

Respiratory Infections and CD-4 Counts in Human Immunodeficiency Virus-seropositive Cases: A Study from Tertiary Care Institute

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Abstract

Introduction: Pulmonary disease is one of the most frequent infections in human immunodeficiency virus (HIV)-positive patients. Among them, the protozoal, viral, bacterial infections and tumors such as Kaposi's sarcoma and lymphoma involving lung often require indoor treatment in hospital. CD4 cell count is an excellent indicator of an HIV-infected patient's risk of developing opportunistic pulmonary infections presumably because it reflects the stage of HIV disease and degree of immune compromise.

Material and Methods: A total of 50 cases of HIV-infected patients showing clinical evidence of respiratory system involvement and admitted in a tertiary care center in Ujjain, from July 2010 to October 2013 were studied in the present study. Detailed clinical history was noted in each patient with special emphasis on history of major surgery, blood transfusion, genital ulcer, multiple sexual partners, occupational exposure, drug abuse history of tuberculosis, and ART whether taken or not, history of antiretroviral drugs taken or not and history of pneumonia.

Results: In the present study, the most common opportunistic infection (OI) was pulmonary tuberculosis 33 (66%) followed by bacterial pneumonia 12 (24%) and others were pneumocystis pneumonia 4 (8%), fungal infection seen in 1 (2%) of the cases.

Conclusion: CD4 count is a sign of decreased immunity and higher chances of OIs. HIV and tuberculosis co-infection is a major problem in India. Early diagnosis of HIV infection and initiation of antiretroviral therapy can be helpful in preventing the patients from OIs.

Key words: CD4 cell count, Human immunodeficiency virus, Opportunistic infections, Tuberculosis

INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) is caused by human immunodeficiency virus (HIV). HIV infection is a global pandemic, with cases reported from virtually every country.¹ The spectrum of HIV-related respiratory diseases has evolved since initial years of the epidemic.² People with advanced HIV are vulnerable to infections called "opportunistic infections" (OIs) because organisms take advantage of the opportunity offered by a weakened

immune system. Since the beginning of the HIV epidemic, OIs have been recognized as common complications of HIV infection.³⁻⁵

Pulmonary disease is one of the most frequent infections in HIV positive patients. Among them, the protozoal, viral, bacterial infections and tumors such as Kaposi's sarcoma and lymphoma involving lung often require indoor treatment in hospital. CD4 cell count is an excellent indicator of an HIV-infected patient's risk of developing opportunistic pulmonary infections presumably because it reflects stage of HIV disease and degree of immune compromise.⁶

Early in the epidemic, *Pneumocystis carinii* pneumonia was considered the predominant pulmonary disorder. However, epidemiologic shifts and advances in treatment have broadened our perspective on the diseases that patients with HIV infection develop.

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P. carinii pneumonia has long been considered the predominant pulmonary disease in patients with HIV, but several factors are changing this perception. The population infected with HIV is increasingly composed of injection drug users and racial and ethnic minorities, which represent groups that have a high incidence of bacterial pneumonia and tuberculosis.^{7,8}

This study was carried out with the aim to study the correlation between CD4 count and respiratory tract infections among HIV-seropositive individuals.

MATERIALS AND METHODS

It was a cross-sectional study. 50 cases of HIV-infected patients showing clinical evidence of respiratory system involvement and admitted to a tertiary care center in Ujjain, from July 2010 to October 2013 were studied in the present study.

Detailed clinical history was noted in each patient with special emphasis on history of major surgery, blood transfusion, genital ulcer, multiple sexual partners, occupational exposure, drug abuse history of tuberculosis, and ART whether taken or not, history of antiretroviral drugs taken or not and history of pneumonia.

Detailed physical examination was carried out in all patients looking, especially for the presence of associated OIs in other systems.

Routine hematological and biochemical, bacteriological, and radiological tests (X-Ray Chest, USG thorax) along with HIV enzyme-linked immunoassay and CD4, CD8 cell count, Hepatitis B surface antigen, and venereal disease research laboratory were carried out in all patients. Special investigation, such as serum lactic dehydrogenase, body fluid examination, and computed tomography (thorax), were performed in patients depending on indication and affordability of patient.

All the patients were treated accordingly in the form of antibiotics, ART, antiretroviral, and supportive therapy. Prophylaxis for various OIs was given where indicated.

RESULTS

In the present study, total number of male patients is 41 (82%) and females are 9 (18%). Out of total 50 patients, 17 (34% cases) were in the age group of 15-29 years, 31 (62%) cases were in the age group of 30-49 years, and 1 (2%) case was in the age group of more than 50 years (Table 1).

In the present study, out of total 50 cases, 23 (46%) cases had CD4 cell count between 200 and 500, which was followed by 16 (32%) cases between 50-199 and minimum 11 (22%) of the cases had CD4 cell count <50 (Table 2).

In the present study, maximum patients 35 (70%) had heterosexual route of transmission. No patient in the present study had homosexual or intravenous route of transmission.

In the present study, fever was the most common presenting symptom in 44 (88%) of the cases followed by cough which was present in 32 (64%) of the cases. Productive cough was present in 24 (48%) of the cases, whereas dry cough was present in 8 (16%) of the cases. Dyspnea was present in 16 (32%) of the cases; chest pain was present in 6 (12%) cases, and hemoptysis was present in 4 (8%) of the cases (Table 3).

In the present study, the most common OI was pulmonary tuberculosis 33 (66%) followed by bacterial pneumonia 12 (24%) and others were pneumocystis pneumonia

Table 1: Distribution of cases according to age and sex

Age group in years	Male n (%)	Female n (%)	Total n (%)
0-14	00 (00)	00 (00)	00 (00)
15-29	14 (28)	03 (06)	17 (34)
30-49	26 (52)	05 (10)	31 (62)
>50	01 (02)	01 (02)	02 (04)
Total	41 (82)	09 (18)	50 (100)

Table 2: Distribution of cases according to CD4 cell counts

CD4 cell count	Number of patients n (%)
>500	00 (00)
500-200	23 (46)
199-50	16 (32)
<50	11 (22)
Total	50 (100)

Table 3: Distribution of respiratory symptoms in HIV-positive patients

Respiratory symptoms	Number of patients n (%)
Fever	44 (88)
Cough	
• Productive cough	24 (48)
• Dry cough	08 (16)
Pleuritic chest pain	06 (12)
Dyspnea	16 (32)
Hemoptysis	04 (08)

HIV: Human immunodeficiency virus

(PCP) 4 (8%), fungal infection seen in 1 (2%) of the cases (Table 4).

DISCUSSION

In the present study, total number of male patients is 41 (82%) and females are 9 (18%). Out of total 50 patients, 17 (34% cases) were in the age group of 15-29 years, 31 (62%) cases were in the age group of 30-49 years and 1 (2%) case was in the age group of more than 50 years. These findings were comparable to the data of global agricultural concept scheme⁹ and NACO,¹⁰ in which maximum number of patients were in the age group of 30-49 years. It shows the prevalence of HIV is more in reproductive life years.

In the present study, maximum patients 35 (70%) had heterosexual route of transmission. These findings were similar to the study conducted by Ramesh and Gandhi *et al.* in Karnataka, in 2015, in which they observed a heterosexual mode of transmission in 84.7% of the total cases.¹¹

In the present study, fever was the most common presenting symptom in 44 (88%) of the cases followed by cough which was present in 32 (64%) of the cases. Productive cough was present in 24 (48%) of the cases, whereas dry cough was present in 8 (16%) of the cases. Dyspnea was present in 16 (32%) of the cases; chest pain was present in 6 (12%) cases, and hemoptysis was present in 4 (8%) of the cases.

In the present study, the most common OI is pulmonary tuberculosis 33 (66%) followed by bacterial pneumonia 12 (24%) and others are PCP 4 (8%), fungal infection 1 (2%) which is comparable to the study done by Tanzania *et al.*¹², in which tuberculosis was seen in 75% of the cases. Study done by Wallace *et al.*,¹³ in USA maximum number of cases, was of PCP 45% and bacterial pneumonia 42%. In a study conducted by Kumarswamy *et al.*, in 1995, in Tamil Nadu, they observed tuberculosis infection in maximum

number of cases. In another study conducted by Sreevidya and Dias, in 2012, they observed that mycobacterium tuberculosis is the most common pathogen causing OIs in HIV-positive individuals.

This shows that, in developing countries, the commonest OI is tuberculosis while, in developed countries, it is PCP and bacterial pneumonia.^{14,15}

CONCLUSION

Tuberculosis is the most common disease in HIV-infected individuals, other than tuberculosis, other bacterial and fungal infections are also common when CD4 cell counts decreased to <200. Low CD4 count is a sign of decreased immunity and higher chances of OIs. HIV and tuberculosis co-infection is a major problem in India. Early diagnosis of HIV infection and initiation of antiretroviral therapy can be helpful in preventing the patients from OIs.

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Table 4: Distribution of various opportunistic respiratory infections in HIV-positive patients

Diagnosis	Number of patients n (%)
Tuberculosis	33 (66)
Bacterial pneumonia	12 (24)
PCP	04 (08)
Fungal infection	01 (02)
Non-TB mycobacteria	00 (00)
Kaposi's sarcoma	00 (00)

HIV: Human immunodeficiency virus, PCP: Pneumocystis pneumonia

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