Original Article

Anemia Prevalence and Related Factors in HIV-Infected Patients: A Cohort Study

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ABSTRACT

Background and Objective: **Anemia is a common manifestation of human immunodeficiency virus (HIV) infection, occurring in approximately 30% of patients with asymptomatic infection and in as many as 75% to 80% of those with AIDS. Anemia has been associated with decreased quality of life and decreased survival. In this study we aimed to determine the prevalence and related factors of anemia in HIV-infected patients.**

Materials and Methods: **A total of 143 HIV positive patients who referred to behavioral disease consulting center in Tehran were screened for anemia. Mild to moderate anemia was defined as hemoglobin (Hb) 8-14g/dl for men and 8-12g/dl for women; severe anemia was defined as Hb less than 8g/dl for both males and females. sociodemographic data were collected using a questionnaire. In all patients, CD4 lymphocytes counting were done by flowcytometry.**

Results: **It was found out that 143 HIV positive patients with a mean age of 37.1± 2 years were enrolled in our study. The mean Hb level was 13.5 ± 2.1 g/dl. Mild anemia occurred in 46% of subjects while severe anemia was not observed. There was not any significant difference between patients with and without anemia regarding age, gender, stage of the infection, CD4 cells count and concurrent anti-retroviral therapy. We also found significant difference between anemia and risk behaviors for HIV acquisition.**

Conclusion: **Our results showed that mild to moderate anemia was frequent in HIV positive patients but severe anemia was not prevalent in this study population.**

Key words: Anemia, Human immunodeficiency virus (HIV)

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Introduction

Anemia is the most commonly encountered hematological abnormality in human immunode-ficiency virus (HIV) positive patients. Estimates of the prevalence of anemia vary greatly depending on the clinical setting and may range from 1.3% to 95% (1;2). As the disease progresses, anemia occurs with greater frequency and is associated with shorter survival times in HIV-infected patients (3;4).

The etiology of anemia in patients with HIV infection is multifactorial in nature, with opportunistic infections, nutritional deficiencies (e.g. iron deficiency, folic acid deficiency), certain medications (including antibiotics and antiretroviral agents such as zidovudine), and infiltrative diseases of the bone marrow among the leading causes (5). The clinical signs and symptoms of anemia depend on the rapidity of onset, HIV disease severity, and patient's age (6).

The estimates of anemia are so disparate because they are based on a variety of factors including stage of HIV disease, definition of anemia, use of antiviral medications (particularly zidovudine), location of the study, sex, pregnancy, injection-drug use, and age. Because anemia has been shown to have an impact on mortality (7) and quality of life (QOL) (5;8), accurately characterizing the prevalence of anemia in HIV infected patients becomes important because it facilitates the identification of patients at greatest risk for adverse outcomes associated with anemia. Therefore, in this study we aimed to determine the prevalence and related factors of anemia in HIV-infected patients.

Patients and Methods

In this cross-sectional study, 143 HIV positive patients who referred to behavioral disease consulting center in Tehran were screened for anemia. The enrolled patients with HIV infection were subjects who tested with two enzyme-linked immunosorbent assay (ELISA) and confirmed with Western blot. A questionnaire was used to collect their sociodemographic data, anti-retroviral medication, stage of the infection (HIV/AIDS) and high risk behaviors for HIV acquisition. In all patients CD4 lymphocytes counting were done by flowcytometry and defined as cells/mm^3.

Normal hemoglobin (Hb) was defined as hemoglobin greater than 14g/dl for men and 12g/dl for women; mild to moderate anemia was defined as Hb 8-14g/dl for men and 8-12g/dl for women; severe anemia was defined as Hb less than 8g/dl for both males and females.

Chi-square and t test were used using SPSS version 11.5 for statistical analysis. Data are presented as means ± standard deviations or when indicated as percentage. A P-value of <0.05 was considered significant.

Results

A total of 143 HIV positive patients were enrolled in our study. In this respect, 86% of them were males and 14% were females with a mean age of 37.1±2 years. Meanwhile, 50.8% of them did not receive any anti-retroviral medication; 49.2% received combination therapy with 2 nucleoside reverse transcriptase inhibitors [NRTIs (zidovudin and lamivudin)] and protease inhibitors [PI (nelfinavir)]. In addition, 70.5% of subjects were intravenous drug abusers (IDUs), 17.3% heterosexual, 5% had infected blood and blood products transfusion and 7.2% had not identified way of HIV acquisition. The CD4 lymphocytes were between 30 and 1413.5 cell/mm^3 (a mean of 229.2±394.5). 48.9% of subjects were HIV infected and 51.1% had AIDS.

The mean Hb level of patients was 13.5 ± 2.1 g/dl (a range of 8.1-19.9 g/dl). Mild to moderate anemia was detected in 46% of subjects while severe anemia was not observed. There was not any significant difference between patients with and without anemia regarding age, gender, stage of the infection, CD4 cells count and concurrent anti-retroviral therapy. The prevalence of anemia was significantly higher in IDUs as compared to patients infected with other routes of HIV acquisition ($p<0.05$).

Discussion

Anemia is a common manifestation of human immunodeficiency virus (HIV) infection (9) occurring in approximately 30% of patients with asymptomatic infection and in as many as 75% to 80% of those with AIDS. Anemia has been associated with decreased quality of life (QOL) and decreased survival (10;11). As persons with HIV infection continue to live longer, primarily as a result of advances in antiretroviral therapy, it becomes important to assess the incidence and prevalence of anemia (1;2;12). Moore et al (1, 13) performed a longitudinal study of anemia in patients with AIDS and AIDS related complex (ARC). The

prevalence of mild anemia in patients with AIDS was 69% and the prevalence of mild anemia in patients with ARC was 49% (1). During the first 2 years of follow-up, serious anemia developed in 45% of patients with a baseline CD4+ count <100 cells × 10^6/L and in 31% of patients with a CD4+ count >100 cells × 10^6/L (13). Mocroft et al showed that out of 6725 HIV infected patients, 40.4% had normal levels of hemoglobin, 58.2% had mild anaemia and 1.4% had severe anemia. At 12 months after the study, the proportion of patients estimated to have died was 3.1% for patients without anemia, 15.9% for patients with mild anemia and 40.8% for patients with severe anemia (4). Another study showed that prevalence of anemia and marked anemia in HIV infected patients was 36% and 5% respectively. Among 1721 patients receiving no HAART, 39.7% were anemic; among 7252 receiving HAART, 35.5% were anemic. Anemia was most prevalent among men, blacks, patients with CD4+ < 200 cells/mm^3 and HIV-1 RNA > 30000 copies/ml. Marked anemia has been more common in women (14). Wills et al reported that overall anemia prevalence was 30.3% in cohort of American HIV-infected patients. Multivariate logistic regression analysis demonstrated that anemia was associated with a CD4+ cell count below 50/microL, female sex, black race, a viral load above 100,000 copies/mL, zidovudine use, and older age. Severe anemia was less prevalent in this study population than in historical comparators; however, mild to moderate anemia rates remain high (15).

In our study, mild to moderate anemia was detected in 46% of HIV infected subjects while severe anemia was not observed. We also did not find any significant difference between patients with and without anemia, regarding age, gender, stage of the infection, CD4 cells count and concurrent anti-retroviral therapy. The prevalence of anemia was significantly higher in IDUs as compared to patients infected with other routes of HIV acquisition. These variable results may be related to various factors such as the HIV infection rate in the general population, the size of the study group and the demographic and clinical features of the patients. Data on the prevalence of anemia are limited in our country. So our study could define some epidemiological aspects of anemia in HIV positive patients. Further studies are needed to exactly determine the rate of anemia in HIV infected subjects.

Conclusion

Our results showed that mild to moderate anemia was frequent in HIV positive patients but severe anemia was not prevalent in this study population.

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