

Original Research Article

PREVALENCE OF TUBERCULOSIS IN HIV SEROCONVERTED PATIENTS AND ITS RELATION TO CD4 COUNT - A PROSPECTIVE STUDY AT ART CENTER IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Tuberculosis is a major communicable disease worldwide. Tuberculosis is the leading killer and the commonest opportunistic infection in HIV-infected individuals, with 1.2 million deaths in 2024. The prevalence of tuberculosis in HIV individuals in India is about 17–23.8%.

Materials and Methods: The study is a prospective study conducted on 300 HIV-reactive patients at the ART center in a tertiary care hospital, GGH Eluru. Data were analyzed for the prevalence of tuberculosis in HIV-infected patients with CD4 counts and their association between them.

Results: Out of 300 HIV-infected patients, 55 were detected with tuberculosis; of them, 48 had pulmonary TB and 7 had extrapulmonary TB. In the present study, 30 (54.5%) patients with CD4 count <200 cells/μL developed tuberculosis, 22 (40%) patients with CD4 count 200–400 cells/μL, and 3 (5.4%) patients with CD4 count >400 cells/μL showed a lesser number of pulmonary and extrapulmonary TB cases.

Conclusion: There is a strong association between tuberculosis and HIV. The prevalence of TB is more when the CD4 count is less than 200 cells/μL. So, it is essential to screen HIV-reactive patients for TB along with CD4 count to prevent complications and mortality. This study showed that the prevalence of pulmonary and extrapulmonary tuberculosis in HIV-infected patients is significantly higher with CD4 count <200 cells/μL.

Keywords: HIV, AIDS, CD4 count, CB-NAAT, Tuberculosis.

INTRODUCTION

Tuberculosis is an ancient disease. It is a chronic granulomatous disease infecting the respiratory system and can infect any organ. Despite drug therapy and awareness of people about HIV, it continues to be a major global public health issue, having claimed 36.3 million (27.2–47.8 million) lives so far.^[1-3] As per the factsheet of HIV-associated tuberculosis, an estimated 862,000 people living with HIV (PLHIV) worldwide fell ill with TB in 2018. TB is the leading cause of death among people with HIV, accounting for some 251,000 people who died from HIV-associated TB in 2018 and about a third of AIDS deaths.

Tuberculosis is the leading cause of death in India, contributing to 30% of the total global burden. Approximately 0.5 million people die of TB annually, and 5% of the incident TB cases in India have HIV. Quantifying the burden that different types of tuberculosis represent for HIV programs during the pre-ART and ART periods is important for program managers. Previous studies have provided evidence of the decreased risk of tuberculosis in HIV-infected patients who initiate ART.^[2,4-8]

Geographically, in 2020, most TB cases were in WHO regions of South-East Asia (43%), Africa (25%), and the Western Pacific (18%). TB incidence in 2020 was 16,28,161, with a rate of 188 per 100,000 population. The most obvious impact on

TB of disruptions caused by the COVID-19 pandemic was a large drop in the number of people newly diagnosed with TB reported in 2020. Compared to 2019, there was a fall of 18% between 2019 and 2020, from 7.1 million to 5.8 million. In 2021, under the vision of the National Strategic Plan for Elimination of Tuberculosis, 18 states have committed to ending TB by 2025.^[9-11]

TB estimated mortality is 14.2%, but reported mortality is 76,002, with a mortality rate of 37 per 100,000 population. There was a 50% decrease in tuberculosis transmission during the lockdown period. The pandemic of HIV infection and acquired immunodeficiency syndrome (AIDS) has caused a marked increase in tuberculosis in some countries. Its natural reservoir is man, and it causes the majority of deaths in HIV-reactive patients. The incidence of TB–HIV co-infection is increasing, and their CD4 count is low. Tuberculosis is the most common serious opportunistic infection in HIV-positive patients and is the manifestation of AIDS. Due to its ability to destroy the immune system, HIV has emerged as the most significant risk factor for progression of dormant TB infection to clinical disease. HIV is an important risk factor associated with an increased risk of latent TB infection (LTBI) progressing to active TB disease.

MATERIALS AND METHODS

It is a prospective cross-sectional study. The study was conducted in the Department of Microbiology and ART clinic in Government General Hospital, Eluru. Data were collected from June 2025 to December 2025. It was conducted on 300 HIV-reactive patients. Samples such as sputum, pleural fluid, ascitic fluid, and lymph node were collected and screened; sputum for pulmonary TB and pleural fluid, ascitic fluid, and lymph node for extrapulmonary TB were screened by the CB-NAAT method. Blood was collected by venipuncture, and CD4 count was estimated by flow cytometry. CD4 count was used to know the injury to the host immune response. This study was approved by the Ethical Committee of GMC, Eluru.

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Inclusion Criteria

- TB in HIV-reactive cases of all age groups and both genders.
- Chronic cough with low-grade fever cases.
- Extrapulmonary symptoms of TB.
- CD4 count less than 400 cells/ μ L.

Exclusion Criteria

- Known bacterial, viral, and fungal infections.
- Known tuberculosis cases.
- HIV non-reactive cases.

RESULTS

Out of 300 HIV-reactive patients, 180 were males and 120 were females. Out of 300 samples, 55 were detected as TB (18%). Out of these, 48 (87%) were pulmonary TB and 7 (13%) were extrapulmonary TB. Out of 55 tuberculosis-positive patients, 31 (56%) were males and 24 (44%) were females. Among them, 48 (87%) were pulmonary TB and 7 (13%) were extrapulmonary TB; of the extrapulmonary cases, 4 were lymph node, 2 were pleural fluid, and 1 was ascitic fluid.

Blood was collected, and CD4 count was estimated by flow cytometry. Thirty (54.5%) patients with CD4 count <200 cells/ μ L developed tuberculosis, 22 (40%) patients had CD4 count between 200–400 cells/ μ L, and 3 (5.5%) patients had CD4 count >400 cells/ μ L. Extrapulmonary tuberculosis cases had CD4 count <200 cells/ μ L. Among pulmonary tuberculosis cases, 22 had CD4 count <200 cells/ μ L and 22 had CD4 count >200 to 400 cells/ μ L. CD4 count <200 cells/ μ L showed a higher number of TB cases than CD4 count 200–400 cells/ μ L, and CD4 count >400 cells/ μ L showed a lesser number of TB cases.

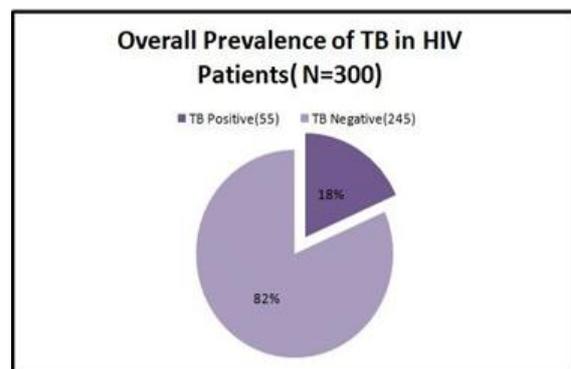


Figure 1: Prevalence of TB positives in HIV patients

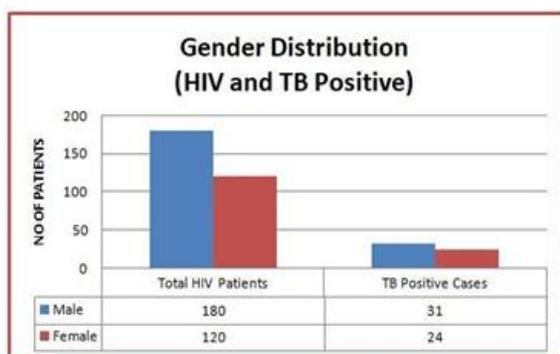


Figure 2: Sex distribution in HIV and TB positive patients

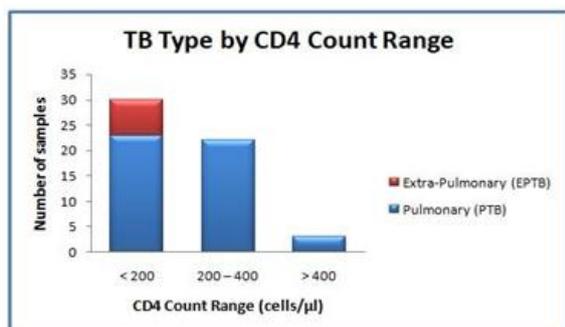


Figure 3: Correlation: TB Type by CD4 Range

DISCUSSION

Tuberculosis with HIV is a major health problem in the world. It is a common opportunistic infection in HIV. TB is more common in HIV and can occur at any stage; therefore, it is essential to screen TB in HIV-reactive patients because the immune system of the patient is decreased. CD4 count <200 cells/μL shows a higher number of TB cases.

So, the study was done on 300 HIV-reactive patients, of whom 55 were detected as TB. Out of these, 48 (87%) were pulmonary TB and 7 (13%) were extrapulmonary TB. Out of 55 cases, 31 (56%) were males and 24 (44%) were females.

In the present study, we have observed that the mean age of the patients was 38.46 ± 8.94 years, and most of the patients were between 26 to 50 years of age, with male predominance. This finding is supported by the work of G. Seshukumar et al,^[1] Holmberg et al., and Zhang et al.

So, the study was done on 300 HIV-reactive patients, of whom 55 were detected as TB. Out of these, 48 (87%) were pulmonary TB and 7 (13%) were extrapulmonary TB. Out of 55 cases, 31 (56%) were males and 24 (44%) were females, which is similar to the study conducted by Dr. D. V. Vinay Kumar et al. at Government Medical

College/Hospital, Ongole. CD4 count <200 cells/μL showed a higher number of patients with TB.^[3]

CONCLUSION

In our study, we observed that prevalence of extra pulmonary TB is more with CD4 count < 200 cells/μl than pulmonary TB. The CD4 count 200–400 cells/μl and >400 cells/μl showed decrease in the burden of tuberculosis. In HIV reactive patients there is increased incidence and prevalence of TB. So to decrease the burden of tuberculosis it is essential to screen HIV reactive patients for TB along with CD4 count to prevent complications and mortality.

It is essential that patients with diagnosed tuberculosis are screened for HIV and patients diagnosed HIV infected be screened for Tuberculosis early stage detection is to reduce mortality and morbidity among HIV positive TB patients.

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