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Research Article

**IMPACT OF DIABETES MELLITUS ON THE CLINICAL
METHODS OF PULMONARY TUBERCULOSIS AND THEIR
ASSOCIATION**

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Abstract:

Objectives: The aim of this research work is to assess the impact of DM (diabetes mellitus) on clinical & detection procedures and feature of radiology of pulmonary tuberculosis as compared to the patients suffering from pulmonary tuberculosis with no diabetes mellitus in Faisalabad, Pakistan.

Methodology: This was a retroactive transverse research work conducted from 2014 to 2018. We reviewed the medical records of the diagnosed patients of pulmonary tuberculosis. We also studied the data about demography, diagnostic and clinical procedures as well as findings from radiology. Two different radiologist completed the radiological information and HRCT (High Resolution Computed Tomographic Scan) of lungs. SPSS was in use for the data entry and statistical analysis of the collected information, we used the Fischer-exact test & Chi square test for the comparison of both groups of study. P value of less than 0.050 was the significant.

Results: Out of total 180 patients suffering from pulmonary tuberculosis, 38.0% (n: 60) patients were available with tuberculosis and coexisting diabetes mellitus making the PT-DM group. There was not much disparity in the average age of the patients in both groups. Co-existing TB & DM was highly available in females as compared to the male patients. There was much disparity between the patients of both groups about as regards fever, loss of body weight, dyspnea & hemoptysis. The most common diagnostic procedure in both groups was positive sputum smear, no important disparity was available. There were more multi-lobar cavities in the group of diabetics. We saw no significant disparities between the patients of both groups through radiology.

Conclusion: Tb can be highly invasive in the patients suffering from diabetes mellitus particularly female patients hence they should be a special preference towards their treatment.

Key Words: Diabetes Mellitus, Tuberculosis, Radiology, Smear, Invasive, Dyspnea, Methodology, Disparity.

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INTRODUCTION:

The patients suffering from DM are available with high danger for some of the serious diseases as TB because of deficiency in defense. This condition could have impact on treatment in all the states of coexistence. The high prevalence of the disease of TB in the patients suffering from TB is the matter of great concern from many years [1-5]. This condition is much prominent in the countries which are under development as Pakistan which is present in the endemic areas of TB disease. The stated occurrence of the tuberculosis in Pakistan from 2010 to 2012 was 12.30/100,000 persons; this occurrence was 42.78/100,000 in general public of Punjab, Pakistan [6]. Different national reports display a rate of occurrence of 3.30% for diabetes mellitus in men & 4.65% in women [7].

One research work stated that diabetes mellitus was the most common co-occurring disease in the patients of pulmonary tuberculosis (22.40%) [2]. In accordance with the high occurrence of the tuberculosis in this particular region, this research work carried out to assess the impact of diabetes mellitus on diagnostic & clinical procedures and features of radiology for pulmonary tuberculosis as compared to patients of pulmonary tuberculosis without diabetes in the Faisalabad

METHODOLOGY:

In this transverse retroactive research work, we studied the medical records of the patients with confirm pulmonary tuberculosis in the Allied Hospital, Faisalabad from 2014 to 2018. We extracted the data of demography, diagnostic & clinical procedures and findings of radiology from the medical files of the

patients. The diagnosis of new patients of DM carried out by random glucose of plasma greater than 200.0 mg/dl or FPG (Fasting Plasma Glucose) greater than 126.0 mg/dl repeated twice. In some amount of patients, the diagnosis of DM was available in the medical files of the patients & they were present on glucose lowering agents. The criteria of the pulmonary TB were same as elaborated by the classification of the WHO (World Health Organization) [8-9]. Patients suffering from other serious malignancies were not the part of this research study. The collection of the radiological data carried out from the reports of chest X-ray and two radiologists reported the HRCT scan.

The ethical committee of the hospital gave the approval for the conduction of this research work. The division of the patients of this study carried out into two groups, first group was the study group with co-existing tuberculosis & diabetes or PT-DM group and the second group consists the patients of pulmonary tuberculosis or PT group (control group). SPSS V. 16 was in use for the statistical analysis of the collected information. Fischer-exact test & Chi square test were in use for the comparison of the data of both groups. P value of less than 0.049 was significant.

RESULTS:

Among 180 patients of pulmonary tuberculosis, 38.0% (n: 60) patients were available with co-existing diabetes mellitus forming PT-DM group. Table-1 is describing the traits of demography of the patients from both groups. St There was not much difference in the average age of the patients from both groups. Females outnumbered the male patients in the group of PT-DM.

Table-I: Demographic Data of the Tuberculosis Patients

| Variable | PT N=100 (50%) | PTMD N= 80 (30%) | P-value |
|------------------|----------------|------------------|---------|
| | Mean \pm SD | Mean \pm SD | |
| Mean Age | 47 \pm 8.6 | 51 \pm 2.2 | > 0.05 |
| Female | 31 \pm 25.3 | 51 \pm 64.1 | > 0.05 |
| Male | 85 \pm 70.3 | 225 \pm 31.6 | < 0.01 |
| Opium addiction | 25 \pm 20.3 | 39 \pm 49.7 | > 0.05 |
| Cigarette Smoker | 56 \pm 46.5 | 20 \pm 25.3 | 0.003 |

There was high rate of opium addiction in this group but the difference was not much significant. The smoking of cigarettes was more common in the group members of PT. as shown in Table-1. Table-2 shows the clinical manifestations of all the patients, we found a much significant disparity as regards high fever, loss

of body weight, dyspnea & hemoptysis. Most frequent used diagnostic procedure was positive sputum smear in the members of both groups but there was no available difference in the comparison of the diagnostic procedures of both groups (Table-3).

Table-II: Clinical Manifestations of Tuberculosis Cases

| Symptoms | PT N=100 (50%) | | PTMD N= 80 (30%) | | P-Value |
|----------------|----------------|-------|------------------|-------|---------|
| | No | % | No | % | |
| Fever | 104.0 | 81.28 | 41.0 | 51.78 | < 0.008 |
| Cough | 107.0 | 89.58 | 63.0 | 83.00 | > 0.049 |
| Dyspnea | 85.0 | 70.48 | 69.0 | 87.88 | 0.003 |
| Night sweating | 71.0 | 58.78 | 45.0 | 57.48 | >0.049 |
| Weight loss | 54.0 | 44.68 | 47.0 | 59.28 | 0.041 |
| Hemoptysis | 24.0 | 19.78 | 31.0 | 39.78 | 0.003 |

Table-III: Diagnostic Methods of Pulmonary TB

| Method | PT N=100 (50%) | | PTMD N= 80 (30%) | | P - Value |
|---|----------------|------|------------------|------|-----------|
| | No | % | No | % | |
| Positive smear | 66 | 54.4 | 36 | 45.3 | > 0.050 |
| Positive smear and culture | 25 | 20.5 | 164 | 18 | >0.050 |
| Clinical and radiological findings plus response to treatment | 23 | 19 | 24 | 30.3 | > 0.050 |

Findings of radiology are available in Table-4. Involvement of lower lobe, parenchymal infiltration & cavitory abrasions were available with high rate in the patients of diabetes. Multi-lobar cavities were available with high proportion in the group of diabetes

in comparison with the group of pulmonary tuberculosis. But we found no statistical disparity between both groups about frequency of parenchymal infiltration, nodular pattern & pleural effusion.

Table-IV: Radiological Findings in PT and PTDM Group

| Finding | Patients | PT | | PTDM | | P- value |
|--------------------------|-------------|------|---------|------|---------|----------|
| | | No | Percent | No | Percent | |
| Parenchymal infiltration | no | 8.0 | 56.28 | 47.0 | 59.28 | |
| | Upper lobe | 17.0 | 13.78 | 3.0 | 4.28 | <0.050 |
| | Lower lobe | 7.0 | 5.48 | 9.0 | 11.78 | |
| | Multi lobar | 20.0 | 16.28 | 13.0 | 16.78 | |
| Cavity | no | 55.0 | 45.48 | 21.0 | 26.78 | |
| | Upper lobe | 17.0 | 13.78 | 14.0 | 18.00 | <0.050 |
| | Lower lobe | 24.0 | 19.68 | 14.0 | 18.00 | |
| | Multi lobar | 16.0 | 13.00 | 23.0 | 29.28 | 0.014 |
| Nodular pattern | | 41.0 | 33.78 | 21.0 | 26.78 | |
| Pleural effusion | no | 50.0 | 41.28 | 35.0 | 44.28 | <0.050 |
| | RT side | 35.0 | 28.78 | 12.0 | 15.48 | |
| | LT side | 17.0 | 13.78 | 13.0 | 16.78 | >0.050 |
| Bilateral | | 10.0 | 8.00 | 12.0 | 15.48 | |

DISCUSSION:

The most frequent co-morbidities are co-occurrence of DM & TB [2-4, 10-14]. In one research work, this rate was 36.30% & 22.60% in immigrants & Saudi patients correspondingly [15]. In two research works conducted in Iran & Turkey, TB & DM were both available in 23.40% & 30.0% patients respectively [2, 16]. In this research work, average age PT-DM (51.0 ± 2.20 years) was slightly greater than group of PT (47.0 ± 1.60 years), but we found no important relationship. Many other works supported this data [16-18]. Different research works stated a high occurrence of co-existing tuberculosis & diabetes mellitus in female gender as compared to male gender [2, 4, 19]. In contrast, some research works displayed a high rate of occurrence of males in the group of PT-DM [15-16, 19].

In current research work, cough (98.0%), dyspnea (75.20%), sweating in night 95.28%, high fever (72.48%), loss of the body weight (50.78%) & hemoptysis (27.78%) were very common clinical results. The rate of occurrence described in this research was similar with many other studies [20-21]. Different research works have displayed that positive sputum smear as the very common diagnostic procedure similar to this research work with no important disparities in the patients of both groups [16, 20-22]. Different research works discovered a significant high rate of frequency of this diagnostic procedure in PT-TB patients [15-16, 18, 23]. Cavitory abrasions & involvement of the upper lobe are well-known pattern of radiology pulmonary TB. Atypical localization was the involvement of the middle or the lower lobe [16]. This pattern was common in the patients of diabetes [20-22, 24-25].

Common cavitory abrasions in the patients of pulmonary TB suffering from DM are available in many research studies [17, 24, 26-28]. Other research works have stated the same frequency of the lung cavity in patients of both groups [18, 28-29]. We displayed a high rate of the involvement of the upper lobe in the patients with no diabetes and very common involvement of the lower lobe in the patients of diabetes (11.78% vs. 5.48%). Many other research works showed the same results [17, 30]. The other imaging outcome including cavity location, parenchymal infiltration, nodular pattern & pleural effusion was available with same rates in the patients of both groups, this information was also similar in many other studies [18, 24-25].

CONCLUSION:

There is very high occurrence of pulmonary tuberculosis in the females suffering from diabetes mellitus with very high rate of occurrence of dyspnea, loss in the body weight, hemoptysis & multi-lobar cavitory abrasions as compared to the non-diabetics. This shows that the invasiveness of tuberculosis is high in the patients of diabetes mellitus. More common a typical involvement of the lung was in the reports particularly in the patients of pulmonary tuberculosis suffering from diabetes. Some of the basic tests as sputum smear X-ray of the chest, and HRCT of lungs can be very effective for the better outcome. The findings also concluded that there is a relationship pulmonary tuberculosis & diabetes mellitus in deficit immunity system.

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