



Original Research Article

Comparison of CD4 counts in HIV-TB co-infection before and after anti-retroviral therapy - A prospective study

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ABSTRACT

Introduction: Tuberculosis and HIV epidemic is the most prevalent problem in both developed and developing countries. Tuberculosis is the most prevalent airborne opportunistic infection among people living with HIV.

Aim: The present study aims to assess the impact of 6 months ART treatment on CD4 counts among HIV-TB co infected patients.

Materials and Methods: This was a prospective longitudinal study to assess the impact of 6 months ART treatment among HIV-TB infected patients. The study duration was between August 2012-March 2013. 189 HIV with TB diagnosed patients were taken from CG Hospital, treated under NACO guidelines. Follow up of cases done after six months of duration with CD4 count. CD4 Count was done by Flow Cytometry Method and expressed as cells/ μ l.

Results: 189 HIV-TB infected cases enrolled for the study who attended ART Centre, Among them 75(40%) were fresh diagnosed cases of HIV and TB and were started on ART therapy. 114(60%) cases were in age group 14 to 50 years with co-infection already on ART. A large number were diagnosed as having pulmonary tuberculosis (120cases). Extrapulmonary TB cases were 69 (lymphnode TB - 39, ascities-15, pleural effusion-10, CSF-5) and total 169 patients were having CD4 count of < 200, before ART, after ART, CD4 count increased to more than 300.

Conclusion: The clinical manifestation of TB-HIV is quite distinct exhibiting different CD4 counts. The co morbidities of HIV -TB has shown a challenge in diagnosis and treatment. HIV-TB cases have shown a decline in CD4 count without ART treatment leading to increased morbidity and mortality.

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1. Introduction

HIV infected patients pose a major threat of co morbidity with air borne infections specially Tuberculosis by primary infection or by reactivation.^{1,2} Majority of patients with co morbidity of TB have advanced HIV(Human Immunodeficiency Virus) disease as defined by low CD4 (T- cell test) counts and high viral loads.¹⁻³ Tuberculosis is critically dependent on the presence of CD4 counts.^{3,4} A decrease in CD4 count leads to various opportunistic infections which in turn leads to mortality and morbidity.^{4,5}

The dual epidemic of HIV with TB(Tuberculosis) is raising problem throughout world majority of them being in developed and developing countries. The incidence of HIV-TB coinfection is about a hundred fold than that in general population. Literature reveals that a majority of HIV infected person contract TB during their life time. Among which half are infected with Mycobacterium tuberculosis and atypical Mycobacterium tuberculosis.⁶

As per WHO(World Health Organization) Latent Tuberculosis is seen in at least one third of population living with HIV worldwide.⁷ On an average around 15% of patients suffering from TB have co morbid conditions of HIV as well as person with HIV-TB are more likely

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to develop active TB disease than persons without HIV.⁷ Tuberculosis is the major opportunistic air borne infection among HIV infected individuals spread from a HIV positive person to a negative person. The co infections of HIV –TB are difficult to diagnose due to negative sputum smear examination, atypical findings radiographically and increased prevalence of EPTB(Extra Pulmonary Tuberculosis).⁷ Hence the present study was undertaken with the aim to assess impact of 6 months ART treatment on CD4 counts among HIV-TB co-morbid patients.

2. Materials and Methods

A prospective longitudinal study was conducted during August 2012-March 2013 among HIV-TB co morbid conditions and who were initiated on ART. A total of 189 TB with HIV co morbid patients were taken from CG Hospital, treated under NACO (National AIDS Control Organisation) guidelines. Follow up of cases done after six months of duration with CD4 count. HIV infection was diagnosed using rapid kit tests like COMBAIDS, TRISPOT, TRILINE. and CD4 Count done by Flow Cytometry Method. Data was collected regarding socio-demographic profile, manifestation of clinical signs and symptoms and laboratory findings of CD4 counts. During follow up the laboratory findings were compared with the base line data. Statistical analysis was done using SPSS20 version. Results are presented as percentage and bi variate analysis using chi square and p value. P value of less than 0.05 was taken as significant under 95% confidence Interval. Odds ratio was used to assess the correlation between variables.

Ethical clearance was obtained from IEC (institutional ethical committee) and written informed consent was taken from the study participants for collection of data.

2.1. Specimen collection

Under strict aseptic precautions, 3ml of venous blood was drawn through vein puncture using EDTA (Ethylene Diamine Tetraacetic Acid) and processed.

2.2. Procedure

CD4 count by flow cytometry was performed according to the standard protocol supplied by the manufacturer. (PARTEC IVD FLOW CYTOMETER machine, by Partec GmbH. Am Flugplatz 13. D-02828 Gornitz. Germany).

2.3. Following investigations were done to diagnose to TB:

1. Ziehl-Neelsen staining of sputum for AFB from given sample was performed as per RNTCP guidelines.
2. The diagnosis of ETPB was based on features suggestive of TB with supportive evidence in the form of pleural, ascetic fluid, lymphnode biopsy, and

radiographic findings.

3. Results

189 HIV-TB infected cases enrolled for the study of which males comprised of 55% and females 45%. 75(40%) were fresh cases of comorbidities with HIV - TB and started on ART therapy. Whereas 114(60%) were known cases of co morbidity on ART therapy between age group 14 to 50 years. Majority of patients were diagnosed as having pulmonary tuberculosis (120cases). Extra pulmonary TB cases were 69 (lymphnode TB - 39, ascities-15, pleural effusion-10, CSF-5). 169 patients were having CD4 count of < 200, before ART whereas after initiation of ART, CD4 count increased to >300. According to the survival of cases 54.1% of the male and 45.9% female survived by the end of the study. Majority of patients diagnosed as having PTB(Pulmonary Tuberculosis) on the basis of sputum smear microscopy and X-ray findings. The death rate was significantly high among those belonging to age group more than 30 years and having CD4 count less than 250.

As per Table 1, Out of 190 cases 11% male and 8 % female cases died. As per the age distribution 10% of the cases death were between 4-15 years. 11% death were between 16-30 years. 7% death were between 31-45 years and 15% deaths were between 46-70 years. Decreased CD4 count was significantly associated with increased mortality. (p<0.05). Cases with CD 4 count <50 had 1.7 times higher odds of mortality as compared to those have CD4 count >50.

4. Discussion

Tuberculosis is the most prevalent infections among HIV infected patients. The screening for TB is recommended for all patients with HIV infections to identify patients with active disease.⁸ Unlike other opportunistic infections, TB may occur at any stage in HIV disease, but its presentation depends mainly on the degree of immunity among individuals. When the CD4 count was >200 cells/ cumm, the disease was more likely to be upper lobe open cavity /infiltrative disease; as immunosuppression increased atypical pulmonary and EPTB became progressively more common.⁹

MTB leads to an increase in HIV replication and accelerates progression of HIV infection with high morbidity and mortality. There was a marked reduction in mortality on early initiation with ART results compared to patients with TB who do not receive ART, those with very low number CD4 have a high short term risk of mortality.¹⁰ WHO recommends that ART to be started within the first eight weeks after starting with ATT and that patients with CD4 count < 50cells/cumm receive ART within first two weeks.⁸ Our study is comparative with previous studies

Table 1: Assessment of factors leading to mortality among HIV-TB CO morbid cases

Variable	Cases	Survived Number	%	Died Number	%	Chi square, P Value, OR
Gender						
Male	105	92	88	12	11	0.474,0.789 0.9
Female	85	78	92	7	8	
Age Group						
4-15 years	10	9	90	1	10	0.44,0.801 0.99
16-30 years	37	4	11	4	11	
31-45 years	94	7	7	7	7	
46-70 years	48	7	15	7	15	
CD4 Counts						
<50	21	14	67	7	33	11.180, 0.011 1.7
51-100	40	39	98	1	3	
101-250	80	72	90	8	10	
251-500	33	31	94	2	6	
>500	15	14	93	1	7	

which estimates an exponential increase in the incidence of Tuberculosis with the reduction in CD 4 cell count emphasizing in early initiation of ART among PLHIV.¹¹ Our results are also comparable with the studies carried out by William et al which showed an exponential decrease in CD4 count associated with PLHIV not on ART and increase in the incidence of TB.^{12,13}

5. Conclusion

The clinical manifestation of TB-HIV is quite distinct exhibiting different CD4 counts. The co morbidities of HIV-TB has shown a challenge in diagnosis and treatment. HIV-TB cases have shown a decline in CD4 count without ART treatment leading to increased morbidity and mortality.

Tuberculosis is the most frequent opportunistic infection within the first three months after ART Regular CD4 count monitoring becomes crucial for patients before ART initiation as well as earlier HAART initiation reduces both HIV and also TB associated morbidity and mortality. Initiation of ART at low CD4 counts, early diagnosis and treatment of TB among HIV patients will have significant clinical and public health benefits.

6. Source of funding

None.

7. Conflict of interest

None.

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