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Role of HRCT in Evaluation of Lung Parenchymal Changes in Symptomatic HIV-Seropositive Individuals - Original Research Article

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ABSTRACT

Background: The association between spectrum of pulmonary infection and human immunodeficiency virus (HIV) presents an immediate and grave public health and socio-economic threat, particularly in the developing world.

Purpose: The purpose of this study is to demonstrate the different patterns of pulmonary abnormalities in HIV patients, to define imaging features of each disease whether infective, non-infective or HIV associated pulmonary malignancy, to differentiate different pulmonary diseases in HIV patients on the basis of pattern of involvement and localization of lesions.

Materials and Methods: The cases were selected based on all patients referred to the Department of Radiology, LLRM Medical College, Meerut with proven HIV/acquired immunodeficiency syndrome (AIDS) infection which was clinically suspected of pulmonary infections. HRCT was done.

Results: Total 60 cases of HIV/AIDS with suspected pulmonary disease were studied. Out of which 39 were male and 21 were female. Out of which 51.67 % of patients were diagnosed as having pulmonary TB, followed by bacterial infection in 10 % cases and fungal infection like aspergillus in 5%, pneumocystis jiroveci pneumonia in 2% & cryptococcus in 1% patients, ILD in 3% and thromboembolism in 1% patients while 23.3% of our study did not reveal any significant abnormality.

Conclusion: Various findings such as pulmonary TB being the most common infection and most common HRCT finding in pulmonary TB were nodular opacity can be obtained from the present study. HRCT is a highly sensitive tool for detecting parenchymal abnormalities and allows better characterization of the lesions, with better reproducibility and less interobserver difference.

Key words: interstitial lung disease, Enzyme-linked immunosorbent assay, Miliary tuberculosis, Pulmonary tuberculosis, pneumocystis jiroveci pneumonia.

INTRODUCTION

Human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS) remains a critical world health issue and a major cause of morbidity and mortality. India is home to approximately 23.49 lakh people living with human immunodeficiency virus (HIV), the third largest number of cases of any country in the world. The lungs are one of the chief target organs for HIV-associated disease, and almost 70% of the patients suffer at least one respiratory complication during the course of their illness. In the HIV patient, there is an enhanced prevalence of bronchial hyper responsiveness and dysfunction of the small airways. Pulmonary infections remain a leading cause of morbidity and mortality and one of the most frequent causes of hospital admission in HIV infected people worldwide. Human immunodeficiency virus {HIV) and acquired immunodeficiency syndrome (AIDS) are Modern Pandemics.

The HIV-associated pulmonary conditions include both opportunistic infections and neoplasms. Majority of the pulmonary complications of HIV positive patients are infectious in origin including various bacterial, viral, fungal and protozoal infections. These infections depend mainly on the CD4 count of the individual; different disease spectrum is seen at different range of CD4 count. Apart from these opportunistic infections, non-infectious conditions like Kaposi's sarcoma, malignancies of lymphatic system like non-Hodgkin's lymphoma are also prevalent.

With the introduction of highly active antiretroviral therapy and PCP prophylaxis, survival of HIV-positive patients has also increased and thus the range of pulmonary manifestations. In the current era of combination antiretroviral therapy, the frequency of HIV-associated OIs and neoplasms has decreased. In contrast, the frequency of non-infectious complications such as chronic obstructive pulmonary disease (COPD), pulmonary arterial hypertension (PAH), and lung cancer may be increasing. HIV infection appears to be an independent risk factor for COPD and PAH.

All these factors underscore the importance of understanding pulmonary diseases in HIV-infected patients and of developing a practical approach for chest imaging studies.

PURPOSE: The purpose of this study is to demonstrate the different patterns of pulmonary abnormalities in HIV patients, to define imaging features of each disease whether infective, non-infective or HIV associated pulmonary malignancy, to differentiate different pulmonary diseases in HIV patients on the basis of pattern of involvement and localization of lesions.

MATERIALS AND METHODS

The study is conducted in Department of Radiodiagnosis, LLRM Medical College, Meerut.

MATERIAL

Study Design: Descriptive study

Study Population: A Total of sixty cases of seropositive HIV symptomatic individuals with pulmonary complaints referred for HRCT CHEST was included in the study. The study was performed with the approval of our institutional review board.

Inclusion Criteria: HIV positive adult (>18 years) patients of both sexes who have presented with a pulmonary complaint

Exclusion Criteria:

- Asymptomatic HIV seropositive patients.
- Immunocompromised patients who have suspected lung disease but are HIV negative.
- Pregnant HIV positive patients.

The primary clinical features were weight loss, fever, cough (both productive and non-productive and dyspnoea.

METHODS

HIV seropositivity was confirmed at our hospital, VCTC where 3 different types of ELISA tests were performed to detect antibodies against HIV. All the cases were examined in detail as per performa with special reference to respiratory system. A thorough clinical history of all the HIV positive patients presenting with suspicion of pulmonary disease was taken. Duration of symptoms was also recorded. General physical and respiratory system examination of all patients was done. Then a meticulous record of all the available laboratory investigations including HIV status, CD4 counts, routine blood examination, sputum examinations, AFB smear examination, Mantoux skin test, pleural fluid analysis, FNAC, and other available investigations was kept. Chest x-rays of the patients were studied for the presence of any abnormality. HRCT scans of the chest were done in all the cases taken in the study.

Patient Preparation

The procedure and objectives of performing the high resolution CT scan was explained to the patient and written consent of the patient was taken. Prior fasting was not advocated as the procedure did not warrant the need for contrast injection. The

patient was explained and demonstrated the procedure of breath holding during the acquisition of HRCT scans.

Patient Position

The patient was kept supine on the gantry table and was scanned cephalocaudal in the axial axis. Scans obtained with patients' supine were adequate in most instances. Prone scans were taken when needed. The scanogram or topogram was first taken and then the whole lung was scanned from apex to the base. The scans were performed on GE OPTIMA 64 SLICE MULTIDETECTOR using the following protocol.

Collimation = 1 mm
Feed = 10mm
Scan time =1 sec
KVp = 120 – 140
mA = 240
Matrix size = 512 x 512
Windows- window mean/ width values = -600 to -700/ 1000 to 1500

RESULT

Pulmonary infections remain a leading cause of morbidity and mortality and one of the most frequent causes of hospital admission in HIV infected people worldwide.

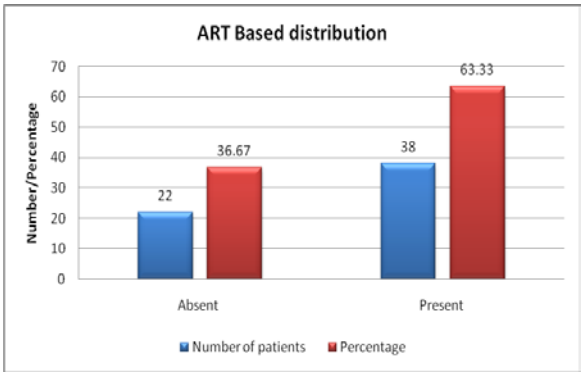
Majority of the pulmonary complications of HIV positive patients are infectious in origin including various bacterial, viral, fungal and protozoal infections. Tuberculosis is the most common OI in this group of patients.

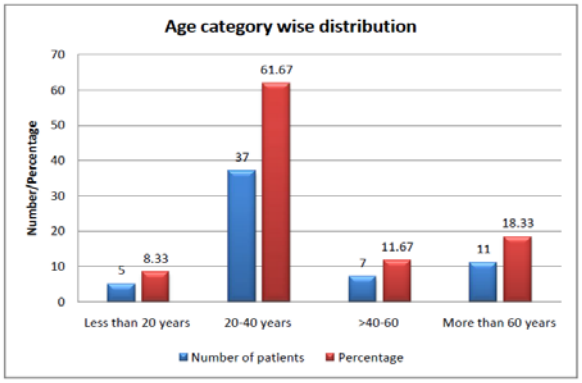
In our study of 60 patients, maximum number of cases are seenbetween20-40 years age group (61.67%), followed by 11 cases more than 60 years (18.33%) about 7cases (11.67%) in40-60years age group and only 5cases (8.33%) were less than 20years, 39patients were male and 21patients were female.

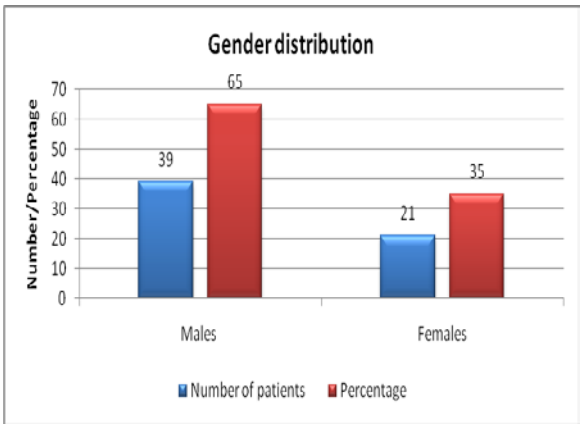
The most common presenting complaints in the study were fever alone (15, 25.00%) or with cough (12, 20.00%). 38 (63.33%) patients are on ART.

These infections depend mainly on the CD4count of the individual, different disease spectrum is seen at different range of CD4count.

In our study maximum 43.3% patients were having CD4 count in the range of>300-400. Maximum are in immunocompetent state.

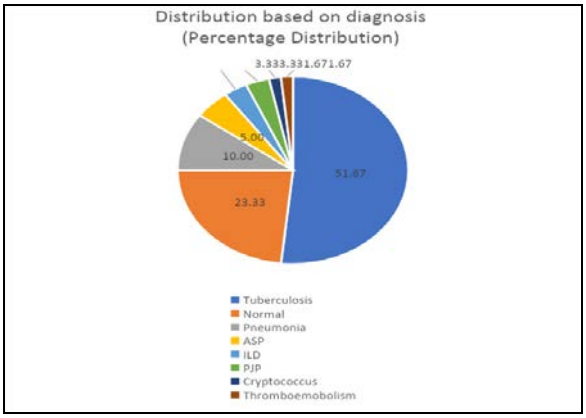


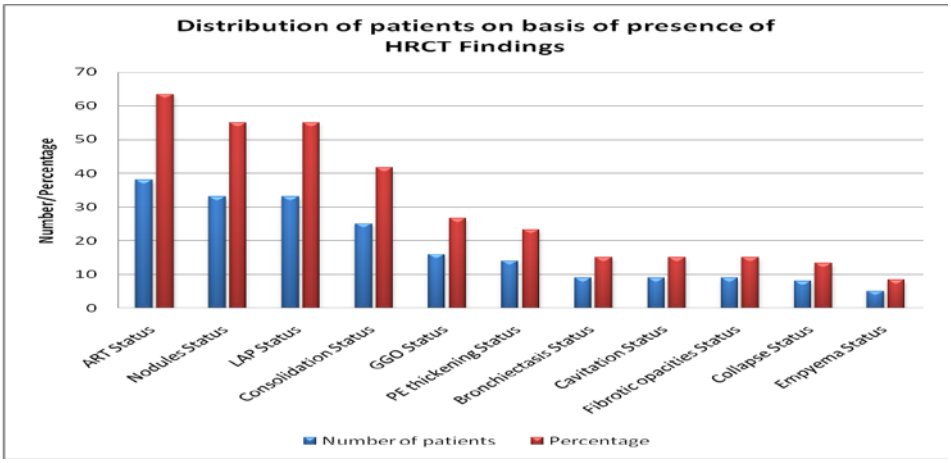




In our study of 60 patients, 31 patients (51.67%) were diagnosed as having pulmonary tuberculosis followed by bacterial infection in 6(10%) patients and fungal infection like aspergillus in 3(5%) patient, pneumocystis jiroveci pneumonia in 2(3.33%) and cryptococcus in 1patints (1.67%), an interstitial lung disease (UIP) in 2 patient (3.33%) and thrombo-embolism in one (1.67%) patient while rest 14(23.3%)

patients did not reveal any significant abnormality as they are suffering from upper respiratory tract infection (sinusitis etc.). On HRCT imaging we found bronchiectasis in 9 patients (15%), air space nodules in 33 patients (55%), variable size lymphadenopathy (hilar/mediastinal) in 33 patients (55%), consolidation in 25 patients (41.67%) variable size cavitation in only 9 patients (15%), ground glass opacities in 16 patients (26.67%) pleural effusion/ thickening (unilateral or bilateral) and empyema in 14 (23.33%) and 5patients (8.33%) respectively and collapse (partial/ complete) in 8 patients (13.33) and fibrotic changes in 9 patients (15%).





Tuberculosis is the most common opportunistic infection with HIV/AIDS and the most common cause of death.

The coincidence of TB and HIV epidemics has created devastating public health crisis. At least one-third of HIV-infected persons worldwide are infected with *Mycobacterium tuberculosis*, and HIV infection is, in global terms, the largest risk factor for developing TB disease.

A total of 31 patients in our study were diagnosed to be suffering from pulmonary tuberculosis. Most common HRCT findings found in tuberculosis is nodular opacities. Maximum number (29/31) of patients with pulmonary tuberculosis were indentified to have nodular opacities.

Table I: HRCT patterns and their frequency in pulmonary tuberculosis cases

HRCT findings	No. of patients
Nodules	29
Lymphadenopathy	22
Consolidation	15
Cavitation	5
Ground-glassopacity	7
Pleural effusion	12
Empyema	3
Collapse	4
Bronchiectasis	6
Fibroticopacity	6

Table II: Nodules distribution in TB cases

Distribution of nodules	No. of patients
Centrilobular	11(35%)
Centrilobular+treein bud	11(35%)
Random+treeinbud	06(19%)
Miliary	03(9.6%)

A total of 6 patients in our study were diagnosed to be suffering from bacterial infection. The most common HRCT finding in bacterial infection was lobar consolidation which is present in all our patients. Two patients in our study were diagnosed to be suffering from Pneumocystis jiroveci pneumonia. The most common HRCT finding was diffuse ground glass opacities in mosaic pattern of distribution.[1] All of these patients were in

severe immunocompromised stage with CD 4 counts < 200 cells/mm3.

Table III: HRCT patterns and their frequency in bacterial infection

HRCT Findings	No. of Patients	Percentage
Lobar Consolidation	06	66.6%
Nodular Opacity	01	22.2%
Bronchiectasis	01	11.1%

Table IV: HRCT Patterns and their frequency in Pneumocystis jiroveci Pneumonia

HRCT Findings	No. of Patients	Percentage
Diffuse Ground Glass Opacity	01	25%
Consolidation and GGO	01	25%
Crazy paving and GGO	02	50%

Three case was diagnosed as angioinvasive aspergillosis showing characteristic halo sign on HRCT scan, i.e., multiple pulmonary nodules surrounded by ground-glass opacity.

One case in our study diagnosed as cryptococcosis most commonly presents with diffuse bilateral interstitial infiltrates the number of cryptococcosis cases has declined significantly following the introduction of HAART.

Two cases of UIP were diagnosed in our case study. Diffuse ground-glass opacity with interlobular and intralobular septal thickening was noted predominantly involving bilateral posterior and lower lung zones with honeycombing.

One case in our study was diagnosed to have pulmonary thromboembolism. His CD4 count was 608 cells/mm3.

HRCT is a highly sensitive modality for detecting parenchymal abnormalities, and it allows better delineation and characterization of the lesions. Hence, HRCT should be incorporated into the management protocols of HIV/AIDS patients coming with suspected pulmonary complications. Early and proper diagnosis of these pulmonary complications in patients with HIV infection will help clinicians develop a focussed therapeutic approach to patient management. Conventional radiography has low sensitivity and specificity and at many times does not lead to a conclusive diagnosis specially in complex situations where multiple infection is commonly seen. The lesions which are not detected or are equivocal on plain radiographs are identified and can be categorized as being active or inactive and thus helps to plan timely management, thereby reducing the morbidity and mortality from respiratory diseases in HIV patients. High resolution CT helps in localizing in the lung where further diagnostic investigations like bronchoscopy, bronchoalveolar lavage (BAL) and fine needle aspiration cytology (FNAC) can be done where ever necessary. Hence, we recommend HRCT in the diagnosis, treatment, and follow up of these patients with pulmonary manifestations. Its non-invasive nature and relatively quicker time of scan make it a suitable choice in these patients.[2]

DISCUSSION

Respiratory illnesses are one of the major causes of morbidity and mortality in HIV-positive patients. This study was conducted in the Department of Radiodiagnosis, LLRM Medical College and associated with Chaudhary Charansingh University, Meerut on 60 HIV-seropositive patients who presented with the chief complaints of chest symptoms of various age groups. Most of the diagnosis was made on the radiological basis along with clinical and laboratory investigations available. The disease activity, pattern, degree of involvement and associated complications were better evaluated with the help of HRCT examination.

In our study of 60 patients with HIV/AIDS with pulmonary disease, maximum number of cases are seen between 20-40 years age group (61.67%), followed by 11 cases more than 60 years (18.33%) about 7cases (11.67%) in 40-60 years age group and only 5 cases (8.33%) were less than 20 years. This correlates well with study by Sharma et al. [3] who reported that most of the HIV-positive patients were in the age group 21-40 years and also with study of Hazarika et al. were maximum number of cases seen between 21-30 years (76.7%). In the study by Kumar et al. [4] maximum patients was in the age group of

20-40 years [5](64%). In our present study according to Kruskal Wallis test the average age was highest for ILD patients and Fungal infections. The average age of patients with TB and pneumonia was significantly higher compared to the patients with normal final diagnosis.

In our study out of 60 patients, 39 patients were male and 21 patients were female. In the study by Hazarika et al. out of 30 patients 21(7%) patients were male and 9 (3%) patients were female. In Kumar et al. Study 43(70%) were male and 18 (30%) were female.

This is similar to nation-level statistic sin which, of the 57781 cases of HIV/AIDS reported to the National AIDS Control Organisation (NACO)[6], 89% of the cases were in the age group 15-44 years and74% were males. This section of the population is more affected because they are sexually more active and the social structure is patriarchal. Unfortunately, these patients also happen to be in the economically most productive years of their lives. The male preponderance might have been due to the fact that in the existing social milieu, females do not seek medical care fearing ostracism and loss of family support.

In the present study, most common presenting complaints were fever alone (15,25.00%) or with cough (12,20.00%). This correlates with study of Sharma et al. who reported that the most common presenting feature was fever (70 %). But in Hazarika et al. Weight loss is the most common presenting symptoms (80%) which is similar to the cumulative data published by NACO in 5204 AIDS patients indicates that 89% patient had weight loss, 88% had fever and cough was seen only in 68%. In our present study It was seen that all the patients with normal final diagnosis had fever only as the chief complaint. Most of the patients with TB (15/31 or 48.38%) had cough alone or with fever. Half of the patients with fungal infections had a spectrum of complaints upon presentation (Cough + Chest pain +Dyspnoea+Fever).

As per NACO recommendation HIV infection is diagnosed on the basis of 3ELISA/rapid single blood tests using different antigen preparations. AIDS is diagnosed on the basis of 2 ELISA/rapid tests and presence of AIDS-related OI. All patients have undergone 2 or more ELISA tests and are found to be positive. Hence, all patients in the present study matched the NACO recommendation.

CD4countrelatedparameters.

In our study maximum 43.3% patients were having CD4 count in the range of >300-400. And nearly 26% patients were below 200 with a median count of 350/mm3. In the study by Hazarika et al. maximum patient were in the state of immunosuppression their mean CD4 count is159.8cell/cumm. In the study by Sharma et al. Maximum patients have CD4 countless then 200 cell/cumm. CD4+ cell counts do not determine the immediate outcome of patients with an OI. In our present study A Mann Whitney test-based analysis of the individual groups was also done for the various groups. The CD4 for TB ($P<0.0001$), fungal infection s($P<0.0001$) and pneumonia ($P<0.0001$) patients was significantly lower compared to normal patients.[7]

SPECTRUMOFPULMONARYDISEASE

In our study of 60 patients, 31 patients (51.67%) were diagnosed as having pulmonary tuberculosis followed by bacterial infection in 6 (10%) patients and fungal infection like aspergillus in 3(5%) patient, pneumocystis jiroveci pneumonia in 2(3.33%) and cryptococcus in 1patints (1.67%) an interstitial lung disease (UIP) in 2 patient (3.33%) and thrombo-embolism in one (1.67%) patient while rest 14 (23.3%) patients did not reveal any significant abnormality as they are only suffering from upper respiratory tract infection.

This correlates well with the study by Hazarika et al. Out of 30patients, 18 patients are diagnosed as having pulmonary TB accounting for 60% of cases, 5 patients are diagnosed as having bacterial infection

accounting for 16.6% of cases and 3 patients are diagnosed as having PCP (10%). Analysis of various OIs reported to NACO from different parts of the country shows that about 64% of the AIDS cases were found to be suffering from pulmonary TB, bacterial infection in7.6% cases, and PCPin3%cases. Hence, the present study fairly correlates with the above-mentioned studies.

In Atwal SS et al.[8] study out of 28 patients, 62.2% of the cases. Suffering from pulmonary tuberculosis and The World Health Organization (WHO) reported that among the 9.27 million incident cases of tuberculosis, an estimated 14.8% occurred in HIV-positive patients, with 456,000 deaths from tuberculosis among HIV-infected patients.

According to NACO annual report 2012-2013-fatality rate among HIV infected TB cases remain 13-14% against less than 4% in HIV negative TB cases‖.

PULMONARYTUBERCULOSIS

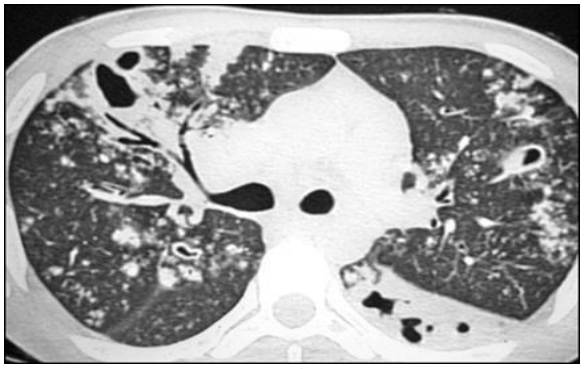


FIG. 1: Scan showing areas of consolidation with cavitation within. Multiple centrilobular nodules showing clustering and tree-in-bud pattern (thick arrow). Case of pulmonary tuberculosis

The sensitivity and specificity to detect pulmonary TB by HRCT were found to be 96.5% and 84.3%, respectively. A total of 31 patients in our study were diagnosed to be suffering from pulmonary tuberculosis. The CD4 count in these patients varied from 21 to 395 cells/mm^3 with a mean count of 292.3 cells/mm^3. Fifteen patients had CD4 counts less than 200cells/mm^3.

In the study by Kumar et al. A total of 33 (54%) patients were diagnosed to be suffering from pulmonary TB. The CD4 count in these patients ranged from 74 to 423cells/mm3. About 12 patients had CD4count <200cell/mm3.

Hazarika et al. A total of 18 patients are diagnosed to be suffering from pulmonary TB and are the most common disease noted. Worldwide, TB is the most common OI affecting HIV-seropositive individuals and it remains the most common cause of death in patients with AIDS. The CD4 count in these patients varied from 21 to 382 cells/cumm with a mean count of 170.6cells/cumm, 6 patients have CD4 count>200cells/cumm, while 12 patients has CD4 count<200cell/mm3. Atwal SS et al. (62.2%) and Sharma et al. (71.1%) reported TB is the most common OI in HIV patients. Maximum number (29/31) of patients with pulmonary tuberculosis were indentified to have nodular opacities followed by Consolidation which found in 15 cases. Cavitation was found 5 patients All the patients having cavitation had CD4 count>200cells/mm^3.

Lymphadenopathy is noted in 22 patients, the hilar region in 8 patients, mediastinal in five while nine patients had both hilar and mediastinal lymphadenopathy.

Eight patients had unilateral and four had bilateral pleural effusion. Among the patients with unilateral pleural effusion 5had right-sided and3 had left sided pleural effusion. Empyema and variable degree lung collapse was noted in three and four cases, respectively.

Hazarika et al. Reported most common HRCT finding in pulmonary TB are nodular opacities seen in 7. 7% cases similar to Kumar et al. and Naseem et al. 54 % and 92 % respectively, followed by consolidation in 50%, pleural effusion in 38.8%, lymphadenopathy in 33.3%, and cavitation in 22.2% cases. Kumar et al. Reported centrilobular pattern of distribution was detected in 60.6% of patients, and it was associated with‖tree-in-bud‖ pattern in 55% of cases. The miliary pattern was evident only in 12.1% of cases with comparison to present study in which

centrilobular pattern noted in 35% of cases and with tree in bud pattern in 35% case military pattern in only 9 % cases. In present study ground glass opacity are noted in 26.6% of patients which correlated well with study by Hartman et al.

WHO [9] noted presence of ground glass opacity in 19% of cases. In present study, cavities are seen in 15 % patients. Laissy et al. noted that 24% patients with pulmonary TB demonstrated presence of cavitation. Furthermore, cavitation is more common in patients who had CD4 counts>200 cells/cumm. The mean CD4 count in these 24% patients is 254.2 cells/cumm. Hartman et al. noted pleural effusions in 38% patients with pulmonary TB. In present study, pleural effusions are seen in 38.8% patients with pulmonary TB. In present study, lymphadenopathy is noted in 55.3%patients with pulmonary TB.

Atwal et al. 78.5% patients demonstrated presence of nodular opacities followed by Consolidation (46.4%), Lymphadenopathy (35.7%), Pleural effusion (35.7), Ground Glass Opacity and Cavitation (21.4%each)

Kumar et al. observed Bronchiectasis was noted in 24.2% of cases of pulmonary TB. Bronchiectasis is generally defined as localized, irreversible bronchial dilatation, often with thickening of the bronchial wall. A bronchus is considered to be dilated if the broncho-arterial ratioexceeds.

Atwal et al. Bronchiectasis was noted in 12 out of 28 patients with pulmonary tuberculosis. With bronchial wall thickening in 8 cases similar with present study where Bronchiectasis was noted in 6 out of 31 patients with pulmonary tuberculosis accompanied by bronchial wall thickening in 8 cases. Hazarika et al. bronchiectasis is noted in44.4%patients. Fibrotic opacities were noted in 6 cases suggestive of old healed infective process in addition to the active pathology.

BACTERIAL INFECTION

A total of 6 patients in our study were diagnosed to be suffering from bacterial infection. The CD4 count in these patients varied from 121to366cells/mm^3, with a mean count of 333.3 cells/mm^3.

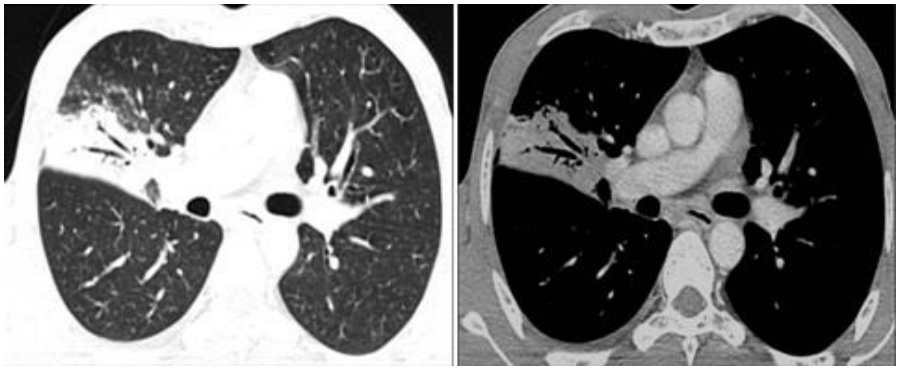


FIG. 2: HIV-positive patient with bacterial pneumonia. Axial HRCT (a) lung window (b) mediastinal window. Area of consolidation seen involving posterior segment of right upper lobe with adjacent areas of ground glass opacity

Kumar et al. reported one case out of 61 patients of bacterial pneumonia with HRCT findings include consolidation, bronchiectasis, nodules, and lymphadenopathy. Hazarki et al. Reported total of 5 patients out of 30 cases suffering from bacterial infections. In present study, the CD4 counts varied from 121 to 366cells/cumm with a mean count of 189.4cells/cumm. In present study, lobar consolidations are seen in 60% cases with bacterial infection and nodules were noted in 22% patients. The nodules are randomly distributed; some are associated with cavitation. In present study, bronchiectasis is noted in one out of six patients with bacterial infections.

Atwal et al. reported total of nine patients out of45 patients suffering from bacterial infection. The CD4 count in these patients varied from 121 to 366cells/mm^3, with a mean count of 195cells/mm^3. The

most common HRCT finding in bacterial infection was lobar consolidation. This correlated with present study where consolidation present in 6 patients.[10]

FUNGALINFECTION

In our present study 6patients out of 60 diagnosis with fungal infection which is similar to the study of Kumar et al.

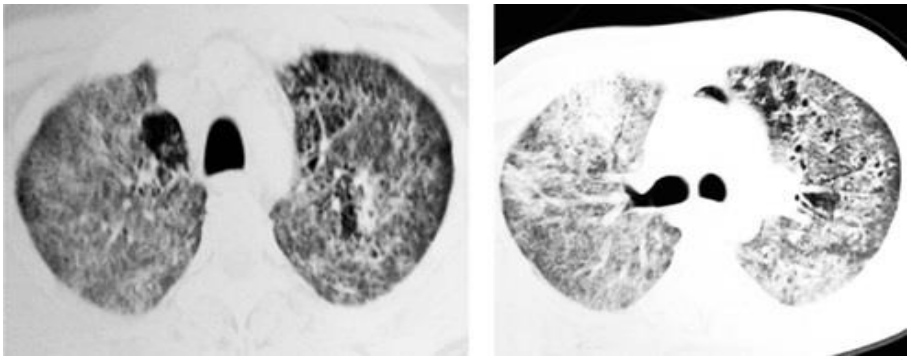


FIG. 3: 29 year old HIV-positive patient. HRCT axial images (a) through upper lobes (b) subcarinal level shows areas of crazy paving and multiple tiny cysts. Focal area of consolidation is also seen in right side. Pneumocystis jiroveci pneumonia.

All of these patients were in severe immunocompromised stage with CD4 counts<200cells/$mm^{3.}$

Kumar et al. reported three patients suffering from PJP. The diagnosis was made on the basis of HRCT findings that were later confirmed on bronchoalveolar lavage findings. In present study, CD4counts in all patients with PCP are<200 cell/mme. In present study, ground glass opacity is noted in 100% patients with PCP. Here the ground glass opacities extended from the apical to basal regions bilaterally. 66.7% patients demonstrated crazy-paving pattern and consolidation is seen in 33.3%cases.

Four patients diagnosed from Pneumocystis jiroveci pneumonia. The diagnosis was established on the basis of HRCT findings and the clinical profile of the patients along with the findings of bronchoalveolar lavage (BAL).

Aspergillosis

3 cases were diagnosed as angioinvasive aspergillosis showing characteristic halo sign on HRCT scan, i.e., multiple pulmonary nodules surrounded by ground-glass opacity which is fairly correlated with Kumar et al. study.

FIG. 4: Aspergillosis. Mycetomas are the least common, but can complicate cavitary Mycobacterium tuberculosis or Pneumocystis carinii pneumonia. The computed tomography here represents a mycetoma in a tuberculous cavity. Note the traction bronchiectasis and loss of volume in the left upper zone

Pneumocystic pneumonia

A total of two patients in our study were diagnosed to be suffering from Pneumocystis jiroveci pneumonia. In our study, diffuse ground-glass opacity with intralobular and interlobular septal thickening (crazy paving) is seen in all the cases of PJP pneumonia which is fairly correlated with the multi-center retrospective study of Tasaka et al.

Cryptococcus

One case in our study diagnosed as cryptococcosis. subpleuranodules were noted with CDcountof178cell/cumm3.

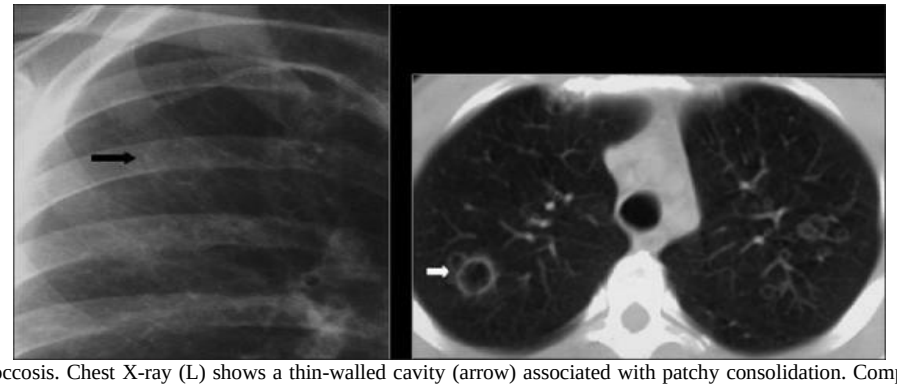


FIG. 5: Cryptococcosis. Chest X-ray (L) shows a thin-walled cavity (arrow) associated with patchy consolidation. Computed tomography section at the level of the lower trachea (R) shows multiple cavities of varying sizes associated with subtle ground-glass opacification.

Kumar et al. Reported Two cases as cryptococcosis. Subpleural nodules were noted in both the patient, one of them showing cavitation. Both of the cases have CD4 count <100 cell/mm3. Additional magnetic resonance imaging brain studies revealed enlarged perivascular spaces suggesting diagnosis of cryptococcosis.

INTERSTITIALLUNGDISEASE

Two cases of UIP were diagnosed in our case study. Diffuse ground-glass opacity with interlobular and intralobular septal thickening was noted predominantly involving bilateral posterior and lower lung zones with honey combing, and bronchiectasis noted in one patient, centriacinar emphysematous changes along with a large bulla also noted, while in another patient, ground-glass opacity with reticular opacities, consolidation, and bronchiectasis was noted involving posterobasal segment. Their CD4 counts were 206 and 296cells/mm3, respectively similar as Kumar et al study.

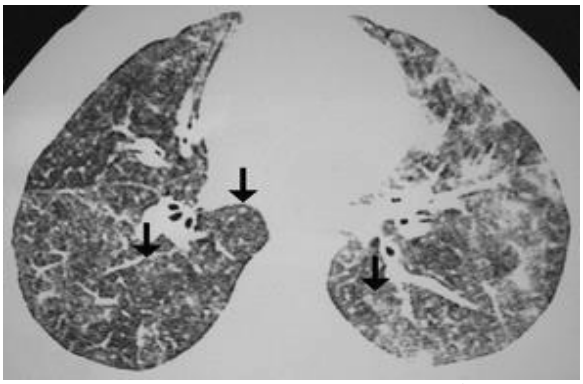


FIG. 6: 7-year-old boy with AIDS and nonspecific interstitial pneumonia. High- resolution CT scan shows patchy bilateral ground-glass opacities, small foci of consolidation, and poorly defined centrilobular nodular opacities (arrows).

Pulmonary thromboembolism

One case in our study was diagnosed to have pulmonary thromboembolism.

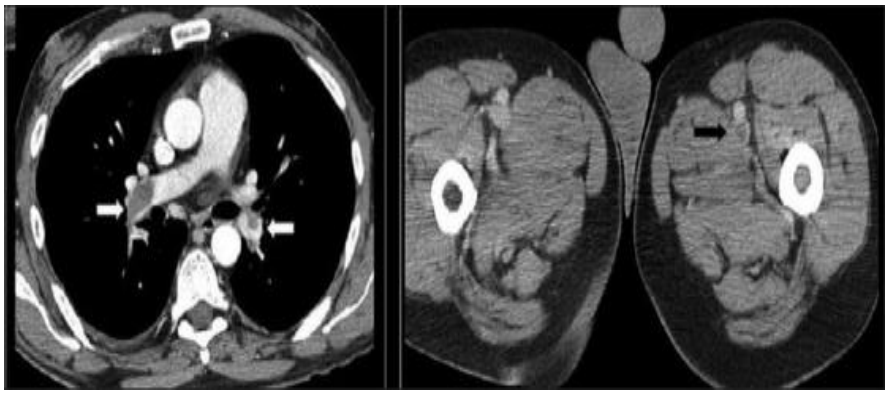


FIG. 7: Thromboembolism. Computed tomography (CT) images from a 38-year old human immunodeficiency virus-positive man with a CD count of 385 presented with acute tightness in the chest and low O2 saturation. The CT scans show pulmonary emboli within the lower lobe pulmonary arteries on both sides (white arrows). Note the thrombus in the left femoral artery (black arrow)

CONCLUSION

Tuberculosis is the most common opportunistic infection in HIV followed by bacterial pneumonia then fungal infection and in rest patients imaging came normal as upper respiratory tract infect is more

common then lower respiratory tract infection as the upper respiratory tract infections (URIs) such as sinusitis, pharyngitis and acute bronchitis were more commonly the cause of respiratory symptoms than pneumocystis jiroveci pneumonia, bacterial pneumonia, tuberculosis and pulmonary Kaposi sarcoma combined. In tuberculosis most common HRCT finding is nodular-opacities, in pneumonia its is lobar consolidation, in PCP it is ground glass opacities etc. These infections depend mainly on the CD4 count of the individual; different disease spectrum is seen at different range of CD4 count. Hence Early and proper diagnosis of these pulmonary complications in patients with HIV infection will help clinicians develop a focussed therapeutic approach to patient management. Conventional radiography has low sensitivity and specificity and at many times does not lead to a conclusive diagnosis. HRCT of lung provides detailed visualization of lung parenchyma and can characterize diseases according to pattern and distribution which can help in formulating a differential diagnosis. Hence, my study is intended to document these radiological findings and correlate them with patient's CD4 counts. it also help in localizing in the lung where further diagnostic investigations like bronchoscopy, broncho alveolar lavage (BAL) and fine needle aspiration cytology (FNAC) can be done where ever necessary. Its non-invasive nature and relatively quicker time of scan make it a suitable choice in these patients. Hence, we recommend HRCT in the diagnosis, treatment, and follow up of these patients with pulmonary manifestations

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