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Study on association of cutaneous tuberculosis with pulmonary tuberculosis

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Abstract

Background: Tuberculosis continues to be a health problem in many countries. There may be simultaneous multiple organ involvement. Diagnosis of one organ disease may lead to missing off diagnosis of other organ involvement. Objectives: The present study was done to analyze the association of cutaneous tuberculosis with pulmonary tuberculosis. Material and methods: Through purposive sampling a total of 23 patients of suspected cutaneous tuberculosis were primarily enrolled in this cross sectional study. History was taken and examinations were done to find out types of cutaneous lesions and to explore a pulmonary involvement. Investigations including CBC with ESR, Mantoux test and Skin biopsy were done for each and every patient. Those who had cutaneous tuberculosis on histopathology chest x-ray were done to detect pulmonary lesions. After investigations 2 patients were excluded due to absence of tubercular infection. Finally 21 patients were included in this study. Data were collected in a predesigned structured questionnaire. Results: Out of 21 patients 16 (76.19%) were male and 5(23.81%) were female with a male to female ratio of 3.2:1. Age range varies from 5-70 years with a mean of 29.76±18.2 years. MT was positive in 76.20% of patients. CXR showed 23.81% of the patients with cutaneous TB had simultaneous pulmonary involvement. The association is statistically significant ($p<0.05$). Conclusions: Patients with Cutaneous tuberculosis may have pulmonary involvement in a statistically significant number. In any patient with cutaneous TB, meticulous systemic examinations and relevant investigations have to be done to explore pulmonary involvement.

Introduction

Tuberculosis (TB) is one of the world's most widespread and deadly illnesses. M. tuberculosis, the organism that causes tuberculous infection and disease (TB), infects an estimated 20-43% of the world's population. Worldwide 3 million people die of the disease in each year. It is estimated that 15 million people are infected with M. tuberculosis in United states[1]. Humans are the only known reservoir for Mycobacterium tuberculosis. TB is transmitted by airborne droplet nuclei, which may contain fewer than 10 bacilli. Exposure to TB occurs by sharing common airspace with a patient who is infectious[2]. The portal of entry is often the lung but may also be the tonsils or intestine or rarely the skin or mucous membrane[3]. When inhaled, droplet nuclei are deposited within the terminal airspaces of the lung. Upon encountering the bacilli, macrophages ingest and transport the bacteria via the lymphatics to regional lymph nodes and then via the blood stream[2,3].

The bacilli have 4 potential fates: (1) they may be killed by the immune system, (2) they may multiply and cause primary TB, (3) they may become dormant and remain asymptomatic, or (4) they may proliferate after a latent period (reactivation disease). Reactivation disease may occur following either (2) or (3) above[2].

Tuberculosis occurs disproportionately among disadvantaged population such as the malnourished, homeless and those living in over crowed and substandard housing. There is an increased occurrence of tuberculosis among HIV-positive individuals[1]. Despite prevention programs, tuberculosis is still endemic in many developing countries[4].

Over 300,000 people develop the disease each year of whom 70,000 die[5]. Extra-pulmonary tuberculosis constitutes about 10 percent of all cases of tuberculosis. Cutaneous tuberculosis represents 1.5% of all cases of extra pulmonary tuberculosis[4],

2.96% with parenchymal tuberculosis and 3.51% of all cases of tuberculosis[6]. The development of resistance to antitubercular drugs and the increase in diseases and conditions associated with immunodeficiency such as AIDS and chemotherapy have caused tuberculosis to increase recently[6].

0.5% of the population have been found to have smear positive pulmonary tuberculosis who if left untreated infect on an average of 10-15 persons every year[7].

Though cutaneous tuberculosis is one of the less common extra-pulmonary tuberculosis, resurgence of skin tuberculosis especially with drug-resistant strains has been well documented in recent years[8]. Bangladesh is listed among the countries where the prevalence of tuberculosis is the highest.[2] Patient with cutaneous TB simultaneously may have pulmonary involvement. So to decrease the transmission of tuberculous infection and to treat tuberculosis patient adequately, any patient with cutaneous TB should properly be investigated to find out pulmonary involvement. Patients with only cutaneous involvement require treatment with 3 drugs regimen but pulmonary involvement necessitate 4 drugs therapy. In case of pulmonary involvement therapy with 3 drugs regimen is mostly inadequate and may increases the chance of emergence of drug resistance tuberculosis. Hence, the present study was done to analyze the association of cutaneous tuberculosis with pulmonary tuberculosis (PTB).

Materials and Methods

This cross sectional study was conducted in the dept. of Medicine and dept. of Dermatology & Venereology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from January 2008 to August 2008. Purposive sampling was done. All the patients attending the out patient departments on two consecutive days in a week were examined with a view to find out patients with suspected cutaneous tuberculosis. Among the patients 23 were suspected as having cutaneous tuberculosis and were primarily enrolled after taking due consent. A detailed history was taken. Age, sex, occupation, socioeconomic status, duration of the disease, personal past and family history of tuberculosis, history of BCG vaccination, close contact with tuberculosis and history suggestive of pulmonary involvement were recorded. Meticulous cutaneous examinations to find out types of cutaneous lesions and systemic examinations to explore a pulmonary involvement were done. Investigations including CBC with ESR, Mantoux test and skin biopsy were done to each and every patient. MT ≥10 mm was considered s positive. Biopsy specimens were examined after staining with hematoxylin and eosin. All of those patients who had cutaneous TB on histopathology underwent chest x-ray P/A view to detect pulmonary lesions. Sputum-smear examinations for acid-fast bacilli (AFB) on 3-consecutive days were done in selected cases. After investigations 2 patients were excluded due to absence of tubercular infection. One of them had lichenoid drug reaction and the other had chronic non-specific dermatitis. Finally 21 patients were included in this study. Data were collected in a predesigned structured questionnaire.

All the data were checked and edited after collection and were analyzed. Z-test was done as a test of significance. P-value < 0.05 was considered as statistically significant.

Results

Out of 21 patients 16 (76.19%) were male and 5(23.81%) were female with a male to female ratio of 3.2:1. Age varies from 5-70 years with a mean of 29.76±18.2 years. Most of the patients (61.90%) were in the age group of 21-50 years. 5 (23.80%) patients were student followed by house-wife 4 (19.04%), service holder 4 (19.04%), cultivator 2 (9.52%), Businessman 4(19.05%) other professions constitute 2 (9.52%) of the patients. 12 (57.15%) patients were poor, 5 (23.81%) lower middle class, 3 (14.28%) upper middle class and 1 (4.76%) patient was rich (Table-I).

Fever, weight loss, loss of appetite and night sweats were there in 8(38.09%), 6 (28.57%), 4 (19.04%) and 3 (14.28%) of cases respectively. Chest pain and cough were in 1 (4.76%) and 3 (14.28%) cases. None had shortness of breath (SOB) or haemoptysis. Past history of TB and Family history of TB were present in 1 (4.76%) and 3 (14.28%) patients. History of vaccination was present in 13 (61.90%) cases (Table-II).

CBC was normal in 20 (95.23%), leucocytosis in 1 (4.76%); ESR raised (>10-90mm) in 18 (85.71%), normal in 3 (14.29%); MT raised (≥10-27mm) in 16 (76.20%) and normal in 5 (23.80%) of patients. Mycobacterial culture and sensitivity (MB C/S) from tissue done in 2 (5.52%) patients and were negative. Among 4 (19.05%) patients with PTB, Sputum for AFB was positive in 1 patient (Table-III).

CXR showed active PTB in 4 (19.05%), healed PTB in 1 (4.76%) and pleural effusion in 1 (4.76%) patient (Fig-1).

Table-I: Socio-demographic variables

Variables	No (Percentage)
Age (Range 5-70 years)	
≤20	5 (23.80%)
21-30	7 (33.33%)
31-40	4 (19.05%)
41-50	2 (9.52%)
51-60	0 (00%)
61-70	3 (14.28%)
Sex (M:F=3.2:1)	
Male	16 (76.20%)
Female	5 (23.80%)
Occupation	
Student	5 (23.80%)
House-wife	4 (19.05%)
Service	4 (19.05%)
Cultivator	2 (9.52%)
Business	4 (19.05%)
Others	2 (9.52%)
Socio-economic status	
Poor	12 (57.15%)
Lower middle class	5 (23.81%)
Upper middle class	3 (14.28%)
Rich	1 (4.76%)

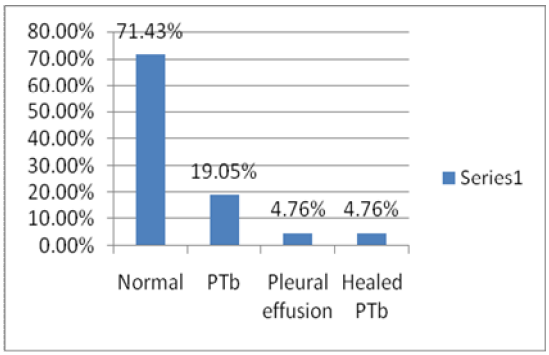
Table-II: Clinical variables

Variables	No (Percentage)	
	Present	Absent
General symptoms		
Fever	8 (38.09%)	13 (61.91%)
Wt. loss	6 (28.57%)	15 (71.43%)
Loss of appetite	4 (19.04%)	17 (80.96%)
Night sweets	3 (14.28)	18 (85.72%)
Respiratory symptoms		
SOB	0 (00%)	21 (100%)
Chest pain	1 (4.76%)	20 (95.24%)
Cough	3 (14.28%)	18 (85.72%)
Haemoptysis	0 (00%)	21 (100%)
Past history of TB	1 (4.76%)	20 (95.24%)
Family history of TB	3 (14.28%)	18 (85.72%)
H/O BCG vaccination	13 (61.90%)	8 (38.09%)

Table-III: Laboratory variables

Investigation	Result
CBC	**(number& percentage)**
Count normal (3-11×10^9/L)	20 (95.24%)
Leukocytosis	1 (4.76%)
ESR (Range 10-90mm)	
Normal (≤10mm)	3 (14.29%)
Raised (>10mm)	18 (85.71%)
MT(Range 02-27mm)	
<10	5 (23.80%)
≥10	16 (76.20%)
Other tests	
MB C/S done in 2 patients	Negative
Sputum for AFB done in 1 pt	Positive

Figure-1: Bar diagram showing chest X-ray findings.



Discussions

Virtually all of the organ systems may be infected with tuberculosis. Approximately 80-85% of the tuberculosis are limited to the lungs, only 15-20% involve extra-pulmonary or both pulmonary and extra-pulmonary sites. The extra-pulmonary sites commonly involved are lymph nodes, genitourinary, CNS, abdomen, skeletal, pleura, upper airways and pericardial. Less common extra-pulmonary sites are- skin, uveal tract, ears, adrenal glands, mammary glands[9].

In this study majority of the cases (61.90%) were in the age group of 21-50 years. These are the patients who are in their active years of life. The World Health Organization had reported highest incidence of tuberculosis in this age group[10] Study done by Rahim AM et al revealed almost similar results[11]. Male to female ratio was 3.2:1 in our study. Rahim MA et al[11] and Choudhury AM et al[12] reported male to female ratio of 2.1:1.2 and 1.86:1 respectively, which were inconsistent to that of the present study.

Tuberculosis occurs disproportionately among the disadvantaged population such as the malnourished, homeless and those living in over crowed and substandard housing[1]. Our observation was also similar. In the present study Poor and lower middle class constitute 81% of cases, followed by upper middle class 14.28% and only 4.76% were rich.

Only 4.76% cases had past history of TB and 14.28% had family history of TB. Weir and Thornton[13] in their series reported 31.57% of the patients had good history of prior exposure.

61.90% patients were vaccinated with BCG and 38.09% were not vaccinated. This reflects that BCG vaccination could not prevent the development of cutaneous tuberculosis in all cases. ESR was increased and MT was positive in 85.71% and 76.20% cases. Increased ESR is a common accompaniment in all types of tuberculosis.

Choudhury AM et al[12] reported MT positive in 80% of cases with skin TB.

We observed active PTB in 19.05%, healed PTB in 1(4.76%) and pleural effusion in 1(4.76%) patients. Here it is evident that 23.81% patients with cutaneous TB had simultaneous pulmonary involvement. The association is statistically significant ($p<0.05$). In one patient there was healed pulmonary lesions, he had history of anti tubercular therapy earlier but later on developed cutaneous TB. One patient with lupus vulgaris received 4 drugs regimen for 6 months, clinically lesions healed up. He developed lupus vulgaris again 2 months after discontinuation of therapy. These might be due to reactivation of mycobacterium. In a series Pandhi D et al. detected pulmonary involvement in 20.6% cases of cutaneous TB in children[8]. This is quite similar to our findings. But our findings are in sharp contrast to the study by Kivanc-Altunay I et al.[6] They reported 61.5% patients with cutaneous TB also had pulmonary involvement.

Conclusion: Patients with cutaneous TB simultaneously may have pulmonary involvement in a statistically significant number. As drug therapy is different in cutaneous TB with or without pulmonary involvement, to decrease the transmission of tuberculous infection, to treat tubercular patient adequately and to reduce the chance of emergence of drug resistance tuberculosis, any patient with cutaneous TB should properly be investigated to find out pulmonary involvement.

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