



LOWER LUNG FIELD PULMONARY TB - A COMPARATIVE ANALYSIS BETWEEN PTB-DM AND PTB NON-DM PATIENTS

Pulmonary Medicine

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ABSTRACT

Background - PTB predominantly involves upper lung zone on the chest radiograph and the incidence of TB is 2 to 5 times higher in diabetic patients than in control groups. "Lower lung field tuberculosis" denotes the involvement by tuberculosis of the area of the lung that in the PA chest radiograph extends below an imaginary horizontal line traced across the hilum and includes the parahilar region. **Aim And Objective** - To compare the lower lung field involvement on chest radiograph between PTB-DM and PTB-non DM patients. **Methodology** - 122 sputum CBNAAT positive PTB patients who attended either OPD or were admitted for treatment have been included in the present study. The chest x ray PA view and the relevant blood investigations were done in all the patients. Based on FBSL, PPBSL and HbA1C the study group was further divided in to two subgroups viz PTB-DM and non-DM patients. **Results** - Out of 122 patients, 66 were PTB-DM patients and 56 were PTB non-DM patients, M:F ratio being 2.56. Pulmonary cavities were observed in 22 (33.33 %) in PTB-DM and 8 (14.03%) in PTB non-DM group. Lower lung fields involvement was seen in 30 (45.45%) in PTB-DM and in 13 (22.80%) in PTB non-DM, the difference was statistically significant (p value<0.05). **Conclusion** - It is advisable to rule out TB in a diabetic patient presenting with lower lobe predominant lesions on chest radiograph. This is important because lower lobe tuberculosis can be misdiagnosed as community acquired pneumonia or cancer leading to delay in diagnosis and initiation of anti-TB treatment.

KEYWORDS

Pulmonary TB, Diabetes, Chest x-ray

INTRODUCTION

Diabetes Mellitus is a well-known risk factor for TB. Patients with type 2 DM are more prone to develop TB which is difficult to treat due to their inherent weak immune system.^[1] Approximately 15% of pulmonary tuberculosis cases have been estimated to be attributable to DM in India.^[2] Historically the incidence of TB has been shown to be 2 to 5 times higher in diabetic patients than in control groups. PTB predominantly involves upper lung zone on the chest radiograph for which many theories have been proposed. "Lower lung field tuberculosis" denotes the involvement by tuberculosis of the area of the lung that in the PA chest radiograph extends below an imaginary horizontal line traced across the hilum and includes the perihilar region^[3]. The lower lung field PTB is seen in immunocompromised state like HIV and diabetes mellitus.

OBJECTIVE

To compare the radiological manifestations on chest radiograph between PTB-DM and PTB non-DM patients.

MATERIAL AND METHODS

122 sputum CBNAAT positive PTB patients who attended either OPD or were admitted for treatment in the Department of Respiratory Medicine, Goa Medical College have been included in the present study. The chest x ray PA view and the relevant blood investigations were done in all the patients. The sputum CBNAAT for M. TB was done for microbiological confirmation of PTB in the study group. The FBSL, PPBSL and HbA1C were done in these patients and based on the results of these tests the study group was further divided in to two subgroups viz PTB-DM and PTB non-DM patients.

OBSERVATION AND RESULTS

The present study group comprised of 66 patients were PTB-DM and 56 were PTB non-DM patients, with a M:F ratio of 2.56. Pulmonary cavities were observed in 22 (33.33 %) in PTB-DM and 8 (14.03%) in PTB non-DM patients. Lower lung fields involvement seen in 30 (45.45%) in PTB-DM and in 13 (22.80%) in PTB non-DM group.

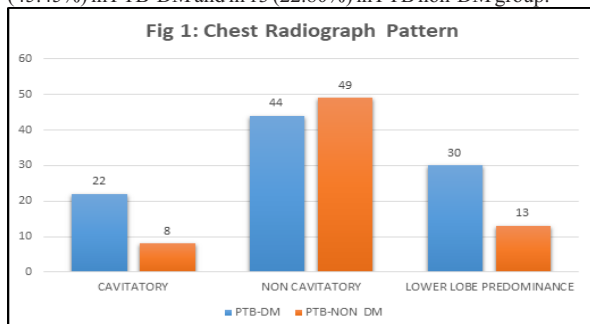


Table 1. Distribution Of The Patients In The Subgroups According To The Type Of Lesion On Chest Radiograph

Lesions	PTB -DM	PTB non- DM	PTB-DM (%)	PTB non-DM (%)
Cavitary	22	8	33.3	14.2
Non Cavitary	44	49	66.6	87.5
Lower Lobe Predominance	30	13	45.5	23.2

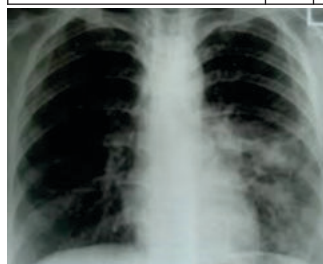


Fig.2 Chest x-ray showing lower lung field PTB on the left side

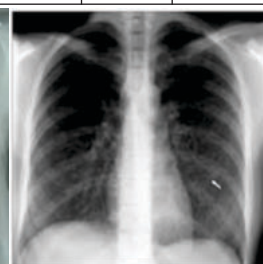


Fig.3 Chest x-ray showing complete resolution of lesions after 9 months

DISCUSSION

PTB-DM patients are more likely to have lower lobe lesions because preferential changes in lower lobe alveolar oxygen tension related to age or diabetes mellitus.^{[3],[4]} The dominant manifestation of DM, namely hyperglycaemia is assumed to favour the growth, viability and propagation of tubercle bacilli.

Diabetes is associated with reduced macrophage function, such as chemotaxis, phagocytosis, and bactericidal action, and impairs the function and proliferation of T-helper 1 cells and production of cytokines.

The radiographic presentation of tuberculosis depends on many factors, including duration of illness and host immune status. In 1927, Sosman and Steidl (World Health Organization 2007); reported that a large proportion of diabetic patients with tuberculosis had lower-lung involvement, whereas non-diabetic patients usually had upper-lobe infiltrates^[5]. Subsequent studies in the 1970s and 1980s corroborated this finding (<http://www.who.int/tb/publications/2011>; Harries AD et al, 2010)^[6] and it was widely believed that pulmonary tuberculosis in diabetic patients presented with an atypical radiographic pattern and distribution, particularly lower-lung involvement. Clinically, this is important because lower-lobe tuberculosis can be misdiagnosed as community-acquired pneumonia or cancer. Also, patients with pulmonary tuberculosis who do not have upper-lobe involvement are less likely to have sputum CBNAAT positivity and cultures (Yang W et al, 2010),^[7] Whereas in one series 20% of patients with diabetes mellitus presented with lower lobe involvement.

Older individuals are more likely to have lower lobe involvement. It is suggested that preferential changes in lower lobe alveolar oxygen tension related to age or diabetes mellitus favor lower lobe disease in this group. In most series, multi lobar disease or the presence of multiple cavities was more common in diabetic patients, but lower lung field PTB was rarely more common in diabetic patients than in controls, except perhaps in patients aged over 40 years.^[8] Results vary substantially between studies, and the frequency of unusual radiographic findings in diabetic patients has probably been overstated. M. A. Shaikh et al (2003) observed that PTB DM group of patients had increased frequency of lung lesions confined to lower lung field compared to PTB group (23.5% versus 2.4%, $p < 10(-4)$). The PTB DM group of patients had significantly higher frequency of cavitory lung lesions compared to PTB group (50.8% versus 39.0%, $p = 0.005$)^[9]. In the present study Pulmonary cavities were observed in 22 (33.33%) in PTB-DM and 8 (14.03%) in PTB non-DM. Lower lung fields involvement seen in 30 (45.45%) in PTB-DM and in 13 (22.80%) in PTB non-DM. In a study conducted by Qianwen Yang et al^[10] CT scan findings in 154 hospitalized PTB-DM patients was analyzed. They observed that patients with TB-DM had significantly more severe TB than those with TB non-DM (89.61% vs. 68.97%, $P < 0.0001$). Regarding CT findings, patients with TB-DM had higher proportions of consolidation (79.22% vs. 52.41%, $P < 0.0001$), cavitory lesions (85.06% vs. 59.31%, $P < 0.0001$), bronchiectasis (71.43% vs. 31.03%, $P < 0.0001$), exudative lesions (88.96% vs. 68.28%, $P < 0.0001$), and fibrous lesions (93.51% vs. 68.97%, $P < 0.0001$) than patients with TB non-DM. In conclusion, patients with TB-DM have more severe CT findings than those without. There were no significant differences in the distribution of lesions in the lung lobes between TB-DM and TB non-DM patients.

CONCLUSION

- A diagnosis of TB should be considered in diabetics with an abnormal chest x-ray (cavities and lower lobe lesions), in the presence or absence of specific clinical symptoms.
- It is advisable to rule out TB in a diabetic patient presenting with lower lobe predominant lesions on chest radiograph. This is important because lower lobe tuberculosis might be misdiagnosed as community acquired pneumonia or cancer.

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