

Chest X ray characteristics in HIV-TB co-infection patients-a single centre study

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ABSTRACT

Aim: To assess the chest x ray findings in tuberculous patients with HIV co-infection.

Design: Cross Sectional

Settings: Department of Pulmonology, QAMC/B.V. Hospital, Bahawalpur- from October 2018 to August 2019

Methods: Chest x-rays of tuberculosis(TB) with human immunodeficiency virus(HIV) co-infection registered patients during the specified time were reviewed .

Results: Among 720 registered tuberculosis patients screened for HIV, n-4 (0.55%) were found positive. Right with left hilar lymphadenopathies were seen in n-3 (75%) of patients. Right with left upper lobe involvements were seen in n-2 (50%) of patients. Only left upper lobe was involved in n-2 (50%) of patients. Right hilar isolated lymphadenopathy was seen in n-1 (25%) of patient. Bilateral upper lobe with right sided lower lobe involvement was seen in n-1 (25%) of patients. Left upper lobe with left lower lobe involvement was seen in 1(25%) of patient.

Conclusion: Hilaradenopathies followed by upper lobe findings were most common in our HIV-TB co-infection patients.

Keywords: Radiology , HIV, Tuberculosis, Co-infection, HIV-TB , Chest X ray.

INTRODUCTION

Chest x ray is investigational modality which is readily available and easy to perform and gives useful information in non invasive way within minutes.¹ Since HIV-TB co-infection mortality is determined by time of treatment so such modality can be used without waiting for pathology reports^{2,3,4}.

On chest x ray most common site of involvement in tuberculosis is apical and posterior segments of upper lobes while in older patients and HIV cases atypical patterns are expected⁵. However lower lobe pulmonary findings are seen but rarely while calcified granuloma with satellite nodules are also typical features. ⁵The one radiological pattern is milliary TB which stands equally true with typical and atypical chest x ray manifestation^{5,6}. Pleural effusions, pneumothoracis, lung abscess and hyperinflation also do exists to some extent in co-infection patients with less than 10% frequency⁶.

WHO by 2018 labelled eight countries as high burden for tuberculosis and Pakistan is included among these⁷. Co-infection tuberculosis and HIV have been a disease with poor outcome particularly if treated late. Its pleasure to mention that the mortality of tuberculosis has been reduced to 1.5 million in 2018 among total of 10 million cases. But if we look into HIV associated mortality then it was 251,000 among 862,000 of total HIV-TB co-infection thus signifying need of early treatment for tuberculosis and HIV both⁸.

The WHO has emphasized on early treatment but only 49% of adults and 27% of children's below 5 years of age avail the WHO policy benefits⁸.

The situation in Pakistan during 2018 for tuberculosis patients was documented as 265/100,000 with incidence of HIV of 1.8 in 636 total HIV positive cases⁹.

The pandemic of HIV has increased the incidence of tuberculosis because HIV is enlisted as one of the reason for conversion of tuberculosis from latent infection into active disease. In such patients macrophages tumor necrosis factor- α (TNF- α) excretion is reduced and TNF fails to eliminate the debris with defective memory T cells. Adding fuel on fire various clusters of differentiations(CD) for example CD38, CD70, human leukocyte antigen with isotype DR (HLA-DR)and CD45R0 are activated¹⁰. Thus making it a leading cause of death in sub Saharan Africa¹¹.

Considering the importance of benefits of early treatment and knowing that we have easily available facilities of chest x ray as an early helping tool¹² so we conducted this study to look into plain chest x ray features of HIV-TB co-infection patients presenting at Bahawal Victoria Hospital Bahawalpur.

MATERIAL & METHODS

In this cross sectional study done at Bahawal Victoria Hospital Bahawalpur Pakistan Pulmonary unit from October 2018 to August 2019, all registered cases HIV-TB co-infections patient's chest x ray findings were assessed. The registered cases are those which has been investigated and diagnosed and sent for registration for treatment. There chest x rays are part of the record and were reviewed for pulmonary lobes and other chest structures involvement. Pediatrics population and adults tested negative for human immunodeficiency virus antibody (HIV-AB) were excluded from the study.

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RESULTS

Among 720 registered tuberculosis patients screened for HIV-AB, n-4 (.55%) were found positive. HIV-AB positive cases chest x rays are described in Table 1. Bilateral hilar lymphadenopathy calcified was seen in n-3 (75%) of patients. Bilateral upper lobe involvements were seen in n-2 (50%) of patients. Isolated left upper lobes were involved in n-2 (50%) of patients. Right hilar isolated calcified lymphadenopathy was seen in n-1 (25%) of patient. Bilateral upper lobe with right sided lower lobe involvement was seen in n-1 (25%) of patients. Left upper lobe with left lower lobe involvement was seen in n-1 (25%) of patient.

Table 1 – Chest X Ray and sputum characteristics in HIV-TB coinfection –

HIV-TB coinfection- Sputum smear and MDR status.	Chest x ray
Patient 1 • AFB Sputum positive • No MDR	Left upper lobe infiltrates
	Right upper lobe infiltrates
	Right Hila enlargement with dense calcification
Patient 2 • AFB Sputum Negative • No MDR	Right & Left upper lobes alveolar infiltrates
	Right lower lobe infiltrates
	Bilateral Hila enlargement
Patient 3 • AFB Sputum positive • No MDR	Left upper lobe cavity
	Left lower lobe cavity
	Left lower lobe consolidation
	Bilateral Hilar enlargement
Patient 4 • AFB Sputum Negative • No MDR	Left upper lobe alveolar infiltrates
	Bilateral Hilar enlargement

DISCUSSION

The role of chest x ray is gaining importance with time not only for infectious disease but for other conditions too¹³. This most commonly available picture for physicians and particularly for pulmonologists is a blessing to rule in many diagnoses in no time thus reducing morbidities and mortalities¹⁴.

A study conducted at government hospital Amritsar India, showed more prevalence of pneumothorax, pleural effusion, lung abscess and Mediastinal widening on chest x ray in HIV-TB co-infection patients in contrary to ours where none of patients had such presentation⁶.

In our study 75% showed upper lung zone involvement while 50% showed lower lung zone of either side of lungs and none showed all four lung zones involvement. However prior review suggested upper zone involvement in 67.3% while mid and lower zone in 36.70% and 9.6% for all pulmonary zones on chest x-ray¹⁵.

The CD4 count seems to play a vital role in chest x ray abnormalities for such group of patients. As long as CD4 remains high lower lobe and mid lung zones isolated abnormalities are hard to find¹⁶. Estimating CD 4 count was not aim of our study but since none of our patient showed mid or lower lung zone involvement so maybe our cohort had higher CD 4 levels.

Adenopathies are very common in HIV patients depending on their immune response. In addition reactive lymphadenopathy due to tuberculosis are in addition to specific HIV related hilar lymph nodes involvement. The

majority of our patients showed calcified hilar lymphadenopathies while many other literature we reviewed none showed predilection for lymph node^{6,15,16} However a recently published review showed 3.73% of such patients with hilar lymphadenopathy¹¹. Importantly the same centre found normal chest x ray as most common x ray finding in co-infection cases.

The importance of immune status in development of pulmonary infiltrates has been described in many reviews¹¹. Prominent chest x ray findings in our patients signifies there appropriate response from immune system.

The cavity formation in such patients is also dependent on CD4 count and may be our study population had higher CD4 count except one patient at the time of chest x ray for diagnostic purpose was done as one of our patient had cavitary lesion. One analysis showed 1.36% while other studies showed 37.8% and 25% sufferers of co-infection with cavities^{11,17}.

Similarly millitary tuberculosis was also an absent finding in our study .while one review of co-infection victims showed 11% of such pattern and another showed 2.73% of millitary tuberculosis^{11,18}. The clinical picture of millitary tuberculosis is more common with HLA-Bw15, HLA-DRB1 and HLA-DQB1. Moreover dissemination of tuberculosis among patients also depends upon interleukin 4 ability to effect toll like receptors and macrophages activation. So more immunosuppression more chances of disease dissemination. Hence it looks our patients were not immunocompromised to that extent or also they may not belong to HLA type, provoking millitary tuberculosis¹⁹.

However pleural effusion in co-infection cases seldom depends on CD4 count or presence of antigen in the pleura in such cases²⁰. But it's a well studied fact that more immunosuppression and less CD4 count gives luxury to mycobacteria to grow unrestricted. The reason of absence of pleural effusion in our study is also example of less explored region for tuberculosis in co-infection cases²⁰. More research is required to elaborate such type of extra-pulmonary tuberculosis co-infection.

CONCLUSION

IV-TB co-infection chest x ray in our patient's is mimicking HIV cases with good CD4 count. Absence of atypical features signifies need to continue to get serological tests for HIV. Such approach will contribute towards effectiveness of local health services present standard operating procedures for diagnosis and management of HIV-TB co-infection.

Recommendations: For every positive HIV patient, CD4 count measurement must also be checked at the same time.

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