RESEARCH ARTICLE

A STUDY OF EPIDEMIOLOGY AND CLINICAL PROFILE OF TUBERCULOSIS IN PATIENTS LIVING WITH HIV-AIDS

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DOI: 10.5455/ijmsph.2014.041020141 Received Date: 29.09.2014 Accepted Date: 04.10.2014

ABSTRACT

Background: HIV-AIDS is associated with many opportunistic infections during the course of disease. One of the most important of them in India is tuberculosis (TB). Also tuberculosis is the one of the most common cause of morbidity and mortality in patients living with HIV-AIDS.

Aims & Objectives: This study was carried out to know the epidemiology and clinical presentation of tuberculosis as an opportunistic infection in patients of HIV-AIDS.

Materials and Methods: This study was carried out in GMERS medical college, Gandhinagar, Gujarat, India, which is attached with the district government hospital. 834 HIV-infected patients, who were visited ART center, general medicine OPD and Pulmonary medicine OPD between November 2012 and December 2013, were recruited in the study. All the patients were screened for presence of tuberculosis and structured performa was used to note down all the details of the patients.

Results: Tuberculosis was most common opportunistic infection recorded and the prevalence rate was 22.19%. Tuberculosis involving the lymph nodes was the most common presentation of TB in patients of HIV-AIDS.

Conclusion: Tuberculosis in HIV-AIDS patients is still an important and fairly common opportunistic infection. All HIV-AIDS patients needs to be screened for evidence of TB and all the patients with TB needs to be screened for HIV co-infection.

Key Words: Human Immunodeficiency Virus (HIV); Acquired Immune Deficiency Syndrome (AIDS); Tuberculosis

Introduction

The first case of human immunodeficiency virus-acquired immunodeficiency syndrome (HIV-AIDS) in India was detected in 1986 in the state of Tamil Nadu[1] and since then cases have been reported from all states and union territories of India.

TB is a major cause of morbidity and mortality among people living with HIV/AIDS, whose impaired immune systems make them particularly vulnerable to the devastating effects of TB [2]. In the individual host the two pathogens, *M. tuberculosis* and HIV, potentiate one another, accelerating the deterioration of immunological functions and resulting in premature death if untreated. Some 14 million individuals worldwide are estimated to be dually infected.[3] Both TB and HIV have profound effects on the immune system, as they are capable of disarming the host's immune responses through mechanisms that are not fully understood. HIV co-infection is the most powerful known risk factor for progression of *M. tuberculosis* infection to active disease, increasing the risk of latent TB reactivation 20-fold.[3,4] Prevalence of TB in HIV patients is 56% and prevalence of HIV in TB patients is 5 %.[5]

Materials and Methods

This study was conducted in GMERS medical college and government hospital which is a major tertiary care center of western India. We reviewed a series of 834 HIV-infected patients, who visited to ART center, general medicine OPD and Pulmonary medicine OPD between November 2012 and December 2013. All the attended patients were screened for TB. A structured performa was used to note down all the details of the patients like age, gender, ethnicity, marital status, transmission route, address, etc. Laboratory tests like liver and kidney functions, fasting plasma glucose, CD4 count were carried out in all patients and other relevant pathological, microbiological, biochemical and radiological investigations were done as per the patient profile.

Pulmonary tuberculosis was confirmed by positive acid-fast bacilli (AFB) in sputum, culture and identification of *mycobacterium tuberculosis*, with testing for multidrug resistance (MDR) and drug sensitivity testing. In smear

negative tuberculosis patient diagnosis of TB was made based on clinical history and chest x-ray. For patients with symptoms and signs of extra-pulmonary tuberculosis relevant investigations were carried out, for e.g. pathological demonstration and AFB in samples of fine needle aspiration of lymph nodes and/or histological picture of tuberculosis, tuberculosis meningitis was diagnosed based on compatible systemic symptoms and signs and cerebrospinal fluid (CSF) analysis indicating pleocytosis with mononuclear predominance and elevated protein and low glucose and exclusion of cryptococcal meningitis, ultrasonography was done to diagnosed for abdominal TB.

Statistical Analysis

The data was subjected to statistical analysis using SPSS version 20 software package. Data was expressed as absolute numbers with or without percentages, as means with standard deviation or as medians with ranges. Chi square test was used to test the significance and a 'p' value less than 0.05 was considered significant.

Results

Total 834 patients with HIV positive status were included in the study. Mean age was 35.45 ± 13.54 years. We observed that Tuberculosis was more common in males (23.75%) than females (19.62%) as shown in Table 1, but no clinical significant difference (p = 0.164253, chi square value = 1.9346) was found for Tuberculosis with gender distribution. We observed that Tuberculosis was more common in 41 to 60 years age group (28.24%) with p value being 0.0003 suggesting it to be significant (chi square value = 17.337). The age wise distribution of TB in HIV patients is shown in Table 2.

Tuberculosis was most common opportunistic infection among 834 clinical records analyzed, and the prevalence rate was 22.19%. The site of involvement by Tuberculosis in HIV patients and their percentage distribution is shown in Figure 1.

We observed that Tuberculosis was more common if CD4 count was less than 200 i.e. 34.27% patients of HIV suffered from tuberculosis if CD4 count was less than 200 while only 17.06% patients of HIV suffered from tuberculosis if CD4 count was greater than 200 (p<0.05). The CD4 count distribution in all the patients with HIV included in the study irrespective of having tuberculosis is shown in Figure 2.

Table-1: Distribution of Tuberculosis according to gender

Gender	Number of Patients (%)		
Male	123 (23.75)	395 (76.25)	518 (100)
Female	62 (19.62)	254 (80.38)	316 (100)
Total	185 (22.19)	649 (77.81)	834 (100)

Table-2: Distribution of Tuberculosis (TB) according to age

Age group (Years)	With TB (%)	Without TB (%)	Total (%)
0 to 20	16 (14.95)	91 (85.05)	107 (100)
21 to 40	90 (20.59)	347 (79.41)	437 (100)
41 to 60	74 (28.24)	188 (71.64)	262 (100)
61 to 80	5 (17.86)	23 (82.14)	28 (100)
Total (%)	185 (30.33)	649 (69.67)	834 (100)

Table-3: Effect of Anti-Retroviral Treatment (ART) on occurrence of Tuberculosis (TB) in HIV-AIDS patients

ART Status	With TB (%)	Without TB (%)	Total (%)
On ART	52 (7.9)	606 (92.1)	658 (100)
Not on ART	133 (75.56)	43 (24.44)	176 (100)
Total (%)	185 (22.18)	649 (77.82)	834 (100)

Table-4: Deaths in patients of HIV with Tuberculosis (TB) as compared to other opportunistic infections (OI)

	Alive (%)	Deaths (%)	Total (%)
HIV-TB Patients	154 (83.24)	31 (16.76)	185 (100)
HIV Patients with other OI	41 (60.29)	27 (39.71)	68 (100)
Total (%)	195 (77.07)	58 (32.93)	253 (100)

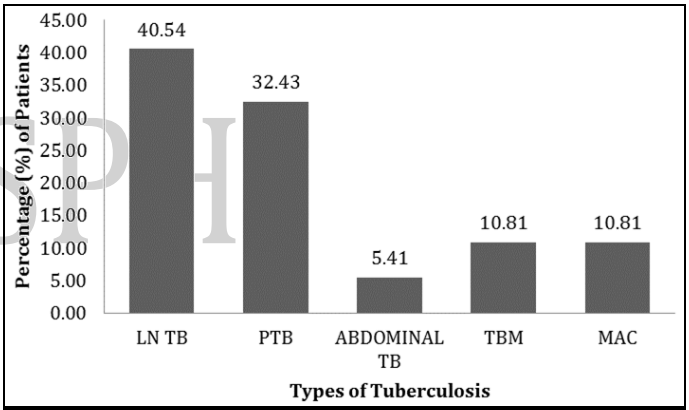

Figure-1: Spectrum of Tuberculosis in patients of HIV-AIDS (LN TB: lymphnode tuberculosis; PTB: pulmonary tuberculosis; TBM: Tubercular meningitis; MAC = mycobacterium avium complex)

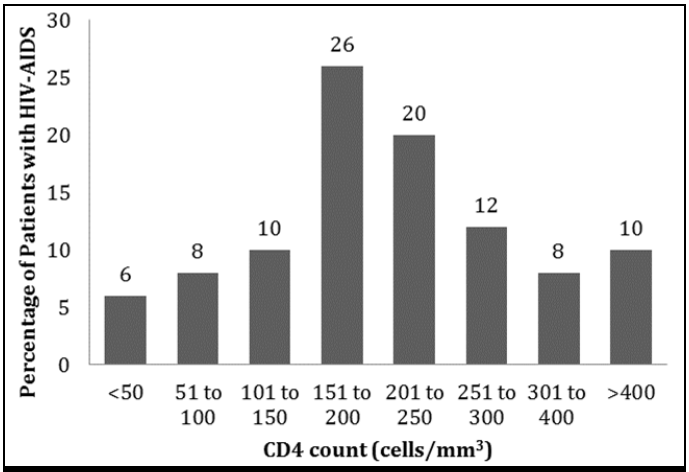

Figure-2: The CD4 count distribution in all the patients with HIV-AIDS

Whether the patient with HIV infection is on anti-

retroviral therapy (ART) or not also makes a difference in the occurrence of TB in these patients as shown in Table 3 ($p<0.05$, chi square value = 368.3173).

Discussion

Tuberculosis (TB) remains a major global health problem. In 2012, WHO estimated that the prevalence of tuberculosis is 2.8 million with the incidence rate of 230 per lakh population. The risk of developing tuberculosis (TB) is estimated to be between 12-20 times greater in people living with HIV than among those without HIV infection.

In 2004, the World Health Organization (WHO) published an interim policy on collaborative TB/HIV activities in response to demand from countries for immediate guidance on actions to decrease the dual burden of tuberculosis (TB) and human immunodeficiency virus (HIV). Interventions to reduce the burden of TB among people living with HIV include the early provision of antiretroviral therapy (ART) for people living with HIV in line with WHO guidelines and the Three I's for HIV/TB: intensified TB case-finding followed by high-quality antituberculosis treatment, isoniazid preventive therapy (IPT) and infection control for TB.[6-8] TB is the largest single cause of death in the setting of AIDS.[9] The number of TB deaths is unacceptably large given that most are preventable. The current challenge is to find ways of preventing both TB and HIV, and to improve diagnosis and management of co-infection.

Tuberculosis is a disease of young adults.[10] But this does not hold true in case of immunocompromised states and patients of all ages in this group are at risk of tuberculosis, although 41 to 60 years age group was most commonly affected in our study with no sex predilection.

Patients living with HIV-AIDS suffer from many opportunistic infections during their disease span like pulmonary and extra pulmonary tuberculosis by typical and atypical mycobacteria, gastrointestinal infections especially by cryptosporiodiosis, fungal infections especially candidiasis, viral infections especially cytomegalovirus, various pnuemonias most importantly by pneumocystic carinii, and many more.[11] But in country like India where TB is endemic, HIV-TB co-infection needs to be addressed seriously. In our study also TB was found as the most common opportunistic infection in HIV-AIDS patients.

Prevalance of extrapulmonary tuberculosis is more common in HIV-AIDS patients than in individuals not suffering from HIV-AIDS.[12] Lymph node is the most commonly affected site in HIV-AIDS patients with extra pulmonary TB.[13]

Opportunistic infections are signs of a declining immune system. Most life-threatening OIs occur when your *CD4 count* is below 200 cells/mm^3. OIs are the most common cause of death for people with HIV/AIDS.[11] Anti-retroviral therapy (ART) helps in restoring the immune system to a certain extent and thus helps in decreasing the chances of opportunistic infections. Thus patients who are taking ART regularly suffer from tuberculosis and other opportunistic infections than those who are not on ART.

The strength of the study was that various forms of TB in HIV-AIDS patients were nicely described and clearly the importance of diagnosing extra pulmonary forms of TB was emphasized. The limitation was that the study needs to be multicentric and should involve different geographical locations so that the exact epidemiology could be studied.

Conclusion

Tuberculosis in HIV-AIDS patients is still an important and fairly common opportunistic infection. All HIV-AIDS patients needs to be screened for evidence of TB and all the patients with TB needs to be screened for HIV co-infection.

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Cite this article as: Mundhra SH, Thakker RM, Upadhyay GP, Mundhra KS, Trivedi NS, Shah Y. A study of epidemiology and clinical profile of tuberculosis in patients living with HIV-AIDS. Int J Med Sci Public Health 2014;3:1519-1522.
Source of Support: Nil
Conflict of interest: None declared