COMPARATIVE STUDY OF CLINICAL PROFILE AND OUTCOME OF CASES OF PULMONARY TUBERCULOSIS WITH AND WITHOUT DIABETES MELLITUS UNDER RNTCP IN RURAL AND SEMIURBAN AREAS, MEDAK DISTRICT

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ABSTRACT

BACKGROUND

A comparative study of clinical profile and outcome of 50 cases of pulmonary tuberculosis with diabetes mellitus and 50 cases without diabetes mellitus was done. The aim of this study is to know the differences in clinical lab and radiological profiles of pulmonary tuberculosis in patients with and without diabetes mellitus. The differences in the outcomes of treatment of both groups under RNTCP are to be analysed.

MATERIALS AND METHODS

Study Design- Descriptive comparative study.

Method of Collection of Data- 1. Pulmonary tuberculosis was diagnosed by detailed history, sputum examination for AFB and chest x-ray; 2. Diabetes mellitus was diagnosed using the national diabetes data group and WHO diagnostic criteria. Adult patients who fulfilled the above criteria were included in the study. After taking consent, patients were examined in detail and subjected to relevant laboratory and radiological investigations.

RESULTS

Results show cough as main symptoms in 72% PTB with DM and only 58% has this symptom among PTB without DM. Fever, more or equal number of people have it among both groups at 56%/50%. Haemoptysis is an important symptom, much less at 12% among without DM over other group at 48%. Loss of weight and anorexia are opposite range with the percentages and most people have some anorexia. Chest pain at 46% in DM group, non-DM has 36%. Night sweats is another important symptom at 30% DM and 24% non-DM group.

CONCLUSION

In the present study, the prevalence of haemoptysis in the diabetic pulmonary group was significantly higher 13 (26%) compared to the prevalence of haemoptysis in the non-diabetic pulmonary tuberculosis group 6 (12%). In the present study, 32% of cases had isolated lower lung fields involved in DM PTB group compared to the 18% of cases with isolated lower lung fields involved in non-DM PTB group. Our study results are reporting that 62% of the cases in the PTB-DM group had cavitary lesions on CXR, a percentage much higher than 30% reported in the non-diabetic group. In the present study, 60% of cases had sputum positivity in DM PTB group compared to 40% of cases with sputum positivity in non-DM PTB group. In the present study, the cure rate was low and failure rate was high in the DM PTB group compared to non-DM PTB group.

KEYWORDS

DM- Diabetes Mellitus, TB- Tuberculosis, LLTB- Lower Lung Field Tuberculosis.

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BACKGROUND

Tuberculosis, one of the major public health problem in the developing countries of the world today has made its impact felt throughout the ages. No other disease has so much sociological, economic and health significance as tuberculosis has. Tuberculosis can be traced back to the early history of mankind. In our country, it has been known since the vedic ages, that is about 5000 years ago. It is worldwide in distribution and strikes both the rich and the poor, all races

and both sexes. 90% of the infected persons do not develop disease in their lifetime, because of immunity that they develop against it or immunisation with BCG vaccination. Even though the estimated TB prevalence figure for India 2015 is given as 2.5 million.^[1]

The seriousness of the association of pulmonary tuberculosis and diabetes mellitus was first noted by the great Arab Physician Avicenna nearly 1000 years ago. With the recognition of this explosive increase in the number of people diagnosed with diabetes mellitus all over the world, a whole new field of issues related to interaction between diabetes and pulmonary tuberculosis has been laid open.

Prevalence of diabetes in adults worldwide was estimated to be 4.0% in 1995 and to rise to 5.4% by the year 2025. The number of adults with diabetes in the world will rise from 135 million in 1995 to 300 million in the year 2025. In a study in Mumbai, tuberculosis was found to be the most

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common complicating illness (5.9%) in a large cohort of over 8000 patients with diabetes mellitus.^[2]

The prevalence of pulmonary tuberculosis in diabetics was 8.3%. Various studies show that incidence of tuberculosis in diabetic patients vary from 1.6% - 8.4%.

Early diagnosis of the combination is rare. At the time of diagnosis, a large majority of cases have severe diabetes and far advanced pulmonary tuberculosis.

In a study from the Regional Institute of Medical Sciences, Imphal, the prevalence of pulmonary tuberculosis in diabetics was found to be 27% by radiological diagnosis and 6% by sputum positivity.^[3]

A rising prevalence of tuberculosis in diabetics has been seen with age. Mortality rates in these patients are reported to be several times higher than in non-diabetic pulmonary tuberculosis patients.

Irrespective of the triggering mechanism(s), the fact remains that an epidemic of diabetes mellitus is sweeping the country. The recent prevalence data has propelled the estimates for India upwards- 32 million in 2000 and 80 million in 2030.^[4]

The only way to counter dreadful combination is to insist on a routine blood sugar screening test in tuberculosis patients of 40 and over, and carryout sputum and x-ray examination in diabetics once a year or on any occasion when cough persists for a month or the insulin requirement suddenly goes up.

MATERIALS AND METHODS

Study Type- Descriptive comparative study.

Source of Data

Sample selection followed was convenient type of sampling from all patients of OPD.

Setting is the Dept. of Pulmonology at Tertiary Rural Medical College, MNR Medical College along with its attached DTC in Sangareddy and DOT centre.

Sample Size

Total number of 100 patients of pulmonary tuberculosis were taken into study, in which 50 cases were with diabetic pulmonary tuberculosis and 50 cases were with non-diabetic pulmonary tuberculosis.

Study participants were included on a convenience sampling basis and later allocated to either of the comparative groups. Group randomly selected from all TB patients presenting to OPD and in that all the selected patients were screened for blood sugars, chest x-ray and sputum microscopy.

Since the sampling was convenient type, we included all those participants who came to the OPD with necessary inclusion criteria and who could consent for the study, thus made 50 each in each group.

Method of Collection of Data

- Pulmonary tuberculosis was diagnosed by detailed history, sputum examination for AFB and chest x-ray.
- Diabetes mellitus was diagnosed using the national diabetes data group and WHO diagnostic criteria.

Adult patients who fulfilled the above criteria were included in the 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, incidence of clubbing, haemoglobin level, erythrocyte sedimentation rate, total leucocyte count, blood sugar values, sputum AFB results and radiological pattern.

The results of clinical profile, relevant tests and radiological findings of both the groups will be analysed and differences in the outcomes are made out as per the statistical design.

This study is done for a period of one year and outcome is assessed and results interpreted.

Inclusion Criteria

- Diagnosed cases of pulmonary tuberculosis as per RNTCP guidelines.
- Cases with diabetes mellitus with pulmonary tuberculosis- 50 cases.
- Cases with pulmonary tuberculosis and without diabetes mellitus- 50 cases.

Exclusion Criteria

- Patients with other co-morbid conditions, i.e. cardiovascular disorders, central nervous system disorders, etc.
- Patients receiving steroids.
- Patients who are non-cooperative and non-compliant.
- Patients under the age of 12 years.

The Following Investigations were used in the Present Study

- Haemoglobin.
- Total leucocyte count.
- Lymphocyte percentage.
- Erythrocyte sedimentation rate.
- Fasting blood sugar.
- Post-prandial blood sugar.
- Sputum AFB.
- Chest x-ray.
- CBNA.

RESULTS

The statistical methodology used in this study is Pearson's Chi-square statistics. Software used for analysis was SPSS ver 17.0.

Results show cough as main symptoms in 72% PTB with DM and only 58% has this symptom among PTB without DM. Fever, more or equal number of people has it among both groups at 56%/50%. Haemoptysis is an important symptom much less at 12% among without DM over other group at 48%. Loss of weight and anorexia are opposite range with the percentages and most people have some anorexia. Chest pain in 46% in DM group and 36% in non-DM group. Night sweats is another important symptom in 30% DM and in 24% non-DM group.

Sl. No.	Clinical Symptoms	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/total (%)	PTB Patients without DM n/total (%)
1	Cough	65/100 (65%)	36/50 (72%)	29/50 (58%)
2	Fever	53/100 (53%)	28/50 (56%)	25/50 (50%)
3	Haemoptysis	19/100 (19%)	13/50 (26%)	6/50 (12%)
4	Dyspnoea	63/100 (63%)	24/50 (48%)	39/50 (78%)
5	Anorexia	83/100 (83%)	38/50 (76%)	45/50 (90%)
6	Loss of weight	48/100 (48%)	25/50 (50%)	23/50 (46%)
7	Chest pain	39/100 (39%)	21/50 (42%)	18/50 (36%)
8	Night sweats	27/100 (27%)	15/50 (30%)	12/50 (24%)

Table 1. Association of Clinical Symptoms among Patients with Pulmonary TB with and without DM

Sl. No.	Outcome	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/total (%)
1	Cured patients	90/100 (90%)	43/50 (86%)	47/50 (94%)
2	Treatment completed	94/100 (94%)	46/50 (92%)	48/50 (96%)
3	Treatment success	94/100 (94%)	46/50 (92%)	48/50 (96%)
4	Failure	4/100 (4%)	3/50 (6%)	1/50 (2%)
5	Lost for followup	3/100 (3%)	2/50 (4%)	1/50 (2%)
6	Not evaluated	2/100 (2%)	1/50 (2%)	1/50 (2%)
7	Treatment regimen changed	0	0	0
8	Died	1/100 (1%)	1/50 (2%)	0

Table 2. Treatment Outcomes among Patients with Pulmonary TB with and without DM

A comparative study of clinical profile and outcome of 50 cases of pulmonary tuberculosis with diabetes mellitus and 50 cases without diabetes mellitus was done.

Group	Type 1 DM	Type 2 DM	Others	Total
DM with PTB	3	47	0	50

Table 3. Diabetes Mellitus Categories in the Present Study

Sl. No.	Categories	No. of Cases DM with PTB	No. of Cases Non-DM with PTB
1	New Case	42	47
2	Previously Treated Patients	Recurrent TB case	3
	Treatment after failure	1	0
	Treatment after lost for followup	1	1
	Other previously treated patients	3	1
3	Transferred in Cases	0	0
Total	50	50	

Table 4. Present Study Categories based on Previous History of TB Treatment Taken

All the previously treated patients in both the groups are sent for CBNAAT, Line Probe Assay for drug resistant testing and found to be negative for drug resistance.

Group	CAT 1	CAT 2	CAT 4	CAT 5	Total
DM with PTB	42	8	0	0	50
Non-DM with PTB	47	3	0	0	50

Table 5. Pulmonary Tuberculosis Categories in the Present Study

Group	Male	Female	Total
DM with PTB	32	18	50
Non-DM with PTB	26	24	50

Table 6. Sex Distribution

Sl. No.	Clinical Symptoms	Total No. of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Cough	65/100 (65%)	36/50 (72%)	29/50 (58%)	0.104
2	Fever	53/100 (53%)	28/50 (56%)	25/50 (50%)	0.344
3	Haemoptysis	19/100 (19%)	13/50 (26%)	6/50 (12%)	0.016 (sig)
4	Dyspnoea	63/100 (63%)	24/50 (48%)	39/50 (78%)	0.002 (sig)
5	Anorexia	83/100 (83%)	38/50 (76%)	45/50 (90%)	0.046 (sig)
6	Loss of Weight	48/100 (48%)	25/50 (50%)	23/50 (46%)	0.421
7	Chest Pain	39/100 (39%)	21/50 (42%)	18/50 (36%)	0.341
8	Night Sweats	27/100 (27%)	15/50 (30%)	12/50 (24%)	0.326

Table 7. Association of Clinical Symptoms among Patients with Pulmonary TB with and without DM

Sl. No.	Past History	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Hypertension	11/100 (11%)	6/50 (12%)	5/50 (10%)	0.500
2	Ischaemic heart disease	5/100 (5%)	3/50 (6%)	2/50 (4%)	0.500

Table 8. Association of Past History among Patients with Pulmonary TB with and without DM

Sl. No.	Past History	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Smoking	59/100 (59%)	31/50 (62%)	28/50 (56%)	0.342
2	Family History of TB	9/100 (9%)	5/50 (10%)	4/50 (8%)	0.500

Table 9. Association of Smoking and Family History of TB among Patients with Pulmonary TB with and without DM

Sl. No.	Signs	Total Number of TB Patients n/Total (%)	TB Patients with DM n/Total (%)	TB Patients without DM n/Total (%)	P value
1	Pallor	49/100 (49%)	26/50 (52%)	23/50 (46%)	0.345
2	Icterus	11/100 (11%)	6/50 (12%)	5/50 (10%)	0.500
3	Clubbing	5/100 (5%)	2/50 (4%)	3/50 (6%)	0.500
4	Cyanosis	14/100 (14%)	6/50 (12%)	8/50 (16%)	0.484
5	Lymph-Node	10/100 (10%)	5/50 (10%)	5/50 (10%)	0.600
6	Pedal Oedema	10/100 (10%)	5/50 (10%)	5/50 (10%)	0.500

Table 10. Association of Signs of General Physical Examination among Patients with Pulmonary TB with and without DM

Sl. No.	Factors	Total No. of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Cavitation	39/100 (39%)	21/50 (42%)	18/50 (36%)	0.341
2	Fibrosis	14/100 (14%)	6/50 (12%)	8/50 (16%)	0.484
3	HPT	5/100 (5%)	3/50 (6%)	2/50 (4%)	0.500
4	Infiltration	12/100 (12%)	5/50 (10%)	7/50 (14%)	0.312
5	Pleural Effusion	21/100 (21%)	9/50 (18%)	12/50 (24%)	0.380

Table 11. Association of Various Factors on Clinical Examination among Patients with Pulmonary TB with and without DM

Sl. No.	Factors	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Cavitation	46/100 (46%)	31/50 (62%)	15/50 (30%)	0.001
2	Fibrosis	24/100 (24%)	10/50 (20%)	14/50 (28%)	0.241
3	HPT	7/100 (7%)	6/50 (12%)	1/50 (2%)	0.050

Table 12. Association of Various Factors on Chest X-Ray among Patients with Pulmonary TB with and without DM

Sl. No.	Factors	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Right side	36/100 (36%)	20/50 (40%)	16/50 (32%)	0.532
2	Left side	41/100 (41%)	14/50 (28%)	27/50 (54%)	0.014
3	Bilateral	21/100 (21%)	14/50 (28%)	7/50 (14%)	0.140

Table 13. Association of Lesions Involved Side on Chest X-Ray among Patients with Pulmonary TB with and without DM

Sl. No.	Factor	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	P value
1	Sputum positivity	50/100 (50%)	30/50 (60%)	20/50 (40%)	0.036
2	Isolated lower lung TB	25/100 (25%)	16/50 (32%)	9/50 (18%)	0.083

Table 14. Association of Sputum Positivity and Isolated Lower Lung TB among Patients with Pulmonary TB with and without DM

Group	N	Mean	Std. Deviation	Mean Difference	T
HB	Diabetic Group	50	10.26	2.533	0.1220
Non-Diabetic Group	50	10.138		2.687	
ESR	Diabetic Group	50	54.78	28.976	6.780
Non-Diabetic Group	50	61.56		29.511	
TLC	Diabetic Group	50	12568.40	11593.564	1108.160
Non-Diabetic Group	50	11460.24		1802.630	
LC	Diabetic Group	50	43.84	8.365	2.460

Table 15. Independent Samples 'T' Test

An Independent Samples 'T' test was computed to compare the Mean of Various factors among the Diabetic and Non-Diabetic population groups.

Analysis Revealed that

1. Diabetics showed higher mean percentage of Hb when compared to Non-Diabetics, showing a mean difference of 0.122 mg% extra as compared to Non-Diabetics. This difference was not found to be significant statistically ($p > 0.05$).
2. Diabetics showed lower ESR rate when compared to Non-Diabetics, showing a mean difference of 6.780 less as compared to Non-Diabetics. This difference was, however, not found to be significant statistically ($p > 0.05$).
3. Diabetics showed higher mean TLC count when compared to Non-Diabetics, showing a mean difference of 1108.16 cells extra as compared to Non-Diabetics. This difference was not found to be significant statistically ($p > 0.05$).
4. Diabetics showed higher mean LC count when compared to Non-Diabetics, showing a mean difference of 2.46 cells extra as compared to Non-Diabetics. This difference was not found to be significant statistically ($p > 0.05$).

Sl. No.	Outcome	Total Number of PTB Patients n/Total (%)	PTB Patients with DM n/Total (%)	PTB Patients without DM n/Total (%)	p value
1	Cured patients	90/100 (90%)	43/50 (86%)	47/50 (94%)	0.318
2	Treatment completed	94/100 (94%)	46/50 (92%)	48/50 (96%)	0.678
3	Treatment success	94/100 (94%)	46/50 (92%)	48/50 (96%)	0.678
4	Failure	4/100 (4%)	3/50 (6%)	1/50 (2%)	0.617
5	Lost for followup	3/100 (3%)	2/50 (4%)	1/50 (2%)	1
6	Not evaluated	2/100 (2%)	1/50 (2%)	1/50 (2%)	1
7	Treatment regimen changed	0	0	0	1
8	Died	1/100 (1%)	1/50 (2%)	0	1
Table 16. Treatment Outcomes among Patients with Pulmonary TB with and without DM					

DISCUSSION

In the present study, the prevalence of haemoptysis in the diabetic pulmonary group was significantly higher 13 (26%) compared to the prevalence of haemoptysis in the non-diabetic pulmonary tuberculosis group 6 (12%); study done by Parvenesh et al had similar findings.^[5] In the present study 32% of cases had isolated lower lung fields involved in DM PTB group compared to 18% of cases with isolated lower lung fields involved in non-DM PTB group. RNTCP TOG guidelines are stressed corroboratively.^[6] Our study results are reporting that 62% of the cases in the PTB-DM group had cavitory lesions on CXR, a percentage much higher than 30% reported in the non-diabetic group.^[7] In the present study, 60% of cases had sputum positivity in DM PTB group compared to 40% of cases with sputum positivity in non-DM PTB group. In the present study, the cure rate was low and failure rate was high in the DM PTB group compared to non-DM PTB group.^[8]

CONCLUSION

A comparative study of clinical profile and outcome of 50 cases of pulmonary tuberculosis with diabetes mellitus and 50 cases without diabetes mellitus was done.

The present study shows higher incidence of pulmonary tuberculosis in the male gender in both groups of pulmonary tuberculosis, comparatively more in the diabetic pulmonary tuberculosis group.

In the present study, the prevalence of haemoptysis in the diabetic pulmonary group was significantly higher 13 (26%) compared to the prevalence of haemoptysis in the non-diabetic pulmonary tuberculosis group 6 (12%).

In the present study, 32% of cases had isolated lower lung fields involved in DM PTB group compared to 18% of cases with isolated lower lung fields involved in non-DM PTB group.^[9] Our study results are reporting that 62% of the cases in PTB-DM group had cavitory lesions on CXR, a percentage much higher than 30% reported in the non-diabetic group.^{[10],[11]}

In the present study, 60% of cases had sputum positivity in DM-PTB group compared to 40% of cases with sputum positivity in non-DM PTB group.^[12] In the present study, the cure rate was low and failure rate was high in the DM-PTB group compared to non-DM PTB group.^[8]

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