EPTB will help in efficient case management.

INTRODUCTION

Tuberculosis remains a major global public health problem. It is estimated that about one-third of the world's population is infected with *Mycobacterium tuberculosis*.^[1] After primary infection, TB may reactivate at anytime and anywhere in the body.

The burden of tuberculosis in India is the highest, accounting for one-fifth (21%) of the global incidence.^[1] As per the Global TB Report 2021, the estimated incidence of all forms of TB in India for the year 2020 was 188 per 100,000 population.^[2]

Clinical manifestations of TB are variable and depend on a number of factors that are related to the microbe, the host and the environment. Our understanding of the role of host-related factors responsible for the occurrence of TB at extrapulmonary sites is limited.^[3]

Risk factors for EPTB in India may be different to those in low-burden countries, but appropriate studies to investigate this are very less. This study aims to identify possible risk factors for EPTB that are distinctive from risk factors for PTB.

Objective: To study the differences between pulmonary and extrapulmonary Tuberculosis patients diagnosed from the institution according to demographic, clinical and life style characteristics.

MATERIALS AND METHODS

Study design: Cross sectional study

Study Population: Pulmonary Tuberculosis and Extra Pulmonary Tuberculosis patients diagnosed from the institution.

Inclusion criteria

All pulmonary and extrapulmonary TB patients diagnosed from SNIMS.

Study Setting: Sree Narayana Institute of Medical Sciences, Ernakulam district, Kerala, India

Study Period: From January 2021 to December 2021.

Study Variables: Pulmonary tuberculosis refers to a case of TB involving the lung parenchyma. Extrapulmonary Tuberculosis (EPTB) refers to any microbiologically confirmed or clinically diagnosed case of TB involving organs other than the lungs.

Method of Data Collection

Retrospective record-based study of patients diagnosed with both pulmonary and extrapulmonary TB from SNIMS from January 2021 to December 2021.

For each patient, demographic information, lifestyle factors (smoking habits and alcohol use) and clinical characteristics were recorded. Clinical characteristics include co-morbid conditions (diabetes mellitus, hypertension, cardiac disease, renal or liver disease, malignancies), treatment history (use of immunosuppressive drugs, steroids), past history of treatment for TB.

Data Analysis

Data analysis was done using SPSS 18 (Trial version). Qualitative variables are expressed as standard deviation. Quantitative variables are expressed as proportion and frequency.

Chi square test was used to compare categorical variables of pulmonary and extrapulmonary TB.

Multivariate analysis was used to find the independent risk factor by calculating Odds ratio, 95% CI. p value < 0.05 was considered statistically significant.

RESULTS

Among the 45 total study subjects, 26 belonged to pulmonary TB (PTB) and 19 subjects belonged to Extrapulmonary TB (EPTB) cases. Overall male to female ratio of TB cases during the study period was 1.25 (25/20). For PTB patients, male to female ratio was 1.37 (11/8) and for EPTB patients male to female ratio was 1.16 (14/12). The association is not significant. Mean age of study participants 53.67 (SD 19.70). Maximum age of study participants is 101 years and minimum age is 1 year. Comparison was done for age distribution after categorizing the subjects into age groups [Figure 1] showed peaking of incidence between 50 to 70 years of age (13/26 cases among PTB and 10/19 cases among EPTB). Bivariable analysis showed the association with age is significant (p 0.036, chi-square test).

The habit of tobacco smoking was present in 10 subjects (38.4%) out of the 26 PTB cases and 2 out of 19 EPTB cases were smokers (10.5%) and the association is significant with p value (0.036, Chi Square test). The strength of association between Smoking and Pulmonary TB compared to EPTB (odds ratio) was found to be 5.3 (Confidence Interval 1.20 – 28.02). History of diabetes mellites was present in 17 out of 26 PTB cases (65.3%) compared to 6 out of 19 EPTB cases (31.6%). This association was found to be significantly different for PTB and EPTB groups (p value 0.025). The strength of

association, odds ratio was found to be 4 with Confidence Interval 1.1 to 14.4.

Contact with pulmonary TB was present for 19.2 % (5/21) of PTB cases and 15.8% of EPTB cases. TB was diagnosed microbiologically in 51% of cases (23/45) of which 81% (21/26) of Pulmonary TB cases were diagnosed microbiologically and rest were diagnosed clinically. Among ETPB cases 90% (17/19) cases were diagnosed clinically and rest microbiologically. Rifampicin sensitivity was tested for 21 out of 26 in case of PTB and 2 /19 in case of EPTB, of which all the samples were sensitive for Rifampicin. All the PTB cases and 89% (17/19) of EPTB were treated for a duration of 6 months, 2 cases of EPTB were treated for a duration of 9 months. Treatment outcome was reported for 18/26 cases in case of PTB and 8/19 cases in case of EPTB [Figure 2].

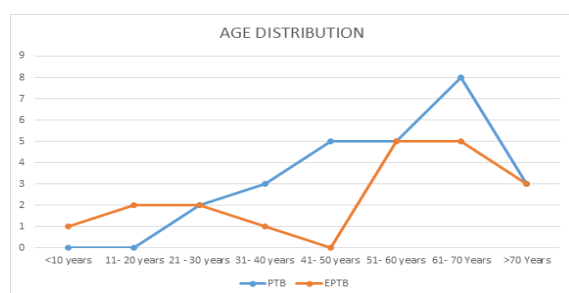


Figure 1

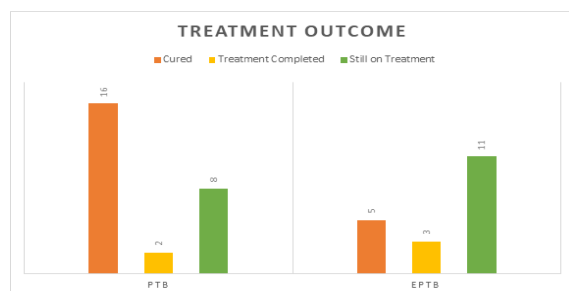


Figure 2

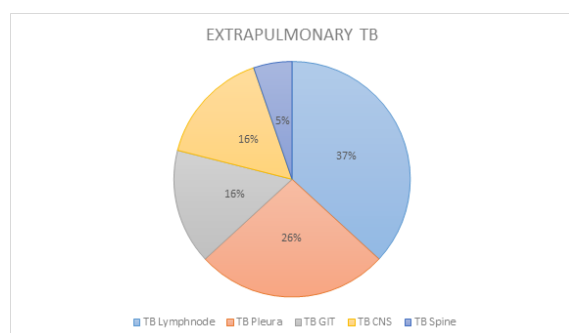


Figure 3

Out of the total 19 EPTB the distribution according to the site is given below. Lymph nodes are the most common site of extrapulmonary TB (37%). Rest was pleural effusion (26%), gastrointestinal TB (16%), CNS (16%), Spine (5%). [Figure 3]

DISCUSSION

Tuberculosis is an infectious disease caused predominantly by *Mycobacterium Tuberculosis*. Tuberculosis is most commonly transmitted by inhalation of infected droplet nuclei which are discharged in the air when a patient with untreated TB coughs or sneezes. TB disease usually affects the lungs, but can involve any part of the body. Pulmonary TB (PTB) which affects lungs is an infectious form of the disease. Extrapulmonary TB (EPTB) can affect the lymph nodes, pleura, bones and joints, genitourinary tract, nervous system, abdomen, skin etc.^[1]

Clinical manifestations of Tuberculosis are variable and depend on a number of factors that are related to the microbe, the host and the environment.^[4]

All those who get infected do not necessarily develop TB disease. The lifetime risk of developing disease among those infected with TB is 10-15%. Other determinants such as diabetes mellites, smoking, alcohol abuse and malnutrition also increase the risk of progression from infection to TB disease.^[5-7]

India is a high burden country for tuberculosis. Risk factors for EPTB in India may be different to those in low-burden countries, but appropriate studies to investigate this are lacking. In India more than 40% of population is infected with *Mycobacterium tuberculosis*. It is estimated that there are 2.5 million prevalent cases of all forms of TB disease. It is also estimated that about 2.2 lakhs people die due to TB annually.^[8-11]

Since our study was carried out in a tertiary-care centre the cases taken in the study may not be representative of those occurring in the general population. Another limitation of the study was that it only identified the differences between PTB and EPTB. There may be some factors common to both forms of TB that could not be identified by our analysis.^[12-15]

Comparison for age distribution showed peaking of incidence between 50 to 70 years of age (13/26 cases among PTB and 10/19 cases among EPTB). Bivariable analysis showed the association with age is significant (p 0.036, chi-square test). In one study the age at incidence of PTB showed evidence of a bimodal pattern, with peaks at 15–25 years and 60–70 years.^[3,16,17]

Overall male to female ratio of TB cases during the study period was 1.25 (25/20). For PTB patients, male to female ratio was 1.37(11/8) and for EPTB patients male to female ratio was 1.16 (14/12). The association is not significant. In contrast to this, in another study, for EPTB patients, the male to female ratio was 1.07 (119/111), but 2.29 (170/74) for PTB patients.³ The difference was statistically significant.^[18]

We have found out that the incidence of extrapulmonary tuberculosis is remarkably high in this study (42.22%). Earlier studies have shown that the rates of EPTB cases among all TB cases ranged from 3.2 % to 53.8 %.^[13-17]

In this study lymph nodes are the most common site of extrapulmonary TB (37%). Rest was pleural

effusion (26%), gastrointestinal TB (16%), CNS (16%), Spine (5%). In a study done in Nepal, the lymph nodes were the most common site of EPTB.^[3] A few other studies have suggested that localization of EPTB may be variable. In Hong Kong,^[6] the genitourinary system and the skin were the common sites, whereas in the USA,^[5] bones and/or joints were the most common sites. Results of our study are comparable with two studies from Turkey which reported that lymph nodes accounted for nearly half the cases of EPTB.^[7,8]

We have observed that history of diabetes mellitus was present in 17 out of 26 PTB cases (65.3%) compared to 6 out of 19 EPTB cases (31.6%). This association was found to be significantly different for PTB and EPTB groups (p value 0.025). Contact with pulmonary TB was present for 19.2 % (5/21) of PTB cases and 15.8% of EPTB cases.

According to some studies, diabetes mellitus and past history of TB are associated with PTB compared to extrapulmonary TB. Whereas a study from Turkey examined the association of diabetes, use of immunosuppressive drugs/steroids and past history of TB with EPTB but found no association with any of these factors.^[7]

81% (21/26) of Pulmonary TB cases were diagnosed microbiologically and rest were diagnosed clinically. Among ETPB cases 90% (17/19) cases were diagnosed clinically and rest microbiologically. However other studies have shown that smear positivity rate was significantly higher in patients with PTB versus EPTB.^[9-11]

In this study tobacco smoking was present in 10 subjects (38.4%) out of the 26 PTB cases and 2 out of 19 EPTB cases were smokers (10.5%) and the association is significant with p value (0.036, Chi Square test). In another case control study on tobacco smoking-associated risk for tuberculosis smoking had a strong association with PTB and EPTB but not with disseminated TB.^[12]

CONCLUSION

In this study we have found out that age distribution showed peaking of incidence between 50 to 70 years of age, and association with age was found to be significant. The most common site of extrapulmonary TB is lymph node. The association with diabetes mellitus was found to be significantly different for PTB and EPTB groups. There was strong association between smoking and pulmonary TB as compared to extrapulmonary TB.

Extrapulmonary tuberculosis is a frequent manifestation of TB. Early diagnosis and treatment of both pulmonary as well as extrapulmonary tuberculosis is essential in order to reduce morbidity

and mortality. A better understanding about the differences between PTB and EPTB will help in efficient case management.

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