A Retrospective Comparative Study of Patients with Tuberculosis and HIV Co-infection in Relation to Mean CD4 Count in cART Era

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Background:-Individuals with HIV infection are at increased risk for tuberculosis (TB) and other respiratory tract infections. Infection with TB enhances replication of HIV and may accelerate the progression of HIV to AIDS, with rapid fall in CD4 count, as both HIV/TB are individually known to decrease CD4 count. **Aim:** Emphasizing the pivotal role of cART and ATT in TB/HIV patients in maintaining their immune system effective (by maintaining CD4 count) and thus decreasing MDR/XDR, morbidity and mortality among these patients. Calculating average mean CD4 count for Indian scenario in cART era.

Material and methods: All the 961 HIV infected patients early morning sputa were screened for AFB and few of the samples were even cultured on LJ medium. The samples were also examined for PMNLs in Gram's staining. All patients' CD4 count were also evaluated by flow cytometry method within one week of sputa collection. Seven other published work of HIV patients were analyzed for TB in relation to CD4 count. Moreover five published research work of CD4 in TB patients but HIV-negative were also discussed in this article. **Results:** Out of 961 patents with RTI , 308(32.06%) found positive for tuberculosis with mean CD4 count found to be 198.5 and 105.9 cells/μl for pulmonary TB and for extra-pulmonary TB respectively in present study. The average mean CD4 count from seven research studies from India were found to be 169.75 and 145.3 cells/μl for pulmonary and extra-pulmonary TB respectively, in TB/HIV co-infected patients on cART. In advanced TB (HIV-negative) patients mean CD4 count found to be 485 ± 321 by other researchers.

Introduction

The study of Jones et al (1997) demonstrated that the CD4 cell count is depressed in approximately one-half of hospitalized HIV- negative patients with tuberculosis and can be as low as that found in HIV – positive patients. Even, individuals co-infected with HIV and TB are 30 times more likely to develop active TB disease. Infection with TB enhances replication of HIV and may accelerate the progression of HIV to AIDS. Globally a decline in incidence and prevalence of HIV has been observed through implementation of various measures like successful awareness programs and health education system with active participation of governmental and nongovernmental organizations.(Joint United National Programme , 2014). However, the rate of mortality still pose a problem to health care system in developing countries like India. Most of these deaths recorded in cases of AIDS are because of opportunistic infections (OI) and other malignancies (Palella FJ et al,2006) The reason may be attributed to the effective destruction or decrease in CD4 cells which play a pivotal role in immune system. The incidence of HIV associated OI have declined in developed countries by effective implementation of ant-retroviral therapy(ART).

But the relative frequencies of these opportunistic infections, causative agents vary in different countries and even in different places of same country. Respiratory tract infections/TB are among the first of some opportunistic infections to be seen in HIV patients. These OI causes substantial morbidity and hospitalization, economic loss to the society and shorten the survival time of HIV patients. They also affect the quality of life of HIV infected patients by increasing morbidity (Moore RD ,1996). All over the world OI has reduced in HIV patients by implementation of ART, which may be due to reduction in the viral load of HIV and hence boosting the immune system. In addition, measures to treat and prevent OI become essential if ART stops working due to poor adherence to the regimen and development of drug resistance if noted.

CD4 count has shown to be an effective predictor in assessing the development of OI in HIV seropositive patients. It is absolutely necessary to have knowledge about the type of OI and the pathogens distributed in the region. Effective management and treatment of these infections not only improves the quality of life but also helps in prevention of transmissible diseases like TB etc.(Smit C, Geskus R et al,2006).

Scientific articles particulates, about 90% of HIV-related morbidity and mortality are caused by OIs compared to 7% due to opportunistic cancers and 3% due to other causes.(Staine JG,et al 2007).The type RTI infections which may be first to be seen and the spectrum of pathogens responsible have been documented in many studies conducted in China, Africa, Korea and Thailand. Studies about the distribution of opportunistic respiratory tract infections among people living with HIV in India have been reported and are limited to place and region. The present comparative study was aimed to emphasis on the pivotal role of HAART to reduce viral load and in turn to maintain mean CD4 count of TB/HIV patients.

Table:- Comparison of other research work for mean CD4 count in HIV/TB Patients from India.

No	Author	Year	Place	Mean Cd4 Pul TB		Mean Ex=Pu lTB
				AFB +ve	AFB −ve	
1	Neethi Chandra et al	2017	Tirupati, AP	205.6		237.6
2	Siddeswari R et al	2016	Hyderabad, Telangana	183	175	168

3	Ajay & Rajeev Raina	2011	Shimala	102	175	108
4	Ackah AN, Coulibaly	1995	Abidjan Cote d'Ivoire	257		198
5	Vajpayee M, Kanswal S	2003	New Delhi North India	189		
6	*Satyanarayan T.et al*	2018	Shimoga, Karnataka	223		
7	Kavya S, Anuradha K	2014	Mysore, Karnataka	184.3		188
8	Sarvepalli AK	2017	Nellor, AP	74.5		67.5
	Rajeev Shah	2013	Surat, Gujarat	198.5		104.9
9	Average Mean CD4	2011-2018	India	169.75		145.3

Conclusion: HAART and ATT both are equally important in maintaining immune system(maintaining CD4 count) of TB/HIV co-infected patients. In India, clinician should suspect more for TB at around mean CD4 count of 169.75 even if found negative by AFB staining but should be confirm by culture on LJ medium, PCR or any other advanced techniques for HIV-positive patients.