



A Study of Impact of CD4 and BMI on Effectiveness of DOTS in HIV-TB Cases Registered in Hamidia Hospital Bhopal

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ABSTRACT

Background: TB is the leading cause of morbidity and mortality among people living with HIV. The treatment for TB is same for HIV infected as for non-HIV infected TB patients. The same criteria determine the treatment category for TB patients irrespective of the HIV Status.

Objectives: The objectives were to study outcome of DOTS in HIV-TB cases; to study the comparison of outcome of DOTS in HIV-TB and TB cases; and to study effects of different factors on outcome of DOTS in HIV-TB and TB cases.

Material and method: Hospital based cross-sectional study was carried out in ART and DOTS center. 98 cases of HIV-TB co-infection and 150 cases of only TB infection were interviewed and BMI and CD4 of all cases of both the group were collected. All cases were observed to see the outcome and factors affecting outcome were studied separately.

Result: cure rate in HIV-TB cases was 12.2% and in TB was 40%. Treatment completion rate was 51% in HIV-TB and 19.3% in TB cases. The study found that BMI was affecting outcome in both group while CD4 count affecting outcome in HIV-TB cases.

Conclusion: The study indicated that cure rate improved as BMI and CD4 count increased.

Keywords: DOTS, HIV-TB co-infection, CD4, BMI

INTRODUCTION

TB is the leading cause of morbidity and mortality among people living with HIV In 21st century and on the other side the HIV pandemic presents a significant challenge to the control of TB. HIV infected individuals co-infected with TB have an annual risk of 5-15% of developing active tuberculosis.¹⁻³ These patients would add to the incidence of tuberculosis thereby leading to increase in new infections and reinfections.⁴⁻⁶ Also, HIV infected persons who become newly infected with Mycobacterium tuberculosis rapidly progress to active tuberculosis disease.

The risk of developing tuberculosis (TB) is estimat-

ed to be between 20-37 times greater in people living with HIV than among those without HIV infection.⁷

In 2009 there were 9.4 million new cases of TB, of which 1.2 (13%) million were among people living with HIV. Of the 1.7 million people who died from TB 400,000 (24%) were living with HIV, with 13% of new TB cases and 24% of TB deaths being HIV associated.^{8,9} Of the 1.8 million HIV-related deaths in 2009, TB represents a serious health risk and is a leading cause of morbidity and mortality among people living with HIV. Of the 1.2 million new TB cases among people living with HIV, 910,000 (76 %) were concentrated in the African region and

180,000 (14%) in the South East Asian region. The treatment for TB is same for HIV infected as for non-HIV infected TB patients. The same criteria determine the treatment category for TB patients irrespective of the HIV Status. WHO recommends that people with HIV complete their TB therapy prior to beginning anti retroviral treatment unless there is a high risk of HIV disease progression and death during the period of TB treatment (CD4 count < 200/ml or the presence of disseminated TB)¹⁰ The study objective was to assess the impact of BMI and CD4 count on the effectiveness of DOTS in TB-HIV co infection

MATERIAL AND METHOD

This cross-sectional, hospital based study was conducted in ART centre and DOTS centre, Hamidia Hospital, Gandhi Medical College, Bhopal during the period of Feb to Oct 2011. Purposive sampling was followed. All the cases who were registered in ART and DOTS centre with TB-HIV and TB respectively and who gave consent to be a part of the study were included.

Pulmonary and Extra-pulmonary TB cases, both were included some were newly diagnosed and some were old cases. Some of them were on ART according to their CD4 count.

Inclusion criteria: TB-HIV co-infected patients registered in ART centre and TB cases registered in DOTS centre. Exclusion criteria: AIDS/HIV cases without TB infection. 98 cases of HIV-TB registered in ART centre and 150 cases of TB registered at DOTS center Hamidia Hospital till the end of Feb. 2011 were interviewed after taking their consent

and data was collected in predesigned and pre-tested Performa. Variables included were: cured, Treatment completed, Treatment failure, Relapse, Defaulter, Died, and Transfer. The cases were observed till the end of treatment to find out the outcome after completion of treatment and to study the factors affecting outcome. Factors studied were: BMI, CD4 count and more factors like TB category, OIs, WHO stage were also studied but not included in present article keeping the word limit of the article in mind. Data was analyzed using epi-info software and Data is presented percentage wise in tabular form. Baseline characteristics like age, gender, TB category, SES and other factors were also studied but were not included in the scope of present article.

OBSERVATION

Age: Maximum cases of TB-HIV were reported in age group 30-45 yrs (54. 88%) and in TB maximum cases were in 15-30 yrs age group (44%)

Gender: TB-HIV cases were more reported in males (77.55%) and TB was more in females (57.33%).

Socio economic status: In TB-HIV, maximum cases were in lower class (53.1%) whereas in TB, maximum cases were reported from upper lower class.

BMI: In HIV-TB, High number of cases belonged to BMI group < 20 (71.42%) followed by BMI 20-25 (24.48%) then 25-30(3.06%) followed by group 30-40(1.02%). Similarly in TB more cases were in the BMI group <20 (76.66%) followed by BMI 20-25 (23.33%).

Table 1: Effectiveness of DOTS in HIV-TB and Only TB Cases

	Cured	Treatment Complete	Treatment Failure	Relapse	Defaulter	Died	Transfer out	Total
HIV-TB	12(12.2)	50(51)	1(1)	7(7.1)	6(6.1)	18(18.4)	4(4.1)	98(100)
TB	60(40)	29(19.3)	4(2.7)	7(4.7)	6(4)	5(3.3)	39(26)	150(100)

Tables 2: BMI wise Outcome in HIV-TB Co-infected Cases

BMI	Cured	Treatment completed	Treatment failure	Relapse	Defaulter	Died	Transfer Out	Total
<20 (%)	6(8.6)	38(54.3)	1(1.4)	7(10)	2(2.9)	13(18.6)	3(4.3)	70(71.42)
20-25 (%)	5(20.8)	10(41.7)	0(0)	0(0)	3(12.5)	5(20.8)	1(4.2)	24(24.48)
25-30 (%)	1(33.3)	2(66.7)	0(0)	0(0)	0(0)	0(0)	0(0)	3(3.06)
30-40 (%)	0(0)	0(0)	0(0)	0(0)	1(100)	0(0)	0(0)	1(1.02)
Total (%)	12(12.2)	50(51)	1(1)	7(7.1)	6(6.1)	18(18.4)	4(4.1)	98(100)

Table 3 BMI Wise Outcome in TB Cases

BMI	Cured	Treatment Completed	Treatment Failure	Relapse	Defaulter	Died	Transfer Out	Total
<20 (%)	40(34.8)	23(20)	2(1.7)	7(6.1)	6(5.2)	3(2.6)	34(29.6)	115(76.66)
20-25 (%)	20(57.1)	6(17.1)	2(5.7)	0(0)	0(0)	2(5.7)	5(14.3)	35(23.33)
TOTAL (%)	60(40)	29(19.3)	4(2.7)	7(4.7)	6(4)	5(3.3)	39(26)	150(100)

Table 4: Outcome According To CD4 Count

CD4 count	Cured	Treatment complete	Treatment failure	Relapse	Defaulter	Died	Transfer out	Total
<200 (%)	2(4.9)	21(51.2)	1(2.4)	1(2.4)	3(7.3)	11(26.8)	2(4.9)	41(41.8)
200-350 (%)	6(18.8)	12(37.5)	0(0)	4(12.5)	2(6.3)	6(18.8)	2(6.3)	32(32.7)
>350 (%)	4(16)	17(68)	0(0)	2(8)	1(4)	1(4)	0(0)	25(25.5)
Total (%)	12(12.2)	50(51)	1(1)	7(7.1)	6(6.1)	18(18.4)	4(4.1)	98(100)

CD4 count: Cure rate in those having CD4<200 was 4.9% when compared to 18.8% in those cases having CD4 count 200-350.

DISCUSSION

As per the WHO, HIV-TB manual 2009 DOTS are equally effective in HIV-TB co-infected patients. In this study, Cure rate in HIV-TB cases was 12.2% and 40% in TB cases, but treatment complete in HIV-TB was 51% and in TB was 19.3%. (Table no. 1) So if we add treatment complete with cured, it becomes 63.2% in HIV-TB and 59.3% in TB which means that Cure rate and treatment complete, if clubbed together reveal that DOTS was significantly effective in HIV-TB co infection as in TB cases. Therefore, if we pay more emphasis on sputum examination at the end of treatment, especially in HIV-TB cases, the treatment complete cases can turn to be cured and increase the overall cure rate in HIV-TB co-infection, so that DOTS becomes equally effective in HIV-TB.

There was a gradual reduction in the number of cases as the BMI increased and As the BMI increased, there was an increase in the cure rates signifying, role of fair BMI in cure of TB in both the groups.

In HIV-TB, High number of cases belonged to BMI group < 20 (71.42%) followed by BMI 20-25 (24.48%) then 25-30(3.06%) followed by group 30-40(1.02%). (Table 2) Similarly in TB more cases were in the BMI group <20 (76.66%) followed by BMI 20-25 (23.33%).(Table no 3) In other study by Comstock GW (1975) malnutrition was described to be a predisposing factor for TB. In HIV-TB cure rate was higher in BMI group 25-30 (33.3%) whereas (20.8%) in group 20-25^{11,12} Among Tuberculosis cases cure rate was higher in group 20-25 (57.1%) when compared to <20 (34.8%).

This study indicated that as the CD4 count increased number of case reduced, there were 41.8% cases having CD4 below 200, followed by 32.7% cases with CD4 count 200-350 and then 25.5% with CD4 count more than 350. Cure rate increased with increase in the CD4 count. Cure rate in those having CD4<200 was 4.9% when compared to 18.8% in those cases having CD4 count 200-350. (Table no 4) In a study at the 18th conference on retroviruses

and opportunistic infections (CROI 2011) stated beginning ART in TB-HIV co-infected patients with a CD4 count of 50 cells/mm³ reduces the death rate by 68%.¹³⁻¹⁵ In our study death rate declined with an increase in CD4 count. Death rate was 26.8% in CD4 count <200, then 18.8% in CD4 count 200-350 followed by 4.5% in CD4 count >350.

CONCLUSION

In TB, 57% were treatment complete and 12.2% were cured. Similarly, in TB- HIV cases 40% were cured and 19.3% were declared treatment complete after DOTS therapy. This study concluded that more cases were reported as Treatment complete as more emphasis is not given to sputum examination at the end of treatment. If we add cured and treatment complete cases, total cases come out to be almost equal in both TB and HIV-TB groups. So, if we pay more attention on sputum examination at the End of treatment cure rate can be improved. BMI was a crucial factor affecting the cure rate in both the groups. The study indicated that cure rate improved as the BMI increased. CD4 count in HIV-TB co infection was another important factor influencing outcome. Study indicated that as the CD4 count increased there was a decrease in number of cases and an increase in the cure rate.

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