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A CLINICO-RADIOLOGICAL PRESENTATION OF PULMONARY TUBERCULOSIS IN HIV POSITIVE PATIENTS IN A TERTIARY CARE HOSPITAL

Radiodiagnosis

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ABSTRACT

Background: The deadliest combination of the two devastating and killer disease TB & HIV has been closely linked since the emergence of AIDS contributing the progress and pathogenecity of each other, and as half of the HIV patients are likely to be infected with tuberculosis, the twin challenge of this CURSED DUET seems to be daunting. There has been increase rate of DR TB, MDR TB, XDR TB, which are difficult to treat and contribute to increase mortality.

Objectives: To study and co-relate clinical and radiological features of Pulmonary TB in HIV positive patients, comparison with degree of immune suppression. To compare the CD T-cell count and sputum status before and after ATT 4 treatment completion.

Material and Methods: This was a prospective cohort study conducted on 50 patients under Department of Radiology, Saraswati Medical College, Unnao from Jan 2018 to Dec 2018. The patients included in the study were all TB patients of age >18 years with strong clinical suspicion of HIV/AIDS. Pulmonary TB was diagnosed either with sputum smear positive or Chest x-ray. When EPTB was suspected as a possible diagnosis, every attempt was made to procure tissue/relevant body fluid for diagnostic testing. Rapid tests are in vitro qualitative tests for the detection of antibodies to Human Immunodeficiency Virus (HIV) types 1 &2 in human serum, plasma, whole blood, urine, saliva was used for diagnosis of HIV. Patients with only extra Pulmonary Tuberculosis and no evidence of pulmonary tuberculosis and Patients with PCP, fungal infection and sepsis were not included because these conditions cause lymphopenia and decreases CD T-cell count.

Results: Out of these 50 patients, most of the HIV-TB co-infected patients (62.5%) were seen among sexually active age group of 25-44 yrs. 80% of the patients were male and 20% were females. Most frequently encountered symptoms were fever (80%), cough (70%), loss of appetite (70%) and loss of weight (60%). About 80% cases were moderately or far advanced disease on the chest radiograph. The typical radiological findings of post primary TB, i.e. upper zone infiltrate, fibrosis and cavities were found in 24%, 4% and 6% cases respectively. Cavitary lesions were more in CD4 count above 100. Overall sputum positive PTB was 76% and sputum negative PTB was 24%.

Conclusion: Treatment of HIV-TB co infection requires strong commitment and a focused approach. A strong coordination between the national TB and AIDS control programmes is required for effective management of TB-HIV patients.

KEYWORDS

HIV, Pulmonary Tuberculosis, DR-TB, PLHWA.

INTRODUCTION:

According to WHO report 2007, south East Asia Region accounts for 18% of the world HIV infected patients and nearly 40% of all tuberculosis cases globally.[1,2] Recently released national HIV prevalence estimates for India indicate that 0.22% of women and 0.36% of men aged 15-49 years are infected.[3] **HIV pandemic fuels the TB epidemic:** - HIV infection has contributed to a significant increase in worldwide incidence of TB by producing a progressive decline in cell mediated immunity. HIV alters the pathogenecity of TB greatly leading to more frequent extra pulmonary involvement and atypical radiological manifestations. Worldwide, TB is most common opportunistic infection affecting HIV seropositive individuals and the most common cause of death in patients with AIDS. In developing countries TB accounts for rd about 1/3 of all deaths and deadly synergy between HIV and TB is the leading cause of mortality among infectious disease in developing world.[4] Factors like malnutrition, overcrowding, unemployment, alcoholism, drug abuse, poverty and homelessness are responsible both for TB and HIV. Extra pulmonary TB, disseminated TB and sputum negative manifestations are more common in patients with advanced immune-suppression. While TB prevalence has remained stable, TB incidence continues to rise especially in countries most severely affected by HIV epidemic. HIV promotes progression to active TB in patients with mycobacterium Tuberculosis infection. The life time risk of TB in immune competent person is 5-10%, but in HIV positive, it is 5-15% per year. Without proper treatment 90% of the people living with HIV die within 6-24 months of contracting 4 TB. HIV in TB patients lead to low cure rate, high morbidity and mortality during treatment, high defaulter rates because of adverse drug reactions, high recurrence rates and increased transmission of drug resistant strains among HIV-infected patients in congregate settings.[5] TB affects HIV; as TB shortens the survival of patients with HIV infection, accelerates the progression of HIV by increasing viral load and late TB diagnosis contributes to increased death rates in PLWHA.[5] HIV per se does not appear to be predisposing factor for MDR-TB but HIV with TB increases MDR TB by defaulting of patients due to drug interaction and toxicities, malabsorption to ATT due to gastroenteropathies, increased frequency of visit to hospital and exposure to MDR TB patients.[6]

A wide clinic radiological spectrum of tuberculosis was seen among HIV patients, in consonance with their varying immune status. With the conventional sputum test not providing an adequate diagnostic help, familiarity with the clinic radiological spectrum of tuberculosis and coexisting opportunistic infections is absolutely necessary. This study makes an attempt to correlate the clinical presentation, chest X-ray and CD4 counts, as it will help in better understanding this deadly duo of HIV and tuberculosis.

AIM AND OBJECTIVES:

1) To study and co-relate the clinical manifestations and radiological patterns of Pulmonary TB in HIV positive patients.
2) To co-relate various clinical and radiological manifestations of Pulmonary TB patients with degree of immune suppression as evidenced by CD T-cell counts in HIV positive patients.
3) To compare the CD T-cell count and sputum status before 4 and after ATT treatment completion.

MATERIAL AND METHODS:

The present study was done as a prospective cohort study in a tertiary care hospital of North India (Dept. of Radiology, Saraswati Medical College, Unnao) from January 2018 to December 2018. Confidentiality of the data collected was maintained. Written consent was taken from the patient to be a part of the study. 40 HIV-positive male patients and 10 HIV-positive females, who satisfy the inclusion criteria, were the subjects of the study. All patients above the age of 18 with confirmed HIV infection as per NACO guidelines were the subjects of the study. After pretest counseling and informed consent, anti- HIV antibody tests were performed (as per the NACO guidelines) by the rapid tests (COMB-AIDS RS kit, and If positive the results were confirmed using the NEVA-HIV and VIRADOT KIT).

These individuals were subsequently assessed thoroughly as per the protocol. This included detailed clinical history including presenting symptoms, past history, disease diagnosis, and complete physical examination followed by appropriate laboratory tests. The chest radiography was taken for all the patients and detailed evaluation of the

radiograph was done. CD4 count was estimated at the same point of time. Sputum AFB stain was carried out to look for pulmonary tuberculosis. When EPTB is suspected as a possible diagnosis, every attempt should be made to procure tissue/relevant body fluid for diagnostic testing. Most accessible tissue should be procured for histopathological, cytopathological and microbiological diagnosis. USG Thorax / Abdomen / Pelvis**,** CT THORAX / HRCT were carried out in specific cases, where required.

RESULTS:

Most of the HIV-TB co-infected patients (62.5%) were seen among sexually active age group of 25-44 yrs. 80% of the patients were male and 20% were females. 80.5% of the patients were married and 19.5% were unmarried.

Most frequently encountered symptoms were fever (80%), cough (70%), loss of appetite(70%) and loss of weight(60%).

Table 1: Distribution of clinical symptoms in HIV-TB Co infected patients

Symptoms	No. of patients	% of patients
Fever	40	80
Cough	35	70
Haemoptysis	18	36
Chest pain	10	20
Breathlessness	25	50
Loss of appetite	35	70
Loss of weight	30	60
Night sweats	25	50
Diarrhea	12	24
Odynophagia	10	20
Malaise	25	50
Abdominal pain	08	16
Headache	09	18
Disorientation	02	04

In our case 36% of the patients had CD4 count 0-50, 28% had CD4 count 51-100, 20% had CD4 count 101-150, 12% had CD4 count 151-200 and only 4% had CD4 count above 200.

Table 2: Distribution of CD4 counts in HIV-TB Co infected patients

CD4 Counts	No of patients	% of patients
0-50	18	36
51-100	14	28
101-150	10	20
151-200	06	12
>200	02	04

Table 3: Radiological extent of Pulmonary TB in HIV-TB Co infected patients

Radiological extent	No of patients	% of patients
Bilateral	28	56
Unilateral	20	40
Minimal	12	24
Moderately advanced	30	60
Far advanced	10	20

On the chest radiograph, B/L involvement was seen in 56% cases. About 80% cases were moderately or far advanced disease. The typical radiological findings of post primary TB, i.e. upper zone infiltrate, fibrosis and cavities were found in 24%, 4% and 6% cases respectively.

Table 4: Zone wise distribution of Pulmonary TB in HIV TB Co infected patients.

Predominant lesion	Type of lesion	No of patients	% of patients
Upper zone	Infiltration	12	24
	Fibrosis	02	04
	Cavitation	03	06
	Consolidation	01	02
Min and lower zone	Infiltration	18	36
	Fibrosis	02	04
	Cavitation	02	04
	Consolidation	01	02
All zone	Infiltration	05	10
	Military	04	08

Table 5: Co relation of sputum status with CD4 counts

CD4 Counts	Sputum positive (n=38)	Sputum negative (n=12)
0-50	13 (72.2%)	04 (27.8%)
51-100	10 (78.5%)	03 (21.5%)
101-150	08 (80%)	02 (20%)
151-200	04 (66.5%)	02 (33.5%)
>200	02 (100%)	00 (0%)

Overall sputum positive PTB was 76% and sputum negative PTB was 24%. Both positive and negative sputum status was present in all the CD4 ranges. Treatment outcome in sputum positive patients were cured in 63%, death in 23.5%, failure in 8% and defaulter in 5.5%. In patients with sputum smear negative PTB treatment completed were 69.5%, death occurred in 15.5%, defaulter and failure was seen in 7.5% each.

Table 6: Co relation of radiographic findings with CD4 counts

Type of lesion	CD 4 0-50	CD 4 51-100	CD4 101-150	CD4 151-200	CD4 >200
Infiltration	12	10	07	03	02
Cavity	01	01	02	01	01
Fibrosis	00	00	01	01	01
Consolidation	01	01	00	00	00
Military	02	01	00	01	00
Pleural effusion	02	01	01	01	00
Hilar lymph node	01	02	01	00	00

DISCUSSION:

Tuberculosis, unlike other HIV-associated opportunistic infections, may occur at relatively high levels of CD4 counts, although its frequency markedly increases in patients with more severe immune suppression HIV-TB cases have been observed to have severe immune suppression at presentation.

Most patients of our study were belonged to age group 35-45yrs (43%) followed by 25-34yrs (25.5%) together constituting about 69% of the patients. Our study is in accordance with the studies by S Bhagyabatiet al[6] found 63% and C N Devianagyam et al[7] found 75%, Asmita A et al[8] found 76% subjects in sexually active group. Of all patients of our study 40(80%) were males and 10(20%) were females. Similar study has been reported in other studies in India (S Bhagyabati Devi et al[6] , C N Devianagyam et al[7], SwaminathanS et al[9] , Asmita A et al[8]).

Out of 50 patients, most frequently encountered symptoms were fever (80%), cough (70%), loss of appetite (70%) and loss of weight (60%). malaise was present in 50% cases, breathlessness in 50%, night sweat in 50%, haemoptysis in 36%, diarrhoea in 24%, chest pain 20%, odynophagia in 20%.This is again consistent with most of the studies; e.g Zuber Ahmad et al[10], S Bhagyabati Devi et al[6], K C Mohanty et al[11], C N Devinayagam et al[7] and P Kumar et al[12] reported similar profile.

Limitations of study:

As it was a single centre study the results cannot be generalized to entire population. Furthermore comprehensive and multi centric studies including meta analysis of various earlier studies should be done, to have a more meaningful and high impact results.

CONCLUSION:

In our study married males are more commonly affected than females in age group of 25-44 yrs, more frequent in migratory workers; heterosexual route is most common route of transmission. In radiology 55% cases had B/L involvement, 74.5% cases were in moderate to far advanced stage of disease and most common radiological presentation of tuberculosis was parenchymal infiltration(70%) followed by consolidation, cavity, lymphadenopathy, pleural effusion, and miliary shadows. Involvement of lung field in tuberculosis was atypical as evidenced by bilateral lung involvement; middle and lower zone or diffuse involvement.

Treatment outcome was successful in 63% in sputum smear positive cases and 70% in sputum smear negative cases.

A strong coordination between the national TB and AIDS control programmes is required for effective management of TB-HIV patients.

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