

*Tanaffos* (2007) 6(3), 26-29

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# Pneumocystis Pneumonia in Patients with Human Immunodeficiency Virus

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## ABSTRACT

**Background:** *Pneumocystis Pneumonia (PCP) caused by Pneumocystis Jirovecii (formerly called P.Carinii) is one of the most common opportunistic infections in patients with human immunodeficiency virus (HIV). The aim of this study was to assess PCP in HIV-infected patients at the "National Research Institute of Tuberculosis and Lung Disease" (NRITLD).*

**Materials and Methods:** *A retrospective study was performed on 12 HIV-infected patients who were hospitalized at the Masih Daneshvari Hospital (NRITLD) and diagnosed as having PCP during 2003- 2007. In patients suspected of PCP with symptoms such as exertional dyspnea, fever, cough and related radiological findings, bronchoscopy including broncho-alveolar lavage (BAL) and transbronchial lung biopsy (TBLB) were performed and high resolution computed tomography (HRCT) was obtained from all patients.*

**Results:** *Mean age of the understudy patients was 32.8±5.02 yrs. The most common symptom was exertional dyspnea (91.7% of cases). Mean duration from the onset of symptoms until diagnosis was 27.4±18.7 days. All patients were treated with Co-Trimoxazole and no adverse effects were detected. Mortality rate was 25%.*

**Conclusion:** *In Iran PCP is one of the common opportunistic infections in HIV-positive patients which is accompanied by a high mortality rate. (Tanaffos 2007; 6(3):26-29)*

**Key words:** *Pneumocystis Jirovecii Pneumonia, Human immunodeficiency virus, Co-Trimoxazole*

## INTRODUCTION

Although prevalence of *Pneumocystis Pneumonia* (PCP), caused by *Pneumocystis Jirovecii* (formerly called *P.Carinii*), has decreased in patients with acquired immunodeficiency syndrome (AIDS) during

the recent years, it is still one of the common causes of pneumonia in these patients (1). At present, PCP occurs commonly in individuals who are not aware of their HIV-seropositive status or do not receive appropriate prophylactic treatment (2). The rates of pulmonary opportunistic infections and malignancies are increased in HIV-infected patients. At first, most patients refer to clinics for their respiratory symptoms, unaware of their HIV serostatus. Therefore, early diagnosis of HIV plays an important

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Received: 27 June 2007

Accepted: 11 Nov 2007

role in treatment of these patients (3). This study is the first report of PCP presentation in HIV-positive patients in Iran.

## MATERIALS AND METHODS

A retrospective study was performed on 12 HIV-infected patients who were hospitalized at Masih Daneshvari Hospital between 2003 and 2007. All were diagnosed with PCP. The inclusion criteria were based on clinical, radiological and laboratory findings (positive monoclonal antibody test in bronchoalveolar lavage fluid). Demographic data, clinical manifestations, radiological features, laboratory findings and treatment outcome were extracted from patient files and records and then analyzed. Demographic data are shown in Table 1.

## RESULTS

None of the patients received antiretroviral therapy before the diagnosis of PCP and those who were already aware of their HIV- seropositive status had not received prophylaxis with Co-Trimoxazole. The most common complaints of patients were

exertional dyspnea in 11 cases (91.7%), fever in 9(75%), productive cough in 8(66.7%) and weight loss in 7 cases (58.3%). Non-productive cough was reported in 3 (25%) patients. Regarding the concomitant co-existing infections, all study patients had oral candidiasis. *M.Tuberculosis* and cytomegalovirus (CMV) were detected in 4(33.3%) and 2(16.6%) cases, respectively, as the second and third concomitant infection. Mean duration from onset of symptoms until diagnosis was  $27.4 \pm 18.7$  days. The mean CD4 count was  $68.1 \pm 42.4$  cells/  $\mu\text{L}$ . Laboratory and radiological findings have been demonstrated in Table 2. All patients were treated with Co-Trimoxazole and no adverse effects were reported. Corticosteroids were given to all patients during the course of the disease. Diagnosis of PCP was made by BAL in 7 patients and BAL plus trans-bronchial lung biopsy (TBLB) in the remaining 5 cases. No complication or mortality was observed following bronchoscopy. Monoclonal antibody test was positive in all BAL samples. Nine (75%) patients were discharged after receiving required treatment and 3(25%) patients died.

Table 1. Demographic data of HIV-infected patients with PCP at the Masih Daneshvari Hospital between 2003 and 2007.

age	Gender		History of cigarette smoking		Awareness of HIV serostatus		Route of transmission			History of treatment HAART *	
	Male	Female	Yes	No	Yes	No	IV	Sex	Unknown	Yes	No
32.8 $\pm$ 5.02	10 (83.3%)	2(16.7%)	9(75%)	3(25%)	5(41.6%)	7(58.4%)	7(58.4%)	3(25%)	2(16.6%)	-	12(100%)

\* HAART: Highly Active Antiretroviral Therapy

Table 2. Radiological and laboratory findings of HIV-infected patients with PCP at the Masih Daneshvari Hospital between 2003 and 2007.

CD 4 count (cells /μL)		CD4		Arterial oxygen pressure (PO <sub>2</sub> )			Bronchoscopy		CXR			HRCT	
68.1±42.4	<200	>200	<70	70-80	>80	BAL	BAL+TBLB	PHII	cystic	other	Ground glass	Ground glass+ cystic change	
	12(100%)	0	8(66.7%)	2(16.6%)	2(16.6%)	7(58.4%)	5(41.6%)	8(66.7%)	1(25%)	3(8.3%)	10(83.3%)	2(16.7%)	

CXR: Chest X-Ray

HRCT: High Resolution Computed Tomography

BAL: Broncho-alveolar Lavage

TBLB: Trans-bronchial lung biopsy

PHII: Peri-Hilar Interstitial Infiltration

## DISCUSSION

*Pneumocystis Jirovecii* is an opportunistic infection causing life-threatening pneumonia in HIV-infected patients (4). Despite the use of antiretroviral drugs, PCP has remained one of the most common manifestations of HIV in these patients (5). In the first decade of HIV epidemics, PCP was seldom reported in developing countries and most authors believed that PCP was uncommon in these countries. However, further reports showed its prevalence to be higher than expected (6,7).

There were few reports about the prevalence of PCP in Asian countries (8).

In our study, the mean age of the patients was as low as other studies (9). In most studies, the number of HIV infected men was higher than women (9,10).

Transmission routes of HIV are different in various studies (9,10). The most common clinical findings were dyspnea, fever and cough in our study which were the diagnostic criteria for PCP (10). A remarkable finding in our study was productive cough whereas dry cough had a higher prevalence in other studies (9,10). It may be due to the status of our study patients who were IV drug abusers (most of them) and developed smoking-induced chronic bronchitis resulting in high prevalence of productive cough.

More than half of our HIV-positive patients (58.3%) were unaware of their HIV-seropositive status and the remaining had not received appropriate prophylaxis whereas the CD4 count was below 200 cells / $\mu$ L. This was consistent with other studies. In a study by Fujii et al. HIV infection was diagnosed after infecting with PCP in 63% of cases (10). It is important to bear in mind that we can prevent PCP by appropriate prophylaxis and prompt antiretroviral therapy. Unfortunately, persons who are at high risk for HIV infection are not aware of the outcome of late diagnosis of the disease after contracting opportunistic infections (11, 12).

In our study, oral candidiasis and tuberculosis were detected as the first two concomitant opportunistic infections. Other studies conducted in developing countries also reported co-infection with tuberculosis and PCP in 13-66% of cases (5).

All of our study patients were treated with Co-Trimoxazole and no remarkable side effect was reported which indicated that Co-Trimoxazole was a safe drug for this group of patients (12). Mortality rate was 25% in this study which was higher than some other studies in other developing countries (9). It may be due to the late HIV diagnosis (i.e. mean duration from onset of symptoms until diagnosis was 27.4 days in our study). In developed countries, the mortality rate is 10-20% (13).

Regarding radiological findings, the most common feature was ground-glass opacities on HRCT which is consistent with other studies (10).

As a whole, the present study showed that *Pneumocystis Jirovecii* was one of the fairly common infections in HIV-positive patients. Thus, HIV positive patients with respiratory manifestations and ground-glass opacities on pulmonary HRCT should be suspected for PCP. On the other hand, in those with promiscuous behaviour and unknown HIV serostatus, PCP should be considered in the differential diagnosis.

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