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Study of pulmonary infection in patients with diabetes Mellitus

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Abstract
Patients with diabetes mellitus are at higher risk of developing pulmonary infections; this study was conducted to study Pulmonary infection in patients with Diabetes mellitus.
Material and Method: *50 known cases of Diabetes Mellitus with symptoms of pulmonary infections were enrolled in the stud. Subjects were studied for symptoms of pulmonary infection; organism of the infection were detected by standard sputum culture method.*
Result: *Cough and fever were most common symptoms (48 out of 50 patients) followed by Anorexia in patients with Diabetes Mellitus. M. Tuberculosis was detected in 25 out of 50 cases, cough and fever was present in cases with M. Tuberculosis.*
Conclusion: *Patients with Diabetes Mellitus are more prone to Pulmonary infection specifically Pulmonary Tuberculosis.*
Keywords: *Diabetes Mellitus, Pulmonary Infection, Pulmonary Tuberculosis, M. Tuberculosis.*

Introduction

Diabetes Mellitus results from relative or absolute deficiency of insulin characterised by chronic hyperglycaemia with or without glycosuria and a tendency to develop ketoacidosis.[1]

Diabetes Mellitus is classified as Type 1 DM, Type 2 DM, Gestational Diabetes Mellitus and other specific type of Diabetes Mellitus. Type 1 DM also known as Juvenile Diabetes Mellitus occurs due to autoimmune or idiopathic destruction of Insulin producing beta cells in islets of pancreas. Type 2 DM known as maturity onset Diabetes Mellitus is interplay between environmental and genetic factors leading to Insulin resistance and beta cells destruction. Gestational Diabetes Mellitus (GDM) is characterised by insulin resistance related to metabolic changes late pregnancy which increases insulin requirement.[1],[2]

Patients with Diabetes Mellitus are at higher risk of developing Pulmonary Tuberculosis and other pulmonary infections because of affected microcirculation, hyperglycaemia and compromised immunity.[3]-[6] This study was conducted to identify and study of pulmonary infections in patients with Diabetes Mellitus.

Aims and Objectives

Goal of the study was to identify and study pulmonary infection in Diabetes Mellitus patients. For the Goal symptoms of pulmonary infection in Diabetes Mellitus cases were identified and studied. Organism responsible for the infection were identified and studied by standard sputum culture method.

Materials and Methods

Present study was conducted in Department of TB and Chest Disease, Pandeet Deendayal Upadhyay Government Medical College and Hospital, Rajkot from November 2007 to July 2008. Known cases of Diabetes Mellitus associated with pulmonary infection were identified from indoor patients; 50 cases were included by Systemic randomization selection method after having institutional ethical committee clearance. Patients with upper respiratory tract infection or patients having extra pulmonary manifestations without pulmonary infection were excluded from the study.

The data of subject was collected in predesigned proforma after having consent of the patient. The data included the detailed past, present and family history and detailed physical examination. Organisms causing pulmonary infection were diagnosed by standard sputum and culture methods.

The data was compiled and analysed with the help of Microsoft Excel 2007 and Epiinfo software. Standard statistical formulas and methods were used to analyse and interpret the data.

Observations and Results

Age distribution (Table 1): Out of 50 patients enrolled in the study 30 patients (60% patients) were between 40 and 60 years of age; the mean age of the group was 51.96 ± 12.48 years. 22 years was the age of youngest patients and eldest patient was 80 years of age.

Gender distribution (Table 1): Out of 50 patients enrolled in the study 36 patients (72% patients) were males and 14 patients (28% patients) were females.

Cough and fever with or without expectorations were the most common symptoms among patients enrolled in the study; among which 25 patients had cough and fever for at least 15 days. Haemoptysis was present among 3 patients out which 1 patient had haemoptysis for more than 30 days.

Table 1: Age and Sex distribution of patients

Age (Years)	Male n (%)	Female n (%)	Total n (%)
21-30	1 (2%)	1 (2%)	2 (4%)
31-40	8 (16%)	1 (2%)	9 (18%)
41-50	8 (16%)	6 (12%)	14 (28%)
51-60	13 (26%)	3 (6%)	16 (32%)
61-70	3 (6%)	3 (6%)	6 (12%)
71-80	3 (6%)	0 (0%)	3 (6%)
Total	36 (72%)	14 (28%)	50 (100%)

Table 2: Distribution and duration of symptoms of pulmonary infections

Symptoms	Duration in Days (No.)					Total patients n (%)
	<15	15-30	31-45	46-60	>60	
Cough	23	5	6	4	10	48 (96%)
Fever	23	5	6	4	10	48 (96%)
Anorexia	6	3	5	2	8	24 (48%)
Weight Loss	4	3	3	4	7	21 (42%)
Breathlessness	12	0	2	0	0	14 (28%)
Chest Pain	11	1	0	0	2	14 (28%)
Haemoptysis	2	0	1	0	0	3 (6%)

Table 3: Organisms causing pulmonary infection in present study

Organism	Number of patients (%)
M. Tuberculosis	25 (50%)
S. Pneumonie	00 (00%)
S. Aureus	03 (06%)
P. Aeruginosa	02 (04%)
K. Pneumoniae	04 (08%)
E. Coli	06(12%)
A.Fumigatus	01 (02%)
Atypical Pathogen	00 (00%)
Unknown	09 18%)

All 25 patients with M. Tuberculosis infection had cough and fever; while anorexia was present in 21 patients with M. Tuberculosis. All 3 patients with Haemoptysis had culture positive for M. Tuberculosis

Discussion

Mean age (51.96 ± 12.48 years) was comparable with previous study (Table 4)

Table 4: Comparison of age distribution with other studies

Study	Mean age (n ± SD) Years
Present Study	51.96 ± 12.48 Years
FezaBecaglu [7]	49.1 ± 11.8 Years
Ezung T [8]	55.4 ± 13.5 Years

Diabetes Mellitus being chronic disease the higher age of the patients in the study is justifiable.

Cough, fever, Anorexia and Weight loss for longer duration are symptoms of Pulmonary tuberculosis or another severe lower respiratory tract infection.

Higher percentage of pulmonary infection may be due to compromised microcirculation as well compromised immunity system in Diabetes Mellitus Patients.[9]-[11] In this study M. Tuberculosis (Table 3) was the most common organism causing pulmonary Infection the reason may be due to insulin resistance or uncontrolled blood sugar level. AL Tawfique et al. demonstrated that the most common organism was S. Pneumonie in 31% patients; AL Tawfique had not investigated for M. Tuberculosis.[9] Bashar M. et al demonstrated 36% Multidrug resistance pulmonary tuberculosis in Diabetes Mellitus patients which supports the finding in present study.[12]

Infection with S. Aureus May be due to complication of upper respiratory infection or haematogenous spread from other site of infection in Diabetes Mellitus Patients. Lipskey B. Et al reported upto 30% patients are nasal carries for S. Auerus in compare to 11% of normal patients.[13]

Summary and Conclusion

Pulmonary infection is common in Diabetes Mellitus patient which may be due to complications of hyperglycaemia like compromised microcirculation, compromised Immunity, anaerobia and hyperglycaemia. M. Tuberculosis is the common organism infecting the patient of Diabetes Mellitus

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