



OUTCOME OF TUBERCULOSIS IN HIV INFECTED PATIENTS WITH SPECIAL REFERENCE TO CD4 COUNT IN AN ART CENTRE, WEST BENGAL

Medicine

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ABSTRACT

Background: Opportunistic Infections in HIV are major determinants of mortality in HIV patients. Tuberculosis is a leading cause of mortality. Tuberculosis is a public health challenge specially in developing countries like India. The incidence of TB HIV co-infection is gradually increasing. **Methods:** This was institution based, retrospective study. Study was conducted at ART Centre, North Bengal Medical College & Hospital, Sushruta Nagar, Darjeeling, West Bengal from January 2015 to January 2020 including 105 HIV-TB co-infected patients. Data was collected and template was generated in MS excel sheet and analysis was done on SPSS software. **Results:** 105, HIV-TB co-infected patients were registered with majority being male (n=79), mean age for male and female patients were 36.78 years and 35.73 years respectively.. The number of patients diagnosed with Extra-pulmonary tuberculosis (EPTB) and Pulmonary tuberculosis (PTB) were almost equal. Majority of patients (34.3%) had CD4 counts <200 whereas (33.3%) had CD4 counts between 200-349. Favourable outcome in terms of cured patients were 82.85% with a statistically significant pre-treatment and post-treatment improvement in body weight (p value<0.0001) and CD4 count (p value<0.002). **Conclusions:** There is a strong association between incidence of TB and HIV infection. Early diagnosis and treatment are essential to reduce mortality and morbidity in people living with HIV. Strict adherence to treatment and dedicated counseling for drug compliance is the need of the hour.

KEYWORDS

ART, CD4, HIV AIDS, Outcome, Tuberculosis

INTRODUCTION:

Human Immunodeficiency Virus (HIV)/ Acquired Immuno-Deficiency Syndrome (AIDS) is a modern global pandemic, affecting both industrialized and developing countries. The People Living with HIV (PLHIV) are more prone to various opportunistic infections like Tuberculosis (TB), candidiasis, pneumocystis jirovecii, herpes zoster, herpes simplex, etc. Out of these, TB is the most common and earliest opportunistic infection among the PLHIV.

Tuberculosis in India is a major concern in the field of public health and medicine.¹ In early stage of immune compromise most patients present similar to normal tuberculosis patients. However, in late stages disseminated TB and extra pulmonary TB are more frequent.² Almost 95% of tuberculosis and 98% of deaths due to tuberculosis occurred in developing countries.³ HIV is the highest risk factor identified so far causing latent tuberculosis infection to progress to active disease. HIV infected individuals are unable to contain pulmonary TB due to their immunodeficient state and cause widespread infection among people.⁴ The mortality is also raised in these individuals by three folds. There are roughly 34 million people living with HIV and out of 1.8 million deaths around 350,000 were due to TB⁵. TB represents a serious health risk and there are few studies investigating the profile of opportunistic infections and association of such infections with CD4 counts in HIV patients in this part of the country.

Thus, due to paucity of such studies, the present study was conducted aiming at finding outcome of Tuberculosis in HIV infected patients with special reference to CD4 count in an ART Centre of West Bengal.

The objective of the study was

1. To evaluate the outcome of TB in PLHIV with various factors like age of presentation, nutritional status, presence of any concurrent OI's with special reference to CD4 Count.
2. To assess the overall morbidity and mortality of HIV-TB co-infected patients

METHOD AND MATERIALS:

Study Design:

Record based Retrospective analysis of TB –HIV patient register from

Nodal ART Centre, North Bengal Medical College & Hospital, Sushruta Nagar, Darjeeling, West Bengal in last 5 years from January 2015 to January 2020. Data of 105 HIV-TB co-infected patients were recorded.

Inclusion Criteria:

PLHIV registered in ART with pulmonary TB or Extra-pulmonary TB

Exclusion Criteria:

The patients with incomplete medical records on data register were excluded.

Institutional Ethical Clearance and permission was taken from WBSACS and RNTCP to collect data from the PLHIV with TB patients registered in ART Centre NMBC . Data regarding socio-demographic profile, CD4 count at time of HIV diagnosis, date of TB diagnosis, pre and post TB treatment CD4 count, type of TB/EPTB and treatment outcome were noted. Treatment success was considered as the sum of patients who were declared cured and those who had completed treatment, as per the World Health Organization's recommendations.

Statistical Analysis:

The data were checked and entered into Excel sheet and analyzed with Microsoft Excel and SPSS version 20. Percentage, mean, standard deviation were calculated. Chi-square test, Fisher exact test were performed where applicable.

Ethical clearance:

The study was conducted only after obtaining written approval from the Institutional Ethics Committee.

RESULTS:

This record based Retrospective analysis of TB –HIV patient was conducted in at Nodal ART Centre, North Bengal Medical College & Hospital, Sushruta Nagar, Darjeeling, West Bengal in last 5 years from January 2015 to January 2020 based on inclusion criteria.

Table 1: Distribution of study population according to age and gender.

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
<15	0	0	1	1	1	0
15 – 24	7	6.7	3	2.9	10	9.5
25 – 34	21	20.0	7	6.7	28	26.7
35 – 44	37	35.2	9	8.6	46	43.8
≥ 45	14	13.3	6	5.7	20	19.0
Total	79	75.2	26	24.8	105	100

Table 1 : shows that there were 79 male patients (75.2%) and 26 (24.8%) female patients. Majority of the male patients (n=37) were 35-44 years' age group and female patients were from the age group of 35-44 years, i.e. 9(8.6.) Mean age for male and female patients were 36.78 and 35.73 respectively.

Table 2: Distribution of subjects according to type of tuberculosis among affected patients.

Type of TB	Male		Female		Total	
	No.	%	No.	%	No.	%
EPTB	39	37.14	15	14.28	54	51.42
PTB	40	38.10	11	10.48	51	48.57
Total	79	75.24	26	24.76	105	100.00

Table 2: shows that 37.14% were diagnosed with EPTB and 38.10 % were diagnosed with PTB.

Table 3: Distribution of study subjects according to their CD4 counts

Cd4 counts/mm3	On diagnosis of HIV		On initiation of ART		On diagnosis of ATD		On post ATD	
	No.	%	No.	%	No.	%	No.	%
<200	61	58.1	61	58.1	48	45.7	36	34.3
200-349	26	24.8	29	27.6	37	35.2	35	33.3
350-499	10	9.5	9	8.6	11	10.5	18	17.1
500	8	7.6	6	5.7	9	8.6	16	15.2
Total	105	100	105	100.0	105	100.0	105	100.0

Table 3: shows that out of 105 patients, 36 (34.3%) had CD4 counts <200 whereas 35 (33.3%) had counts between 200-349. In 18 (17.1%) patients had CD4 counts between 350-499 and 16 (15.2%) patients had CD4 count ≥ 500.

Table 4: CD4 count and weight of co-infected patients (n=105)

	During start of ATD	After completion of ATD	p-value
Mean ± SD weight (Kg)	44.91±8.541	49.76 ±9.114	< 0.0001
Mean ± SD of CD4 count (cells/mm3)	218.41±204.226	299.22 ±208.980	< 0.002

Table 4 : shows that the difference in body weight prior to initiation of ATD and after completion of ATD were found to be statistically significant with p value < 0.0001. There was statistically significant improvement in pre and post CD4 value (p value <0.002).

In this study, the favorable outcome, as determined by number of cured patients was 87 and the number of patients who did not complete the treatment was 13. Among the patients with unfavorable outcome, 2 were treatment defaulters, 2 were treatment failure and 1 patient died.

DISCUSSION

This study was conducted in Nodal ART Centre, North Bengal Medical College & Hospital, Sushruta Nagar, Darjeeling, West Bengal among 105 HIV-TB co-infected patients after applying inclusion and exclusion criteria and after that data was collected.

The data was entered in an excel sheet and the results were written in a tabulated form and then the results of this study was compared with the previous studies results and statistical analysis was done which has found to be significant.

In this study, majority of patients were male 79 (75.2). Most of the male patients 35.2% belonged to the age group of 35-44 years. Mean age for male was 36.78, for females was 35.73. Similar results were observed

in number of studies on HIV/AIDS. A study conducted in Shimla Himachal Pradesh, by Jayral et.al, found that male were affected more than females and the most of them belonged to age group 31 to 40 years and mean age of the patient was 34.94 years. Similar results were found in study by Ong et.al. where majority of the patients were of the age 35-59 years.

In the present study, the number of patients diagnosed with EPTB and PTV were almost equal. Affusim et.al. conducted a study where pulmonary TB was the more common, seen in 88 patients out of the 112 co-infected patients.⁸

In our study, out of 105 patients 36 (34.3%) had CD4 counts <200, whereas 35(33.3%) had counts between 200-349. In 18(17.1%) patients had CD4 counts between 350-499 and 16 (15.2%) patients had CD4 count 500. Jayral et.al. in the study found 43 patients had CD4 count less than 100 cells per microlitre, 71 had CD4 count less than 200 cells per microlitre and 16 had CD4 count more than 200 cells per microlitre.⁸ Another study conducted in Benin city of Nigeria by Affusim et.al. found that a total of 181 patients were found to have CD count less than 201 and 104 patients had CD4 count between 201-499. The remaining 45 patients had CD4 count 500 and above.⁸

In the present study, it revealed that the improvement in body weight prior to initiation of ATD and after completion of ATD, was found to be significantly high with p value < 0.0001. Similarly there was significant improvement in CD4 count after completion of ATD (p value <0.002). Kumarasamy N et al.18 also showed increase in CD4 count after 6 months, after 18 months and after 24 months of initiating HAART. Kavya S et al.19 found statistically significant difference in CD4 count before and after ATT. Swaminathan S et al. 20 also found a significant improvement in weight, at the end of ATT. but the CD4% declined significantly.

In this present study, favorable outcome, as determined by number of tuberculosis patients were 87 (82.85%) and numbers of patients who completed the treatment were 13 (12.38%). Among the patients with unfavorable outcome, 2 were treatment defaulters, 2 were treatment failure and 1 patient died during the study period.

In the study conducted by Sharma S Ket al.¹², favourable outcome was observed among 78% extra pulmonary TB patients and is lower than that reported in present study (82.85%). In a study by Vijay S et al.¹³, among smear positive patients the favourable outcome was observed in 62% patients.

In a study by Singhal S et al.¹⁴, 6 (43%) co-infected patients died, out of which 5 patients were with pulmonary tuberculosis and 1 extra pulmonary tuberculosis case i.e. mortality rate was high among pulmonary patients and we observed same finding in our study. But in a study by Shastri S et al.¹⁵, mortality proportions were equal in the pulmonary and extra pulmonary TB infection groups.

Limitation of the study :

The limitation of the study was that it was a record based retrospective analysis conducted amongst registered patients in last 5 years from January 2015 to January 2020, so some of the important factors like drug susceptibility status and other co-morbid conditions which are likely to influence the treatment outcome were not studied. Therefore, further studies are required in depth to know the causes of treatment default, treatment failure and death among HIV-TB co-infected patients.

CONCLUSIONS:

We can conclude that as the incidence of TB is increasing in general population it is more commonly seen among HIV infected people. Strong implementation of programme is necessary to control the burden of dual infection in resource poor countries like India. It is essential that patients with diagnosed tuberculosis are screened for HIV and patients diagnosed as HIV infected be screened for TB. Detailed clinical examination is necessary to detect TB at an early stage to reduce mortality and morbidity among PLHA.

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Ethical approval: The study was approved by the institutional ethics committee

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