

Original Research Article

Evaluation of Predictors of Mortality in TB-HIV Co-Infected PatientsDr. Naveen Pandhi¹, Dr. Jasvir kaur², Dr. Nirmal Chand Kajal³¹Associate Professor, Chest and TB Department, Govt. Medical College Amritsar, India²Junior Resident, Chest and TB Department, Govt. Medical College Amritsar, India³Professor, Chest and TB Department, Govt. Medical College Amritsar, India***Corresponding author**

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Abstract: Tuberculosis remains one of the prominent causes of death in HIV/AIDS patients. A few studies have been found in the literature to discuss the risk factor for death and outcome of the treatment with Anti-Tuberculosis Treatment (ATT). The aim of this study is to identify predictors of mortality in TB-HIV co-infected patients. It was an observational perspective study which included 100 patients with TB-HIV co-infection on ATT and HAART. Patients were followed up at 6 and 12 months and after complete history, GPE was done and basic laboratory investigations were also repeated. Functional status was assessed according to the mobility of the patients at each step. The statistical analysis was done with the help of Pearson chi square test and T test. The study was conducted on 100 patients. Mortality rate in TB/HIV co-infected patients were high (i.e. 15% and 19% at 6 months and 12 months). The CD4 count at presentation was 500 cells/mm³ in majority (90%) of the cases. The CD4 count of died patients were below 150 cells/mm³. Most of the subjects who died had Hb at the presentation time less than 9 g/dL. Malnourished cases were at high risk of death who has BMI less than 18.5. Bedridden cases were at high risk of mortality. Percentage of EPBT was greater than PBT (60% and 40% respectively). Bed ridden cases had poor outcome. With treatment the patients improved in terms of Hb, BMI, CD4 count and functional status of the patients.

Keywords: Tuberculosis, EPBT, Hb, BMI, CD4 count

INTRODUCTION:

TB/HIV co-infection significantly changes the natural history of both diseases. This gives rise to different problems. One problem associated with patients co-infected with HIV and TB is overlapping of signs and symptoms between HIV/AIDS and tuberculosis. Clinical features of HIV/AIDS and tuberculosis are difficult to separate, both diseases present with wasting and persistent fever. In cases of tuberculosis patients co-infected with HIV/AIDS the physician tends to attribute the signs and symptoms of tuberculosis to HIV/AIDS, hence under-diagnosing tuberculosis in HIV patients and vice versa. The risk of death in co-infected individual is twice that of HIV infected individual without TB, even when CD4 count is taken into account [1]. The interaction between HIV and TB in co-infected persons is bidirectional and synergistic; on one hand, HIV-1 infection predisposes to the development of active TB, and, on the other, the course of HIV-related immunodeficiency is worsened by active TB infection [2].

Other impact is that two different diseases with two different modalities of diagnosis do exist in one patient. IN BOTH THE diseases more than one drug is given. As a result a complex situation of different side effects may lead to poor adherence and lost to follow up. The annual risk of developing TB disease in a PLWHA who is co-infected with M. tuberculosis is 5 to 15 percent [3-4]. HIV increases the rate of recurrent TB disease, which may be due to either endogenous reactivation (true relapse) or exogenous re-infection [5]. HIV is the strongest factor in the development of active TB; it is estimated that only one out of ten immunocompetent persons infected with TB develops active TB in his/her lifetime; whereas, one out of ten HIV-infected persons infected with TB will develop active TB every year. Autopsy studies have shown that 30 to 40% of HIV-infected adults die from tuberculosis in Africa [6]. On the other hand TB has been shown to accelerate HIV disease progression to AIDS and probably early death [7-11]. In 2014, 9.6 million people acquired TB and 1.5 million people died from the disease. The risk of developing the active TB is

estimated to be 26 times greater in people living with HIV than those who are HIV negative [12].

The hallmark of HIV infection is a progressive depletion and dysfunction of CD4+ T lymphocytes, coupled with defects in macrophage and monocyte function. Because CD4+T lymphocytes and macrophages have a central role in anti-mycobacterial defences, dysfunction of these cells places patients with HIV infection at high risk for primary or reactivation TB disease. Epidemiological evidence indicates that HIV infection significantly increases the risk of reactivation of latent tuberculosis infection [13]. The interaction between HIV and TB in co-infected persons is bidirectional and synergistic; on one hand, HIV-1 infection predisposes to the development of active TB, and, on the other, the course of HIV-related immunodeficiency is worsened by active TB infection [4].

METHODOLOGY:

The study included 100 patients diagnosed with TB-HIV co-infection coming to outpatient department or admitted in wards of various departments of Government Medical College Amritsar/ Chest and TB department and ART centre Amritsar. Diagnosis of TB was made as per the Revised National Tuberculosis Control Programme (RNTCP). The Pearson Chi-square test and T test were applied for the calculation of p value to validate the attribute (Age, sex, CD4, Hb, etc.) statistically and given below in form of table and graphs. The Pearson’s chi-squared test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories.

Inclusion criteria:

1. All patients who were having tuberculosis and HIV positive status
2. All patients who were eligible for the study and who consent to join the study

Exclusion criteria:

1. All patients who were having other fatal disorders like malignancy.
2. All patients of TB who were having HIV non-reactive status.
3. All patients who did not consent to join the study.
4. All HIV patients who were below 18 years of age.
5. All the patients with abnormal liver function tests/renal function tests.
6. Patient with MDR TB.

RESULT AND DISCUSSION:

The 100 patients were registered during the study period those who met all the inclusion/ exclusion

criteria. The subjects were examined and followed up at three intervals i.e. 0 month, 6 month, and 12 months. Following observations were made.

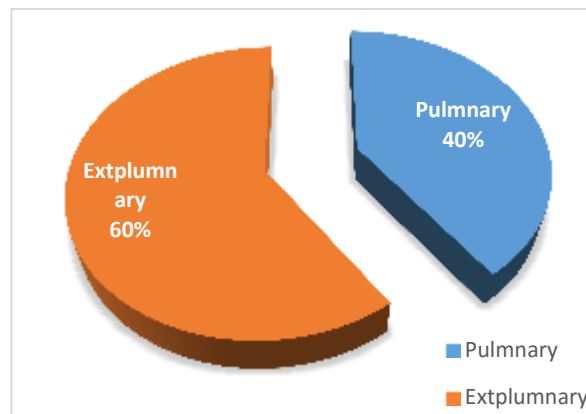


Fig 1: Distribution of TB and HIV co-infected Patient with type of TB

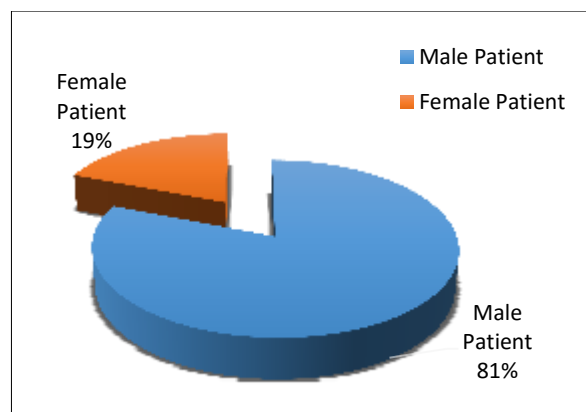


Fig 2: Distribution gender of TB and HIV co-infected Patient

60% patients were having EPTB, 40% patients were having PTB as is shown in figure 1. As shown in the figure 2, 81% were male and 19% were females.

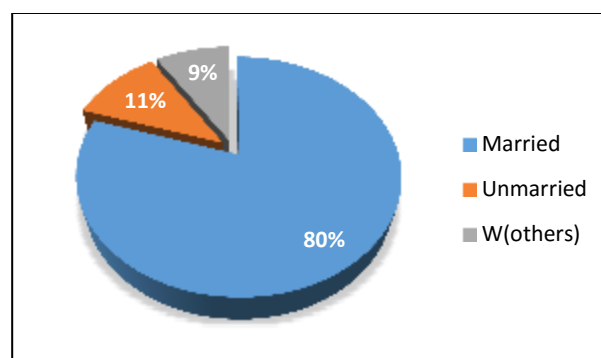


Fig 3: Distribution of subject according to marital status

As shown in figure 3 the majority of the patients were married, i.e. 80% married and 11% unmarried.

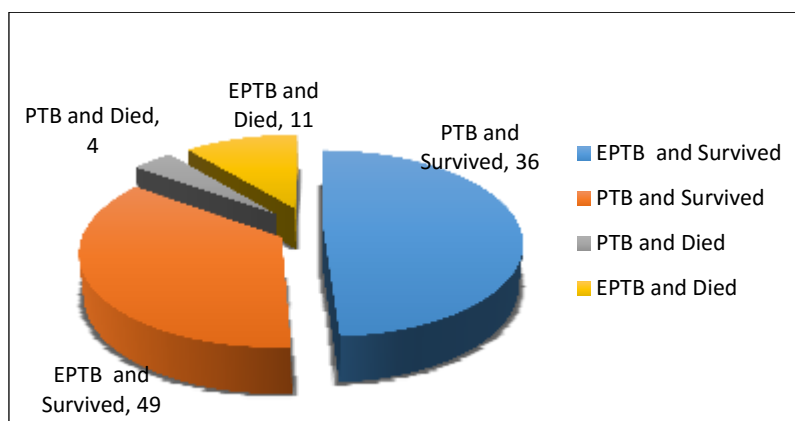


Fig 4: Distribution of TB and HIV co-infected Patient with type of TB with their respective survival/died value (number of patients) at six Month

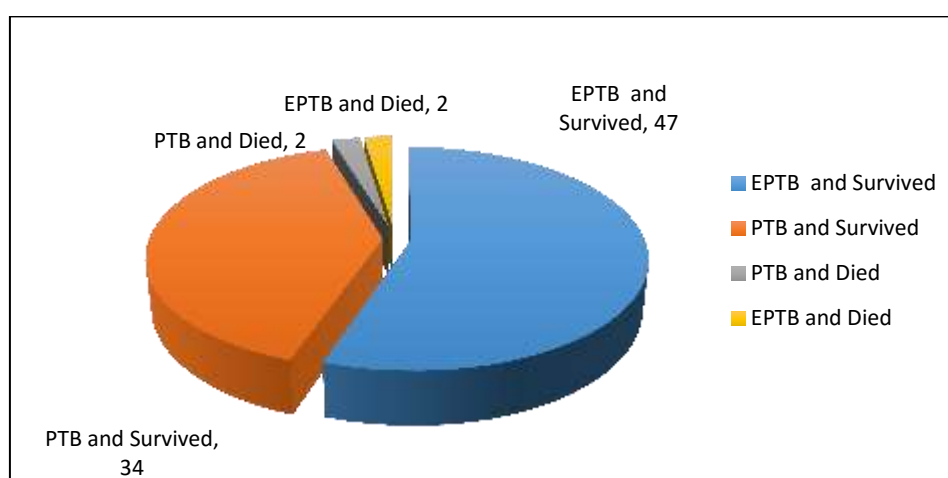


Fig 5: Distribution of TB and HIV co-infected Patient with type of TB with their respective survival/died value (number of patients) after 12 Month

The convergence of the tuberculosis (TB) and the HIV epidemics pose new public health challenges [3].

Table 1: Summary of Hb at 6 month outcome at 12 month

Hb at baseline (Anemia)	Outcome at 6 month		Outcome at 12 month	
	Died	Alive	Died	Alive
Normal	0	2 (100%)	0	2 (100%)
Mild	1 (2.7%)	36 (97.3%)	2(5.40%)	35 (94.6%)
Moderate	10 (20.40%)	39 (79.6%)	13 (26.50%)	36 (73.5%)
Severe	4 (33.30%)	8 (66.7%)	4 (33.3%)	8 (66.7%)
Total	15 (15%)	85 (85%)	19 (19%)	81(81%)
P value	0.029		0.040	

Table 2: Summary of BMI at 6 and 12 Month

BMI	Outcome at 6 month		Outcome at 12 month	
	Died	Alive	Died	Alive
>18.5	0	24 (100%)	0	40 (100%)
<=18.5	15 (19.73%)	61 (80.27%)	4(7.55%)	41(77.44%)
Total	15 (15%)	85(85%)	4 (4.70%)	81 (95.29%)
P value	0.018		0.053	

Table 3: Summary of Working Status at 6 and 12 Month

Working status	Outcome at 6 month		Outcome at 12 month	
	Died	Alive	Died	Alive
Bed	5(31.25%)	11 (68.75%)	7(43.75%)	9 (56.25%)
Ambulatory	4(9.52%)	38 (90.47%)	6 (14.28%)	36 (85.71%)
Working	6 (14.28%)	36 (85.71%)	6 (14.28%)	36 (85.71%)
Total	15 (15%)	85 (85%)	19 (19%)	81(81%)
P value	0.001		0.002	

The CD4 count and age are summarized in the table 26 and 27 respectively at different interval of study. The p value and standard deviation are calculated

statistically to find the significance of the respective attribute.

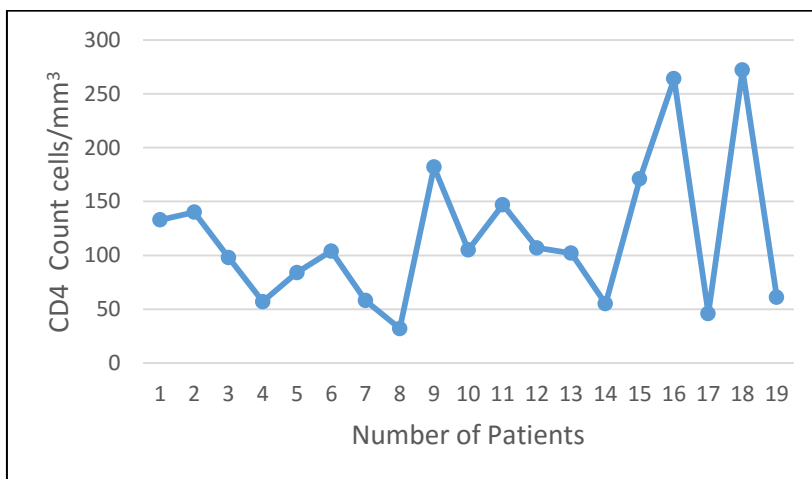


Fig 6: CD4 count Died of Patients at Presentation

Figure 7 shows the average of alive patients at all intervals of study which shows the improvement in the CD4 count. Average of CD4 count 116.73

cells/mm³ of died patients (shown in figure 6) and alive are 287.29 cells/mm³ (shown in figure 7).

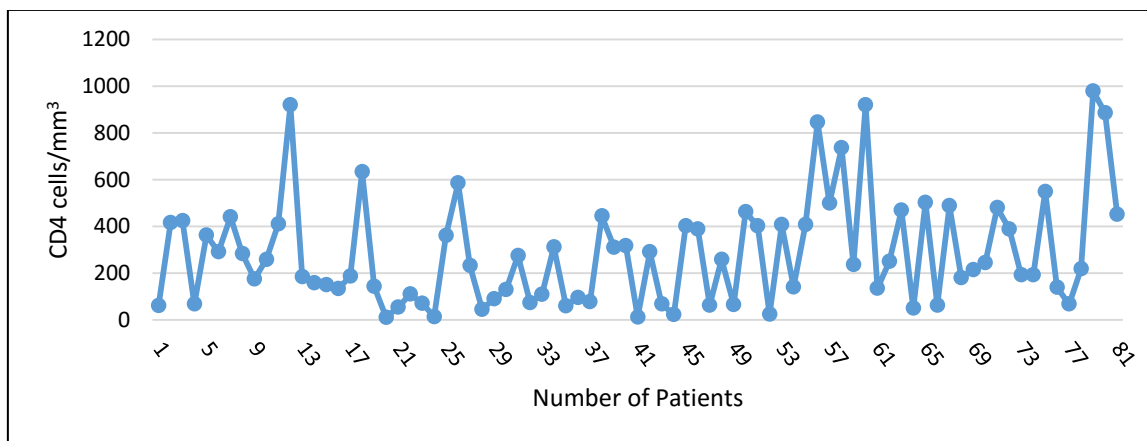


Fig 7: CD4 count of Alive of Patients at Presentation

Table 4: Summary of CD4 count

	Outcome at 6 month		P value	Outcome at 12 month		P value
	Died	Alive		Died	Alive	
CD4 at baseline	129.00 ± 69.69	277.11 ± 231.85	0.016	116.74 ± 67.85	287.30 ± 232.72	0.002
CD4 at 6mth	-	-		105.25 ± 34.13	338.59 ± 201.69	0.024

Table 5: Summary of Age

	Outcome at 6 month		P value	Outcome at 12 month		P value
	Died	Alive		Died	Alive	
Age at baseline	39.93 ± 8.916	35.01± 11.38	0.432	38.16± 8.877	35.19± 11.590	0.326

The table 4 and 5 are the summary of CD4 count and age with their respective P value at 6 month and 12 month. It is found that CD4 count was significant attribute of patients and age cannot be

correlated with mortality rate of the patient of HIV/TB in this study. The same pattern is shown in table 6 for marital status, which is not a significant attribute with patient outcome at any stage of the study.

Table 6: Summary of Marital Status of Patients

Gender	Outcome at 6 month		Outcome at 12 month	
	Died	Alive	Died	Alive
Married	12(15.0%)	68(85.0%)	15(18.8%)	65(81.3%)
Unmarried	1(9.1%)	10(90.9%)	1(9.1%)	10(90.9%)
W(others)	2(22.2%)	7(77.8%)	3(33.3%)	6(66.7%)
Total	15(15%)	85(85%)	19(19%)	81(81%)
P value	0.716		0.385	

DISCUSSION:

The mortality among the HIV/TB co-infected patients was found to be high. Intervention at various level may improve survival chances and outcome of treatment. TB is the leading cause of death in HIV prevalent population. In HIV infected patient annual risk of tuberculosis is 5- 15 %. TB is the most common opportunistic infection in developing countries with about 25-65% of the patients with HIV /AIDS [23-24]. Following observation was made during the study:

- Mortality rate was high i.e. 15% at the end of six month, as shown in other studies from developing countries [13, 14].
- Mortality is found to be significant in patients who had low CD4 count i.e. less than 150/micro L at presentation, these findings is consistent with other studies [16, 17, 20, 24].
- Extra pulmonary tuberculosis was more common i.e. 60%; the same finding was shown by other studies [20, 23].
- In bedridden patients outcome was poor, mortality is found to be more in bedridden cases.
- Favorable outcome was present in 87% case at the end of 6 months.
- Low Hb (i.e. less than <9) is associated with unfavorable outcome [20].
- Malnourished patient with BMI less than normal i.e. 18.5 are more prone to get tuberculosis and outcome is more unfavorable in these patients [52, 55].
- With antitubercular treatment there is improvement in Hb, BMI, CD4 count of the patients and improved mobility is observed.
- Nine factors were discussed and it was found that only Hb, BMI, CD4, and Working Status were found significant.

- In limited resources setting even with the availability of HAART and DOTS which is available free under national program, the mortality is still high in this particular set of patients. So more vigorous and innovative ideas are needed to make people aware of the disease and its presentation so that the mortality rate can be brought to the lowest level

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