

Original Article

Clinical Syndromes in HIV/AIDS according to CD4 count

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ABSTRACT

Objectives: Immunodeficiency due to HIV infection can produce unusual diseases in infected individuals & CD4 count is the main predictor of disease progression. In this study clinical syndromes resulting in admission, are considered according to CD4 count for the better diagnosis and treatment of clinical problems in HIV infected patients.

Material & Methods: This is a cross-sectional study that was performed since March 2002 to March 2003 in Kermanshah Sina Hospital. HIV infection was confirmed with positive double ELISA and Western Blot. CD4 count was measured by flow cytometry, clinical syndromes were collected with final diagnosis, and the rest of the data were gathered according to the patients' interviews. Statistical analysis was performed by SPSS 11.5.

Results: During this study, 72 out of 215 admissions were enrolled. All of them were male with the mean age of 33.4 ± 9.1 years. 64 cases (88.9%) were addicted and 40 cases (55.6%) had prison history. Clinical and/or laboratory indicators of AIDS were observed in 32 cases (44.4%). The average of CD4 count was $356/\mu\text{L}$. Patients with lymphadenopathy, neurologic and pneumonia syndromes had the least count of CD4 with the averages of 90, 241 and $269/\mu\text{L}$ and patients with sepsis, endocarditis and hepatitis syndromes had the highest CD4 average count of 646, 394 and $373/\mu\text{L}$ respectively. Statistically correlations were observed between pneumonia syndrome with $\text{CD4} < 200/\mu\text{L}$ (P -value=0.005), and addiction history (P -value=0.0001). Suffering from hepatitis syndrome was also statistically correlated with being at prison.

Conclusion: High prevalence of AIDS in our study was a trait which means high prevalence of asymptomatic HIV infection in general population. Also in patients with $\text{CD4} < 200/\mu\text{L}$, especially those who are addicted, pneumonia syndrome may occur. Lymphadenopathy, neurologic and pneumonia syndromes are more common in $\text{CD4} < 300/\mu\text{L}$ whereas sepsis, Endocarditis and hepatitis syndromes are common in $\text{CD4} > 300/\mu\text{L}$, that shows the effect of CD4 count in appearance of clinical syndromes. Unsafe injections in prisons may cause acquisition of viral hepatitis in these patients.

Key words: HIV, CD4, Clinical Syndromes

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Introduction

HIV positive patients are susceptible to wide variety of infectious and noninfectious syndromes. The occurrence and etiology of these syndromes is related to immunodeficiency due to HIV infection. On the other hand, a clinical syndrome, in a HIV infected patient, may have different etiology according to the degree of immunodeficiency. It means that the approach to a clinical syndrome in HIV infected patients is different than noninfected individuals. CD4 count is the best way to evaluate the cellular immunity and the severity of immunodeficiency. It can also help the physician to diagnose and treat the disorders of HIV positive patients (1, 2).

Because of the high prevalence rate of HIV infection in Kermanshah, we decided to evaluate the clinical syndromes which caused admission in HIV infected patients according to CD4 count. Here, we report the relation between immunodeficiency and progress of diseases in HIV positive individuals for better approach to these patients.

Material and Methods

This is a cross sectional study that was performed between March 4, 2002 to March 3, 2003 in Sina Hospital of Kermanshah and 72 from 215 admissions were enrolled. HIV infection was confirmed with positive double ELISA and Western Blot. We used flow cytometry method to determine CD4+ count. Study data includes: CD4 count and also age, gender, marital status, addiction history, prison history and clinical syndromes which caused the admission, were taken from medical records of patients and entered into a database. All tests for significance and resulting P values were two-sided, with a level of significance of 0.05.

Results

Characteristics of the cases:

A total of 150 HIV infected patients were admitted once or several times in the study period which led to 215 admission. 72 of them who are

their patients were consent, enrolled to the study. All of them were male with the mean age of 33.4 +/- 9.1 years. The youngest of all was 19 and the oldest patient was 65 years old. 41 (56.9%) of cases were younger than 35 and 31 (43.1%) were older than 35 years old. 46 (63.9%) of admitted individuals were single and 64 (36.1%) were married. In 64 (88.9%) we found positive addiction history. Mean duration of addiction in this group was 88.4 months (12 to 336 months), also 40 (55.6%) of cases had prison history with mean duration of 60 months (1 to 300 months).

CD4 count and statistical correlations:

From 72 admitted individuals 32 cases (44.4%) had clinical and/or laboratory indicators of AIDS. (Table 1)

Table 1-Distribution of cases according to HIV classification system

CD ₄ count	Clinical Categories		
≥ 500/ul	A ₁ =14	B ₁ =0	C ₁ =2
200-499/ul	A ₂ =26	B ₂ =0	C ₂ =5
<200/ul	A ₃ =16	B ₃ =0	C ₃ =9

The least average of CD4 count was seen in lymphadenopathy, neurologic and pneumonia syndromes and the highest average of CD4 count was seen in sepsis syndrome. (Table 2)

There was correlation between pneumonia and CD4 <200 / μL (Pvalue = 0.005) and CD4 <100 / μL (Pvalue = 0.01). Also we found that pneumonia syndrome was related to addiction history (Pvalue = 0.0001). (Table 3)

There was correlation between hepatitis syndrome and history of prison (Pvalue = 0.022) but soft tissue infection was related with negative history of prison (Pvalue = 0.007) and also CD4 > 350 / μL (Pvalue = 0.034).

There was no relation between other clinical syndromes and CD4 count.

Discussion

In our study, all of the cases were male, 88.9% of them were addicted and 55.6% had prison history. According to the report of center of disease

Table 2-Mean and domain of CD4 count in clinical syndromes

Domain of CD4	Mean of CD4	Frequency	Clinical Syndrome
48-804	376.9	20(27.8)	Skin and soft tissue infection
23-2007	269.9	17(23.6%)	Pneumonia
83-910	327.6	15(20.8%)	DVT
21-2007	646.1	6(8.3%)	Sepsis
210-568	373.3	6(8.3%)	Hepatitis
176-830	394	3(4.2%)	Endocarditis
67-565	316	2(2.8%)	Osteoarticular Syndrome
—	311	1(1.4%)	Gastroenteritis
—	241	1(1.4%)	Neurologic.Syndrome
—	90	1(1.4%)	Lymphadenopathy

control in Iran, 95.5% of HIV positive patients are males and only 4.5% of them are females. 66.4% of the patients with HIV infection have a history of intravenous drug usage, 12.6% have other known risk factors and in 21% of them, the mode of transmission was unknown (3). Also UNAIDS reported that 65% of HIV transmission in Iran was due to intra venous drug usage (4). Male gender and frequent addiction history in our study suggests that injecting drug usage is the mean mode of HIV transmission in our patients. Although sexual transmission of HIV infection is important but we do not have the exact rate of this one.

Clinical and/or laboratory indicator of AIDS, was seen in 44.4% of cases, because HIV infected individuals in our study were selected from hospitalized patients, but this may reflect high frequency of asymptomatic HIV infection in general population.

The average of CD4 count in 17 cases were admitted with pneumonia syndrome was 269/ μ L and upper limit of CD4, except one case, was less than 500/ μ L. In Williams' study, the average of CD4 count in patients with pneumonia was 574/ μ L, 30% of them had CD4 < 200/ μ L and 70% of them had CD4 < 500/ μ L, but there was no relationship between severity of pneumonia and CD4 count (5). In Huang's study, when CD4 dropped below 500/ μ L, recurrent bacterial pneumonia occurred (6). These results are similar to our study.

The average of CD4 count in 20 individuals with skin and soft tissue infections was 377/ μ L (48 to 804/ μ L). It means that these infections are due to injecting drug usage than a result of HIV infection.

We found that the patients with DVT had the average CD4 count of 328/ μ L (83 to 910/ μ L). In Saber and Co - worker's study, the risk of DVT in HIV positive patients was 10 times greater than general population which was due to infectious or malignant prolems (7). Although all of the patients with DVT in our study were intra venous drug users, the role of low CD4 count in this problem should be considered.

As shown in other studies, HIV infected patients with sepsis syndrome have higher CD4 count (5). In six patients with Sepsis syndrome, the mean CD4 count was 464/ μ L with the range of 21 to 2007/ μ L that is the highest average of CD4 in our study. CD4 count was strongly influenced by the total number of the white blood cells. We should consider that sepsis syndrome can increase WBCs with different mechanisms, therefore CD4 count is not a valuable indicator in this syndrome. In this situation CD4 percent may be helpful.

The mean CD4 count in six cases with hepatitis syndrome in our study was 373/ μ L (210 to 568/ μ L). In the study of Castile - Leon prisons in Spain, 81.4% of HIV positive patients had HCV infection and 12.6% of them had HBS - Ag positive and median CD4 count in this study was 426/ μ L (8). Transmission of viral hepatitis is

Table 3-Clinical syndromes according to study variables

Variables Clinical syndrome	Frequency	Addiction		Prison		CD4 count		Statistical Correlations
		yes	No	yes	No	<200	200≥	
Skin & Soft Tissue infection	20 (27.8%)	20 (100%)	0 (0)	6 (%30)	14 (%70)	4 (%20)	16 (%80)	Prison=Yes: PV=0.007
Pneumonia	17 (23.6%)	10 (%58.8)	7 (%41.2)	9 (%52.9)	8 (%47.1)	11 (%64.7)	6 (%35.3)	Addiction=Yes: PV=0.000 CD4 = Yes: PV= 0.005
DVT	15 (20.8%)	15 (%100)	0 (0)	7 (%46.7)	8 (%53.3)	5 (%33.3)	10 (%66.7)	No
Sepsis	6 (8.3%)	5 (%83.3)	1 (%16.7)	5 (%83.3)	1 (%16.7)	2 (%33.3)	4 (%66.7)	No
Hepatitis	6 (8.3%)	6 (%100)	0 (0)	6 (%100)	0 (0)	0 (0)	6 (%100)	Prison=Yes: PV=0.022
Endocarditis	3 (4.2%)	3 (%100)	0 (0)	3 (%100)	0 (0)	2 (%66.7)	1 (%33.3)	No
Osteoarthicular Syndrome	2 (2.8%)	2 (%100)	0 (0)	1 (%50)	1 (%50)	1 (%50)	1 (%50)	No
Gastroenteritis	1 (1.4%)	1 (%100)	0 (0)	1 (%100)	0 (0)	0 (0)	1 (%100)	No

similar to HIV infection thus the acquisition of viral hepatitis is due to the habits of the patients, and it does not seem that CD4 count to be important in this situation. Although the number of CD4 is important in clinical presentations of hepatitis. When CD4 count is high, symptoms of hepatitis is visible, while the CD4 count is low, asymptomatic hepatitis is greater than symptomatic ones.

The number of patients with endocarditis, gastroenteritis, neurologic and lymphadenopathy syndromes were too low to interpret these syndromes.

In our study there was relationship between pneumonia and CD4 <200/ μ L (PV = 0.005) and also CD4 < 100/ μ L. In brecher and Co - workers' study, HIV positive patients with CD4 < 200/ μ L were susceptible to bacterial pneumonia five times greater than general population (9). Feikin and Co - workers' found that bacterial pneumonia in HIV positive patients was 25 times greater than general population and the incidence of disease

increased with the reduction of CD4 count(10), which is similar to our findings. It seems that antimicrobial prophylaxis was helpful to prevent from pneumonia.

HIV positive patients that use tobacco was susceptible to PCP three times more than non tobacco users and these individuals were at risk for pulmonary diseases (11, 12). In our experience, all of the addicted patients were cigarette smokers. It seems that smoking is an independent risk factor for pneumonia in HIV positive patients.

We found the relationship between hepatitis syndrome and history of prison. In the study of Burbano and Co-workers, 97% of prisoners were HCV infected and 88% of them were intra venous drug users (13).

In our study, there was correlation between skin and soft tissue infections and no prison history and it may be due to the simplicity of addicted practices outside the prison. Also there was relationship between skin and soft tissue infections and CD4>350/ μ L and it may be due

to leukocytosis in soft tissue infections, although this finding requires further evaluation.

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