

A study of prevalence of pulmonary Tuberculosis in HIV positive individuals and its association with CD4 count in RIMS Medical college & Hospital, Ongole, Andhra Pradesh

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Abstract:

Background: In recent years, the incidence of Human immunodeficiency virus (HIV) infection has increased enormously all over the world. Patients with HIV infection are known to have risk of developing TB. Case fatality rate is high with drug resistant TB in Acquired immunodeficiency syndrome (AIDS).

Material and methods: This is an observational study of prevalence of pulmonary tuberculosis in HIV positive individuals conducted in the Department of Pulmonary medicine from September 2016 to August 2017 in RIMS Medical College and Hospital, Ongole, Andhra Pradesh, India.

Results: Out of 1016 patients, a total of 227 (22.35%) were diagnosed as Pulmonary tuberculosis. It was commoner in males (64%), and more frequent in laborers (46%) and Out of Total 227 HIV TB co-infection individuals 115 (50.67%) had CD4 counts of less than 200, in 49 (21.58%) patients between 200 & 349, in 38 (16.74%) patients between 350 & 500 and in 25 (11.01%) patients. The results of the study emphasize that co-infection of TB in HIV/AIDS patients is a concern. There is direct correlation between CD4 counts depletion and Pulmonary TB in HIV/AIDS patient. Hence, regular monitoring of these patients is warranted.

Conclusion: Reduction of CD4s in HIV infected patients below 500 associates with increasing prevalence of pulmonary tuberculosis. Early diagnosis of TB and prompt institution of Anti retro viral therapy reduces the prevalence of pulmonary tuberculosis mortality and morbidity significantly.

Keywords: Pulmonary Tuberculosis, HIV, AIDS, CD4 counts.

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I. Introduction

Tuberculosis (TB) an ancient disease, continues to remain even today a major public health problem in much of developing world¹. The problem is now further complicated by relentless spread of the Human immunodeficiency virus (HIV), which causes AIDS pandemic². TB is the Tuberculosis infects a third of world's population. 0.4% of adults in India are sero-positive 5.7 million people³. As per WHO/UNAIDS estimates (2004)⁴, up to 56% of Indians develop TB in HIV or AIDS⁵. Unlike other OI which occur at CD4 counts below 200/mm³, active TB occurs throughout the course of HIV disease⁶. Recent studies have found that drug resistant TB (MDR-TB) is no more common among HIV infected people⁷. The lifetime risk of tuberculosis in immune competent persons is 5% to 10%, but in HIV positive persons, there is a 5% to 15% annual risk of developing active TB disease². The estimated prevalence of positive TB (Smear and/or culture) is 249 per 100,000 for India⁸. The pattern of clinical presentation of TB depends on the host immunestatus. The CD4 T-cell count is one of the best indicators of the immediate state of immunologic competence of the patient with HIV infection. Thus determinations of CD4 cell counts provide a powerful tool for determining prognosis and monitoring response to HAART⁹. Therefore the present study has been undertaken to know the prevalence of Pulmonary Tuberculosis (PTB) in HIV positive persons, to diagnose PTB in HIV positive individuals using Ziehl Neelsen stain, radiologically, and CBNAAT, to study the correlation of pulmonary tuberculosis with the CD4 cell counts in HIV positive individuals.

II. Material And Methods

This Hospital Based Study was conducted in the Department of Pulmonary medicine from September 2016 to August 2017 in association with the ART clinic, Integrated Counseling & Testing Centre, Chest and TB wards and all other wards of RIMS Medical College & hospital Ongole. A total of 1056 known HIV positive either hospitalized or coming to ART clinic, clinically suspected of having pulmonary tuberculosis, after written informed consent, were included in the study. The patients with extra pulmonary manifestations were excluded from the study. Two sputum samples were obtained from each patient as per RNTCP guidelines. Sputum tested

for AFB by Smear examination by Ziehl Nielsen stain, CBNAAT. About 3 ml of blood was collected from each patient using aseptic precautions in EDTA vacutainers. CD4 counting of blood samples was done by Flow cytometry as per manufacturer's instructions . The findings of the chest X ray were noted of each patient. Correlation of CD4 cell counts was done with the pulmonary tuberculosis in HIV positive patients.

III. Results

Out of 1016 patients, a total of 227 (22.35%) were diagnosed as Pulmonary tuberculosis patients by radiology, Z.N. staining and CBNAAT. Out of total 1016 individuals according to their occupation coolies were 536(52.7%) PTB detected in 105(46.25%) patients, House wives were 162(16.94%) PTB detected in 35(15.41%) patients, FSW were 94(9.25%) PTB detected in 22(9.69%) patients, job holders were 81(7.97%) PTB detected in 20(8.81%)patients, Drivers were 81(7.97%) PTB detected in 29(12.77%)patients and others were 62(6.1%)PTB detected in 62(6.1%)patients, shown in Table 1. Out of total 1016 individuals 17(1.67%) were <15 years, 604 (59.44%) were in 15 to 39 years, 350(34.44%) were in 40 to 64 years and 45(4.42%) were >65years , shown in Table 2. Out of 1016 patients males were 657(64.67 %) Females were 359(35.33 %),as shown in table 3. Out of Total 1016 HIV individuals 115 (11.31%) had CD4 counts of less than 200, in 49 (4.82%) patients between 200 & 349, in 38 (3.74%) patients between 350 & 500 and in 25(2.46%) patients the CD4 counts were more than 500 cells/ μ l. The association of CD4 counts with occurrence of PTB is shown in Table 4. Out of Total 227 HIV TB co-infected persons 115 (50.67%) had CD4 counts of less than 200, in 49 (21.58%) patients between 200 and 349 CD4 counts, in 38 (16.74%) patients between 350 and 500 CD4 counts and in 25(11.01%) patients had CD4 counts more than 500 cells/ μ l. The association of CD4 counts with occurrence of PTB is shown in Table 5.

IV. Discussion

AIDS is a pandemic of 21st century and pulmonary tuberculosis is the most common opportunistic infection (AIDSCAP)¹⁰it is important of PTB among the HIV positive persons, in the present study is 22.35 per cent. The prevalence of co-infection with HIV varies widely across regions^{11,12,13,14,15,16} world wide mainly due to the variations in risk factors, geographic location, awareness . In the present study, amongst these HIV/PTB co infected, as many as 105 (46.25%) were coolies(laborers) by occupation followed by House wives 35(15.41%) and drivers 29 (12.72%). Thus laborers, house wives and drivers among HIV patients had a significant association (p=0.023) with the risk of developing TB seen like studies Muniyandi M. Ramachandran R. Gopi PG et al ,Stewart JE, Lopez DE Fede A, Harris MJ,et al ^{17,18}. Moreover, TB is still a disease of the poor and the low socio-economic background particularly among the developing countries and homeless people. 59.44% of persons effected with HIV PTB co infection are in 15 to 39 age influence economic production of country. In our study males were more effected(64%) than females as seen in epidemiological study¹⁹, and also influence economic production of family and country. The appearance of many opportunistic infections (OI's) correlates with the CD4 cell count. In PTB patients the depletion of CD4 counts bear a direct correlation with acquisition of disease. Tuberculosis has a direct association with cell mediated immunity (CMI). The data in the present study indicates that the patients with CD4 counts of less than 500/ μ l are at substantially higher risk of acquiring PTB. Similar correlation was reported by other Indian and foreign studies.^{20,21,22} and more than 50%are had less than 200 CD4 counts . And from less than 500CD4 counts increased correlation appearing between HIV and PTB infection.

V. Figures And Tables

Table: 1 Occupation in HIV persons

Occupation	No of total patients & (%)	No. of Tuberculosis patients & (%)
Cooli	536(52.7%)	105(46.25%)
House wife	162(16.94%)	35(15.41%)
FSW	94(9.25%)	22(9.69%)
job	81(7.97%)	20(8.81%)
Drivers	81(7.97%)	29(12.77%)
others	62(6.1%)	16(7.04%)

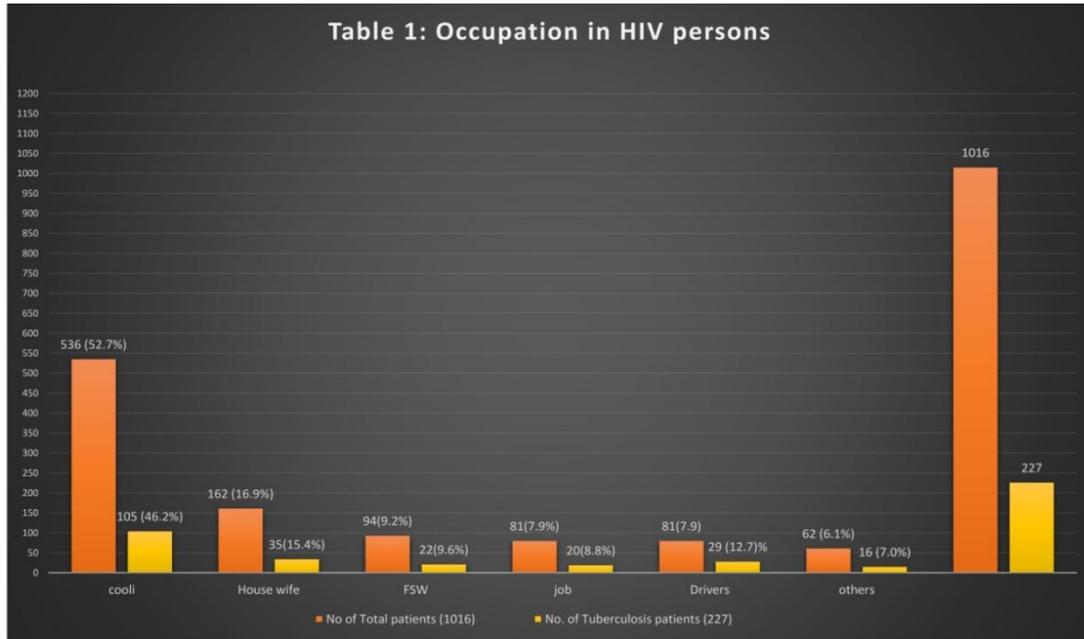


Table:2 Age Wise Distribution

<15 years	17	1.67%
15to39	604	59.44%
40to64	350	34.44%
Above 65	45	4.42%

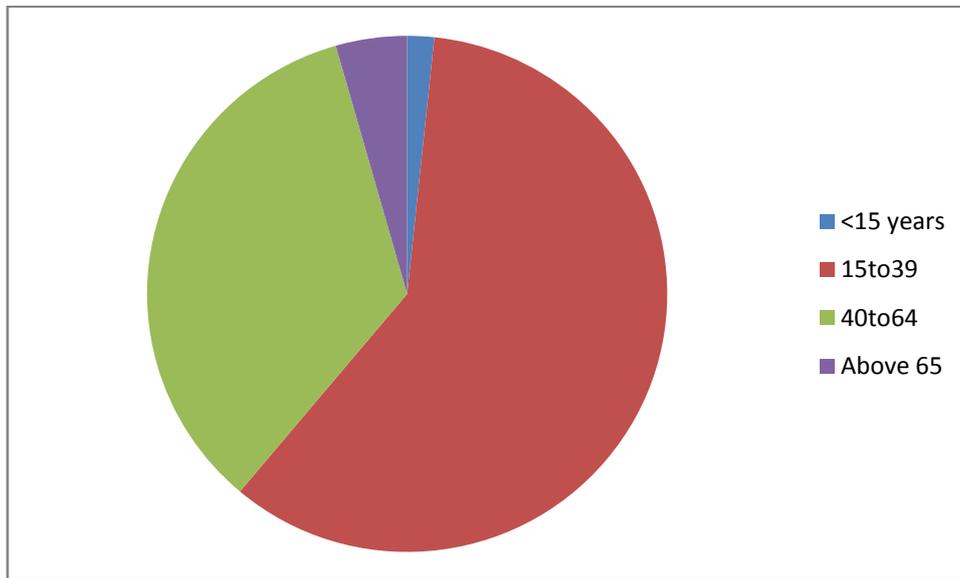


Table:3 SEX Distribution

Male	Female	Total
657 (64.67 %)	359 (35.33 %)	1016 (100%)

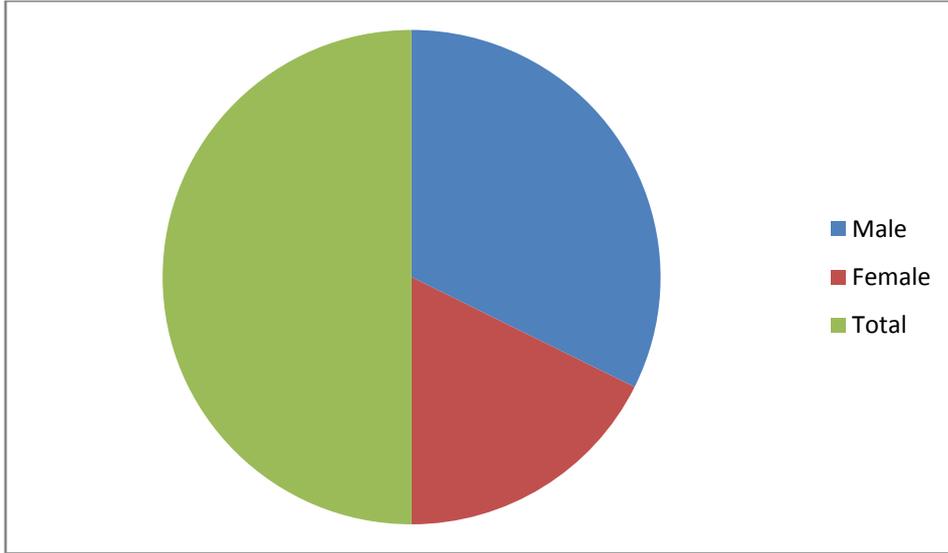
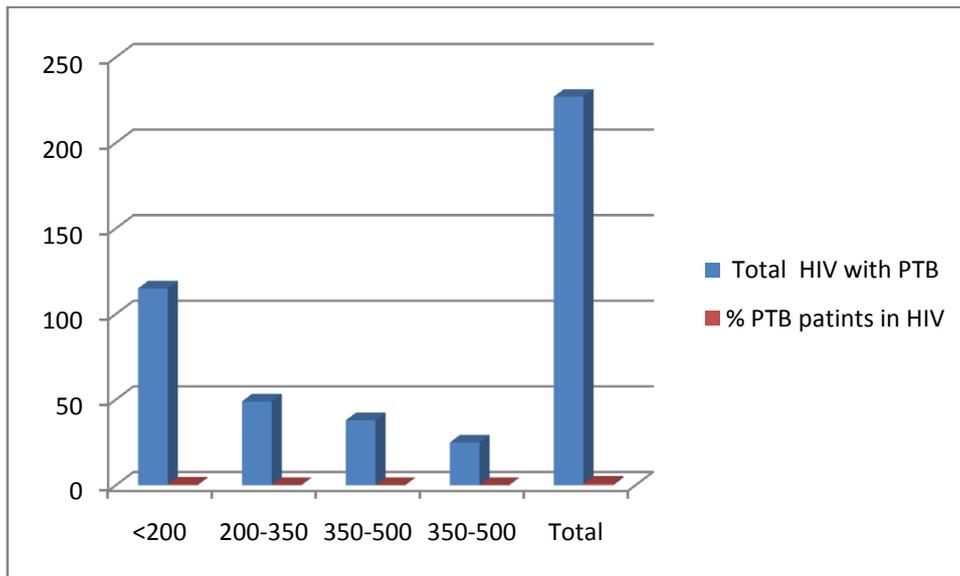


Table:4 CD4 Count Distribution

CD4 counts:Cells/ul	HIV with out PTB& (%)	HIV with PTB& (%)	Total (%)
<200	167(16.44%)	115(11.31%)	282(27.75%)
200-350	166(16.33%)	49(4.82%)	215(21.15%)
350-500	376(37.00%)	38(3.74%)	414(40.74%)
>500	80(7.87%)	25(2.46%)	105(10.33%)
Total	789(77.65%)	227(22.35%)	1016(100%)

Table 5 relation between CD4 count &PTB%

CD4 counts:Cells/ul	Total HIV with PTB	% PTB patints in HIV
<200	115	50.67%
200-350	49	21.58%
350-500	38	16.74%
>500	25	11.01%
Total	227	100%



VI. Conclusion

Reduction of CD4s in HIV infected patients below 500 associates with increasing prevalence of pulmonary tuberculosis . Early diagnosis of TB and prompt institution of Anti retro viral therapy reduces the prevalence of pulmonary tuberculosis mortality and morbidity significantly.

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