

FREQUENCY OF PULMONARY TUBERCULOSIS IN PATIENTS WITH DIABETES MELLITUS

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ABSTRACT

Background: Pakistan ranks sixth in terms of tuberculosis burden. The frequency of tuberculosis in diabetics is reported to be four times higher than in non-diabetics. The aim of this study was to determine the frequency of pulmonary tuberculosis in admitted patients of diabetes mellitus.

Material & Methods: Patients of diabetes mellitus admitted to Medical Unit A, Hayatabad Medical Complex, Peshawar, from 1st August 2010 to 31st July 2011, were studied. Routine investigations including blood complete, erythrocyte sedimentation rate, fasting and random blood glucose, were carried out in all patients. Three early morning sputum smears for acid fast bacilli and x-ray chest and bronchoalveolar lavage were the main tools for diagnosis of pulmonary tuberculosis.

Results: A total of 100 patients with diabetes mellitus were admitted during the study period. Out of them, 54 patients were males, and 46 females. Fourteen (14%) of these patients were diagnosed as having pulmonary tuberculosis. Fever was the commonest presenting symptom of tuberculosis and was present in 75%, followed by cough in 56%, and hemoptysis in 17% patients. Cavitating lesions were seen on chest x-ray in (35.7%) and pleural effusion in (28.5%) of these patients.

Conclusion: Pulmonary tuberculosis is common in patients with diabetes mellitus. Fever and cough are the common presenting symptoms.

KEY WORDS: Tuberculosis, Pulmonary tuberculosis, Diabetes mellitus.

INTRODUCTION

Robert Koch reported the discovery of microbes causing tuberculosis on March 24, 1882.¹ Still about one third of the world's population has latent tuberculosis; among them approximately 9 million cases of active tuberculosis occur annually, resulting in 2 to 3 million deaths.² Tuberculosis is the 7th leading cause of death.³ The largest number of cases occur in the South-East Asia Region which accounts for 33% of incident cases globally.⁴ Pakistan ranks sixth in terms of tuberculosis (TB) burden with a World Health Organization (WHO) estimated incidence of 181 cases per 100,000 persons or 272,000 new cases annually.⁵

Poverty, poor hygiene, illiteracy, drug resistance and poor compliance with medications are important reasons for the rising incidence of TB.⁶ Effective health education, access to treatment centers and trained and motivated health care providers can go a long way in making national TB control program a success.⁷

The World Bank recognizes the Directly Observed Treatment Short Course (DOTS) strategy as one of the most cost-effective health interventions and recommends that effective TB treatment

should be a part of the essential clinical services package available in primary health care.⁸

Diabetes mellitus is known to be an important predisposing factor in the development of pulmonary tuberculosis. The frequency of tuberculosis in diabetics is reported to be four times higher than in nondiabetics.⁹ The reason for increased susceptibility of diabetics to TB may be multifactorial. Alveolar macrophages play a critical role in eliminating mycobacterial infection in collaboration with lymphocytes. Alveolar macrophages have been found to be less activated in TB patients complicated with DM and this may contribute to increased susceptibility.¹⁰

In a survey by WHO it was shown that in 1995 Pakistan was 8th on the list of top ten countries with high prevalence of diabetes and there were 4.3 million people with diabetes mellitus. However it is estimated that in the year 2025, Pakistan will be 4th on the list with 14.5 million people suffering from this disease.¹¹

MATERIAL AND METHODS

We conducted this study on 100 patients with diabetes mellitus (DM) who were admitted to Medical A Unit Hayatabad Medical Complex, from 1st August 2010 to 31st July 2011.

All patients with diabetes mellitus were included in the study. The following patients were excluded from the study: HIV positive, patients on steroids, patients on immunosuppressive therapy, patients with malignant disorders, patients of chronic renal failure, intravenous drug abuser, patients with cirrhosis and patients with history of gastrectomy /jejunal by-pass. After informed consent, the demographic characteristics were recorded.

All the subjects were screened for TB. This screening was based on findings suggestive of TB. History included contact with TB patients, cough for more than three weeks, fever, hemoptysis and weight loss. Diagnosis of pulmonary TB was made according to the Pakistan Chest Society Guidelines for the diagnosis of pulmonary TB. Chest radiographs were for consolidation, cavitation, hilar lymphadenopathy, pleural effusion and miliary mottling. This was confirmed on sputum AFB testing, bronchoalveolar lavage for AFB and pleural fluid examination.

The data was entered in a structured proforma and entered into SPSS version 14.0 for statistical analysis.

RESULTS

In 100 patients with DM, 54 were males, and 46 females. Age range of patients was 20 to 95 years. The majority of the patients (82%) were of 40–70 years age, with only 7% below 40 and 11% above 70 years.

Out of 100 patients with diabetes, 14% patients were diagnosed as having both TB and DM. Fever was the commonest presenting symptom of TB in this group, being high grade ($> 38^{\circ}\text{C}$) in 75% of patients followed by cough in 56% patients. Hemoptysis occurred in 17%. The clinical characteristics of these patients are presented in Table 1. Cavitating lesions were seen in (35.7%) in tuberculous patients followed by pleural effusion (28.5%). Chest radiograph findings in all patients is given in Table 2. Sputum AFB was positive in only 5 % of patients with TB. The highest prevalence of TB (42.8%) was in those with DM of more than 10 years duration.

Table 1: Clinical presentation of diabetic patients with tuberculosis.

Clinical presentation	Frequency	Percentage
Fever	75	75%
Cough	56	56%
Hemoptysis	17	17%
Shortness of breath	13	13%
Weight loss	11	11%

Table 2: Chest x-ray findings.

Chest X-ray findings	Frequency	Percent
Normal	69	69.0%
Consolidation	15	15.0%
Cavitation	6	6.0%
Pleural effusion	6	6.0%
Lymphadenopathy	2	2.0%
Miliary mottling	2	2.0%

DISCUSSION

TB and DM are common diseases in Pakistan and the incidence of both is rising, not surprisingly they co-exist. Patient with DM are susceptible to infections and the risk of developing TB is as high as three times in diabetics as compared to non-diabetics. The possibility of concomitant diabetes should be considered in patient with poor clinical response to anti-tuberculous treatment and similarly the suspicion of associated TB should be considered in patients with uncontrolled diabetes.¹² Similarly, pulmonary TB may adversely affect the glycaemic control. TB infection has been shown to produce glucose intolerance that improves or normalizes with anti-TB treatment.¹³

In our patients the prevalence of TB was 14% in diabetics, which is consistent with the study by Jabbar et al who showed it to be 11.9%.¹⁴ In a random sample of 100 Indian diabetic patients, TB was diagnosed by a positive sputum result in 6% and by radiological examination in 27%.¹⁵

The majority of patients in our study who developed TB were middle-aged (40–70 years) which is similar to other studies. In the Indian study the majority of patients were above 40 years of age.¹⁶ In both Korean¹⁷ and Japanese¹⁸ studies the prevalence was high in the age group 40–50 years compared to the other age groups.

The presence of DM does not seem to modify the presenting symptoms of pulmonary TB. Fever with cough and sputum remain the most common presenting features. Tuberculin reaction was found to be similar.¹⁶ Upper zone involvement and presence of cavitation are typical features of active pulmonary TB. In patients with DM and other systemic diseases, chest radiograph changes may be atypical. In our study, consolidation was the most frequent change. Cavitation was seen in 35.7% of our patients. A higher rate of multiple cavitation has been reported in many studies^{19,20} but not in others.²¹

CONCLUSION

Pulmonary TB is common among patients with diabetes mellitus, mostly between 40 and 70 years of age. Fever and cough are the common presenting symptoms. Cavitating chest lesion is common. An associated effusion may be present.

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