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Original Research Article

Study of Pulmonary Tuberculosis in Diabetic and Non Diabetic Patients on DOTS Therapy

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ABSTRACT

Introduction: Tuberculosis is one of the oldest diseases known to affect human, it is a major cause of death worldwide. The global burden of tuberculosis remains enormous. In the year 2012 India accounted for 2.0 million – 2.4 million cases of tuberculosis (26% of global cases). People with diabetes mellitus have a 2-3 times higher risk of tuberculosis compared to people without diabetes mellitus. The aim was to study the clinical profile, laboratory and radiological features of Pulmonary Tuberculosis in diabetic and non-diabetic patients.

Materials and Methods: 60 patients of Pulmonary Tuberculosis with diabetes and non-diabetes who attended Outpatient and Inpatient department of Dr. D.Y. Patil Medical College Hospital and Research Institute, Kadamwadi, Kolhapur in a period of 2 years between 2013 and 2015 were evaluated on the basis of clinical assessment, sputum AFB, blood sugar levels fasting and post prandial and chest x-ray.

Results: Cough, fever followed by anorexia was major symptom in both diabetic and non-diabetic patients.The duration of the symptoms was shorter for diabetic patients, whereas it was longer for non-diabetic patients. Present study showed that there was an increased bacillary load amongst the diabetics. Maximum sputum conversion was seen in 4 to 6 weeks in diabetic patients, whereas among non-diabetic it was 2 to 4 weeks..In Diabetic patients bilateral lung fields with lower zone, cavitary lesions were predominant when compared to non-diabetic.Sputum smear conversions were significantly late in diabetic patients. .

Conclusion: All sputum positive tuberculosis patients should be screened for diabetes by doing random blood sugar levels as a routine for tuberculosis patients. Diabetic patients with respiratory symptoms should be screened for tuberculosis. Tight control of hyperglycemia should be done for TB diabetic patients to initiate early sputum conversion to negativity and reduce the infective burden to the community.

KEY WORDS: Tuberculosis, Diabetes Mellitus.

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INTRODUCTION

Tuberculosis is one of the oldest diseases known to affect human, it is a major cause of death worldwide[1]. Tuberculosis is an infectious diseases caused by various strains of Mycobacterium, especially Mycobacterium tuberculosis[2]. It typically affects the lungs (Pulmonary TB) but can affect other sites as well (Extra Pulmonary TB).The global burden of tuberculosis remains enormous. In the year 2012 India accounted for 2.0 million – 2.4 million cases of tuberculosis (26% of global cases)[3].

Diabetes mellitus is one of the most widespread chronic disease in the world prevention and early detection of complication in diabetic patients is crucial,especially in light of the estimated increase in worldwide diabetes to approximately 366 million by 2030.[4] In India as a consequence of population growth, longevity, changed life style and urbanization, the country has 63 million persons with diabeties[5]. Prevalance of type 2 diabetes mellitus is increasing because of increasing obesity and decreased activity levels as countries become more industrialized.[6] In recent years along with HIV infection, malnutrition, alcoholism and smoking, diabetes mellitus has been shown to be an independent risk factor for TB[7]. The association between diabetes and tuberculosis is well documented and there is substantial evidence to support that fact that diabetes is an important risk factor for TB. People with diabetes mellitus have a 2-3 times higher risk of tuberculosis compared to people without diabetes mellitus. About 10% of tuberculosis cases globally are linked to diabetes mellitus[5].

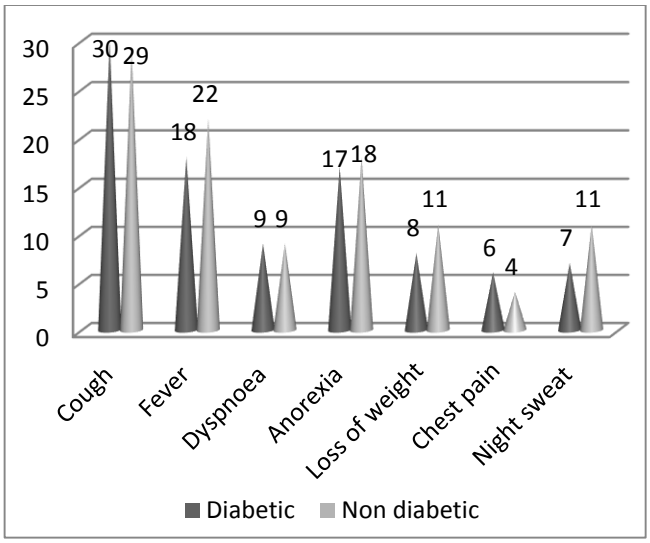
An increased susceptibility of patients with diabetes mellitus to develop tuberculosis could be due to neutrophil dysfunction and cytokines production. Studies have shown that production of IL-1β and TNF α is significantly lower in patients with poor glycemic control[8]. Evidence from an experimental study revealed that diabetes mellitus was associated with reduced macrophage functions, such as chemotaxis, phagocytosis and bactericidal actions, and also impairs the function and proliferation of T-helper 1 cells and their production of cytokines.[9]

METHODOLOGY

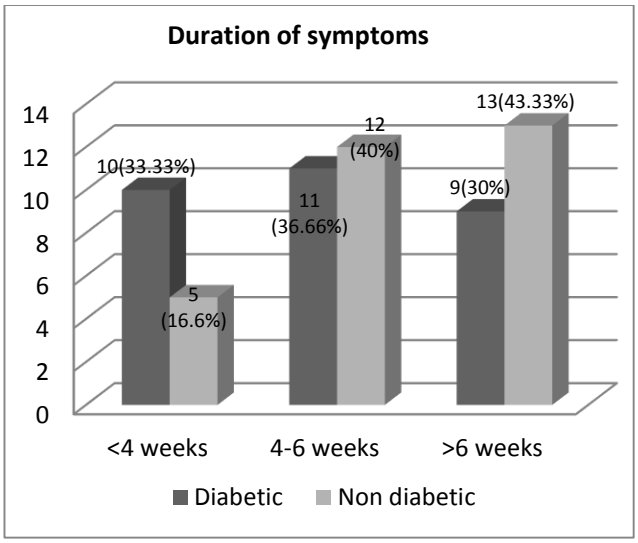
All patients presented with history of cough for >2 weeks, fever, hemoptyis was screened for pulmonary tuberculosis and diabetes mellitus as well. They subjected for sputum smear examination with AFB and was graded as 1+,2+,3+. All patients subjected for

Chest X-ray and reviewed by radiologist[10] .Patients were grouped as pulmonary tuberculosis with DM and pulmonary tuberculosis without DM. Follow ups sputum smear examination was done at end of 2, 4 and 6 weeks of treatment .Diabetes mellitus diagnosed using the WHO diagnostic criteria. Adult patients who fulfilled the above criteria were included in this study. After taking consent, patients were examined in detail and subjected to relevant laboratory and radiological investigations.

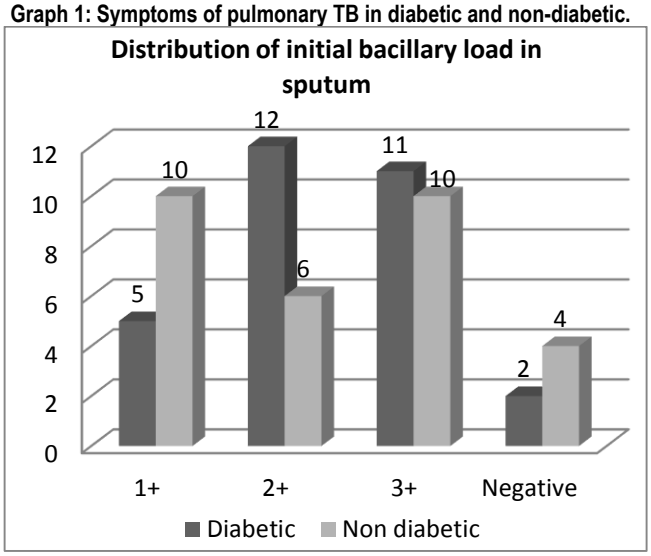
The clinical profile which was evaluated in this study include age and sex distribution, symptom of presentation, past history of tuberculosis, duration of diabetes mellitus, incidence of smoking & alcohol, incidence of pallor, clubbing, haemoglobin level, erythrocyte sedimentation rate, total leukocyte count, blood sugar values, sputum AFB results and radiological pattern[11,12]. The results of the above clinical profile, relevant tests and radiological findings were tabulated and analysed.Patients below 18 years of age, extra pulmonary tuberculosis, HIV, Other Interstitial diseases of the lungs were excluded from study.



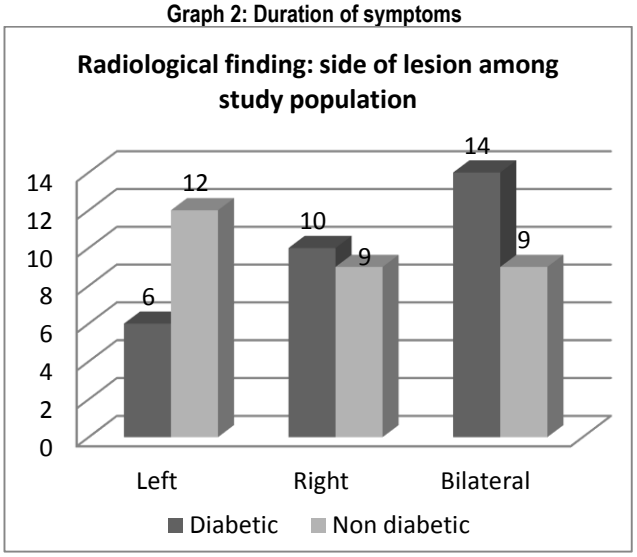
Graph 1: Symptoms of pulmonary TB in diabetic and non-diabetic.



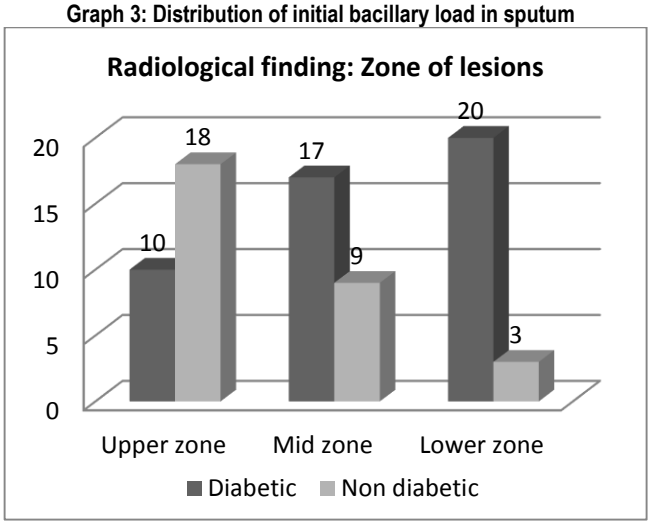
Graph 2: Duration of symptoms



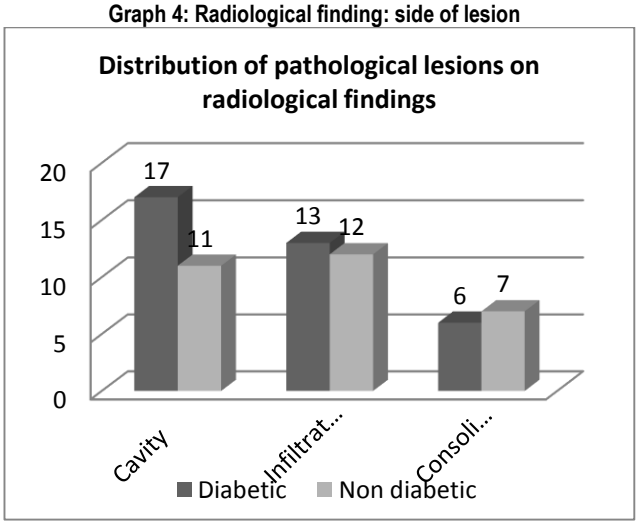
Graph 3: Distribution of initial bacillary load in sputum



Graph 4: Radiological finding: side of lesion



Graph 5: Radiological finding: Zone of lesions



Graph 6: Pathological lesions on radiological findings

RESULTS

Cough was the predominant symptom noted in both groups followed by fever and anorexia. P value was <0.05, which shows there is no significance among the two groups. But in both diabetics and non-diabetics patient with pulmonary tuberculosis had similar symptoms.

79% of patients were showing symptoms in <6 weeks duration in diabetic patients whereas in non-diabetic patients (80%) of them showed the duration >6 weeks, which shows that duration of symptoms was shorter for diabetic patients whereas non diabetic patients had a longer duration of symptoms before sputum becoming positive.

There was an increased bacillary load amongst the diabetics i.e. 2+ was (40%) followed by 3+ (36.66%) and only (16.66%) 1+, as compared to non-diabetic patients it was maximum (33.33%) 1+, followed by (20%) 2+, and (33.33%) 3+.

Among the diabetic patients maximum (47%) had bilateral lesions. Among diabetic patients majority (66.66%) lower zone was affected, whereas among non-diabetic patients majority (60%) upper zone was more affected. 56.66%of patients on chest x-ray showed cavitary lesions among diabetic patients.

DISCUSSION

The mean age of presentation in our study population for diabetics was 51.7 years and of non-diabetics were 48.2 years with tuberculosis. Our study was comparable with Deshmukh et al and Philips et al, and similar findings were observed. Males affected were five times the number of females in both diabetics and non-diabetics. Tripathy (1984) and Kar (1984) reported that 78% of their patients were males. Our study was comparable with Deshmukh et al, Patel et al, Morris et al, Tripathy and Kar, and similar findings were observed. Cough, fever followed by anorexia were major symptoms in both diabetic and non-diabetic patients. In a study done in Ethiopian (1999) diabetic patients with tuberculosis, three most common symptoms of tuberculosis were fever (80.5%), sweating (80.4%) and cough (70.5%)[14,15].

Our study was comparable with study done in Ethiopian diabetic patients with tuberculosis, and similar findings were observed.79% of patients were showing symptoms in <6 weeks duration in diabetic patients whereas in non-diabetic patients 80% of them showed the duration >6 weeks. Our study was comparable with Dr. Lalitha S, and similar findings were observed. There was an increased bacillary load amongst the diabetics[16] i.e. 2+ was 40% followed by 3+ 36.66% and only 16.66% 1+, as compared to non-diabetic patients it was maximum 33.33% 1+ and 3+, followed by 20% 2+. A study by Dr.Lalitha S (1996) showed that the pre-treatment bacillary load (indicated by 1+, 2+ & 3+) was more for diabetic patients compared to non-diabetics. In present study it was seen that the fasting blood sugar of the study population was maximum 43.33% in the range of 201 to 300 mg/dl followed by 36.66% in 151 to 200 mg/dl. Mean value of fasting blood sugar was 198.43 mg/dl.

A study by Dr Hari Prasad (2006) showed that the fasting blood sugar value of 200 – 300 mg was noted in 41% of the patients and values above 300mg were noted in 23% of the cases. Present study showed that the post prandial blood sugar of the study population was maximum 53.33% in the range of 251 to 350 mg/dl.

A study by Dr Hari Prasad (2006) Post prandial blood sugar value at 2 hours was above 350mg% in 45% of patients. Mean PPBS was 341.5[19,20]. Similar findings were seen in present study. Present study showed majority of patients of 60% diabetic and 43.29% non-diabetic patients had heamoglobin levels in the range of 7 to 10 gm%. Present study showed that Erythrocyte sedimentation rate where majority 84% diabetic patients and 80% non-diabetic patients had an ESR in the range of 21 to 50 mm/hr.

Present study showed that radiologically bilateral side (46.66%), lower zone (66.66%), cavitary lesions (56.66%) was more affected among diabetic patients. Similar findings were seen in a study by Patel A et al, higher involvement of lower lung field (84%) as compared to upper lung field (16%)[24-25]. Our study was comparable with Dr. Hari Prasad, Bacakoglu, Perez Guzman, Chaya B E et al and Singh A et al and similar findings were observed.

CONCLUSION

There was no significant difference in the symptoms. But the duration of the symptoms was shorter for diabetic patients, whereas it was longer for non-diabetic patients. Increased bacillary load on initial sputum smear was seen among diabetic patients. Diabetic patients have increased cavitary and radiologically extensive disease with of lower zone involvement affecting bilateral lung fields. Sputum smear conversions were significantly late in diabetic patients than non-diabetic patients. Patients on insulin treatment showed sputum smear conversion earlier than patients on OHA treatment.

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