



To Study the Pattern and Prevalence of Comorbidities in Patient with Drug Resistant TB

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Abstract

This is a cross sectional study, which included 50 micro biologically confirmed cases of Drug resistant tuberculosis (TB) which were admitted in the wards. Clinic-diagnostic profile of these cases was determined. The collected data were documented, compiled, tabulated and statistically analysed to reach a valid conclusion. Out of 50 micro biologically confirmed cases of TB, 36% of the cases were in the age group of 21-30 years and there was male preponderance. Amongst DR-TB cases, 28 (56%) were new and 22 (44%) were previously treated cases. Comorbidities were seen in 24 (48%) of the participants in our research. Out of the 22 patients with comorbidities, 11 (20.00%) had only one, whereas 13 (24%) had more than one (multimorbidity). Diabetes was the most prevalent comorbidity followed by HIV and COPD. 14 (28%) cases had previously diagnosed comorbidities whereas in others the comorbidity was diagnosed during the pre-treatment evaluation.

Keywords: Drug resistant Tuberculosis, Comorbidities, diabetes mellitus, HIV

Introduction

Pulmonary tuberculosis is the most typical manifestation of TB, an ancient human disease caused by the Mycobacterium tuberculosis bacterium. TB has historically been a significant health burden because of its contagious nature, complicated immune response, chronic progression, and requirement for long-term therapy. Over the course of human history, treating and preventing TB has been a constant struggle due to the emergence of multi-drug resistance strains and the present TB-HIV epidemic, which is linked to its serious social implications.^{1,2}

Aligning with the global End TB Strategy, India has announced the target of ending TB by 2025, five years ahead of the rest of the world. In 2021, the 30 high TB burden countries accounted for 87% of new TB cases. The total number of incident TB patients in

India (new and relapse) notified during 2021 were 19,33,381 as opposed to that of 16,28,161 in 2020.³

Multimorbidity is increasingly being recognized as a serious public health concern in the control of both drug-susceptible and drug-resistant tuberculosis (DR-TB). The effect of associated comorbid conditions on treatment of drug sensitive TB especially HIV, Diabetes Mellitus (DM) has been well known. The associated comorbidities may be one of factors for poor response to MDR TB treatment.⁴

The association of MDR-TB outcomes and associated comorbidities are not well described in literature. Expanding drug-resistance surveillance activities to monitor and improve patient management; assessing TB patients' comorbidity status to improve care and joint management of comorbidities; and enhancing collection of information on case notification, monitoring

treatment adherence, social support and treatment outcomes at all levels can improve patient management.⁵

This study was planned to know the pattern and prevalence of comorbidities in patients with drug resistant tuberculosis. This study is expected to help determine the frequency and distribution of comorbidities in patients with drug-resistant tuberculosis. By diagnosis and treatment of comorbidities along with patient care, the management of patients on antitubercular treatment can be strengthened, which might improve the success of treatment and lessen the overall burden of the illness.

Materials And Methods:

This cross-sectional study was carried out in the Department of Chest and Tuberculosis, Government Medical College, Amritsar. This study included 50 patients presenting with Drug resistant Tuberculosis with one or more comorbidities, presenting to the outpatient department or admitted in wards. This study was conducted over a period of 1 year after approval from Institutional Ethics Committee, Government Medical College, Amritsar. A written informed consent from the patient was taken before recruitment.

Inclusion Criteria:

1. Patients consenting for the study
2. All patients presenting with DR TB to the department of Chest and Tuberculosis, Government Medical College, Amritsar

Exclusion Criteria:

[1] Patients not giving consent for the study.

Informed written consent was taken from all the subjects. A pre-structured proforma was filled in those cases, which were included in the study. The following details were recorded.

Personal Data: Age, sex, occupation, address (including phone number) were noted down. A detailed history was sought, smoking history, past history, history of comorbidities (such as diabetes mellitus, hypertension, HIV infection, Hepatitis C, thyroid disorders, pre-existing liver or renal dysfunction, psychiatric illnesses, hearing or vision impairment, pregnancy, cardiovascular disorders,

preexisting hematological abnormality, etc.) occupational history

1. Symptoms: Chief complaints were noted and a detailed account of each was obtained.
2. Past history: Any significant past medical history was noted.
3. Personal history: Whether the person is or was a smoker. In case of 'yes' as answer, whether he is smoking bidis, cigarettes or any other forms of tobacco smoke; the number smoked per day, any other addiction. In case of non-smokers, any history of smoking among other family members or friends was noted.
4. Family history.
5. Physical examination: A complete clinical examination was performed in all cases, including - general examination, examination of respiratory system in detail and other systems.
6. Investigations: Investigations were done to arrive at a diagnosis and detect any associated condition or co-morbidities. These included: blood examination- Haemoglobin (Hb), Total counts (TC), Differential counts (DC), Erythrocyte sedimentation rate (ESR), Fasting blood sugar (FBS), renal function tests (RFT), liver function tests (LFT), Urinalysis, HIV testing, HCV testing, Thyroid Stimulating hormone levels, serum electrolytes, ECG, Serum proteins, Urine pregnancy test (in females of reproductive age group), Serum amylase and serum lipase levels.
7. The results of sputum smear for acid fast bacilli, Sputum CBNAAT (for detecting R resistance), Second Line LPA (for detecting resistant to second line drugs) were followed up as per PMDT guidelines.
8. Covid-19 testing was done.
9. Chest X-ray.

Statistical Analysis:

The data was documented, tabulated and analysed to reach a valid conclusion.

Results:

In our study, there were 50 microbiologically confirmed cases of drug-resistant TB; of these, 47

cases had pulmonary tuberculosis and were identified using molecular techniques, such as LPA/CBNAAT of sputum samples, whereas 3 patients had extrapulmonary TB and were identified using CBNAAT of pus aspirates from 2 iliopsoas abscesses and 1 cold abscess.

Patients ranged in age from 16 to 68 years old, with the majority of them (36%) falling into the 21 to 30 age bracket. Most patients were seen during a person's most productive years.

There was an overall male preponderance in the study and a slight higher percentage of patients from urban area. Of the 50 cases, 24 % were housewives, followed by workers (22%), the self-employed (20%), and students (18%). Cough with expectoration (90%), fever (72%) and breathlessness (26%) were the three most common presenting complaints of the patients which brought the patients to our hospital.

22 patients had a prior history of ATT use and the majority of the which were treated with antitubercular medications were given first-line antitubercular drugs.

Comorbidities were seen in 24 (48%) of the participants in our research. Out of the 22 patients with comorbidities, 11 (20.00%) had only one, whereas 13 (24%) had more than one (multimorbidity). Diabetes was the most prevalent concomitant disease, present in 10 patients (20%), followed by HIV and COPD, each present in 3 cases (6%). Following diabetes, HIV, and COPD, additional comorbidities were hypertension, thyroid diseases, hepatitis B, cardiac disorder, and covid 19 in 2 (4% each). Chronic kidney disease (CKD), pregnancy, and severe anaemia were all present in one patient (2%).

In our study, among the 24 patients with comorbidities, 14 (28%) cases had previously diagnosed comorbidities whereas in 10 (20.00%) patients, the comorbidity was diagnosed during the pre-treatment evaluation. In our study, 1 (2%) one case had mono drug resistant TB, while 4% were Pre XDR tb cases and 47 (94%) were multidrug resistant cases. There were zero recorded cases of XDR TB in our study participants.

In our study 17 cases had a history of addiction. The most common addiction was alcohol 17(34%),

followed by smoking in (32%) and drug abuse in (12%). The family history of TB was present in 12% cases.

Discussion:

There were a total of 50 microbiologically confirmed cases of drug resistant TB, out of which 47 cases had pulmonary tuberculosis who were detected through molecular methods i.e., LPA/CBNAAT of the sputum specimen; whereas 3 patients had extrapulmonary TB who were detected by CBNAAT of the pus aspirate (2 from iliopsoas abscess and one from cold abscess).

In our study, out of 50 patients taken for the study the maximum number of patients belonged to the age group of 21-30 years i.e., 36% followed by 22% in the age group of 41-50 years. Minimum patients were in age group >60 years i.e., 4%. Mean age was 33.98 ± 14.38 years. The youngest patient was 16 years old and the oldest patient was 68 years in age. Findings in this research are similar to those of Richard et al who have also reported that majority of their patients (61%) were in this age group.⁶

Male preponderance was recorded in our study. Many other investigators have also noted male preponderance in their studies. Ramachandran et al. have also reported male preponderance.⁷ Studies by Martinez AN et al⁸ and Hamid Salim MA et al⁹ reported a male to female incidence rate ratio of 2.1 and 1:0.33 respectively. A review by Holmes CB et al, also reported that the prevalence of tuberculosis is more in males.¹⁰

A slightly higher percentage of patients belonged to urban areas as compared to rural areas. A study by Emerson DA et al., also reported an increased incidence in cases of tuberculosis in urban population.¹¹ Tuberculosis affects vulnerable populations like HIV- infected people, drug abusers, homeless, immigrants in a disproportional way. These populations tend to live in urban areas affecting TB epidemiology of large cities.¹²

The findings in our study were consistent with a study done by Sharma P et al., to assess the Epidemiological profile of tuberculosis patients in Delhi. Similar to our study, the highest proportion of patients recorded by them were housewives.¹³ In our country housewives or female family members are responsible for taking care of ill patients. This may

be the cause of female preponderance of housewives in this study.¹⁴

In our study, 20 (40%) patients were having previous history of ATT, whereas 30 (60%) patients were not having any previous history of ATT.

Out of the 20 patients who had a previous history of treatment with antitubercular drugs, 2 (4%) cases were previously treated for drug resistant TB and 18 (36%) cases were previously treated with antitubercular regimens for drug sensitive TB. Out of the 18 cases who had taken ATT for drug sensitive TB, 16 (32%) had completed treatment and 2 (4%) were lost to follow up cases. In the ones who completed treatment for drug sensitive TB 12 (24%) had history of ATT only once, whereas 3 (6%) were treated twice and 1 (2%) was treated thrice. Previous anti-tuberculosis treatment is a widely reported risk factor for multidrug-resistant tuberculosis (MDR-TB).¹⁵

In our study, 24 (48%) patients had the presence of comorbidities whereas 26 (56%) had no comorbidity. MDR/XDR-TB treatment programs often report high proportions of these comorbidities, with the prevalence of HIV, DM and alcohol misuse exceeding 10–20% in several large MDR/XDR-TB cohort studies.¹⁶ 11 cases (20 %) had only one comorbidity while 13 (24%) had more than 1 comorbidity. In a similar study by Peltzer K, the prevalence of comorbidity (with one NCD) was 26.9% and multimorbidity (with two or more NCDs) was 25.3%.¹⁷

The most common comorbid condition in our study was diabetes present in 10 (20%), followed by HIV and COPD which were present in 3 cases each (6% each). This was followed by hypertension, thyroid disorders, hepatitis B, cardiac disorder and covid 19 in 2 (4% each). Chronic kidney disease (CKD), pregnancy and severe anaemia was present in 1 case each (2% each).

The presence of thyroid disorders, pregnancy, anaemia, cardiac disorders and chronic kidney disease, not only complicates the disease, but also puts the patient at risk of increased side effects due to the treatment for drug resistant tuberculosis.

We reported two (4%) occurrences of cardiovascular disease, one of which was an old MI with RBBB. The prevalence of heart disorders was reported to be

9.3% in a research by Xie B et al.¹⁸ One patient (2%) was discovered to be pregnant in our cases. The burden of TB in pregnant women is significant¹⁹, with prevalence estimates ranging from 0.06% to 7.2% in pregnant and post-partum women, and as high as 11% in HIV-infected women in a high-burden scenario.

We also documented the prevalence of addiction among the patients, and it was shown that alcohol was the most prevalent addiction (17%), followed by smoking (16%) and drug misuse (12%). In a study by Franke MF et. al., substance abuse was the strongest risk factor for treatment default and was highly concentrated among men (91.0%).²⁰

Conclusion:

Tuberculosis is one of the leading causes of death from a single infectious agent worldwide. The emergence of multi-drug resistance poses a global threat as the treatment is difficult, expensive, and a major health care cost burden in developing countries. Comorbidities make treating drug-resistant TB even more challenging. The overlapping TB and comorbidities exacerbate each other's risk and mortality rate. Various studies have shown that the presence of comorbidities interfere with the incidence as well as the treatment outcome of tuberculosis. Coexisting diseases are continuously being identified as a vital factor in the control of TB. Hence it is important to timely identify and effectively treat the comorbidities, to help alleviate the development of TB and reduce the spread of DR-TB.

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