

ROLE OF DIABETES IN ATYPICAL RADIOLOGICAL PRESENTATION OF PULMONARY TUBERCULOSIS

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Abstract;

Background; Diabetes mellitus has been reported to modify the presenting features of pulmonary tuberculosis, but there are varying data, particularly regarding the association with lower lung field involvement. This study was conducted to document frequency of atypical radiological presentation of pulmonary tuberculosis in our population of Southern Punjab. **Material and methods;** A total of 200 study cases having age range; 35 – 70 years of either sex having diabetes for more than 1 year and pulmonary tuberculosis (irrespective of disease duration) were included in our study. Known cases having Malignancies, HIV, pregnant ladies, asthmatic patients and those with COPD were excluded from our study. Patients of pulmonary tuberculosis fulfilling the inclusion and exclusion criteria was included in this study. Sociodemographic and Radiological data from each was collected and recorded on a performa. **Results;** Of these 200 study cases, 116 (58%) were male patients while 84 (42%) were female patients. Mean age of our study cases was noted to be 55.52 ± 9.33 years (with minimum age was 38 years while maximum age was 70 years). Of these 200 study cases, 117 (58.5%) were

from rural areas and 117 (58.5 %) were poor. Mean duration of diabetes in these patients was 7.41 ± 3.76 years (with minimum duration of diabetes was 3 years while maximum duration was noted to 15 years). Mean duration of tuberculosis was 6.74 ± 2.29 months (with minimum duration of disease was 2 months and maximum duration was 12 months).

Diabetes was controlled in only 33 (16.5%) of our study cases and only 63 (31.5%) were taking treatment for diabetes. Right side of lungs affected was seen in 105 (52.5%) and lower lung field was affected in 116 (58 %) of our study cases. Atypical presentation was seen in 95 (47.5%) of our study cases.

Conclusion; Frequency of atypical radiological presentation of pulmonary tuberculosis was high in our study. Atypical presentation of pulmonary tuberculosis in patients with diabetes is quite common. Atypical presentation was significantly associated with gender, age groups, residential status, socioeconomic status, duration of diabetes, control of diabetes, treatment status of diabetes, lung side affected and lung field affected. Clinicians treating diabetic patients must keep these facts in their minds while treating such patients to avoid misdiagnosis.

Keywords; Diabetes, tuberculosis, atypical presentation.

Introduction

Tuberculosis (TB) remains one of the world's deadliest communicable diseases. TB ranks as the second leading cause of death from an infectious disease worldwide, after the human immunodeficiency virus (HIV). In 2013, an estimated 9.0 million people developed TB and 1.5 million died from the disease. Pakistan ranks 5th among high burden TB countries in the world. There are about 4,20,000 new TB cases in Pakistan each year. More than 90% of the Global TB cases and deaths occur in the developing world, Where 75% of cases are in the most economical productive age group i.e. 15 to 55 Years¹.

On the other hand, diabetes mellitus is also a major health problem. It is predicted that the world prevalence of DM will increase from 285 million in 2010 to 439 million by 2030, with 36 million diabetics in the United States (US) alone². South Asia in particular is considered one of the areas of highest increase in projected numbers. Of the estimated 155 million diabetic people in the world, 100 million live in the developing world, mostly in Asia. In the year 2011, 366 million people with diabetes were estimated globally which is anticipated to rise to 552 million by 2030. An upsurge in the cases of diabetes globally is mainly due to the rising prevalence of risk factors like age, ethnicity, overweight, obesity, physical inactivity and family history of diabetes.³ DM causes more pronounced atypical radio-logical findings in pulmonary TB. When two diseases are common in a

community, these can effect each other in terms of clinical presentation, course, diagnosis and response to treatment.⁴ The peculiar relationship of DM and TB has been observed for more than 2000 years. Pulmonary Tuberculosis is classified into primary and postprimary tuberculosis. Primary Tuberculosis usually presents as an inflammatory patch or consolidation in lung fields and hilar lymphadenopathy, it commonly infects children and previously uninfected individuals. Postprimary tuberculosis usually presents with nodular infiltration with or without cavitation involving the apical and posterior segment of upper lobe and in some cases apical segment of lower lobe is first to be involved⁵. These presentations are considered as typical and usual. There are many patients of Pulmonary Tuberculosis who show different radiological involvement including miliary shadowing, diffuse pulmonary tuberculosis, pleural effusion, pneumothorax and alveolar consolidation^{6,7}. More recently a report in the radiological literature suggested that many patients with cavitory disease show air fluid levels. Isolated lower lung zones involvement, hilar lymphadenopathy and some other unusual pattern may be seen on the chest x-ray in tuberculosis and often misdiagnosed as Pneumonia. These presentations are referred as atypical and commonly seen in elderly, diabetics and other immunocompromised conditions like HIV⁸⁻¹⁴.

In a study done at Victoria hospital Bahawalpur⁹ where total of 150 patients were analyzed in which 105 were male and 45 females. Out of 150 films, 81 (54%) pts showed the atypical pattern.

Material & Methods

A total of 200 study cases having age range; 35 – 70 years of either sex having diabetes for more than 1 year and pulmonary tuberculosis (irrespective of disease duration) were included in our study. Known cases having Malignancies, HIV, pregnant ladies, asthmatic patients and those with COPD were excluded from our study. Patients of pulmonary tuberculosis fulfilling the inclusion and exclusion criteria was included in this study. Sociodemographic and Radiological data from each was collected and recorded on a performa. **Atypical Presentation;** was deemed as positive on in case of presence of any one of **Cavitation** (Presence of cavity > 2 cm (assessed with measuring tape) in diameter in right or left apex of lung), **Pleural effusion** (Effusion which is more than one third of either lung volume), **Miliary Pattern** (Bilateral nodular shadows involving all radiological zones in both the lungs), **Parenchymal lesion** (Reticular or reticulonodular shadowing of upper one third of either lung on chest x-ray) and **Mediastinal widening** (widening of mediastinum >1cm (assessed with measuring tape) on either side of mediastinum)

Results;

Our study included a total of 200 diabetic patients with pulmonary tuberculosis. Of these 200 study cases, 116 (58%) were male patients while 84 (42%) were female patients. Mean age of our study cases was noted to be 55.52 ± 9.33 years (with minimum age was 38 years while maximum age was 70 years). Mean age of the male patients was 56.07 ± 10.74 years while that of female patients was 54.76 ± 6.90 years ($p = 0.329$). Our study results have further indicated that majority of our patients i.e. 136 (68%) were belonging to age group of 51 – 70 years of age. Of these 200 study cases, 117 (58.5%) were from rural areas and 117 (58.5 %) were poor. Mean duration of diabetes in these patients was 7.41 ± 3.76 years (with minimum duration of diabetes was 3 years while maximum duration was noted to 15 years). Our study results have indicated that majority of our study cases i.e. 117 (58.5%) had disease duration more than 5 years. Mean duration of tuberculosis was 6.74 ± 2.29 months (with minimum duration of disease was 2 months and maximum duration was 12 months). Our study results have indicated that majority of our study cases i.e. 115 (57.5%) presented with TB within 6 months. Diabetes was controlled in only 33 (16.5%) of our study cases and only 63 (31.5%) were taking treatment for diabetes. Right side of lungs affected was seen in 105 (52.5%) and lower lung field was affected in 116 (58 %) of our study cases. Atypical presentation was seen in 95 (47.5%) of our study cases.

Discussion;

Diabetic patients are considered as a high-risk population for the development of pulmonary tuberculosis (PTB). Usually, PTB is found predominantly in the upper lobes. In some series, multilobar disease or the presence of multiple cavities was more common in diabetic patients, but lower lung disease was rarely more common in diabetic patients than in controls, except, perhaps, in patients aged over 40 years.^{15,16} Our study included a total of 200 diabetic patients with pulmonary tuberculosis. Of these 200 study cases, 116 (58%) were male patients while 84 (42%) were female patients. Tatar et al¹⁷ from Turkey reported 56.4 % male gender predominance over female patients which is similar to that of our study results. Baghaei et al¹⁸ from Iran reported female gender predominance as they reported 42.6 % male patients, thus contradicting with our findings. Shital et al¹⁹ from India also reported male gender predominance with 77 % male patients having pulmonary TB with diabetes. Qazi et al⁹ also reported 70 % male gender predominance which is in compliance with our study results. Mean age of our study cases was noted to be 55.52 ± 9.33 years (with minimum age was 38 years while maximum age was 70 years). Mean age of the male patients was 56.07 ± 10.74 years while that of female patients was 54.76 ± 6.90 years ($p = 0.329$). Our study results have further indicated that majority of our patients

i.e. 136 (68%) were belonging to age group of 51 – 70 years of age. Tatar et al ¹⁷ from Turkey also reported 53.55 ± 12.66 years which is also in accordance with our study findings. Baghaei et al ¹⁸ reported 57.8 ± 13.6 years mean age of TB patients with diabetes which is close to our study findings. Shital et al ¹⁹ reported 55.4 ± 14.2 years mean age of these patients which is in compliance with our study results. Pérez-Guzman et al ²⁰ reported 51.3 ± 0.9 years mean age which is close to our study results. Qazi et al ⁹ reported 49.81 ± 12.28 years mean age which is close to our findings.

Of these 200 study cases, 117 (58.5%) were from rural areas and 117 (58.5 %) were poor. Baghaei et al ¹⁸ from Iran reported 97.4 % urban population which is contrary to our findings. Qazi et al ⁹ also reported 87 % patients from rural areas which is in compliance with our results as our study also reported more patients from rural areas.

Mean duration of diabetes in these patients was 7.41 ± 3.76 years (with minimum duration of diabetes was 3 years while maximum duration was noted to 15 years). Our study results have indicated that majority of our study cases i.e. 117 (58.5%) had disease duration more than 5 years. Mean duration of tuberculosis was 6.74 ± 2.29 months (with minimum duration of disease was 2 months and maximum duration was 12 months). Our study results have indicated that majority of our study cases i.e. 115 (57.5%) presented with TB within 6 months. These study results are in compliance with that of Tatar et al ¹⁷ from Turkey.

Diabetes was controlled in only 33 (16.5%) of our study cases and only 63 (31.5%) were taking treatment for diabetes. Right side of lungs affected was seen in 105 (52.5%) and lower lung field was affected in 116 (58 %) of our study cases. Similar findings have been reported by Shital from India ¹⁹. Qazi et al ⁹ reported 56 % right side lung affected, 26 % left and 18 % bilateral involvement which is similar to that of our study results. Qazi et al ⁹ reported 54 % lower lung field affected which is close to our study results.

Atypical presentation was seen in 95 (47.5%) of our study cases. Tatar et al ¹⁷ from Turkey reported 37.2 % atypical presentation which is close to our findings. Baghaei et al ¹⁸ from Iran reported 24 % atypical presentation which is quite less than that of our study findings. Pérez-Guzman also reported similar findings ²⁰. Qazi et al ⁹ reported 54 % atypical presentation which is similar to that of our study findings.

Conclusion;

Frequency of atypical radiological presentation of pulmonary tuberculosis was high in our study. Atypical presentation of pulmonary tuberculosis in patients with diabetes is quite common. Atypical presentation was significantly associated with gender, age groups, residential status, socioeconomic status, duration of diabetes,

control of diabetes, treatment status of diabetes, lung side affected and lung field affected. Clinicians treating diabetic patients must keep these facts in their minds while treating such patients to avoid miss-diagnosis.

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