

ORIGINAL ARTICLE

PREVALENCE OF HUMAN IMMUNODEFICIENCY VIRUS POSITIVITY IN TUBERCULOSIS PATIENTS AT A MEDICAL COLLEGE

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ABSTRACT

Background: Objectives of the study were to study the prevalence of HIV positivity in tuberculosis patients, to study the difference of presentation of Tuberculosis in AIDS with that of non-immunocompromised persons, to study the risk factors among HIV infected patients and comparing the results obtained in present study with those of various studies done in India and abroad.

Materials and methods: The study was carried out at the Department of Pathology, Sheth L. G. General Hospital, Maninagar. A total of 200 cases of pulmonary tuberculosis and extra-pulmonary tuberculosis were studied. The criteria for case selection were for pulmonary tuberculosis- clinical features, chest X-ray, sputum smear examination for AFB, Tuberculin skin test and for Extra-pulmonary tuberculosis-tissue biopsy, lymph node FNAC, pleural fluid examination. Details of the cases were recorded in a proforma. Data were then analysed using Microsoft excel software.

Results: Out of total 200 mycobacterium infected (TB) patients, 11 (5.5%) of patients had HIV infection. Most common age group having HIV in male and female was 21-30 years, usually those who were sexually more active. Sex wise distribution showed slightly female preponderance (54.54%). Most important mode of HIV transmission was unprotected sexual exposure. Tuberculin skin test and Sputum smear examination for AFB were positive only in 27.28 % patients. Diffuse focal infiltration in chest x- ray was the most common presentation. Pallor was found in all cases. Most of the cases showed cough, fever, weight loss, and diarrhoea.

Key words: Human Immunodeficiency Virus, Pulmonary Tuberculosis, extra-pulmonary tuberculosis Prevalence, TB-HIV co-infection

INTRODUCTION

TB and HIV infection together form a very grave public health hazard. WHO estimates that there are 2.5 million HIV sero-positive persons in India.¹ Infection with HIV has transform TB from an endemic disease into a worldwide problem. In many countries of East and Southern Africa TB notification rate increased by five or more times as a result of HIV epidemic². According to study carried out by WHO, the global prevalence of HIV infection in patient with TB is estimated at 8 %, however some regions of the world have significantly higher rate of TB-HIV co-infection, such as Africa, where prevalence ranges between 31% and 66%^{2,3}. In India sero positivity of HIV infection in general population varies between 0.39% and 4.7 %⁴.

TB is frequently observed among patients with HIV infection mainly as a result of reactivation of latent TB infection under the influence of reduction in the cell

mediated immune response due to HIV infection^{4,5}. TB shares a deadly synergism with HIV and increases the risk by 150 times for developing active TB. The estimated annual risk of reactivation among these co-infected with HIV and TB is about 5 to 8% with cumulative life time risk of 30% or more compare to cumulative life time risk of 5 to 10% in HIV negative adult patients⁶. TB also accelerates HIV infection by increasing viral load by 5 to 7 fold. In India where the prevalence of TB is high, screening for HIV sero positivity amongst the TB patients should be an essential procedure².

Objectives of the study were to study the prevalence of HIV positivity in tuberculosis patients, to study the difference of presentation of TB in AIDS with that of non-immunocompromised persons, to study the history of risk factors among HIV infected patients and comparing the results obtained in present study with those of various studies done in India and abroad.

MATERIALS AND METHODS

The study was carried out at the Department of Pathology, Sheth L. G. General Hospital, Maninagar during 2006. A total of 200 cases of pulmonary tuberculosis and extra-pulmonary tuberculosis were come in the hospital during January 2006 to December 2006 and were studied. The criteria for case selection were for pulmonary tuberculosis- clinical features, chest X-ray, sputum smear examination for AFB, Tuberculin skin test and for extra-pulmonary tuberculosis-tissue biopsy, lymph node FNAC, pleural fluid examination. Each patient was screened for antibodies against HIV-1/HIV-2 by ELISA kits as per NACO guidelines¹⁶.

Details of cases were recorded in the proforma which included age, sex, occupation, clinical details, examination of lymphnodes, History of risk factors and Laboratory findings-tuberculin test, X-ray chest, Sputum Z-N/ gram stain, pleural fluid: Routine/microscopic, HIV ELISA, FNAC/biopsy findings. Data were then analysed using Microsoft excel software.

RESULTS

Total 200 cases of pulmonary and extra-pulmonary tuberculosis were observed.

Table 1: Age and Sex Distribution of Cases

Age group (Years)	Male		Female		Total	
	Case	HIV+ve CASE (%)	Case	HIV+ve Case (%)	Case	HIV+ve Case (%)
<1	3	0 (0.00)	1	0 (0.00)	4	0 (0.00)
1 to 10	13	0 (0.00)	9	0 (0.00)	22	0 (0.00)
11 to 20	17	0 (0.00)	30	0 (0.00)	47	0 (0.00)
21 to 30	31	4 (12.90)	27	3 (11.11)	58	7 (12.07)
31 to 40	15	0 (0.00)	22	1 (4.55)	37	1 (2.70)
41 to 50	9	1 (11.11)	12	2 (16.67)	21	3 (14.29)
51 to 60	6	0 (0.00)	3	0 (0.00)	9	0 (0.00)
61 to 70	0	0 (0.00)	1	0 (0.00)	1	0 (0.00)
71 to 80	1	0 (0.00)	0	0 (0.00)	1	0 (0.00)
Total	95	5 (5.26)	105	6 (5.71)	200	11 (5.50)

Table 2: Cases according to History of Risk Factor for HIV Transmission, Clinical Presentation, Lymphnode Involvement, Radiological Pattern and Type of TB

	HIV +ve Cases(n=11)	Total Cases (n=200)
History of Risk Factor		
Blood transfusion	3 (27.27)	46 (23)
Unprotected sexual exposure	10 (90.90)	42 (21)
Prenatal transmission	0 (0)	4 (2)
STDs(Genital ulcer)	3 (27.27)	6 (3)
IV Drug abuse	1 (9.09)	7 (3.5)
Clinical Presentation		
Weight loss	11 (100)	66 (33)
Fever	11 (100)	196 (98)
Cough	11 (100)	190 (95)
Diarrhoea	4 (36.36)	17 (8.5)
Lymphnode Involvement		
Cervical	5 (45.45)	105 (52.5)
Axillary	0 (0)	15 (7.5)
Inguinal	0 (0)	5 (2.5)
Others	0 (0%)	11 (5.5%)
Radiological Pattern		
Consolidation	2 (18.18%)	45 (22.5%)
Cavitation	2 (18.18%)	10 (5%)
Calcification	0 (0%)	12 (6%)
Milliary mottling	2 (18.18%)	6 (3%)
Diffuse infiltration	3 (27.27%)	3 (1.5%)
Type of TB		
Pulmonary	6(54.55%)	45(22.5%)
Extra pulmonary	3(27.27%)	136(68.0%)
Both	2(18.18%)	19(9.5%)

Table 1 shows that pulmonary and extra-pulmonary tuberculosis was highest in 11- 40 yrs age group and lowest in the 61-80 yrs age group. Sex wise there was not much difference. However sample size of TB patients with HIV reactive was too small to derive any conclusion, still in present study, majority of cases diagnosed between 21 to 30 yrs of age. HIV reactive cases among male and female were almost equal.

Table 2 shows most common history of risk factor among TB patients for HIV transmission was unprotected sexual exposure. Though BT was present as a risk factor of 27.27% of cases with HIV, it was mostly associated with other risk factors.

Fever and cough were most common presenting features while weight loss was as presenting symptoms in 1/3rd of cases. Diarrhoea was relatively rare presenting complain. HIV with TB patient showed higher percentage of diarrhoea and weight loss as presenting feature, however these may not be purely feature due to TB as there were many infections associated with HIV and were also features itself of HIV infection.

Cervical lymph nodes were among most frequently infected by mycobacterium consisting about more than 90% of TB lymphadenopathy. Consolidation was the most common pulmonary manifestation of TB while other common manifestations include cavitation and calcification according to this study. In HIV infected patients with TB, diffuse infiltration was most common

pulmonary manifestation while compared with only TB infected patients.

Table 3: Distribution of Cases According to MT Test and Sputum Examination

	Result of MT Test			AFB in Sputum		
	MT +ve (%)	MT -ve (%)	Total (%)	AFB +ve (%)	AFB -ve (%)	Total (%)
HIV +ve Cases (%)	3 (27.27%)	8 (72.72%)	11 (100%)	3 (27.27%)	8 (72.72%)	11 (100%)
Total Cases (%)	165 (82.5%)	35 (17.5%)	200 (100%)	48 (24%)	152 (76%)	200 (100%)

82.5% of TB cases show MT test positive while in 17.5% of TB infected person shows negative MT test. Patient having HIV reactive with TB infection shows greater percentage of negative MT test than person with only mycobacterium infection (72.72% compared to 17.5%). Only 24% of cases with TB infection show positivity of acid fast bacilli in sputum while rest 76% show negative sputum for AFB. As with only mycobacterium infection alone, patients with HIV with TB show only 27.27% of positivity in sputum. However this may be due to variation in number of pulmonary and extra pulmonary TB cases taken in this study. So it was difficult to arrive at any inference from this study regarding prevalence of sputum smear positivity among HIV reactive and non reactive TB patients.

DISCUSSION

Results of the present study were compared with various other similar studies. Diagnosis of TB in HIV infected patients is often difficult due to several reasons: (1) frequently negative sputum smears (2) atypical radiographic findings (lower zone infiltration, diffuse infiltration without cavitation) (3) higher prevalence of EPTB especially at the inaccessible site. (4) Tuberculin skin test negativity. (5) Lack of classic granuloma formation and (6) resemblance to other opportunistic pulmonary infections.

The results of present study were comparable with the study carried out by P A Orege et al⁷, Ravi Malhotra et al², R Ramachandran et al⁸. The most commonly involved age group for HIV infected patients with TB was 21- 30 years, followed by 30-39 years. Present study includes 7 cases between 21-30 years, 1 case between 31-40 years and 3 cases between 41-50 years of age group. This is the age group generally found to be sexually active and sexual mode of transmission is still the most common mode of transmission throughout the world.

Regarding sex wise distribution, out of 11 HIV infected patients with TB cases, 5 (45.45%) were male while 6 (54.55%) were females. P A Orege et al⁷ reported 55% were male and 45% were females. While Ravi Malhotra et al² reported 81.81% were male and 18.18% were females. R Ramachandran et al⁸ observed 74.77% were males and 25.22% were females. Regarding the history of risk factor, K C Mohanty et al⁹, observed 95.95% cases were heterosexual while J A Cayala¹⁰ et al reported 82.7% cases were homosexual. S K Jain et al¹

and Ravi Malhotra et al² observed 43.75% and 54.5% cases respectively were heterosexual. Unprotected sexual exposure accounts for 90.92% of cases in present study while whole blood and blood products were the second most common risk factor. This indicates safe sexual practice and appropriate use of blood and blood products can be truly effective in preventing the HIV epidemic.

According to clinical presentation among HIV+ve cases, weight loss, cough and fever were present in 100% of cases in present study while Ravi Malhotra et al² reported weight loss in 100% of cases, cough in 75% of cases and fever in 50% of cases. Lymphadenopathy was observed in 45.5% of cases in present study while Ravi Malhotra et al² reported it 50% which was almost similar.

Tuberculin test reactivity wise, results were comparable with other studies. 82 % MT were positive in HIV negative individuals compared to 27 % in HIV reactive individuals. Recommended by CDC(Centre for Disease Control), cut-off point for tuberculin skin test was taken as 10 mm in non-HIV reactive individuals and 5 mm in HIV reactive individuals. Sputum smear positivity was highly variable in different studies. In present study, it was around 24 % in HIV negative individuals and 27.28 % in HIV positive individuals. Present study data confirms the findings of Smith et al¹¹ who observed no differences in the frequency of positive smears between HIV infected and non-infected individuals. This suggests that sputum smear microscopy is useful test for diagnosis of tuberculosis in the TB control Programme.

Radiographical feature wise, K C Mohanty et al⁹ reported cavitory lesion in 55.38% of HIV infected patients with TB cases. Robert L Smith et al¹¹ observed 54.54% of cases have focal infiltrate while in present study it was in 33.33% of cases. Studies done by A.J. Abdul-Abbas et al¹², J A Cayala et al¹⁰, Tahziba Hussain et al¹³, Ida M. Onorato et al, Mukadi et al suggest that pulmonary location of TB (73.91% to 87.3%) was still the most common location in HIV infection, because TB is transmitted by inhalation of infected aerosols. The present study also indicates that pulmonary TB (54.54% of cases) was also more prevalent in HIV infected patients.

Prevalence of HIV sero positivity varies in different studies ranging from 0.5% (in Banavaliker et al) to 20.39% (in Tripathy et al). In present study, it was 5.5%. HIV- sero positivity in TB patients in other

countries ranging from 2.2 % (in A M C Rose et al¹⁴) to 33.2 % (in Tosi et al¹⁵).

Table 4: Depicts a comparison of HIV-sero positivity in T.B. patients in INDIA¹³

Author	Place of study	Year of study	Tuberculosis patients	HIV-positive cases (%)
Banavaliker et al	Delhi	1994-95	1002	5 (0.5)
Dey et al	Calcutta	1993-96	1349	9 (0.67)
Gupta et al	Udaipur	1995-96	520	40 (7.7)
Jain et al	New Delhi	1997-98	2361	16 (1.14)
Kumar et al	Delhi	1997-2000	301	42 (14)
Mandal et al	Varanasi	1999	393	26 (6.6)
Mohanty et al	Mumbai	1989-94	3878	260 (6.7)
Paranjape et al	Pune	1991-96	4618	694 (15.0)
Purohit et al	Ajmer	1993-95	2448	18 (0.7)
Rajasekaran et al	Thanjavur	1996-99	915	39 (4.3)
Ramachandran et al	TamilNadu	1997-98	2361	111 (4.7)
Rao et al	Pondicherry	1986-94	26063	885 (3.4)
Samuel et al	Chennai	1996	112	19 (17.0)
Sharma et al	New Delhi	2000-2002	555	52 (9.4)
Solomon et al	Chennai	1991-93	1430	24 (1.7)
Talib et al	Marathwada	1991-93	340	16 (4.7)
Tripathy et al	Pune	1995-2000	2800	571 (20.39)
Vasadeviah et al	Pondicherry	1994-96	1600	66 (4.1)
Present study	Ahmedabad (Gujarat)	2006	200	11 (5.5)

CONCLUSION

According to WHO recommendations, HIV testing and counselling should be offered to all TB patients in settings where the HIV prevalence among TB patients exceeds 5%. So there is a pressing need for the RNTCP and NACO to collaborate on feasibility of making HIV counselling and testing routinely available to all DOTs and other TB patients throughout India.

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