ORIGINAL ARTICLE

VARIATION IN RESULTS OF CONVENTIONAL DIAGNOSTIC TEST OF TUBERCULOSIS IN HIV POSITIVES

Shilpa B Sutariya[1], Hemant M Shah[1], Dipika A Patel[1], Vinod A Dandge[1]

Author's Affiliation: [1]Assistant Professor, Department of Medicine, SMIMER, Surat, Gujarat.
Correspondence: Dr. Hemant M Shah, Email: hemanthshah2801@gmail.com

ABSTRACT

Introduction: TB and HIV co-infection are associated with special diagnostic and therapeutic challenges. This study was conducted to detect variation in sputum AFB and Montoux test in TB HIV positives.

Methodology: Current study was a cross sectional study comprises of all HIV patients attending the ART centre. List of HIV positive patients diagnosed with tuberculosis form sampling frame. Total 100 HIV positive patients diagnosed with Tuberculosis and having age more than or equal to 18 years were included in the study.
Results: Out of total 100 patients, 60% were having Pulmonary Tuberculosis and 40 patients were diagnosed with Extrapulmonary Tuberculosis. Age group of 21 to 40 years represents around 49% of patients. Out of total 60 pulmonary TB patients, only 16 (26.7%) shows positive test result on sputum AFB. On Montoux test, 88% patients show negative result and only 1% shows induration ≥ 10 mm.

Conclusion: The study reveal that in HIV TB coninfection results of conventional tests like AFB examination may varied with more sputum negative among pulmonary TB. Majority of patients were tuberculin non-reactive.

Keywords: HIV-TB**,** Montoux test, Sputom AFB

INTRODUCTION

Since emergence of the Human Immunodeficiency Virus (HIV), Tuberculosis and HIV have been linked closely. HIV infection has contributed to a significant increase in the worldwide incidence of Tuberculosis. Worldwide, tuberculosis is the most common opportunistic infection affecting HIV seropositive individuals and it is the most common cause of death in AIDS patients, killing 1 of 3 patients. In 2013 there were 9 million new cases of TB, of which 1.1 million were among people living with HIV in the world.[1,2]

TB and HIV co-infection are associated with special diagnostic and therapeutic challenges and constitute an immense burden on healthcare systems of heavily infected countries like India.[3] An HIV infected person co-infected with *M. tuberculosis* has a 50 percent lifetime risk of developing TB disease, whereas an HIV non-infected person infected with *M. tuberculosis* has only a 10 percent risk of developing TB.[4,5]

HIV not only increases the number of TB cases, but also alters the clinical course of TB disease. As HIV related immunosuppression increases, the clinical pattern of TB changes, with increasing numbers of smear-negative and extrapulmonary cases. In addition, TB disease is more likely to be disseminated and more difficult to diagnose as the immunosuppression progresses. HIV infected TB patients can also suffer from other HIV related diseases. National TB programmes in the high HIV burden countries are reporting increasing case fatality rates of up to 25 percent in the smear-positive and 40-50 percent in smear-negative pulmonary TB patients.[6]

The clinical manifestation of TB in HIV-infected patients was quite varied and generally shows different patterns as CD4 count. In patient with relatively high CD4 count, the typical of pulmonary reactivation occurs, while in patients with lower CD4 count disseminated disease was more common.

Rates of smear-negative pulmonary and extrapulmonary tuberculosis have been rising in countries with HIV epidemics. The mortality rate among HIV-infected tuberculosis patients is higher than that of noninfected tuberculosis patients, particu-

larly for those with smear-negative pulmonary and extrapulmonary tuberculosis. Delayed diagnosis may be an important cause of excess mortality in people living with HIV who have smear-negative pulmonary and extrapulmonary tuberculosis.[7]

Pulmonary TB (PTB) is most common form of TB disease. HIV positive and HIV negative patients with active pulmonary TB generally manifest similar clinical features, namely cough, fever, night sweats, haemoptysis and weight loss. The presentation depends on the degree of immune suppression. In patients with mild immune suppression, the clinical picture often resembles usual adult post-primary pulmonary TB (PTB), and the sputum smear is frequently positive for acid-fast bacilli (AFB). The chest X-ray (CXR) in such patients with early HIV infection typically shows upper lobe and/or bilateral infiltrates, cavitations, pulmonary fibrosis and shrinkage. In severely immune suppressed patients, the features of the disease are atypical, resembling those of primary TB. The sputum smear can often be negative and chest x-ray shows may show any pattern. Interstitial infiltrates tend to be common, especially in the lower zones, and features such as cavitation or fibrosis are less common. Infiltrates may be unilateral or bilateral, and are seen more often in the lower lobes than in the upper lobes.

Features of PTB	**Stages of HIV Infection**	
	Early	**Late**
Clinical Picture	Often resembles post-primary TB	Often resembles primary TB
Sputum Smear Result	Often positive	Often negative
Chest X-ray appearance	Often cavities	Often filtrates with no cavities

In persons with advanced HIV infection, disseminated and extrapulmonary TB (EPTB) are more common. The most common forms are lymphadenitis, pleural effusion, pericarditis, miliary disease and meningitis.[8]

This study was planned with the objective of detecting variation in results of sputum AFB and Montoux test in Tuberculosis in HIV positives.

METHODOLOGY

Current study was a cross sectional study, conducted in a tertiary care hospital of Gujarat, India. Study population comprises of all HIV patients attending the ART centre. List of HIV positive patients diagnosed with tuberculosis form sampling frame. This list was obtained from ART centre with due permission of Gujarat State AIDS Control Society. Total 100 HIV positive patients diagnosed with Tuberculosis and having age more than or equal to 18 years were selected randomly using random number table from the list. TB-HIV patients having age less than 18 years were excluded from the study. Patients were contacted during their routine visit to ART centre. Informed written consent was obtained from all patients after explaining them nature of the study. All patients those cannot be traced or refused to participate in the study were excluded and immediate next patient from the list was recruited in the study.

Permission from Institutional Ethical Committee was obtained to conduct the study. Approval from Gujarat State AIDS Control Society was obtained to conduct the study and to access the data of ART centre.

A detailed regarding the mode of onset of the disease, clinical profile and duration was obtained. Details of investigations were also recorded. A complete general and systemic investigation of all patients was also done.

All data were entered in the Microsoft Excel and data analysis was carried out using Epi-Info software.

RESULTS

Out of total 100 patients having HIV with Tuberculosis, 60 patients were having Pulmonary Tuberculosis and 40 patients were diagnosed with Extrapulmonary Tuberculosis.

It was seen from the present study that Maximum number of patients from 31 to 40 years. Age group of 21 to 40 years represents around 49% of patients.

Table 2 shows radiological findings of patients. Out of total 60 patients of Pulmonary TB, 33 (55%) patients were having radiological findings of Low & mid zone infiltrates. 12 (20%) patients shows pleural effusion, whereas, only 4 (6.7%) patients shows radiological findings suggestive of Cavitation.

Table 1: Age wise distribution of patients

Age group	Cases (n=100) (%)
18-20	19 (19)
21-30	30 (30)
31-40	39 (39)
41-50	8 (8)
51-60	2 (2)
>60	2 (2)

Table 2: Radiological features of patients

Radiological findings	Cases (n=60) (%)
Low/mid zone infiltrates	33 (55.0)
Pleural effusion	12 (20.0)
Predominant upper zone infiltrate	10 (16.7)
Cavitation	4 (6.7)
Miliary pattern	1 (1.7)

Table 3: Sputum AFB results of patients

Sputum	Cases (n=60) (%)
Acid Fast Bacilli +ve	16 (26.7)
Acid Fast Bacilli -ve	44 (73.3)

Table 4: Montoux test results of patients

M.T. (mm)	Cases (n=100) (%)
Negative	88 (88)
1-4 mm	1 (01)
5-9 mm	10 (10)
>= 10 mm	1 (01)

Table 3 shows sputum AFB test result of all pulmonary TB patients. It was observed that out of total 60 pulmonary TB patients, only 16 (26.7%) shows positive test result.

Table 4 shows Montoux test result of all TB patients. Out of total 100 patients, 88% patient shows negative test result. Only 1% patient shows induration of more than or equal to 10 mm.

DISCUSSION

Incidence of TB in HIV positives was highest in age group 18-30 years. Zuber Ahmed et al also reported maximum incidence of TB in HIV positive in age group 21-30 years.[9] In the study done by K.C. Mohanty and others, maximum numbers (42.9%) of HIV seropositive cases were in the age group of 21-30 years followed by 31-40 years.[10]

This is probably due to the reason that this age group is generally found to be sexually active and active transmission is most common mode of transmission of HIV, and TB is most common opportunistic infection in HIV seropositive patients. Active TB is most common in patients 25 to 44 years of age. HIV infection increases the risk of developing active TB by a factor of 100.

In present study the most common findings were lower zone/med zone infiltrates (33%), pleural effusion (12%). Cavitary lesion and military motting were present in only 4% and 1% patients only. In the study of FA Post and others, most common radiological findings are parenchymal infiltrate in mid or lower zone (34%), followed by pleural affection (21%) diffuse interstitial infiltrate with or without cavitation seen in 12% of patients.[11] In the study of Kramer and others, hilar adenopathy (52%) was the most common finding, followed by pleural effusion (36%), upper zone infiltrate (32%), milliary pattern (16%), normal x-ray (8%).[12]

Radiographs with infiltrates localized predominant in the upper lobe or superior segment of the lower lobes with or without cavitation were categorized as typical of reactivation (post-primary) pulmonary TB. Atypical radiographic presentation were characterized by lower zone infiltrate, hilar-adenopathy interstitial diffuse infiltrate or milliary pattern and lack of cavitation. Pleural effusion was more common in HIV seropositive patients than seronegative patients. Pleural effusion regarded as a marker of early clinical HIV disese.[13]

Since cell mediated immunity is necessary to control TB, it is possible as the CD4 count declines the patients is unable to control infection and an 'atypical' radiographic pattern results.

The patient may have have been recently infected and has primary disease which leads to 'atypical' radiographic findings.

Cavitary lesions are usually seen with intact delayed type hypersensitivity (DTH) reaction to TB antigen in HIV patients, DTH reaction is suppressed because of defective macrophage and lymphocyte fuction. Therefore, cavitory lesion usually not seen in patients with low CD4 cell counts.

Significance: TB presenting 'atypically' could be used to estimate the stage of HIV disease.

In present study pulmonary TB with both typical and atypical presentation was the most common manifestation of TB (54%) while extrapulmonary TB in which lymphatic system (37%) was most commonly involved. Findings of this study correlates with Zuber Ahmed's study in which pulmonary TB was the most common manifestation of TB (80%), and also suggest a high extrapulmonary involvement (38.46%) patients. Lymphatic system was most commonly involved in 18% followed by pleural involvement in 14% cases.[9]

The clinical manifestations of TB in HIV –infected patients are quite varied and generally show different patterns as a CD4 cell count. In patients are quite varied and generally shows different patterns as a CD4 cell count, the typical of pulmonary reactivation occurs, while in patients with lower CD4 cell count disseminated disease is more common. Present study shows that AFB was negative in 73.3% patients while sputum AFB was positive in 26.7% patients. In the study of Mohanty et al reported that sputum AFB –ve 52% and sputum AFB was positive in 15%. [10] Jayswal et al showed that 72% patients were sputum AFB negative and 27% were sputum AFB positive. [14]

HIV positive patients have been reported to have lower yield on AFB smear because HIV positive patients extracted slightly lower organism per ml of sputum than did HIV negative patients with TB. Along with it the sensitivity of sputum smear may be greater in those patients with less immunosuppression, because they presented with cavitory lesions. HIV patients presented adenopathy and pleural effusion were sputum negative.

This can be the reason for majority of HIV positive patients were sputum negative in present study.

In present study 88% HIV positive patients were non reactive to TB to tuberculin test, 1% patients were shown induration of 1-4 mm. Induration of 5-9 mm and >= 10 mm were seen 10% and 1% of patients respectively. In Canessa study 92% HIV positive patients were non reactive to tuberculin test.[15] In Zuber Ahmed study, tuberculin test was non reactive in 52% of patients.[9]

Tuberculin test is a delayed type hypersensitivity reaction that generally parallels cellular immunity against TB. Immunosuppression in HIV infection reflects negative Mantoux test in majority patients. The prevalence of Tuberculin reactivity varied directly and that of anergy inversely with absoule CD 4 cell count. A reactive skin test is an indicator of TB infection but a negative reaction does not rule out infection.

CONCLUSION

HIV and TB co-infection was more common in age group of 18-30 years. Sputum for AFB examination was shows lower yield of AFB in smear in HIV positive patients with pulmonary TB than negative patients.

Majority of patients (88%) were tuberculin non-reactive because Tuberculin test is a delayed type hypersensitivity reaction that generally parallels cellular immunity against TB. Immunosuppression in HIV infection reflects negative Mantoux test in majority patients.

The prevalence of tuberculin reactivity varied directly and that of anergy inversely with absolute CD4 cell count.

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