



Clinico Radiological Spectrum of Respiratory Manifestations in HIV Seropositive Patients

KEYWORDS

Sero-positive, Tuberculosis, Radiological, Pulmonary, Commonest.

Dr. N. GOPICHAND

ASSOCIATE PROFESSOR, DEPARTMENT OF PULMONARY MEDICINE, ACSR GOVERNMENT MEDICAL COLLEGE, NELLORE.

Dr. D. SARADA

ASSISTANT PROFESSOR, DEPARTMENT OF MICROBIOLOGY, SIDDHARTHA MEDICAL COLLEGE, VIJAYAWADA.

Dr. K. MANIDEVI

SENIOR RESIDENT, DEPARTMENT OF PULMONARY MEDICINE, GUNTUR MEDICAL COLLEGE, GUNTUR.

Dr. S. BABULAL

REGISTRAR, Dr.NTR HEALTH UNIVERSITY, VIJAYAWADA.

ABSTRACT

Pulmonary complications have been one of the most common causes of morbidity and mortality since the advent of AIDS. The spectrum of pulmonary illnesses in HIV infected patients includes both Opportunistic infections and Neoplasms.

A cross sectional prospective study was conducted at Governmental General Hospital, Siddhartha medical college, Vijayawada in the Department of Pulmonary Medicine on a total of 100 sero-positive cases in a period of 12 months. Routine Pathologic and Microbiological investigations were done for specimens collected from each individual. The most common age group was 31- 40yrs followed by 21-30. Males constitute 65% and females 35%. Tuberculosis (81) is the commonest condition followed by Pneumocystis carinii (8) and others. Radiologically, 31% presented with Infiltrates/opacities, 18% Pleural effusion, 11% normal chest X ray, 12% Cavity, 6% miliary TB and others. Knowledge of clinical and radiological features helps in early diagnosis of respiratory manifestations in HIV sero-positive individuals even in areas where CD4 count facilities are not available.

INTRODUCTION: The Human Immunodeficiency Virus is a lentivirus (a subgroup of retrovirus) that causes the Acquired Immunodeficiency Syndrome(AIDS). Pulmonary complications have been one of the most common causes of morbidity and mortality since the advent of AIDS. The spectrum of pulmonary illnesses in HIV infected patients includes both Opportunistic infections and Neoplasms. The opportunistic infections are caused by Mycobacterial, Bacterial, Viral, Fungal and Parasitic pathogens with a characteristic clinical and radiographic presentation. Knowledge of the CD4 count also helps in attaining a possible diagnosis and therapeutic plan. Among the various opportunistic infections, Respiratory infections account for up to 70% of AIDS defining illness. Pulmonary complications are also likely to vary according to geographical location, HIV risk factors, gender and social habits of patients.

Clinical course and pattern of opportunistic infections varies from patient to patient and from country to country. Radiological presentation of different opportunistic infections differ in HIV sero-positive individuals compared to sero-negative individuals. Knowledge of these varied clinical and radiological patterns helps for early diagnosis and effective management. Early diagnosis of opportunistic infections and prompt treatment definitely contribute to increased life expectancy among infected patients delaying progression to AIDS. Hence the present study was undertaken with the aim of evaluating Clinico-Radiological profile of different opportunistic infections in HIV Sero-positive patients.

MATERIALS AND METHODS:

This prospective study is a cross sectional study conducted at Governmental General Hospital, Siddhartha medical college, Vijayawada in the Department of Pulmonary Medicine. A total of 100 cases diagnosed as HIV positive as

per NACO guidelines attending the pulmonary medicine department GHG, were studied in a period of 12 months (December 2012 to December 2013).

A detailed history of presenting symptoms, past history, family history, residence, travel history and personal history were obtained and a thorough general and systemic examination done for every individual. Each patient was subjected to routine Haematological (complete blood counts and ESR), Biochemical (Liver and Renal function tests) and Bacteriological investigations (sputum acid fast bacilli smears, sputum gram staining and cultures) and X-ray of the chest. Special investigations like Pulmonary Function Tests, Ultrasound of the chest/abdomen, Computed Tomography chest, High Resolution CT (HRCT) chest were done when indicated.

For definitive Microbiologic or Pathologic diagnosis, sputum and blood samples and Respiratory specimens obtained by Bronchoscopy (Broncho-alveolar lavage, Brush biopsies or Forceps/needle biopsies) Pleural fluid (with or without pleural biopsies) CT-guided trans-thoracic needle aspiration, Thoracoscopy, Mediastinoscopy and Open-lung biopsy were collected. Specimens were examined microscopically or cultured for Bacterial, Fungal, Mycobacterial and Parasitic pathogens and also Cytopathologic and Pathologic studies. Specimens from other sites (skin, lymph node, bone marrow, cerebrospinal fluid) provided evidence for the diagnosis of extra pulmonary or disseminated disease.

Patients diagnosed as HIV positive as per NACO guidelines, both male and female, between 12 to 60 yrs of age irrespective of CD4 count and Anti Retroviral Therapy were considered for the study and Patients below 12yrs and above 60 yrs and Pregnant and Lactating women were ex-

cluded.

RESULTS: Among the 100 Sero-positive individuals, the most common age group was 31-40(39%), followed by 21-30(31%), 41-50(19%), 12-20(6%) and 51-60(5%). Males constitute 65% and Females 35%.

Among the individuals, 81% had Tuberculosis, 8% Pneumocystis carinii pneumonia, 3% Bacterial pneumonias, 2% Bronchiectasis, 1% Chronic bronchitis, 2% Malignancy, 2% Emphysema and 1% had URTI (Table III). Of 81 tuberculosis cases 54 (83.1%) were males and 27 (77.1%) were females.

Of 100 cases, 59% had Fever, 52% Cough, 48% Loss of appetite, 41% Breathlessness, 38% Wt loss, 34% Chest pain, 29% Diarrhoea and 18% Haemoptysis.

Of the 100 sero-positives, 52% had Oral Candidiasis, 15% Seborrheic dermatitis, Eczema & Pruritic rash, 8% Herpes zoster, 3% Acquired ichthyosis, 2% Tinea corporis and 1% Molluscum contagiosum.

Radiologically 31% presented with Infiltrates/opacities, 18% Pleural effusion, 11% Normal chest X-ray, 12% Cavity, 6% Miliary TB, 5% Hilar lymphadenopathy, 4% Bronchiectasis, 2% Pneumothorax, 2% Hydro-pneumothorax, 2% Consolidation, 3% Interstitial Reticular pattern, 2% Hyperlucent lung fields, 1% Lung abscess and 1% had Ground glass opacity. Of 31 infiltrates/opacities, 29 were due to Tuberculosis and 2 due to Malignancy. Of 11 normal X-rays, 5 had Cervical lymphadenopathy, 4 were diagnosed as Pneumocystis carinii pneumonia, one Chronic bronchitis and the other URTI. Among 4 cases of Bronchiectasis, 2 were diagnosed as Post tubercular bronchiectasis.

Of the 100 cases, 63% had CD4 count <200, 30% 200-499 and 7% >500. Among 63% cases with CD4 count <200, 52 were Tuberculosis cases, 7 were PCP, one BCP, one Bronchiectasis and two were Malignancy. Among 30 patients with CD4 count between 200 and 499, 24 were Tuberculosis, one PCP, two BCP, one Bronchiectasis, one Emphysema and one was URTI. Among 7 cases with CD4 count >500cells/ μ L, five were Tuberculosis, one Chronic bronchitis and one Emphysema.

Of 81 Tuberculosis cases 53% had Pulmonary tuberculosis, 39.5% Extra pulmonary tuberculosis and 7.4% Disseminated disease. Smear positive were 22 (27.16%) and smear negative were 59 (72.83%). Pulmonary infiltrates were seen in 67.4%, Cavity in 27.8% and Post tubercular bronchiectasis in 4.6%. Upper zone infiltrates were seen in 13.9%, Lower zone infiltrates in 13.9% and Diffuse involvement in 39.5% and Cavitary lesions in 27.8% (Table I).

A total of 43.7% had Pleural effusion, 15.7% Miliary TB, 13.1% Hilar lymphadenopathy, 5.2% Pneumothorax, 5.2% Hydro-pneumothorax, and 13.1% Normal (Table II). Of 43.7% Pleural effusions, 5.2% had Emphysema.

9 cases had CD4 count <200, 12 between 200 -499 and one with CD4 count >500. Six cases of upper zone involvement had a mean CD4 of 471.16, six of lower zone involvement had a mean CD4 of 246.16 and 17 of diffuse involvement had a mean CD4 of 198.88 .

A total of 8 cases had pneumocystis carinii pneumonia, 3 Bacterial pneumonia, 2 Bronchiectasis, 1 Chronic bronchitis, 2 Malignancy, 2 Emphysema and 1 URTI. Among 8 cas-

es of PCP, 7 had initial spo2 >90% and a mean drop of 4% with exercise. One had initial spo2 of <90% and a mean drop of 12% with exercise. Of the 8 cases of pneumocystis carinii pneumonia 4 had normal radiology, 3 interstitial reticular pattern and one had ground glass opacity.

One female had left lower zone necrotising pneumonia and the other right upper zone consolidation with sputum Gram's stain and culture sensitivity showing gram positive Streptococcus pneumoniae. Their CD4 count was 233 and 358 cells/ μ L .One male with right upper zone consolidation that developed into lung abscess with sputum stain and culture sensitivity showing gram negative bacilli, Klebsiella. His CD4 count was 17 cells/ μ L.

DISCUSSION

The present study was a cross sectional study of 100 sero-positive patients attending the department of pulmonary medicine in Siddhartha medical college, Vijayawada.

Of 100 sero-positive individuals 6% were in age group 12-20, 31% in 21-30, 39% in 31-40, 19% in 41-50 and 5% in 51-60. In this study males (65%) out number females (35%) and majority (70%) belong to age group 21- 40 which correlates with study by Pratima Gupta, et, al. with a total of 42 HIV sero-positives with 71.42% males and majority (64.28%) belonged to the age group of 21-40 years. Similar results were reported by Dr. Sham P Toshniwal et, al., Madkar SS et, al. and Deivanayagam et, al.

In our study, Tuberculosis (pulmonary and extra pulmonary) (81%), was the most common respiratory manifestation in HIV (Table III) followed by Pneumocystis carinii pneumonia (8%), Bacterial pneumonia (3%), Bronchiectasis (2%), Chronic bronchitis (1%), Malignancy (2%), Emphysema(2%), and URTI (1%).This result correlates with Observational Cross-Sectional Study by Dr. Sham P Toshniwal et, al. of 227 HIV sero-positive patients over a period of 2 yrs where pulmonary tuberculosis was the most common respiratory complication seen in 147(64.76%). Madkar SS et, al. reported Tuberculosis as the most common respiratory manifestation in HIV.

Fever (59%) was the most common presenting complaint in this study followed by Cough (52%), Loss of appetite (48%), Breathlessness (41%) and others which correlates with symptomatic presentation in, Dr. Sham P Toshniwal et, al. study of fever (84.58%). In a study by E. J. PETERS et, al. chronic productive cough topped the list of respiratory symptoms. The clinical and radiological pattern of most patients with chronic cough was highly suggestive of Mycobacterial infection such as Tuberculosis.

Oral candidiasis (52%) was the most common associated complication in our study which correlates with Pratima Gupta, et, al. (40%).

Radiologic profile of the individuals showed 31% Infiltrates/opacities, 18% Pleural Effusion, 11%Normal Chest X-ray, 12% Cavity, 6% Miliary TB, 5% Hilar lymphadenopathy, 4% Bronchiectasis, 2% Pneumothorax, 2% Hydro-pneumothorax, 2% Consolidation, 3% Interstitial reticular pattern, 2% Hyperlucent lung fields, 1% Lung abscess and 1% Ground glass opacity. Out of 31 infiltrates/ opacities 29 were due to Tuberculosis and 2 due to Malignancy. Of 11 Normal X-rays, 5 had Cervical lymphadenopathy, 4 were diagnosed as Pneumocystis carinii pneumonia, one case had Chronic bronchitis and the other URTI. Among 4 cases of Bronchiectasis 2 were as diagnosed as Post Tubercular

bronchiectasis. Among 18 cases of pleural effusion 2 were diagnosed as Empyema.

According to the present study 63% had CD4 count <200, 30% between 200 to 499 and 7% CD4 count >500. The results were similar to Toshniwal, et al study - Respiratory Complications in HIV Seropositive Patients where out of 227 patients, 157 were having CD4 count <200 cells/ μ L (69.16%), 59 between 200 and 499 cells/ μ L (25.99%) and 11 patients >500 cells/ μ L (4.85%)

Out of 81 tuberculosis cases 54 (83.1%) were males and 27(77.1%) were females similar to **Deivanayagam** et, al. where out of 1268 patients (79.25%) were males and the rest (20.75%) were females. Among 81 tuberculosis cases 52 cases had CD4 count <200 (64.1%), between 200 and 499 (29.6%) and 5 had CD4 count > 500(6.1%). The results correlate with **Toshniwal, et. al.**, study - Respiratory Complications in HIV Seropositive Patients, out of 147 tuberculosis patients 64.76% had CD4 count <200, 59 (25.99%) between 200 and 499 cells/ μ L and 11(4.85%) were CD4 count >500cells/ μ L.

In this study, of the 81 tuberculosis cases, 43(53%) were pulmonary TB and 38(39.5%) were extra pulmonary TB which correlates with study by Pratima Gupta, et, al. where of 42 HIV sero-positive patients, 64.28% (27) had pulmonary tuberculosis and 35.71% (15) had EPTB. Of 81 tuberculosis cases 22 (27.16%) were smear positive and 59 (72.83%) were smear negative. Similarly in C. N. Deivanayagam et, al. study, of 1600 patients with tuberculosis and HIV disease, 235(15%) were sputum positive and Pratima Gupta, et, al. reported smear positivity in 40.74%, and smear negativity in 59.25%. In an Observational Cross-Sectional Study by Dr. Sham P Toshniwal et, al. (2014) of 227 HIV sero-positive patients 64(39.19%) were positive for sputum AFB and 163(71.81%) were negative.

Among 81 tuberculosis cases 9(11.1%) sputum positives had CD4 count <200, 12(14.8%) between 200 and 499 and 1(1.2%) had CD4 count > 500. The results correlate with Dr. Sham P Toshniwal et, al. where in patients with CD4 count <200 cells/ μ L, 29(45.31%) were positive for sputum AFB, 33 between 200 and 499 cells/ μ L, and 2 with CD4 count >500 cells/ μ L.

Radiological presentation with pulmonary tuberculosis (Table I) of 43(53%) cases, shows pulmonary infiltrations in 29(67.4%), cavitory lesions in 12(27.8%) and post tubercular bronchiectasis in 2(4.6%). Among 29 cases (67.4%) of pulmonary infiltrations upper zone involvement seen in 6(13.9%), lower zone involvement in 6(13.9%) and diffuse involvement in 17(39.5%) and the result correlates with studies by C.N. Deivanayagam et, al, and Soumya Swaminathan et, al.

Radiological presentation of extra pulmonary tuberculosis with 38 cases shows 18(43.7%) had Pleural effusion, 6(15.7%) Miliary TB, 5(13.1%) Hilar lymphadenopathy, 2(5.2%) Pneumothorax, 2(5.2%) hydropneumothorax, and 5(13.1%) normal (Table II). Six cases of upper zone involvement had a mean CD4 of 471.16, six cases of lower zone involvement had a mean CD4 of 246.16 and 17 cases of diffuse involvement had mean CD4 of 198.88.

According to **Post FA, et al.** upper zone infiltrate typical of PTB reactivation was associated with early HIV infection (mean CD4+ T-cell count 389) and had 78% positive predictive value for identifying patients with > 200 CD4+ T-

lymphocytes/microl.

In the present study, Pneumocystis carinii pneumonia constituted 8% of the study group. Bronchoalveolar lavage was done in seven cases and Methanamine silver staining showed pneumocystis carinii cysts in four cases. In the present study exercise oxygen desaturation was seen in all eight cases. Out of 8 cases 7 had an initial SPO2 of more than 90%. A mean drop of 4% occurred in them with exercise. One case has an initial SPO2 of less than 90%. In that case mean drop was 12% with exercise. Radiological pattern in 8 cases of PCP was normal in 4, reticular pattern in 3 and ground glass opacity in one case.

According to **JD Stansell** et. al, study of 1,182 HIV-infected subjects for 52 months, there were 145 episodes of Pneumocystis carinii pneumonia (PCP). Low CD4 count correlated with high risk of PCP ($p < 0.0001$); 79% had CD4 counts less than 100/microl and 95% had CD4 counts less than 200/microl.

Bacterial pneumonia constitutes 3% of study group. One case (female) had left lower zone necrotising pneumonia. Sputum Gram's staining and culture showed streptococcus pneumoniae and negative for AFB. Second case (female) had right upper zone consolidation. Sputum Gram's staining and culture showed streptococcus pneumoniae. Their CD4 count was > 200. The results correlated with V. Falco et. al, which showed streptococcus pneumoniae (34%) to be the most common organism isolated.

According to **Berman DM** et al, Of the 749 patients whose charts were reviewed, 43 met the case definition for bronchiectasis HIV-1 infected children with a history of recurrent pneumonia, profound immuno-suppression (CDC immunologic category 3), and Lymphocytic Interstitial Pneumonia appear to have a higher risk of developing bronchiectasis.

The present study showed two cases (2%) of malignancy, one male with irregular opacity in right lower lung. Sputum for malignant cells is negative but FNAC lung showed adenocarcinoma. The other case was a female with a history of breast carcinoma showing lung metastasis. Both had CD4 count < 200. According to Mani D, et al Lung cancer is the most prevalent non-AIDS defining malignancy in the highly active antiretroviral therapy era. Adenocarcinoma is the most common histological subtype.

The present study showed two cases of Emphysema with hyperlucent lung fields on radiology and CD4 count > 200. In a study by Diaz and colleagues, 15% of 114 HIV-positive subjects had radiographic emphysema compared to only 2% of 44 HIV negative subjects.

One case of chronic bronchitis showed normal radiology with CD4 count >500 and one case of upper respiratory tract infection with normal radiology and CD4 count between 200- 499. **According to Man-Po LEE**, in the HIV-infected patients **upper respiratory tract infection, acute bronchitis** and **acute sinusitis** occur at all strata of CD4 cell counts and have higher rates compared with HIV-negative control.

CONCLUSION

In the present study of 100 HIV sero-positive individuals, Tuberculosis (81%) was identified as the most common respiratory manifestation and Non tubercular cases as 19%. Knowledge of clinical and radiological features helps a lot in early diagnosis of respiratory manifestations in HIV sero-

positive individuals even in areas where CD4 count facilities are not available.

TABLE I: RADIOLOGICAL PRESENTATION OF PULMONARY TUBERCULOSIS IN HIV SEROPOSITIVE PATIENTS (n=43)

RADIOGRAPHIC FEATURE	NUMBER	PERCENTAGE
Upper zone infiltrates	6	13.9%
Lower zone infiltrates	6	13.9%
Diffuse infiltrates	17	39.5%
Cavity	12	27.8%
Post tubercular bronchiectasis	2	4.6%
Total	43	100%

Table II: RADIOLOGICAL MANIFESTATIONS OF EXTRA PULMONARY AND DISSEMINATED TB IN HIV SEROPOSITIVE PATIENTS (n=38)

RADIOLOGY	NUMBER (percentage)
Pleural effusion	18 (43.7%)
Pneumothorax	2 (5.2%)
Hydropneumothorax	2 (5.2%)
Hilar lymphadenopathy	5 (13.1%)
Miliary TB	6 (15.7%)
Normal	5 (13.1%)
Total	38 (100%)

Table III: SPECTRUM OF RESPIRATORY MANIFESTATIONS OTHER THAN TB IN HIV (n=19)

DIAGNOSIS	MALES	FEMALES	TOTAL
Pneumocystis Carinii pneumonia	4	4	8
Bacterial pneumonia	1	2	3
Bronchiectasis	2	0	2
Chronic bronchitis	1	0	1
Malignancy	1	1	2
Emphysema	2	0	2
URTI	0	1	1
Total	11	8	19



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