International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

IJMRP

Original Research Article.

Study of CD_4 Count Level in HIV-TB Co-Infection in ART Patients Before And After Anti-Tubercular Treatment

Ashok Kumar Sharma[1*], Ashwini Verma[2], Manoj Kumar[3], Manish Kumar Sinha[2], Amber Prashad[4], Kumari Seema[5]

[1*]Associate Professor, [2]Junior Resident, [3]Professor & Head, [4]Assistant Professor, [5]Senior Research Scientist, Department of Microbiology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India.

ABSTRACT

Introduction: HIV and TB co-infection is when people have both HIV infection and also active TB disease. HIV infected individuals have a high risk of developing active TB following infection and also have increased mortality. Worldwide TB is one of the leading cause of death among people living with HIV. Initiation of ART during the course of ATT has been shown to reduce mortality in co-infected persons, especially in those who are severely immunosuppressed. Absolute CD_4 cell levels are the main markers of disease severity in patient with HIV, as well as the best markers yet for disease progression.

Aims and Objective: The study was aimed to determine the effect of HIV-TB co-infection on CD_4 count level.

Materials and Methods: A study was carried out at the ART of RIMS, Ranchi from July 2016 to June 2017. A total of 61 HIV-TB co-infection patients, who attended ART clinic receiving ART and ATT treatment during the study period.

Results: In the study, more patients of HIV-TB co-infection had lower CD_4 count. Of total 61 patients, 36 were less than 200 CD_4 count, 11 were between200-350, 7 were between 350-500 and 7 were more than 500.

Conclusion: CD_4 lymphocyte cells are the primary targets of HIV. It is used to stage the patient's disease, determine the risk of opportunistic illnesses, assess prognosis and response to therapy.

Keywords: CD_4 Count, HIV-TB Co-Infection, ART.

***Correspondence to:**

Dr. Ashok Kumar Sharma,
Associate Professor,
Department of Microbiology,
RIMS, Ranchi, Jharkhand, India.

Article History:

Received: 30-10-2017, **Revised:** 01-12-2017, **Accepted:** 24-12-2017

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2018.4.1.134	

INTRODUCTION

HIV and TB co-infection is when people have both HIV infection and also active TB disease. Tuberculosis is a common opportunistic infection and a leading cause of death in HIV patients worldwide, especially in developing countries. HIV infected patients with latent TB infection are at risk of reactivation and those with recently acquired infection are at high risk of progressive primary TB. There is clinical and experimental evidence suggesting that active TB accelerate the course of HIV disease.[1,2]

An estimated 1.2 million people living with HIV worldwide fell ill with TB in 2015. TB is the leading cause of death among people living with HIV, accounting for some 390,000 people who died from HIV-associated TB in 2015.[3]

Globally people living with HIV are 19 times (17 – 22) more likely to fall ill with TB than those without HIV.[3] In 2015, there were an estimated 10.4 million cases of tuberculosis disease globally, including 1.2 million [11%] among people living with HIV. Tuberculosis-related deaths among people living with HIV fell by 33% between 2005 and 2015. However, almost 60% [57%] of tuberculosis cases among people living with HIV were not diagnosed or treated, resulting in 390 000 tuberculosis-related deaths among people living with HIV in 2015.[4] Approximately 60-80% of HIV-infected patients with TB have pulmonary disease, and 30-40% has extra pulmonary disese.[5] The incidence of extra pulmonary features tends to increase with advancing immunosuppression in HIV-infected persons.

HIV infection is the strongest of all known risk factors for the development of TB. HIV-infected persons are at markedly increased risk for progressive disease following primary TB infection[6-8], as well as reactivation of latent tuberculosis infection (LTBI). HIV infection also increases the risk of subsequent episodes of TB from exogenous reinfection.[9-11]

The course of HIV infection is accelerated subsequent to the development of TB and the inverse relationship between HIV viraemia and CD4+ count gets shifted to the right[12]. Further, increased HIV replication has been demonstrated locally, at sites of disease affected by TB such as affected lung and pleural fluid, in patients with HIV-TB.[13,14]

Thus in HIV-infected persons with active TB, the sites of active TB infection act as epifoci of HIV replication and evolution independent of systemic HIV disease activity.[12] CD4 counts are critical in the control of infection with Mycobacterium tuberculosis, as quantitative and qualitative deficiency of these effector cells in HIV infected individuals increases the rate of both primary and reactivation of disease. Unlike other opportunistic infections which occur at CD4+ counts below 200/mm^3, active TB occurs throughout the course of HIV disease.[6] Clinical presentation of TB in HIV-infected individuals depends on the level of immunosuppression resulting from HIV infection. In patients with relatively intact immune function (CD4+ count > 200/mm3), pulmonary TB (PTB) is more frequently seen than extrapulmonary TB (EPTB).[15,16] In these patients, chest radiographic findings include upper lobe infiltrates and cavitation, similar to those in HIV negative individuals with PTB.[17] Sputum smears are often positive for acid-fast bacilli (AFB) in these patients. As immunosuppression progresses, EPTB becomes increasingly common. In contrast to HIV-negative patients with EPTB, the disease is often disseminated involving two or more non-contiguous organs concomitantly, in patients with HIV/AIDS.[18] The commonest manifestations of extra pulmonary tuberculosis are superficial lymphadenitis, genitourinary disease, pleural disease, miliary disease, bone and joint disease and abscesses of the soft tissues.

AIMS AND OBJECTIVES

The study was aimed to determine the effect of HIV-TB co-infection on CD4 count level.

MATERIALS AND METHODS

A study was carried out at the ART of RIMS, Ranchi from July 2016 to June 2017. A total of 61 HIV-TB co-infection patients, who attended ART clinic receiving ART and ATT treatment were included during the study period.

Details regarding age, sex, duration of HIV and ART, type of tuberculosis whether pulmonary tuberculosis (PTB) or extra-pulmonary tuberculosis (EPTB), CD4 counts before and after ATT was collected.

HIV seropositivity was diagnosed by using NACO (National AIDS Control Organisation) supplied Comb- AIDS, Tridot and Triline test kits and tests interpreted as per manufacturers instruction and diagnosis was done as per national guidelines. CD4 count was performed with FACS (Fluorescent Assisted Cell Sorter) counter, with labelled antibodies. Pulmonary TB was diagnosed when either sputum smear was positive for AFB or when clinical or X-ray findings are strongly suggestive of TB. Extra-pulmonary TB was defined as the involvement of organs other than lungs like lymph node, pleura, pericardium, meninges, abdomen, bladder, joints and spine. Diagnosis was based on culture, histo-pathological proof, radiological evidence or strong clinical suspicion.

Complete blood picture, serum creatinine, blood urea, serum electrolytes, liver function tests, sputum for acid fast bacilli smear, chest radiography, CD4 cell count, fine needle aspiration and biopsy (if necessary), magnetic resonance imaging (if necessary), computed tomography (if necessary), colonoscopy (if necessary) can be taken.

Table 1: Distribution of types of tuberculosis

Tuberculosis	Frequency	Percentage
PTB	38	62.30
EPTB	23	37.70
TOTAL	61	100

Table 2: Age and sex distribution of the patients

Age group (years)	Male (n,%)	Female (n,%)	Total (n,%)
<20	4 (9.09%)	3 (17.65%)	7 (11.48%)
20-29	1 (2.27%)	0 (0%)	1 (1.64%)
30-49	29 (65.91%)	9 (52.94%)	38 (62.30%)
≥ 50	10 (22.73%)	5 (29.41%)	15 (24.59%)
Total	44	17	61

Table 3: Distribution of cases of EPTB and their percentage

Extrapulmonary Tuberculosis	Frequency	Percentage
Tubercular meningitis	7	30.44
Lymphadenitis	6	26.08
Tubercular pleural effusion	5	21.75
Tubercular abdomen	3	13.05
Miliary tuberculosis	1	4.34
Spine tuberculosis	1	4.34
Total	23	100

Table 4: CD4 count before and after ATT

	Tuberculosis	Mean
CD4 count before ATT (cells/µl)	PTB	251
	EPTB	162
CD4 count after ATT (cells/µl)	PTB	338
	EPTB	232

RESULTS AND DISCUSSION

Tuberculosis is the most common opportunistic infection in HIV/AIDS and is the most common cause of death in HIV/AIDS patients. Early diagnosis and treatment can decrease the mortality and morbidity. HIV enters the body when an individual comes in contact with infected blood, semen and/or vaginal secretions. The CD4receptor is the principal target site for HIV.A normal CD4 count in a healthy, HIV-negative adult can vary but is usually between 500 and 1500 CD4 cells/mm3 (though it may be lower in some people). Mortality among HIV-infected individuals is due to improper awareness and consequent poor clinical management of Opportunistic infections.

A total of 61 patients were included in the study of which 44 (72.13%) male and 17(27.87%) female were patients. Regarding age distribution among males 30-49 (65.91%) years age group and among females 30-49 (52.94%) years age group was the most commonly affected. Out of 61 patients, 38 patients had pulmonary tuberculosis and 23 had extra pulmonary tuberculosis. Out of 38 patients of PTB, 29 were male and 9 were female while among 23 EPTB patients 15 were male and 8 were female.

Among the type of EPTB analyzed Tuberculosis meningitis was the commonest form of EPTB found, followed by tubercular lymphadenitis, tubercular effusion, tubercular abdominal, miliary and spinal tuberculosis.

Mean CD4 count before and after ATT in HIV and EPTB patients was lower when compared with HIV and PTB patients. Mean CD4 count in EPTB was lower than in case of PTB. There was a statistically significant recovery in CD4 counts following ATT and ART. Tuberculosis can occur at any CD4 cell count. Pulmonary tuberculosis is more common at CD4 counts between 200-500 cells/µl. Miliary and extra pulmonary tuberculosis at less than 200 cells/µl. MAC at less than 50 cells/microL.

CONCLUSION

There was statistically significant increase in CD4 count after ATT in PTB and EPTB. Greater increment in CD4 counts with ATT and ART in dually infected patients suggests that TB additionally influences the reduction of CD4 counts in HIV patients.

REFERENCES

1. Whalen C, Horsburgh CR, Hom D et al. Accelerated course of human immunodeficiency virus infection aftertuberculosis. Am J RespirCrit Care Med 1995;151:129-35.

2. Shafer RW, Edlin BR. Tuberculosis in patients infected with human immunodeficiency virus: perspective on the past decade. Clin Infect Dis 1996;22:683-704.

3. World Health Organisation (WHO); Tuberculosis and HIV. www.who.int/tb/areas-of-work/tb-hiv/en/

4.www.unaids.org/sites/default/files/media_asset/UNAIDS_FactSheet_en.pdf.

5. Fauci AS, Lane HC. Human Immuno deficiency Virus Disease: AIDS and Related Disorders; Harrison's Principles of Internal Medicine 19 edition. 2015;226:1215-85.

6. Havlir DV, Barnes PF. Tuberculosis in patients with human immunodeficiency virus infection. N Engl J Med 1999;340: 367-73.

7. Daley CL, Small PM et al. An outbreak of tuberculosis with accelerated progression among persons infected with the human immunodeficiency virus: an analysis using restriction fragment length polymorphisms. N Engl J Med 1992; 326: 231-5.

8. Liberato IR, de Albuquerque Mde F, Campelo AR, de Melo HR. Characteristics of pulmonary tuberculosis in HIV seropositive and seronegative patients in a northeastern region of Brazil. Rev Soc Bras Med Trop 2004; 37: 46-50.

9. Sonnenberg P, Murray J, Glynn JR, Shearer S, Kambashi B, Godfrey-Faussett P. HIV-1 and recurrence, relapse, and reinfection of tuberculosis after cure: a cohort study in South African mineworkers. Lancet 2001; 358: 1687-93.

10. Small PM, Shafer RW, Hopewell PC, Singh SP, Murphy MJ, Desmond E, et al. Exogenous reinfection with multidrug-resistant Mycobacterium tuberculosis in patients with advanced HIV infection. N Engl J Med 1993; 328: 1137-44.

11. Korenromp EL, Scano F, Williams BG, Dye C, Nunn P. Effects of human immunodeficiency virus infection on recurrence of tuberculosis after rifampin-based treatment: an analytical review. Clin Infect Dis 2003; 37: 101-12.

12. Toossi Z. Virological and immunological impact of tuberculosis on human immunodeficiency virus type 1 disease. J Infect Dis 2003; 188: 1146-55.

13. Toossi Z, Johnson JL, Kanost RA, Wu M, Luzze H, Peters P, et al. Increased replication of HIV-1 at sites of Mycobacterium tuberculosis infection: potential mechanisms of viral activation. J Acquir Immune DeficSyndr2001; 28: 1-8.

14. Nakata K, Rom WN, Honda Y, Condos R, Kanegasaki S, Cao Y, et al. Mycobacterium tuberculosis enhances human immunodeficiency virus-1 replication in the lung. Am J RespirCrit Care Med 1997; 155: 996-1003.

15. Jones BE, Young SM, Antoniskis D, Davidson PT, Kramer F, Barnes PF. Relationship of the manifestations of tuberculosis to CD4 cell counts in patients with human immunodeficiency virus infection. Am Rev Respir Dis 1993; 148: 1292-7.

16. Zumla A, Malon P, Henderson J, Grange JM. Impact of HIV infection on tuberculosis. Postgrad Med J 2000; 76:259-68.

17. Perlman DC, el-Sadr WM, Nelson ET, Matts JP, Telzak EE, Salomon N, et al. Variation of chest radiographic patterns in pulmonary tuberculosis by degree of human immunodeficiency virus-related immunosuppression. The Terry Beirn Community Programs for Clinical Research on AIDS (CPCRA). The AIDS Clinical Trials Group (ACTG). Clin Infect Dis 1997; 25: 242-6.

18. Sharma SK, Kadhiravan T, Banga A, Goyal T, Bhatia I, Saha PK. Spectrum of clinical disease in a cohort of 135 hospitalised HIV-infected patients from north India. BMC Infect Dis 2004; 4: 52.

Source of Support: Nil.

Conflict of Interest: None Declared.

Cite this article as: Ashok Kumar Sharma, Ashwini Verma, Manoj Kumar, Manish Kumar Sinha, Amber Prashad, Kumari Seema. Study of CD_4 Count Level in HIV-TB Co-Infection in ART Patients Before And After Anti-Tubercular Treatment. Int J Med Res Prof. 2018 Jan; 4(1):612-14. DOI:10.21276/ijmrp.2018.4.1.134