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Impact of CD4 Count in the Detection of TB in PLHIV: Role of GeneXpert MTB/RIF

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Abstract: ***Introduction: HIV–TB co-infection has emerged as a major public health threat. In PLHIV with low CD4 count, get affected with TB. Hence the present study had taken up to know the prevalence of TB in its association with CD4 counts and Rifampicin resistance pattern in persons attending ART center, GGH, Guntur. Method: A prospective observational study conducted over an of the period of 3 months (August –October) 2018 enrolled 204 PLHIV attending ART center who were symptomatic for TB. Sputum samples were obtained from them and subjected to CBNAAT in DTC. Among these TB infected cases, CD4 counts analyzed. Results: Among 204 cases, sputum samples were positive for TB in 26 (12.7%) PLHIV by CBNAAT, of which Rifampicin resistance was 15.3%. The predominant age group with53.6% HIV TB co-infection was between 31-50 years. Males (92.4%) were more affected by TB. TB-HIV co-infection among PLHIV with CD4 counts below 200mm^{3}was 53.8%. It was statistically significant with p<0.05. Conclusion: In PLHIV, with low CD4 cell count gives alert and that person is susceptible to TB infection or reactivation of latent infection. HIV-TB co-infection has more mortality and morbidity rates. GENEXPERT considered as excellence in early diagnosis with short turnaround time in combating HIV-TB co-infection.***

Keywords: CBNAAT, PLHIV, CD4count, HIV-TB co-infection

1. Introduction

Tuberculosis (TB) is a communicable disease, and it is a major cause of ill health1, one of the top ten reasons for death worldwide and the leading cause of death from a single infectious agent (ranking above HIV/AIDS)[1]. According to the WHO TB 2019 report, **862 000**people living with HIV estimated to have fallen ill with TB in 2018, and **251 000**people living with HIV estimated to have died from TB, a preventable and curable disease[2]. HIV and *Mycobacterium tuberculosis* infections are bidirectional and synergistic interactions, and each one accentuates the progression of the other[3].In HIV –TB co-infection, there is scanty sputum production, lack of caseous necrosis leading to a decreased number of bacilli in sputum4. Conventional methods take more turnaround time for diagnosis of TB and detection of Rifampicin resistance from samples. In December 2010, WHO first recommended the use of the CBNAAT in the name of Xpert MTB/RIF assay[5] and implemented it in 2013 in 21 countries. So that test turns around time changed from weeks to hours. This study had done to know the incidence of HIV-TB co-infection, Rifampicin resistance based on CBNAAT in a tertiary care hospital, Guntur, Andhra Pradesh.

2. Material &Methods

This prospective study had carried out in the Department of Microbiology in collaboration with the District tuberculosis center laboratory at DTCO and ART center in Guntur Medical College and Hospital, Guntur, Andhra Pradesh. The duration of the study period was 3monhs from August 2018 to October 2018. sputum samples collected from patients attending ART center, CD4 count are also taken. Sputum Sample processed according to the RNTCP guidelines (by Gene Xpert).CD4 count analyzed according to the NACO guidelines. The principle of Genexpert was Hemi nested real-time PCR by targeting the rpoβ gene with six color laser detection. The test platform employed a sonic horn that inserted into the cartridge base to cause ultrasonic lysis of the bacilli and release of the genetic material. *M. tuberculosis* was detected using five overlapping molecular beacon probes (probes A to E[10]). M. tuberculosis detected when at least two of the five probes give positive signals with a cycle threshold (CT) of d"38 cycles[11]

3. Results

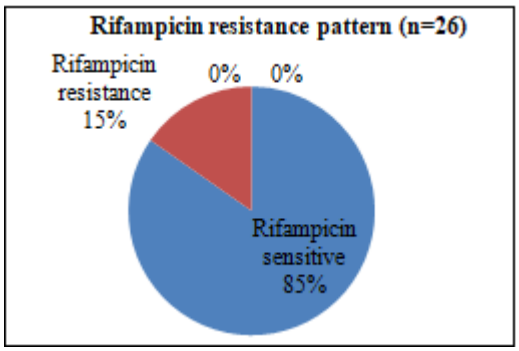
Among the 204 PLHIV, 12.7% of TB positives noted

Gender wise distribution of cases

n=204	TB positive	TB negative	Total
Males	**24(92.3%)**	101	125
Females	2(7.7%)	77	79
Total	26	178	204

Age wise distribution of TB pattern

Age group	Total	TB positives	TB negatives
0-10	6	0	6
Nov-20	4	1	3
21-30	30	05(19.2%)	25
31-40	71	09(34.6%)	62
41-50	59	09(34.6%)	50
51-60	27	1	26
61-70	7	1	6
Total	204	26	178



Correlation of TB pattern in PLHIV with their CD4 counts

CD4 count	TB positives (%)	TB negative
< 200	14(53.8)	47
201-349	5(19.2)	28
350-499	5(19.2)	30
>500	2(7.6)	73

4. Discussion

Among 204 PLHIV Tuberculosis noted in 12.7% and similar was observed Haider et al[9]. 12%in 2013and Deepak bansali[5] (2016) in Indore is 15.6%, R Dewan etal[6] (2015) observed 40% in New Delhi. The reason for the higher incidence in Chennai was due to the presence of risk factors in population living standards.

The present study shows the male predominance of TB with 92.3%, whereas 67.2% by Nella Harshini et al[7] from Telangana (2017). A study in the AIMS New Delhi for six years and Male reported predominance, which may be accounted for their migration for employment within and outside the state, thereby subjecting them to risk factors. The majority of females may be illiterates and housewives who don't have access to health care facilities. HIV and TB both have social stigma often go unreported[8]. In our study, the prevalence of TB was more in the age group of 31- 50 years (69.2.%) and correlating with Nella Harshini et al[7]. (2017) 54.1%.

The present study shows that higher(53.8%) TB prevalence in <200 CD4 counts with chi-square value is 8.1504 and p<0.05 statistically significant. The present study was correlating with Nella Harshini et al. with from Khammam. (2017) With 42% and R Dewan et al. (2015) from New Delhi with 60%. TB prevalence was strongly associated with baseline CD4 cell count. According to Chakravorty S, et al. (2017) 95% sensitivity, 98% specificity for CBNAAT, comparison with ZN-staining[18]. The present study shows 15% rifampicin resistance among total TB positives and similarly correlating with Deepak Arora et al[8]. (2015) with 15.8%

5. Conclusion

In PLHIV, there is severe immune suppression due to low CD4 cell count, and the person is susceptible to TB infection or reactivation of latent infection, which are difficult to treat and contribute to increased mortality and spread of disease in the community. CBNAAT considered as excellent in early diagnosis in combating HIV-TB co-infection

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