

# Study of Chest X-Ray in Diabetes Melitus Patients associated with Pulmonary Infection

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## A B S T R A C T

**Introduction:** Patients with Diabetes Melitus are at higher risk of developing pulmonary infections. This study was conducted to study Pulmonary infection in patients with Diabetes Melitus.

**Material and Methods:** Chest X-ray from 50 known cases of Diabetes Melitus with symptoms of pulmonary infections were Studied for Extent of lesion, type of lesion and lobes of lung involvement; organism of the infection were detected by standard sputum culture method.

**Result:** 30% (15 out of 50) cases show advanced extent of lesion; 50% (25 out of 50) cases show multiple lobes involvement and 84% (42 out of 50) cases show exudative type lesions.

**Conclusion:** Chest- X-ray in diabetes Melitus patients associated with pulmonary infection show extensive involvement of lung which indicated necessity to control blood sugar level and active treatment of the infection.

**Key words:** Diabetes Melitus, Pulmonary Infection, Chest- X ray, Nodular Lesion

## INTRODUCTION

Hyperglycaemia resulting from absolute or relative deficiency of Insulin is known as Diabetes Melitus which may complicate as ketoacidosis.<sup>1,2</sup>

Patients with Diabetes Melitus are at higher risk of developing Pulmonary Tuberculosis and other pulmonary infections because of affected microcirculation, hyperglycaemia and compromised immunity.<sup>3-6</sup> Previous studies reported affected function of granulocyte in patients with fasting blood sugar more than 200 mg/dl.<sup>7</sup> Pulmonary infection may be due to bacteria like M. Tuberculosis, S. Auerus, Streptococci etc; may be due to fungus like Aspergillus or may be due to virus.<sup>7</sup> Chest X-ray and sputum examination are mainstream investigations for differential diagnosis of Pulmonary infection; Chest X ray gives an idea of the spread of infection and prognosis of the patient. This research was conducted to study Chest X-ray in known patients of Diabetes Melitus associated with Pulmonary infection.

For the goal organisms were detected by standard sputum and culture methods in subjects; Chest-X rays of the patients were studied for radiological characteristics: involved lobes and types of lesion. This study was conducted to study Pulmonary infection in patients with Diabetes Melitus.

## MATERIAL AND METHODS

Present cross-sectional 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 after approval from institutional ethical committee. Known cases of Diabetes Melitus associated with pulmonary infection were identified from indoor patients; 50 cases were included by Systemic randomization selection method after written consent in verbal language. 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.

Postero-anterior view of Chest X-ray of patients were taken and studied for the extent of lesion, lobes involved and type of lesion. Extent of lesion was classified as per the National Tuberculosis and Respiratory Disease Association of USA. 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.

## RESULTS

**Age and gender distribution:** Mean of patients enrolled in the study was 51.96 ± 12.48 years. 22 years was the age of youngest patients and eldest patient was 80 years of age. Out of 50 patients enrolled in the study 36 patients (72% patients) were males and 14 patients (28% patients) were females. Diabetes Melitus was first time detected in 10 patients at

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%)

**Table-1:** Organisms causing pulmonary infection in present study

Extent of Lesion	Smear for AFB		Total
	Positive n (%)	Negative n (%)	
Minimal	03 (12%)	7 (28%)	10 (20%)
Moderately Advanced	13 (52%)	12 (48%)	25 (50%)
Far Advanced	9 (36%)	6 (24%)	15 (30%)
Total	25	25	50

**Table-2:** Extent of lesion in patients with Diabetes Melitus and pulmonary Infection

Lobes Involved		Number of patients n (%)
Right	Upper	08 (16%)
	Middle	02 (4%)
	Lower	07 (14%)
Left	Upper	04 (8%)
	Middle	01 (2%)
	Lower	01 (2%)
Right upper and left Middle Lobes		01 (2%)
Left upper zone and Right Lower Lobes		01 (2%)
Right Lower and Left Lower Lobes		03 (6%)
Multiple Lobes (>2)		25 (50%)
Total		50

**Table-3:** Lobes involvement in patients with Diabetes Melitus and pulmonary Infection

Type of lesion	Number of patients n (%)
Exudative	18 (36%)
Nodular	2 (10%)
Cavity	4 (10%)
Hydropneumothorax	1 (2%)
Exudative and Cavity	19 (38%)
Exudative and Hydropneumothorax	03 (06%)
Exudative and Hydropneumothorax and Nodular	02 (04%)
Cavity and Nodular	01 (02%)
Total	50

**Table-4:** Type of pulmonary Lesion in patients with Diabetes Melitus and pulmonary Infection

the time of enrolment while 40 patients were known cases of Diabetes Melitus. 25 out of 50 patients were infected with M. tuberculosis and

A. fumigatus was detected in 1 out of 50 patients (Table:1). 15 cases out of 50 subjects (30%) had advanced extent of lesion in subjects while 50% cases show moderately advanced lesion. There was not statistically significant difference in extent of lesion for smear positive and smear negative for Acid fast Bacilli cases. (P=0.3268, Table 2) 22 out of 50 patients show single lobe involved while, 25 patients show more than 2 lobes involved. 16 patients show bilateral involvement of lung. 42 patients show exudative type of lesion out of which in 24 patients it was accompanied by other type of lesions also. Only one patient show combination of cavity and nodular type of lesion. 2 patients had lung abscess out of 24 patients with cavity lesion. Chest x-ray of 6 patients show hydropneumothorax.

### DISCUSSION

50 known cases of Diabetes Melitus with Pulmonary infection were enrolled in the study. Average age of the subjects was 51.96 ± 12.48 Years; middle age was more affected with pulmonary infection because Diabetes Melitus is the chronic disease commonly diagnosed in middle age. Only 3 patients enrolled in the study had controlled blood sugar lever which indicates the uncontrolled blood sugar level is one of the factors for pulmonary infection. M. Tuberculosis was detected in 25 patients; which may be due to compromised microcirculation as well compromised immunity system in Diabetes Melitus Patients.<sup>8-10</sup> Gupta et al. (1995) reported 66.6% patient with advanced extent of lesion in cases of Diabetes Melitus associated with pulmonary tuberculosis which is quite higher than the present study where only 36% patients of tuberculosis show advanced extent of lesion.<sup>11</sup> In the present study 25 patients show multiple lobes involvement out of which 22 cases show lower zone involved; 13 cases show involvement of lower lobe alone or along with another lobe (Table 2). One of the reasons for infection of lower lobe is decreased number of granulocytes in Diabetes Melitus patients.<sup>7,12</sup>

In the presented study 48% patients had cavity type of lesion which is comparable with the report of Backaglu et al (2001).<sup>8</sup> Exudative lesions were the maximum (84%, 42 out of 50 cases) in frequency in the presented study out of which 18 cases had only exudative type of lesion which indicated the infection with expectorant. High number of cases with cavity type of lesion is due to anaerobia possible in Diabetes Melitus.<sup>7,12</sup>

### CONCLUSION

Chest x-ray in Diabetes Melitus patients with Pulmonary infection show extensive involvement of lung which requires aggressive control of blood sugar lever and active treatment of infection.

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