

Study of HIV seropositivity among patients of tuberculosis

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Abstract

Background: Infection with HIV results in progressive immunodeficiency and renders the infected person become increasingly vulnerable to wide range of pathogens. In many parts of the world Tuberculosis is the most common opportunistic infection in HIV infected person. The immune defects produced by HIV influence the natural course of TB infection. In present study we aimed to study HIV seropositivity among patients of tuberculosis, taking treatment at DOTS center affiliated to our tertiary hospital. **Material and Methods:** This was a cross sectional study conducted in patients (new as well as previously treated/relapse) who have completed two months of DOTS therapy, willing to participate underwent HIV testing. **Results:** During study period 1120 patients were taking AKT from selected DOTS cum Designated Microscopy Centers. After applying inclusion and exclusion criteria total 1068 patients were considered for this study. We observed 5.43 % incidence of HIV seropositivity among total study population. HIV seropositivity was more common in previously treated patients (7.29%) as compared to new patients (5.24%). In HIV seropositive patients, 70.69 % patients had Pulmonary tuberculosis while extra pulmonary tuberculosis was noted in 29.31 % patients. Cough (91.38 %), Weight loss (87.93 %), Fever (75.86 %) and loss of appetite (70.69 %) were common symptoms noted in study population. Lymphadenopathy (64.71 %) and pericardial effusion (17.65 %) were commonest presentations of extra-pulmonary tuberculosis in study patients. Common radiological findings in chest radiogram in study population were upper lobe involvement (25.86 %), middle and lower lobe involvement (22.41 %), bilateral extensive pulmonary tuberculosis (22.41 %) and cavitory lesions (18.97 %). CD4 count among HIV/TB co-infected individuals was <200 (29.31 %), 200-349 (25.86 %), 350-500 (18.97 %) and >500 (25.86 %). **Conclusion:** Treating physician should maintain a high index of suspicion for HIV seropositivity in patients undergoing treatment for tuberculosis. Screening for HIV infection should be recommended in all tuberculosis patients, as dual infection is documented in many studies.

Keywords: HIV, tuberculosis, CD4 Counts, DOTS, NACO.

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INTRODUCTION

Tuberculosis (TB) is the most common opportunistic infection among people living with HIV (PLWHIV). In

2014, HIV-associated TB accounted for 25 per cent of all TB deaths and one-third of the estimated 1.2 million deaths from HIV/AIDS.¹ Infection with HIV results in progressive immunodeficiency and renders the infected person become increasingly vulnerable to wide range of pathogens. In many parts of the world Tuberculosis is the most common opportunistic infection in HIV infected person. The immune defects produced by HIV influence the natural course of TB infection. TB is one of the most common infections in HIV-infected people, especially in high TB prevalence areas. Moreover, the risk of MDR-TB transmission may be increased if effective and uninterrupted TB treatment is not ensured.² HIV – TB co infection is on the rise more so in the developing countries like India. TB accounts for about a third of deaths among

patients with AIDS.³ HIV infection causes a gradual depletion of cell mediated immunity and thus offers an opportunity for activation of the latent TB infection. In present study we aimed to study HIV seropositivity among patients of tuberculosis, taking treatment at DOTS center affiliated to our tertiary hospital.

MATERIAL AND METHODS

This was a cross sectional study carried out at DOTS cum Designated Microscopy Centers under Department of Microbiology, SHKM, Government Medical College. Study was conducted under department of microbiology with help from department of chest and TB during June 2018 to May 2020. Ethical approval from institutional review board was obtained.

The study population consisted of all patients with TB registered for DOTS treatment under RNTCP in selected centers.

Inclusion criteria

Patients (new as well as previously treated/relapse) who have completed two months of DOTS therapy, willing to participate, underwent HIV testing

Exclusion criteria

- Patients not completed 2 months DOTS therapy
- Patients already diagnosed with HIV

- children < 2 years.
- Not willing to participate

Study was explained to patients and a written informed consent was taken for participation. Confidentiality was ensured and the collected data was used for research purpose only. HIV testing was done after proper counselling and reporting was done as per NACO guidelines only. Confirmed reports were considered in study. Socio-demographic details (age, sex, religion, marital status), clinical features (symptoms/signs), detailed physical examination was done. Necessary laboratory (CBC, CD4, LFT, RFT) and imaging (CXR, whenever needed CT-thorax) were done. Data was collected in Microsoft excel sheet and statistical analysis was done using descriptive statistics.

RESULTS

During study period 1120 patients were taking AKT from selected DOTS cum Designated Microscopy Centers. After applying inclusion and exclusion criteria total 1068 patients were considered for this study. We observed 5.43 % incidence of HIV seropositivity among total study population. HIV seropositivity was more common in previously treated patients (7.29%) as compared to new patients (5.24%).

Table 1: HIV seropositivity between 'new' and 'previously treated' patients

Treatment Category	HIV positive (%)	HIV negative	Total
New patients	51 (5.24%)	921 (94.75%)	972 (91.01%)
Previously treated patients	7 (7.29%)	89 (92.70%)	96 (8.98%)
Total	58 (5.43%)	1010 (94.56%)	1068

In HIV seropositive patients, 70.69 % patients had Pulmonary tuberculosis while extra pulmonary tuberculosis was noted in 29.31 % patients.

Table 2: Distribution of tuberculosis

Tuberculosis	No. of patients (n=58)	Percentage (%)
Pulmonary tuberculosis	41	70.69
Extra pulmonary tuberculosis	17	29.31

Cough (91.38 %), Weight loss (87.93 %), Fever (75.86 %) and loss of appetite (70.69 %) were common symptoms noted in study population.

Table 3: Clinical presentation.

Symptoms	No. of patients (n=58)	Percentage (%)
Cough	53	91.38
Weight loss	51	87.93
Fever	44	75.86
Loss of appetite	41	70.69
Dyspnea	28	48.28
Hemoptysis	10	17.24
Chest pain	3	5.17

Lymphadenopathy (64.71 %) and pericardial effusion (17.65 %) were commonest presentations of extra-pulmonary tuberculosis in study patients.

Table 4: Presentations of extra-pulmonary tuberculosis.

Extrapulmonary presentation of TB	No. of patients (n=17)	Percentage (%)
Lymphadenopathy	11	64.71
Pericardial effusion	3	17.65
CNS TB	2	11.76
Bone TB	1	5.88

Common radiological findings in chest radiogram in study population were upper lobe involvement (25.86 %), middle and lower lobe involvement (22.41 %), bilateral extensive pulmonary tuberculosis (22.41 %) and cavitory lesions (18.97 %).

Table 5: Radiological findings in chest radiogram in study population

Location of involvement	No. of patients (n=58)	Percentage (%)
Normal Chest X-Ray	18	31.03
Upper lobe	15	25.86
Middle and lower lobe	13	22.41
Bilateral extensive pulmonary tuberculosis	13	22.41
Cavitory lesions	11	18.97
Miliary shadow	5	8.62

CD4 count among HIV/TB co-infected individuals was <200 (29.31 %), 200-349 (25.86 %), 350-500 (18.97 %) and >500 (25.86 %).

Table 6: Distribution of CD4 count among HIV/TB co-infected individuals

CD4 count (CELLS/MM3)	No. of patients (n=58)	Percentage (%)
<200	17	29.31
200-349	15	25.86
350-500	11	18.97
>500	15	25.86

DISCUSSION

HIV testing of TB patients is now routine through provider-initiated HIV testing and counselling (PITC) and has been implemented in all States with the intensified TB-HIV package.⁴ In India, the proportion of TB patients with known HIV status has consistently increased over the past five years from 31 per cent in 2008-2009 to 63 per cent in 2013. Increased access to HIV testing facilities and co-located TB and HIV testing services by both national programmes could be the reason for this improved performance at the national level.^{5,6} The introduction of highly active antiretroviral therapy (HAART) has led to a significant reduction in AIDS-related morbidity and mortality. Since the introduction of ART, a significant decline in OIs and AIDS progression has been observed.⁷ The progressive destruction of immune system by chronic HIV infection leads to progressive fall in the level of CD4 cells (<200/ μ l to <50/ μ l), responsible for the occurrence of infections by a variety of opportunistic microorganisms. A cross-sectional record analysis study from 2000 to 2011, overall, 50 (12.3%) of the consenting 406 TB patients were HIV positive. Of these 406 patients, 44% had pulmonary TB, and 56% had extrapulmonary TB (EPTB). Coughing was the most common symptom (90%), followed by fever (78%). Pleural effusion (60.7%) was the most common form observed in the EPTB cases.⁸ Similar findings were noted in present study. In another Indian study from

January 2012 to June 2013, 610 adult patients registered under RNTCP were studied. Of these, 458 patients (75%) [mean age: 38.6 \pm 16.3 yrs.; 295 (64.4%) males] underwent HIV testing; HIV-co-infection was present in 21 (4.6%) patients. A significantly higher proportion of HIV co-infection was evident in PTB compared with EPTB (7.2% vs 2.8% respectively) and in previously treated patients compared to new patients (11.8% vs 3.7% respectively).⁹ The study focused on screening of these people for pulmonary TB, of the 170 seropositive individuals screened 60(35.29%) were found to be co-infected with HIV and TB. Of these 60 co-infected patients, 21(35%) were smear positive and 32 (53.33%) were culture positive. Of these 32 isolates 29 could be identified as M. tuberculosis and the rest 3 were as NTM. Screening of HIV seropositive individuals for TB will definitely help in early initiation of AKT as well as ART which in turn will help to improve the life span of patients with dual infection.¹⁰ Shrikanth R *et al.*,¹¹ studied 150 tuberculosis patients, thirteen (8.66%) were found to be HIV seropositive. 84.6% were males and 15.4% were females. 76.92% patients were from the age group of 21 – 40 years. Out of 11 HIV seropositive male patients 45.45% were labourers, 36.36% were truck drivers, 61.53 % belonged to urban area and 38.47% were from rural areas. 38.46% patients had disseminated/military tuberculosis (DTB/MTB), 23.07% patients had pulmonary tuberculosis, 23.07% had pleural

effusion, 15.38% had neuro-tuberculosis. 76.92% seropositive patients had CD4 count <350. Atypical presentation, extrapulmonary and disseminated / military tuberculosis cases are more at CD4 < 350/ml TB is the most common serious opportunistic infection in HIV positive patients and is the manifestation of AIDS in more than 50% of cases in developing countries. TB shortens the survival of patients afflicted with HIV infection, may accelerate the progression of HIV and is the cause of death in one third of people with AIDS worldwide. The higher mortality is due to the progression of AIDS rather than TB probably due to the fact that M. tuberculosis increases viral replication.¹² By producing a progressive decline in cell-mediated immunity, HIV alters the pathogenesis of TB, greatly increasing the risk of disease from TB in HIV-co infected individuals and leading to more frequent extra pulmonary involvement, atypical radiographic manifestations, and paucibacillary disease, which can impede timely diagnosis.¹³ Among the risk factors for coinfection, heterosexual promiscuity and casual sex was found to be the most important by some Indian observers while others observed that the majority were intravenous drug abusers.¹⁴ Coinfection of HIV and TB is intricately and causally associated with malnutrition, unemployment, alcoholism, drug abuse, poverty, homelessness and illiteracy.¹³ Appropriate management of patients with HIV-TB requires not only treating the TB and HIV alone but a strengthened mechanism of cross reference between the Antiretroviral treatment (ART) center and Directly Observed Treatment, Short Course (DOTS) centre.¹⁵ In endemic areas like India, it is important to screen MDR-TB cases especially in the immunosuppressed individuals to identify early resistance and also to prevent the spread of MDR-TB.

CONCLUSION

Treating physician should maintain a high index of suspicion for HIV seropositivity in patients undergoing treatment for tuberculosis. Screening for HIV infection should be recommended in all tuberculosis patients, as dual infection is documented in many studies.

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