

ORIGINAL RESEARCH

Chest X-Ray Findings Of New Tuberculosis Cases In HIV Patients, In Relation to CD4 T-Lymphocytes Count

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ABSTRACT

Introduction: Pleuro-pulmonary Tuberculosis (TB) is a major contributor to morbidity and mortality in HIV infected persons. The manifestations of TB in HIV infected persons are dependent on level of immunosuppression at the time of overt disease. HIV infection causes impaired Cell-Mediated Immunity (CMI) by causing a decline in the number and function of CD4+ subset of T-cells. It is reported that CD 4 T-lymphocytes more than 200/ μ l is associated with radiological findings similar to TB in normal persons.

Material and methods: 154 HIV patients with recently detected Tuberculosis, presented at the Department of Respiratory Medicine, during the period of April 2011-May 2015, were subjected to Chest X-ray and CD4 T-lymphocytes count, as a routine part of their clinical management. The various Chest X-ray findings were recorded and observed against the CD4 T-lymphocyte counts.

Result: Out of 154 patients with HIV-TB co-infection, 30(19%) presented with pleural effusions, among which 65(42%) belonged to the group with CD4 T-lymphocytes count less than 200/ μ l. Consolidation in lower zone of the chest radiograph was seen in 9(14%) among the group with CD 4 T-lymphocyte count less than 200/ μ l, while it was present only in 1(1%) among the other group. Infiltrations in chest x-ray was noticed in 17(26%) of the first group and in 13(15%) of the second group with CD4 T-lymphocyte count >200/ μ l.

Conclusion: Lower cell mediated immunity in HIV-TB co-infection leads to diagnostic challenges due to unusual or atypical chest X-ray appearance.

Keywords: Tuberculosis, HIV, CD4 T-lymphocytes

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INTRODUCTION

Frequency of Tuberculosis infection is increased in presence of immunosuppression, the amount of which deciding the clinical presentation.^{1,2} Chest radiographs are studied in such cases, for presence of atypical or typical presentations of Tuberculosis,³ the latter being associated with CD4 T-lymphocytes more than 200/ μ l. After initial infection with Mycobacterium tuberculosis, HIV co-infection can lead to progression to active TB⁴. The risk of progression to disease is 30-50% for life in HIV- co-infected persons, such risk is 5-10% for life in HIV- negative persons.⁵ Pleural effusion in primary TB is most probably from a hypersensitivity response to tuberculo-protein released in pleural space.⁶ Pleural involvement may occur usually 3-7 months after initial infection.⁷ In post-primary tuberculosis, It occurs less commonly due to release of organisms, from rupture of a cavity or lung parenchymal focus.

A typical radiological presentation of Primary tuberculosis is a Ghon focus- the initial site of parenchymal disease at the time of first infection, and hilar or mediastinal lymph node(s). The occurrence of parenchymal lesion in primary infection if seen in chest x-ray, along with lymphadenopathy mentioned above, is known as Ghon complex. Post-primary disease is seen as parenchymal opacities in apical and posterior segment of the upper lobes and superior segments of the lower lobes, often associated with cavities. Another form of tubercular radiological appearance is Miliary tuberculosis, with 1-3 mm diameter nodules, which are uniform in size and uniformly distributed.⁷ The study was conducted to find out the pattern of chest x-ray presentations in patients with TB-HIV coinfection, in relation to level of CD 4 T-lymphocyte count indicating level of immunosuppression.

MATERIALS AND METHODS

In this study, 154 HIV patients with recently detected Tuberculosis, presented at the Department of Respiratory Medicine, during the period of April 2011-May 2015, were subjected to Chest X-ray as a routine part of their clinical management. Written consents were obtained from all of them, although

permission from ethics committee was not possible as it was not formed during the period. Their Chest X-ray findings were recorded, along with CD4-Tymphocyte level of each patient. Tests done were demonstration of Acid Fast Bacilli in the sputum sample or pleural fluid, culture of sputum or pleural fluid for Mycobacterium tuberculosis. A clinical profile strongly suggestive of Tuberculosis and an experienced physician has decided to start anti-tubercular treatment, was also considered for deciding the patient as a case of Tuberculosis, in few instances, as per Revised Tuberculosis Control program (RNTCP) guideline.⁸ Diagnosis of Tubercular Pleural effusion was emphasised on pleural fluid analysis showing exudative lymphocytic pleural effusion and high pleural fluid Adenosine Deaminase level, with or without demonstration of Acid Fast Bacilli in the sputum.

Inclusion criteria: All HIV patients with pulmonary and pleural tuberculosis cases with Chest x-ray taken

Exclusion criteria: Patients with Diabetes mellitus.

STATISTICAL ANALYSIS

Cross sectional study was conducted among 154 HIV patients having pleuro-parenchymal Tuberculosis, to study the Chest x-ray findings in relation to CD 4 T-lymphocyte count. Descriptive statistics like number, percentages and proportions were used in the analysis.

RESULT

Out of 154 HIV-TB co-infected patients, 90(58%) were males and 64 (42%) were females, aged from 15 to 52 years. 2 (1%) had normal chest radiograph, 30(19%) suffered from pleural effusion and 10(6%) were having atypical feature like lower lobe consolidations, among the total number of 154 patients. Cavitation was seen in 14 (9%), infiltration in 30 (19%), upper lobe consolidations in 33(21%), miliary nodules in 8 (5%), and primary complex in 2 (1%) were observed. Pulmonary consolidations/ cavities mixed with pulmonary fibrosis were noted in 21(14%) patients. The persons with other radiological feature like pneumothorax, hydro-pneumothorax, mediastinal lymphadenopathy, pleural thickening, pericardial effusion, pulmonary oedema and mixture of any features were 4(3%) in number.

Of the total (N=154) patients, 65(42%) were having CD 4 T-lymphocyte count less than 200/ μ l. and 89(58%) patients had CD4 T-lymphocytes count more than 200/ μ l. Out of the patients with lower CD 4 T-lymphocytes count (N=65), 37(57%) were females and 28(43%) were males. There were

62(70%) males and 27(30%) females among those with CD4 T- lymphocytes count more than 200/ μ l.

Type of Lesion	Number	percentage
Normal Chest x-ray	2	3%
Pleural effusion	14	22 %
Cavity	5	8%
Consolidation in upper zone	11	17%
Consolidation in middle/lower zone	9	14%
Infiltrations	17	26%
Miliary nodules	4	6%
Primary (Ghone)complex	1	1%
Consolidation /cavities mixed with Fibrosis	2	3%

Table-1: Radiological lesions at presentation among patients with CD4 T lymphocyte count <200 cells/ μ l (N= 65)

Type of Lesion	Number	Percentage
Normal Chest x-ray	0	0%
Pleural effusion	16	18%
Cavity	9	10%
Consolidation in upper lobe	22	25%
Consolidation in middle/lower lobe	1	1%
Infiltrations	13	15%
Miliary nodules	4	4%
Primary (Ghone) complex	1	1%
Consolidation /cavities mixed with Fibrosis	19	21%
Others	4	4%

Table-2: Radiological lesions at presentation among patients with CD4 T lymphocyte count >200 cells/ μ l (N=89)

DISCUSSION

In HIV infected persons, opportunistic infections are more common when CD 4 T- lymphocytes count is low. But, Tuberculosis happens at any level of CD 4 T- Lymphocyte count. It was observed in this study that that atypical radiological presentation of Pulmonary tuberculosis was seen in patients whose CD 4 T-lymphocytes level less than 200 cells/ μ l. Lesions in middle/lower zones and infiltrations were present commonly in such patients, which is very rare in patients of CD 4 T-lymphocytes count more than 200/ μ l. Consolidation with or without cavities existing with fibrosis was more in those with higher CD 4 T-lymphocytes level, in this study.

Pleural effusions were common in both groups, irrespective of the CD 4 T- lymphocyte count. In a group of patients with CD4 T-lymphocyte level less than 200 cells/ μ l, pleural effusion was more common in a study conducted by Mahesha Padyana et al.⁹ In another study by Kooi Eng San et al, middle/lower

zone lesions were more common in the patients with CD 4 T-lymphocytes count less than 200 cells/ μ l, similar to our study.³ Qiu L et al, reported that both pleural and parenchymal involvements are common in HIV-TB co-infection.¹⁰

Because of the atypical radiological presentation of Tuberculosis in HIV patients with lower CD 4 T-lymphocytes count, diagnosis can be missed or unduly delayed. However, such a situation can be of importance in HIV patients as mortality and morbidity of these patients are immensely increased because of co-infection with Tuberculosis. Primary (Ghone) complex which is usually found in childhood form of Tuberculosis was seen in HIV infected patients with Tuberculosis in this study. As a matter of fact, primary forms of tuberculosis in adults are mentioned as primary complex, pleural effusion, military tuberculosis and consolidation in middle or lower lobes.¹¹

CONCLUSIONS

In patients with CD 4 T-lymphocytes count less than 200 cells/ μ l, atypical chest x-ray manifestations occur, leading to diagnostic challenges and pleural Tuberculosis being quite common in HIV-TB co-infection, HIV testing is necessary even in tubercular Pleural effusion cases.

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