

STUDY OF SEROPREVALENCE OF HIV AMONG TUBERCULOSIS PATIENTS AND CLINICO- RADIOLOGICAL IMPLICATIONS OF DUAL INFECTIONS

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ABSTRACT: AIM: To determine the prevalence of human immunodeficiency virus (HIV) infection among tuberculosis patients, to compare the clinical features of tuberculosis among HIV seropositive and seronegative patients, & to correlate the seropositive tuberculosis patients with the CD4 count.

METHODS: This study was undertaken in Gandhi Medical College, Hamidia Hospital, Bhopal, in department of medicine during November 2008 to November 2009. A total of 150 radio logically and / or bacteriologically confirmed patients of tuberculosis were tested for HIV seroprevalence.

RESULTS: Among 150 tuberculosis patients, thirteen (8.66%) were found to be HIV seropositive. Eleven (84.6%) were males and two (15.4%) were females. Among 13 HIV seropositive patients ten (76.92%) patients were in the age group of 21 – 40 years. Out of eleven HIV seropositive male patients five (45.45%) were labourers, four (36.36%) were truck drivers, Among HIV seropositive patients, eight (61.53 %) belonged to urban area & five (38.47%) were from rural areas. Eleven (84.6%) had contracted HIV infection through sexual contact, one was IV drug abuser, one was supposed to be infected by blood transfusion. five (38.46%) patients had disseminated/military tuberculosis (DTB/MTB), three (23.07%) patients had pulmonary tuberculosis, three (23.07%) had pleural effusion, two (15.38%) had neurotuberculosis. Ten (76.92%) seropositive patients had CD4 count <350.**CONCLUSION:** The trend of dual infection with HIV and tuberculosis in the area is rising. Atypical presentation, extrapulmonary and disseminated / military tuberculosis cases are more at CD4 < 350/ml

KEY-WORDS: HIV, Tuberculosis, HIV seroprevalence.

INTRODUCTION: The harmful synergy between the HIV and tuberculosis epidemics has added dramatically to the suffering and death caused by each disease alone. HIV-infection is among the strongest risk factors for progression of latent tuberculosis infection to active disease. HIV surveillance among tuberculosis patients allows assessment of the impact of the HIV epidemic on the tuberculosis situation and facilitates planning of collaborative activities between HIV/AIDS and tuberculosis programmes. Furthermore, surveillance provides information necessary to monitor the effectiveness of joint strategies aimed at reducing the impact of HIV among tuberculosis patients¹.

HIV seroprevalence among tuberculosis patients in Uganda and Zambia was found to be 50-70%² and in Tanzania 40%³; in Thailand, HIV seroprevalence rose from 2.4% in 1989 to 10.8%⁴ and 22.0% in 1996⁵. Several workers from India have reported highly variable seropositivity rates among TB patients. A high prevalence of HIV seropositivity among TB patients has been reported from .Chennai⁶, Mumbai⁷ and Pune^{8,9}, a low seropositivity has been reported from north India ^{10,11}.

The clinical presentation of TB among the HIV infected is dependent on the degree of immune suppression. Patients with relatively preserved immune function (with CD4+T cell counts above 200/cumm) are more likely to have typical symptoms, upper lobe disease and sputum smear

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positive for acid-fast bacilli (AFB). Patients who are severely immunosuppressed are more likely to have atypical clinical and radiographic features; extrapulmonary disease is also more common in the later stages of the HIV infection.¹²

The aim of this study was to find out the seroprevalence of HIV infection and to compare the spectrum of tuberculosis among HIV seropositive and seronegative patients in tertiary centre of central India, Bhopal.

MATERIAL AND METHODS: The study was conducted in the department of medicine, Hamidia Hospital, Gandhi Medical College, Bhopal from November 2008 to November 2009. During the study a total of one hundred and fifty consecutive patients diagnosed with tuberculosis, extra-pulmonary, or both forms of tuberculosis were screened for HIV seropositivity after informal consent. Diagnosis was based on detailed clinical history, clinical examination, X-ray chest and sputum examination for acid fast bacilli (AFB) by direct smear or, in some cases, by culture. In AFB negative patients, diagnosis was based on clinicoradiological findings compatible with pulmonary tuberculosis and lack of response to a 2-3 weeks course of antibiotics. Extra-pulmonary tuberculosis was confirmed by suggestive histology, cytology, AFB staining and culture of biological fluids.

A patient diagnosed with both pulmonary and extrapulmonary TB classified as pulmonary TB. Involvement of two or more non contagious organ was taken as disseminated TB. All the patients were screened for HIV after counselling and obtaining their written consent. Serum samples were analysed with simple rapid test. As per WHO guidelines, the HIV reactive sample in the screening test is further subjected to a supplemental test with two different antigenic systems and again found to be HIV reactive; the positive predictive value of the same is 99.9% only then these cases were taken as HIV positive. All HIV positive patients' blood samples were sent for CD4 count to ART centre in Gandhi Medical College, Bhopal.

RESULTS: Among 150 tuberculosis patients screened for HIV infection thirteen (8.66%) patients were found to be HIV seropositive. Among thirteen HIV seropositive patients ten (76.92%) patients were in the age group of 21 – 40 years, while among 137 HIV seronegative patients 69 (50.36%) belonged to this age group. There were 11(84.6%) males among HIV seropositive and 95 (69.34%) among HIV seronegative patients.

Among HIV seropositive patients, eight (61.53 %) belonged to urban area & five (38.47%) were from rural areas, compared to 22 (16.05%) to urban areas & 115 (83.95%) to rural areas in HIV seronegative patients

Out of 11 HIV seropositive male patients four (36.36%) were truck drivers, five (45.45%) were labourer, one (9.09%) was farmer, & one (9.09%) was unemployed. Out of two seropositive females, one was housewife & one was the primary school teacher. Eight (72.72%) males had heterosexual promiscuity, one (9.09%) was i.v drug abuser, and one (9.09%) had history of blood transfusion. Both the females got infected from their respective husbands.

Among 13 seropositive patients (table 2), five (38.46%) patients had disseminated/military tuberculosis, three (23.07%) patients had pulmonary tuberculosis, three (23.07%) had pleural effusion, while two (15.38%) had neurotuberculosis.

Two of the three seropositive cases of pulmonary tuberculosis had CD4 count of less than 350, CD4 for one patient was not available, and both were sputum positive and had bilateral lung

involvement radiographically. One patient had MDR TB five (38.5%) cases were of extrapulmonary tuberculosis (EPTB), three cases of EPTB had CD4 count less than 350, two were of pleural effusion and one was tubercular meningitis. All the seropositive DTB/MTB cases had CD4 < 350.

Among 3 seropositive PTB cases, 2(75%) were sputum positive and 2 (40%) cases of disseminated/military tuberculosis were sputum positive.

Associated complications were more common among seropositive patients compared to seronegative patients (table 3). (84.6% VS 26.27%) patients had significant weight loss, (76.92% VS 3.6%) patients had oral candidiasis, (46.15% VS 1.4%) suffered with chronic recurrent diarrhoea, and (69.2% VS 3.6%) had skin infections, with 7 patients suffering from tenia versicolor and 2 patients having herpes infection.

On the chest x-ray (PA view) (table 4), pleural effusion (21.05% VS 15.3 %), reticulonodular pattern (9.09% VS 4.08 %) and military mottling (18.18% VS 2.04%), were more common in seropositive patients compared to seronegative patients, there were neither cavitatory lesions nor fibrosis found in seropositive patients

DISCUSSION: In present study, out of 150 tuberculosis patients screened for HIV infection, 13 (8.66%) were HIV seropositive. Among 13 HIV seropositive cases, 11(84.6%) were males and 2(15.6%) were females

In Delhi HIV seroprevalence increased from 0.4% in 1994-1999 to 9.4% in 2000-2002¹³. Sentinel surveillance done in Pune showed that seropositivity has increased from 10% in 1995 to 28.75% in 2000¹⁴. In Thanjavur seroprevalence was seen to increase from 0.59% in the year 1996 to 8.89% in 1999¹⁰. Seroprevalence in Goa was reported to increase from 2.01% in 1995 to 10.9% in 2000¹⁵. Studies have shown that seroprevalence has increased from 2.6% in 1988-1989 to 6.7% in 1989-1994 in Mumbai⁷. HIV seroprevalence among tuberculosis patients ranged widely, from 1% in Bihar to 13.8% in Guntur. In the aggregate population of tested patients across 15 districts, HIV seroprevalence in tuberculosis patients was highest in the groups of those aged 25–34 years (11.0%) and 35–44 years (10.6%). HIV seroprevalence was higher among male tuberculosis patients than female tuberculosis patients (8.4% VS 5.6%).¹⁶

Sexual route (heterosexual) was found to be major risk factor (80.65%), for transmission of HIV infection. Heterosexual promiscuity and causal sex was also found to be the major risk factors in the studies by other Indian workers. Majority (76.92%) of HIV seropositive patients belonged to the 21-40years age group. This is sexually active age and also the most productive in one's life. Of all the HIV seropositive patients, 84.6% were males & (15.6%) were females. The striking male predominance noted in the present study has also been observed by other workers in India^{16, 17, 18, 19, 20}. In the aggregate population of tested patients across 15 districts, HIV seroprevalence in tuberculosis patients was highest in the age group of 25–34 years 11.0%) and 35–44 years (10.6%). HIV seroprevalence was higher among male tuberculosis patients than female tuberculosis patients (8.4% vs. 5.6%).¹⁶

Truckers contracting HIV from sex workers in cities and on the road constituted 36.36% of our patients as was the finding in Uganda²¹ and some Indian reports.^{18, 22, 23}

Pulmonary tuberculosis is the commonest presentation in co-infection. In present study out of overall 13 seropositive tuberculosis patients, we found only 3(23%) cases of pulmonary tuberculosis, among which 2(75%) cases were sputum positive for AFB. Two of the three

seropositive cases had CD4 count of less than 350, CD4 for one patient was not available, and both were sputum positive and had bilateral lung involvement radiographically. One patient had multidrug resistant TB. 5(38.46%) patients had disseminated/military tuberculosis 3(23.07%) had pleural effusion, while 2(15.38%) had neurotuberculosis. 3 cases of EPTB had CD4 count less than 350, 2 were of pleural effusion and one was TBM. All the seropositive DTB/MTB cases had CD4 < 350.

In present study, prevalence of extrapulmonary tuberculosis and disseminated tuberculosis is more because of lower immunity among the seropositive cases as evidenced by their low CD4 count this was consistent with study by Zumla et al²⁴ & Praveen Kumar, et al.²⁵

Among 3 seropositive PTB cases 2(75%) were sputum positive and 2 (40%) cases of disseminated/military tuberculosis were sputum positive, Which was similar to finding in Tamil Nadu (88%)¹⁷, Lucknow (62.5%)¹⁹

Associated complications were more common among seropositive patients compared to seronegative patients, (84.6% VS 26.27%) patients had significant weight loss, (76.92% VS 3.6%) patients had oral candidiasis, (46.15% VS 1.4%) suffered with chronic recurrent diarrhoea, and (69.2% VS 3.6%) had skin infections, with 7 patients suffering from tenia versicolor and 2 patients having herpes infection similar to study from Aligarh,¹⁸ but cases of significant weight loss were more common in present study.

On the chest X-ray (PA view) pleural effusion (21.05% VS 15.3 %), reticulonodular pattern (9.09% VS 4.08 %) and military mottling (18.18% VS 2.04%), were more common in seropositive patients compared to seronegative patients, there were no cavitary lesions nor fibrosis found in seropositive patients. It has been shown that in mild immune-suppression the appearance is often classical while in severe immune-suppression, it is atypical^{10,24,26,27}

CONCLUSION: Screening for HIV infection should be done in all tuberculosis patients as dual infection is more common, however due to large number of cases this may not always is possible. At least patients with the above mentioned characteristics should be screened without fail. Hence, clinicians should maintain a high index of suspicion and is imperative to have a thorough understanding of the interactions between these two diseases.

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TABLE 1: Distribution of tuberculosis patient's according to age and HIV serostatus

AGE IN YEARS	HIV +		HIV -	
	NUMBER N=13	%	NUMBER N=137	%
11-20	0	0	24	17.51
21-30	3	23.07	45	32.84
31-40	7	53.86	24	32.84
41-50	3	23.07	19	13.86
51-60	0	0	11	08.02
>60	0	0	14	10.21

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TABLE 2: Association of diagnosis of seroprevalence in tuberculosis patients and their correlation with the CD4 count

Diagnosis	Total	HIV+	%	CD4 count	
				<350	>350
PTB	91	3	4.35	2	0
S.AFB +ve	77	2	2.60	2	0
S.AFB -ve	14	1	7.14	NA	
EPTB	49	5	10.20	3	2
PLEURAL EFFUSION	16	3	18.75	2	1
TBM/TBG	23	2	8.70	1	1
MTB/DTB	10	5	50	5	0
DTB S.AFB +	4	2	50	2	0
DTB S.AFB -	6	3	50	3	0

TABLE 3: Clinical profile of HIV seropositive and seronegative TB patients.

CLINICAL PARAMETER	HIV +ve		HIV -ve	
	NO	%	NO	%
SIGNIFICANT WEIGHT LOSS	11	84.6	36	26.27
CHRONIC RECURRENT DIARRHOEA	6	46.15	2	1.4
SKIN INFECTIONS	9	69.2	5	3.6
ORAL THRUSH	10	76.92	5	3.6
SEIZURES	1	9.09	8	5.83

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TABLE 4 ASSOCIATION OF CHEST X-RAY WITH SEROPREVALENCE IN TB PATIENTS

CHEST X- RAY FINDINGS	HIV +		HIV -	
	NO	%	NO	%
Cavity/fibrosis	0	0	33	33.67
Exudative lesion	4	36.36	53	54.08
Pleural effusion	4	21.05	15	15.30
Reticulo-nodular pattern	9.09	42.85	4	4.08
Miliary mottling	2	18.18	2	2.04

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