

MANIFESTATIONS OF TUBERCULOSIS IN HIV/AIDS PATIENTS AND ITS RELATIONSHIP WITH CD4 COUNT

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ABSTRACT

Background: Tuberculosis (TB) is said to be one of the commonest opportunistic infection among human immunodeficiency virus (HIV) seropositive. Varied clinical manifestations have been observed according to immune status of HIV positives.

Aims & Objective: The present study aims to relate the clinical, radiological and laboratory profiles of patient with HIV/TB co-infection and its correlation with CD 4 count.

Material and Methods: Seventy adult TB patients having confirmed HIV seropositivity were included. A detailed history, physical examination, laboratory and radiological investigations were carried out.

Results: Maximum numbers of patients were from age group of 21–40 years. Commonest mode of HIV was heterosexual route (80 %). Male: Female ratio was 4:1. Most of the patients (45.71%) were labour workers, followed by housewife (20%), sales man (18%), textile worker (8.8%), and transport driver (8.8%). Fever (75.71%), weight loss (68.57%) and decrease appetite (65.57%) were predominant symptoms. Pulmonary TB (PTB) was found in 24.28% patients, while extra-pulmonary TB (EPTB) in 75.72% patients. Most of Pulmonary TB had CD 4 count > 180, while in extra-pulmonary TB most of patients had CD 4 count < 180. Commonest form of EPTB was disseminated TB (30%) followed by abdominal TB (21.42%), tuberculous lymphadenopathy (12.85%) and CNS tuberculosis (4.28%). Positive smear for acid-fast bacilli (AFB) was found in 17.14% patients of PTB. The mean CD4 count at presentation were 214 cells/ μ l, 182.47 cells/ μ l, 175.22 cells/ μ l and 54.66 cells/ μ l in tubercular meningitis, abdominal TB, tuberculosis lymph node TB and disseminated TB respectively.

Conclusion: HIV/TB co-infection is more common in sexually active age group and commonest mode of HIV infection is heterosexual transmission. Sputum smear AFB test positivity is low in TB patients having HIV. Disseminated TB is common in advanced HIV cases as CD 4 count decreases.

Key-Words: HIV; Signs and Symptoms; Tuberculosis; CD4 Count

Introduction

Tuberculosis and HIV have been closely related since the emergence of AIDS. HIV infection has contributed to a significant increase in the worldwide incidence of tuberculosis.^[1,2] By producing a progressive decline in cell-mediated immunity, HIV alters the pathogenesis of tuberculosis, greatly increasing the risk of developing disease in co-infected individuals and leading to more frequent extrapulmonary involvement and atypical radiographic manifestations. Worldwide, tuberculosis is the most common opportunistic infection affecting HIV-seropositive individuals^[1], and it is the most common cause of death in patients with AIDS.

Tuberculosis being a major public health problem in India accounts for 20-25% of deaths among patient living human immunodeficiency virus.^[3] On the other hand, it is noted that nationally about five percent tuberculosis patients registered under Revised National Tuberculosis Control Programme also have HIV infection.^[3] This HIV positivity among tuberculosis patients varies across the states and districts in the country between one and 13%, and is

related to HIV prevalence in the general population. In high prevalent states and districts, positivity among tuberculosis patients is over 10% and may be as high as 40% in certain districts.^[3] Thus, while the country is dealing effectively with HIV burden, tuberculosis associated HIV epidemic is posing an important challenge.^[3] The aim of the present study is to record the clinical, radiological profile of pulmonary and extrapulmonary tuberculosis (EPTB) in HIV-seropositive persons.

Materials and Methods

This was a prospective study done over a period of 2 year (from 1st June, 2008 to 31st December, 2011) in the department of Medicine at Surat Municipal Institute of Medical Education & Research (SMIMER), Surat. Permission was obtained from the Institutional Ethical Committee of the Surat Municipal Institute of Medical Education and Research, Surat before commencing the study. Confidentiality of the data collected was maintained strictly throughout the study. Informed consent was taken and patients were assessed clinically. Relevant investigations were undertaken to establish the diagnosis

of pulmonary tuberculosis and extrapulmonary tuberculosis. HIV infection was diagnosed using three antigenically different rapid kits as per the national HIV testing policy (ELISA/Rapid/Simple) and CD4 cell counts were determined by flow-cytometry technique using FACS Count Machine with FACScount™ reagents. Following investigations were done to establish the diagnosis of tuberculosis^[4]: (1) Ziehl-Neelsen (Z.N) of acid fast bacilli (AFB) from given specimen or culture if indicated. (2) Histopathological demonstration of typical caseous granulomatous reaction. (3) Suggestive clinical profile and empirical response to antitubercular therapy (ATT). (4) Radiological features suggestive of tubercular lesions. (5) Pleural/ascitic fluid analysis showing evidence of lymphocytic exudative effusion and CSF showing lymphocytic pleocytosis with hypoglycorrhachia (low CSF glucose).

Results

70 patients included in our study. Males (80%) were affected more than females (20%). The most common affected age group in our study was 18-39 years and mean age of the patients was 34.94 year (range 22-56 years). Unprotected heterosexual contact with professional sex workers was found as the most common (80%) mode of HIV transmission. History of blood transfusion was present in 4.28% patients. None of the patients had history of intravenous drug abuse. Most common affected professional group was labor workers (31.42%) and majority of affected females were housewives. Fever (75.71%), weight loss (68.57%) and decrease appetite (65.57%) were the commonest symptoms on presentation. Other symptoms on presentations are fatigue (60%), cough (40%), breathlessness (36.41%), diarrhea (54.28%), dysphagia (21.42%), vomiting (20%), chest pain (17.14%), altered sensorium (15.42%), convulsions (15.42%) and hemoptysis (17.14%). Beside tuberculosis, commonest opportunistic infection was oral candidiasis (45.71%). Anaemia was detected in 35 patients (50%).

Chest X-ray was done in all 70 cases out of that 41 cases had abnormal findings. 6 cases (18.64%) had apical/upper zone nodular cavitary lesions, 11 patients (32.58%) had middle zone nodular, fibrotic lesion, 19 cases (55.88%) had lower zone infiltration. Five cases (5.32%) had pleural effusion. USG abdomen was done in all patients and splenomegaly was demonstrated in 14 patients (43.90%). Ascites was found in 6 (26.82%) patients. Computed tomography scan (CT scan) of head was done in two patients and both had radiological features suggestive of meningitis.

CD4 count was done in all the patients. Fifty-one (72.86%) of them had CD4 cell count \leq 200 cells/ μ l and 19 (27.14%) had CD4 cell count $>$ 200 cells/ μ l. Mean CD4 cell count was 146.71 cells/ μ l.

Pulmonary tuberculosis (PTB) was diagnosed in 17 patients and EPTB was reported in 53 patients. Twenty-one patients had disseminated tuberculosis and all of most had CD4 count below 200/cmm (mean-54.66/cmm) except one. Majority of patients with pulmonary and EPTB had CD4 count below 200/cmm (mean CD4-184.47 and 174.92 respectively). Sputum smear-positive pulmonary tuberculosis was reported in 17.14% patients of PTB. Majority of them had CD4 count below 200 cells/cmm. Sputum smear-negative tuberculosis was diagnosed on the basis of clinical symptomatology, chest X-ray findings, raised ESR and response to antitubercular chemotherapy.

Commonest form of EPTB in our study was disseminated tuberculosis detected in 21 (30%) patients followed by abdominal tuberculosis in 15 (21.42%) patients. Tubercular lymphadenopathy and pleural effusion were reported in 12.85% and 7.14% patients, respectively. Tubercular meningitis was detected in 2 patients. Mean CD4 cell count in patients with CNS tuberculosis was 214 cells/cumm.

Fifteen patients (21.42%) in our study had abdominal tuberculosis. Commonest form of abdominal tuberculosis was tubercular lymphadenopathy followed by splenic tuberculosis and ascites, respectively. Imaging studies by USG and CT scan abdomen, analysis of ascitic fluid and response to ATT were the criteria used for diagnosis of abdominal tuberculosis. Nine patients with abdominal tuberculosis had CD4 count below 200/cumm. Mean CD4 cell count of patients with abdominal tuberculosis was 182.86 cells/cumm. Peripheral lymphadenopathy was present in 9 patients. Axillary lymphadenopathy was the commonest lymph node involvement present in 4 patients followed by cervical lymphadenopathy in 3 patients. Two had generalized lymphadenopathy. Seven out of nine patients with tubercular lymphadenopathy had CD4 count below 200/cumm.

Table-1: Chest X-ray in patients with Pulmonary Tuberculosis and HIV

Chest X-ray Findings	Number of patients	Mean CD4 cell count
Lower zone infiltration	19	62.15
Middle zone nodular, fibrotic lesion	11	114
Apical /upper zone nodular & cavitary lesions	6	358
Pleural effusion	5	203.8
Total	41	

Table-2: Comparison of pulmonary TB and extra pulmonary TB with other study

Site of TB	Present study (%)	Jayral et al ^[4] (%)	SK Agrawal et al ^[10] (%)
Pulmonary TB	29.78	36.27	67.7
Pleural effusion TB	5.32	10.78	6.5
Lymph node TB	12.85	7.84	16.1
CNS TB	2.13	18.62	6.5
Disseminated TB	22.34	14.70	3.2
Miliary TB	1.06	-	-
Abdominal Koch's	16	11.76	-

Discussion

Most of our study group patients (67.14%) belonged to the age group of 21–40 years, which is the sexually active age and is also the most productive in one's life. The striking male predominance (80%) noted in the present study has also been reported by other authors.^[5,6] The occupational profile of our patients revealed that a majority of them were labour workers (45.71%), followed by housewife (20%), sales man (18%), textile worker (8.8%), and transport driver (8.8%). Mohanty et al^[7] reported 36.8% patients working as manual laborers while Rajsekaran et al^[8] found majority (55.6) of patients working as farmer. Bhagyabati et al^[9] have found sero-positivity rate was highest among those who were unemployed (40%) followed by the business professionals (35%). The percentage of the professions is thus seen to vary in different studies, largely due to the differences in the occupational patterns and the source from where the patients were selected.

Sexual route (heterosexual) was found to be the major risk factor (80%). Three patients (3.24%) had blood-transfusion-related transmission. Heterosexual promiscuity and casual sex was found to be a major risk factor in the studies by some Indian observers.^[6,7] Fever (75.71%), weight loss (68.57%) and decrease appetite (65.57%) were predominant symptoms in our study. Deivanayagam et al^[5] and Mohanty et al^[7] reported that cough with expectoration and fever were the most common complaint respectively. Positive smear for acid-fast bacilli (AFB) was found in 17.14% patients of PTB. Mohanty et al^[7] has reported 31.59% while Deivanayagam et al.^[5] has reported 15% patients as smear positive. This is very different from the situation in HIV uninfected tuberculosis patients and indicates that smear microscopy is not a sensitive diagnostic tool in the presence of HIV infection. It has been shown that sputum smear is often positive in the early stage of HIV infection.^[3]

Extra-pulmonary tuberculosis is more common in HIV/TB patients, especially with advanced immunosuppression than in non-HIV/TB patients.^[3] Extra pulmonary

tuberculosis was seen in 53 (75.71%) of our HIV/TB patients. Commonest form of EPTB was disseminated TB (30%) followed by abdominal TB (21.42%), tuberculous lymphadenopathy (12.85%) and CNS tuberculosis (4.28%). In SK Sharma et al^[11] study, disseminated TB was found in 25.20% of patients. Other authors have observed that lymphatic system is the most commonly involved, followed by pleural involvement in HIV/TB patients.^[8,12] Jayral et al^[4] reported commonest form of EPTB was CNS tuberculosis detected in 33.84% patients followed by abdominal tuberculosis in 26.15% patients. The difference in their study could be because of more inclusion of hospitalized immunocompromised patients.

The mean CD4 count at presentation were 214 cells/ μ l, 182.47 cells/ μ l, 175.22 cells/ μ l and 54.66 cells/ μ l in tubercular meningitis, abdominal TB, tuberculosis lymph node TB and disseminated TB respectively. Patients with pulmonary tuberculosis had higher mean CD4 count (mean 184.47/ μ l) compared to patients with disseminated TB (mean CD4 count 54.66/ μ l). Our findings are similar to those of SK Agarwal et al^[12] study.

Conclusion

HIV is more common in sexually active younger society and heterosexual transfer is the commonest mode of HIV infection. Tubercular co-infection is common in HIV infected and more so with falling CD4 cell level. Every patients having HIV-TB needs special attention as they have atypical features, atypical radiological findings, low incidence of sputum AFB positivity, MDR TB and opportunistic infections. Commonest EPTB was disseminated TB unlike most other Indian studies where either lymph node or pleura were the commonest site of involvement. Disseminated tuberculosis was only found in patient with CD4 count less than 100/cmm. Early diagnosis of tuberculosis and prompt institution of ATT reduces mortality and morbidity significantly. Therefore, adequate knowledge of the manifestations of tuberculosis in HIV-infected patients is absolutely necessary for optimal management and to reduce mortality and morbidity.

References

1. AIDS Control and Prevention (AIDSCAP) Project of Family Health Internal, The Francois-Xavier Bagnoud Center for Public Health and Human Rights Of the Harvard School of Public Health, UNAIDS. The Status and Trends of the Global HIV/AIDS Pandemic. Final Report July 5-6, 1996.
2. Raviglione MC, Narain JP, Kochi A. HIV-associated tuberculosis in developing countries: clinical features, diagnosis, and treatment. Bull WHO. 1992;70:515-526.
3. National Acquired Immunodeficiency Syndrome Control Organization, Ministry of health & Family Welfare, Government of

- India. HIV/ Acquired Immunodeficiency Syndrome surveillance in India. Available at URL: http://nacoonline.org/facts_overview.htm. Accessed on 20 July, 2011.
4. Jaryal A, Raina R, Sarkar M, Sharma A. Manifestations of tuberculosis in HIV/AIDS patients and its relationship with CD4 count. *Lung India*. 2011;28(4):263-6.
 5. Deivanayagam CN, Rajasekaran S, Senthilnathan V, Krishnarajsekhar R, Raja K, Chandrasekar C, et al. Clinico-radiological spectrum of tuberculosis among HIV seropositives: A Tambram study. *Indian J Tuberc*. 2001; 48:123.
 6. Swaminathan S, Sangeetha M, Arunkumar N, Menon PA, Thomas B, Shibi K, et al. Pulmonary Tuberculosis in HIV positive individuals: Preliminary report on clinical features and response to treatment. *Indian J Tuberc*. 2002; 49:18.
 7. Mohanty KC, Sundrani RM, Nair S. HIV infection in patients with respiratory disease. *Indian J Tuberc*. 1993; 40:5.
 8. Rajasekaran R, Lima A, Kamakshi S, Jeyaganesh D, Senthamizhchelvan A, Savithrr S, et al. Trend of HIV infection in patients with tuberculosis in rural south India. *Indian J Tuberc*. 2000; 47:223.
 9. Bhagyabati DS, Naorem S, Singh TJ, Singh KB, Prasad L, Shantidevi T. HIV and TB Co-infection. *Journal, Indian Academy of Clinical Medicine*. 2005;6:220.
 10. Agarwal SK, Makhija A, Singh NP, Prabhakar A, Baveja UK. Tuberculosis in HIV Acquired Immunodeficiency Syndrome patients in a tertiary care hospital in Delhi. *Indian J Tuberc*. 2003;50:163.
 11. Sharma SK, Mohan A. Co-infection of human immunodeficiency virus (HIV) and tuberculosis: Indian perspective. *Indian J Tuberc*. 2004; 51:5.
 12. World Health Organization. *A Clinical Manual for Southeast Asia*. Geneva: World Health Organization; 1996.

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