# TUBERCULOSIS AND HIV COINFECTION: A TERTIARY CARE HOSPITAL STUDY

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**ABSTRACT**

**OBJECTIVE**

The aim of the present study is to record the clinical, radiological profile of pulmonary and extra pulmonary tuberculosis (EPTB) in HIV positive patients. To win the battle against AIDS we have to fight against TB. Unlike HIV/AIDS, TB is completely curable in the vast majority of cases.

**MATERIALS AND METHODS**

This prospective study was conducted in the department of pulmonary medicine, Gadag institute of medical sciences, Gadag. All newly diagnosed HIV patients during the study period were included and screened for TB. HIV infection was confirmed by enzyme linked immunosorbent assay using two different antigens and a rapid test as recommended by NACO.

**RESULTS**

Among 370 newly diagnosed HIV positive patients, 113(30.54%) patients were diagnosed to have TB. Most common affected age group was 31-40years with a mean age of 38.08 years. Unprotected heterosexual contact was the most common mode of HIV transmission. Fever, weight loss and cough were the commonest symptoms at presentation. Pulmonary TB was diagnosed in 85(22.97%) patients, EPTB in 21(5.67%) and disseminated TB in 7(1.8%) patients. Among the EPTB patients, 2(9.5%) patients had extra thoracic lymphadenopathy. Cervical lymph node was the commonest lymph node involved. 14(66.66%) patients had pleural effusion, 3(14.28%) had abdominal TB, 1(4.76%) had tubercular meningitis and 1(4.76%) patient had TB testis.

**CONCLUSION**

The prevalence of HIV–TB co-infection was high. Moreover, HIV positive patients need early diagnosis and treatment of active TB. However large sample size prospective studies are needed to correlate the clinical and CD4 count with the occurrence of different types of tuberculosis.

**KEYWORDS**

HIV, Tuberculosis, Extra-Pulmonary Tuberculosis, HIV-TB.

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**INTRODUCTION:** Global increase in pandemic human immunodeficiency virus (HIV) has led to increase in prevalence of tuberculosis (TB). In the pre-HIV era, annual incidence of TB worldwide was 4 million[1] and in the post-HIV era[2] it is 10 million. TB is the commonest opportunistic infection among HIV positive patients in India and HIV/TB co-infection poses a major public health challenge in developing countries.[3] It is estimated that 60-70% of HIV positive patients will develop TB in their life time.[4] By suppressing the immune response, HIV infection favours the progression the from latent infection to active TB. The prevalence of HIV/TB co-infection ranges from 50%-80% in sub-Saharan Africa. In India it varies from 1%-13% and may be as high as 40% in high prevalent states and districts.[5] The CD4+ lymphocyte count is an important prognostic marker in staging and progression of HIV infection.[6,7,8,9] TB and HIV infections have a synergistic influence on the host immunoregulation. TB can develop at any stage of immunosuppression regardless of the level of the circulating CD4+ T-lymphocytes.

The patients with early course of the disease present with similar pattern as immunocompetent individuals, where as those individuals with advanced diseases presents atypically. In India to combat and control the HIV/TB co-infection, a strategy of intensified case finding is adopted. It includes the routine screening of TB patients for HIV at integrated counseling and testing centers (ICTCs) and anti-retroviral centers (ART). The aim of the present study is to record the clinical, radiological profile of pulmonary and extra pulmonary tuberculosis (EPTB) in HIV positive patients. To win the battle against AIDS we have to fight against TB. Unlike HIV/AIDS, TB is completely curable in the vast majority of cases.

**MATERIALS AND METHODS:** This prospective study was conducted in the department of pulmonary medicine, Gadag institute of medical sciences, Gadag, India from April 2015 to December 2015. All newly diagnosed HIV patients during

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the study period were included and screened for TB. HIV infection was confirmed by enzyme linked immunosorbent assay using two different antigens and a rapid test as recommended by NACO. Informed consent was taken from the study subjects. Ethical committee approval was taken. A structured questionnaires like demographic characteristics, TB symptoms (cough, loss of appetite, weight loss, and night sweats), risk factors for TB (including housing, alcohol, smoking, recreational drug use, incarceration, previous contact with health services, time away from community, and employment history), and risk factors for HIV infection (including number of sexual partners and condom use) was completed

All the patients, irrespective of whether they had signs and symptoms, were screened for TB by microscopic examination of sputum for acid fast bacilli, radiological features suggestive of tuberculosis and positive skin tuberculin testing, histopathological demonstration of caseous granuloma, pleural/ ascetic/ pericardial/ cerebrospinal fluid analysis when present. Regardless of age, induration of 5 mm or more on tuberculin test is considered as positive in HIV-infected patients.[10] Fine needle aspiration cytology and excisional biopsy that showed the presence of tuberculoid granulomas with epithelioid cells and giant cells facilitated our diagnosis of lymph node TB.

Subjects with concomitant opportunistic infection or currently receiving antibiotic therapy for TB were excluded from the study.

**STATISTICAL ANALYSIS:** All data was analyzed using SPSS Statistics version 17.0 (Chicago, USA). Continuous variables are presented as mean±SD. Independent sample t-test and one way ANOVA were used to compare the means of variables between various patient subsets. P-values less than 0.05 were considered to indicate statistical significance.

**RESULTS:** Among 370 newly diagnosed HIV positive patients, 113(30.54%) patients were diagnosed to have TB. 64(56.63%) were males and 47(41.59%) were females. Most common affected age group was 31-40years with a mean age of 38.08years. Unprotected heterosexual contact was the most common mode of HIV transmission. Fever, weight loss and cough were the commonest symptoms at presentation. Chest x-ray findings of HIV/TB patients are shown in Table 1. Pulmonary TB was diagnosed in 85(22.97%) patients, EPTB in 21(5.67%) and disseminated TB in 7(1.8%) patients. Among the EPTB patients, 2(9.5%) patients had extra thoracic lymphadenopathy. Cervical lymph node was the commonest lymph node involved. 14(66.66%) patients had pleural effusion, 3(14.28%) had abdominal TB, 1(4.76%) had tubercular meningitis and 1(4.76%) patient had TB testis (Table 2).

| Chest X-ray findings | No. of patients |
|---|---|
| Pulmonary infiltrates | 35 |
| Normal | 49 |
| Pleural effusion | 14 |
| Intra thoracic lymph nodes | 10 |
| Cavities | 5 |

***Table 1: Chest X-ray findings***

| Type of TB | No. of Patients (%) |
|---|---|
| Pulmonary TB | 85 (22.97) |
| Pleural effusion | 14(3.78) |
| Tubercular lymphadenopathy | 2(0.5) |
| Abdominal TB | 3(0.8) |
| Tubercular meningitis | 1(0.27) |
| TB testis | 1(0.27) |
| Disseminated TB | 7(1.8) |

***Table 2: Different forms of tuberculosis in HIV patients***

| Type | Sputum Positive | Sputum Negative | Total |
|---|---|---|---|
| Pulmonary TB | 48 (56.47%) | 37 (43.52%) | 85 |
| Disseminated TB | 4 (57.14%) | 3 (42.85%) | 7 |

***Table 3: Sputum status in tuberculosis***

**DISCUSSION:** In the present study, we showed the relationship of HIV and TB and it was found to be mutually beneficial. HIV positive patients are susceptibility to mycobacterium tuberculosis infection. They are more likely to develop active rather than latent infection and are also susceptible to reactivation of latent tuberculosis infection with an annual risk of 5-10%.[11] They are usually susceptible to rapid progression to active disease.[12] Tuberculin-positive co infected persons have a risk of TB development of 8 to 10% per-year compared to <0.1% annually in those without HIV infection.[13] Thus, once infection is established, progression to clinical disease is faster and more severe in HIV-positive patients. The increase in TB is likely to be the result of a combination of factors, including improved detection and HIV. It is important to consider this multi-factorial phenomenon when interpreting the increase of TB in a geographical area. The increase in the number of TB cases could be due to HIV.

Central nervous system involvement is also more common in HIV-positive patients.[14] The clinical presentation of meningitis is similar in both groups, although mass lesions are more common in HIV-infected patients.[15] We diagnosed meningitis in 1 case.

In our study, 56.47% of patients with pulmonary TB had positive sputum smears. 49 TB cases have normal chest x-ray. .About 5% HIV-infected patients with pulmonary tuberculosis have positive results on acid-fast staining of sputum; despite normal chest radiographs.[16]

HIV is the most powerful risk factor for progression from M. tuberculosis infection to TB disease. The risk of development of TB in HIV infected patients in India is 6.9/ 100 person years as compared to 10% lifetime risk of developing TB in HIV negative persons. This is especially important in India where 40% of adult population is latently infected with M. tuberculosis.[17] TB, in turn, accelerates the progression of HIV infection to AIDS defining stage and shortens the survival of such patients and is the leading cause of death, accounting for one-third of deaths due to AIDS worldwide.[18]

Tuberculin skin test (TST) is the only tool to diagnose latent tuberculosis but lacks sensitivity in HIV positive individuals. The main advantage of TST is its low cost, but with some limitations like, patients may not return to read the result and interpreting results need expertise. Interferon (IFN) ϒ release assays (IGRAs), are T-cell-based assays allowing measurement of IFN-g, which is released from T cells following stimulation by 2 unique antigens of mycobacterium TB (MTB) like early secreted antigenic target 6 (ESAT-6) and culture filtrate protein 10 (CFP-10).[19] In the present study we have not done IGRAs, so there is high chance of missing the latent tuberculosis infection.

The co-management of HIV and TB is challenging due to drug-drug interactions, overlapping drug toxicities, concerns about adherence, and the immune reconstitution inflammatory syndrome. However, the initiation of antiretroviral therapy (ART) during the course of TB treatment is necessary to improve survival, and the appropriate timing of ART is dependent on the level of immune suppression. Therefore, the management of TB must be well coordinated with HIV resources, prepared to rapidly diagnose HIV, assess immune status, and correctly treat both infections.

The strength of this study is, study is a prospective study with enrolment of all the HIV positive patients regardless of the symptoms. Hence it guides finding the HIV-TB cases even in early and latent stages and prevent spread. The limitations of the present study are small sample size, CD4 count of cases not available, virologic markers and search for primary drug resistant TB were not assessed due to financial constraints. The high rates of AFB smear-negative disease in HIV patients, culture can be essential to confirm the diagnosis of HIV. In our study sputum culture was not done. Despite these limitations, our study shed light on the prevalence and determinants of HIV–TB co-infection in a tertiary care hospital in Bangalore.

**CONCLUSION:** The prevalence of HIV–TB co-infection was high. Moreover, HIV positive patients need early diagnosis and treatment of active TB. However large sample size prospective studies are needed to correlate the clinical and CD4 count with the occurrence of different types of tuberculosis. HIV-related TB shows a higher prevalence of extrapulmonary and disseminated TB and adverse events due to ATT. Early recognition of concurrent OIs, their adequate treatment and chemoprophylaxis is essential. The increased risk of TB in HIV-positive patients and the complex clinical presentation means that HIV positive patients should be regularly screened for tuberculosis.

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