Section: Medicine

Original Research Article

A STUDY OF FACTORS ASSOCIATED WITH ANEMIA IN HIV INFECTED INDIVIDUALS IN VIMS MCH, BALLARI

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Abstract

Background: Anemia is the most common hematologic manifestation seen in HIV infection. The etiologies of anemia may be different from the general population. The objectives of the study were to study the etiology of anemia in HIV positive individuals and to study the relationship between anemia and immunological status as indicated by the CD4 count. **Materials and Methods:** A cross-sectional study will be carried out on 100 consecutive HIV patients in different stages of disease attending the Department of Medicine, Vijayanagara Institute of Medical Sciences Bellary, Karnataka during the period of 18 months from October 2014 to May 2016 applying following inclusion and exclusion criteria. **Result:** Mean age of the patients was 39 years and 72% of the subject were male. CD4 count was lesser than 200/µl in 61% of patients and was greater than 200 in 39%of the patients. 58% of the patients were on HAART. There was significant difference in hemoglobin values among patients who had CD4 count less than 200/µl (mean Hb 6.387gm/dl) and CD4 count greater than 200/µl (mean Hb 7.469gm/dl) (p=0.001). There was positive correlation between CD4 count and hemoglobin (r=0.2637, p=0.001). There was positive correlation between Vitamin B12 levels and CD4 count (r-0.2748) or (r-0.271) but relationship is weak. There was negative correlation between ferritin levels and CD4 count (r =0.7796) or Hemoglobin (r=0.3917). **Conclusion:** Mean age of the patients was 39 years and the disease was seen affecting people in the most productive years of their life. 72% of the subjects were male. CD4 count was lesser than 200/µl in 61% of patients and was greater than 200 in 39%of the patients. Thus the patients included in this study had advanced disease.

INTRODUCTION

The human immunodeficiency virus (HIV) is a lentivirus (a subgroup of retrovirus) that causes and over time acquired immunodeficiency syndrome (AIDS).[1,2] AIDS is a condition in humans in which progressive failure of the immune system allows life-threatening opportunistic infections and cancer to thrive. Without treatment, average survival time after infection with HIV is estimated to be 9 to 11 years, depending on the HIV subtype.[3] Infection with HIV occurs by the transfer of blood, semen, vaginal fluid, pre-ejaculate or breast milk.

Within these bodily fluids, HIV is present as both free virus particles and virus within infected immune cell. AIDS was first clinically observed in 1981 in the United States. The initial cases were a cluster of injection drug users and gay men with no known cause of impaired immunity who showed symptoms of pneumocystis carinii pneumonia (PCP), a rare opportunistic infection that was known to occur in people with very compromised immune systems.[4] Soon thereafter, additional gay men developed a previously rare skin cancer called Kaposi's sarcoma(KS). Many more cases of PCP and KS emerged, alerting U.S. Canter for Disease Control and Prevention (CDC) and a CDC task force was formed to monitor the outbreak.[5] The earliest retrospectively described case of AIDS is believed to have been in Norway beginning in 1966. Anemia in human immunodeficiency virus (HIV)–infected patients can have serious implications, which vary from functional and quality-of-life decrements to an association with disease progression and decreased survival. In 2002, 16 members of the Anemia in HIV Working Group, an expert panel of physicians involved in the care of HIV-infected patients that met first in 1998, reconvened to assess new data and to translate these data into evidence- based treatment guidelines.[6]

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Understanding the association between anaemia and HIV infection is important because Treatments for anemia are available including recombinant human erythropoietin, blood transfusion, and in drug-induced anemia, cessation of myelosuppressive therapies. Hence knowledge of the pathophysiological mechanisms and the prevalence of various causes of anemia will help us in treatment of anemia in HIV positive patients.[7] Very few studies have examined factors associated with anemia in the setting of a developing country.

MATERIALS AND METHODS

A cross-sectional study will be carried out on 100 consecutive HIV patients in different stages of disease attending the Department of Medicine, Vijayanagara Institute of Medical Sciences Bellary, Karnataka during the period of 18 months from October 2014 to may 2016 applying following inclusion and exclusion criteria.All respondents were adults, aged more than 18 yrs. Informed consent was taken prior to inclusion in the study.

Inclusion Criteria

HIV patients above 18 years of age.

Anemia with hemoglobin less than 10 gm/dl

Exclusion Criteria

HIV patients below 18 years of age.

HIV patients who do not give consent for the study

Methodology

The study will be undertaken in 100 HIV positive patients who will be attending the Department of Medicine, Vijayanagara Institute of Medical Sciences, Bellary during the study period of October 2014 to may 2016. A detailed and careful history will be taken regarding the duration and symptoms of the disease. A thorough systemic examination will be done. HIV was confirmed by the ELISA test. CD4 counts were analyzed using the Flowcytometry method. Hemoglobin,total count and differential count were performed in the laboratory using automated counting chambers . Further work up for anemia including ,peripheral smear examination,mean corpuscular volume estimation, serum ferritin and B12 levels were done. Bone marrow aspiration and biopsy was done for few of the patients as part of anemia evaluation.Other tests were done as per the needs of the patient.

Statistical Analysis

Once data was collected and tabulated using MS Office Excel, the tabulated data was then analyzed. Descriptive Analysis was done using Percentages, Proportions, Mean and Standard Deviations and inferential Analysis was done using unpaired T-tests, chi-square.

RESULTS

As per [Table 1] In our study 12 patients were between 18-30 years, 39 patients were between 31-40 years of age, 43 patients were 41-50years of age and 6 patients were >50years. 100 patients with HIV infection and anemia were included in the study. Minimum age was 18 years and maximum mage was 55 years (Mean age was 39).

Table 1: Association age with CD4 count

Age in years	Number of patients CD4<200	%	Number of patients CD4>200	%	Total
18-30	6	50	6	50	12
31-40	24	61	15	38	39
41-50	27	62	16	37	43
>50	4	66	2	33	6
Total	61	61	39	39	100

p-0.89

Table 2: Association Gender with CD4 count

Gender	Number of patients <200	%	Number of patients >200	%	Total
Male	47	65.3	25	34.7	72
Female	15	53.6	13	46.4	28
Total	62	62	38	38	100

Out of 100 HIV patients 72 were male and 28 were female. Among 72 male patients 47 patient having CD4 count of <200 and 25 were having CD4 >200 among 28 male patients 15 patient having CD4 count of <200 and 13 were having CD4 >200.

Table 3: Etiology of Anemia

Etiology	No of patients	%
Anemia chronic disease (inflammation)	55	55
Iron deficiency anemia	12	12
B12/Folate deficiency anemia	11	11
Zidovudine Induced anemia	22	22
Anemia se condary to hemolysis	1	1
Total	100	100

As per [Table 3] HIV induced anemia (anemia of chronic disease) is characterized by normocytic and normochromic red cells and an inappropriately low reticulocyte response. This is reflected by a low serum iron,

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serum ferritin values increase threefold over basal levels in the face of inflammation and a a hypoproliferative marrow. Iron deficiency anemia is characterized by microcytic and hypochromic anemia and is reflected by low serum iron, low mcv and low ferritin B12 deficiency anemia is characterized by macrocytic anemia and is reflected by low vitamin B12 and high mcv Zidovudine induced anemia can be identified by features. Patient on zidovudine and Macrocytic/normocytic anemia. Improvement in hemoglobin by greater than 2 three months after stopping zidovudine.

Table 4: CD4 count and Etiology of Anemia

Variables	CD4 count <200/µl	CD4 count >200/µl	P value
Anemia chronic disease (inflammation)	41(67%)	13(33.5%)	0.0023**
Iron deficiency anemia	4(6.5%)	8(20.5%)	0.432
B12 deficiency anemia	7(11.5)	4(10%)	0.0622
Zidovudine Induced anemia	9(15%)	13(33.5%)	0.4954
Anemia secondary to hemolysis	0	1(2.5)	

As per [Table 4] Among patients with low immunological status as expressed by CD4 count less than 200/µl, the etiologies of anemia were Anemia of chronic disease (67%), zidovudine induced anemia (15%), B12/folate deficiency (11.5%), Iron deficiency (6.5%), Among patients with CD4 count greater than 200/µl, the most common etiologies of anemia were, Anemia of chronic disease (33.5%) zidovudine induced anemia (33.5) Iron deficiency (20%) B12/folate deficiency(10%) anemia secondary to hemolysis (2.5).

DISCUSSION

In this study 100 patients infected with HIV of which 72 males and 28 females and anemia who were admitted to the vims ballari in dept of medicine, were included. Patients with mild anemia (>10g/dl) were excluded from the study. Only patients with hemoglobin less than 10 gm/dl (WHO classification of anemia, moderate and severe grade) were included in the study.

Minimum age of the subjects was 18 years and the maximum age was 51 years with mean age of 39years. 72 patient were male and 28 were female. Mean age in males was 40 years and in females was 40 years. These demographic data are similar to those documented in other studies done in India.[8] Coming to marital status of the patients, 81 of patient in this study are married and 9 of patient are unmarried. 8 out of 9 married patient are male and 1 was female. Through Premarital and extramarital sexual contact, most male have acquired the disease, whereas females have mostly acquired the disease from their spouses. Females have generally been diagnosed as HIV positive when their husbands came with opportunistic infections. Majority of our patient were from ballari and surrounding taluka and village and few from neighbouring Andhra Pradesh.[9,10]

In our study 72% had established diagnosed greater than 1 year and 38% has diagnosed within 1 years, this was much similar to many studies 9. The mean CD4 count was 237/µl. Mean CD4 count in males was 233/µl and in females was 229/µl. 62% of patients had CD4 count lesser than 200/µl in and 39% of the patients. Had greater than 200/µl. These features were similar to the other studies done in South India.[10] Thus the patients included in this study had advanced disease. This was in contrast to a study done in which majority of patients were found to have mild to moderate grade anemia occurring in 67% of patients.[11,12] This is probably because our study was done in a tertiary care hospital and majority of the patients had advanced disease and severe grades of anemia. In our study most of patients had anemia of chronic disease in comparison to other etiologies. 54% had anemia of chronic disease, 22 % had anemia secondary to use of zidovudine, 12% had iron deficiency anemia, 11% had B12/folate deficiency and 1 % had anemia due to hemolysis.

AIDS Shown that low CD4 cell counts (<200 cells/µl) and higher HIV-1 RNA level in plasma have been independently associated with anemia and also a study by done in Ghana hemoglobin can used as a surrogate marker for CD4 count for monitoring of disease Progression and is explained that disease progression can be associated with cytokine mediated Myelosupression.[13-15] However various factors not related to disease progression may interfere in the direct relationship between CD4 count and hemoglobin including antiretroviral therapy, blood loss etc. and need to be excluded as in the above study.[15] There may be no correlation between CD4 and anemia if all the etiologies of anemia are included as in our study.

In our study there was significant difference in hemoglobin values among patients who had CD4 count less than 200/µl (mean Hb 6.387 gm/dl and CD4 count greater than 200/µl (mean Hb 7.469gm/dl) (p=0.001). There was positive correlation between CD4 count and hemoglobin (r=0.2637, p=0.001) in our study. Among patients with low immunological status as expressed by CD4 count less than 200/µl, the etiologies of anemia were,anemia of chronic disease (67%), zidovudine, induced anemia (15%), B12/folate deficiency (11.5%),iron deficiency (6.5%). Among patients with CD4 count greater than 200/µl, the most common etiologies of anemia were Anemia of chronic disease (33.5%), zidovudine induced anemia (33.5) Iron deficiency (20%), B12/folate deficiency

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(10%), anemia secondary to hemolysis (2.5%). In our study we found that means haemoglobin was significant lower in established cases than in the newly diagnosed case. Probably as newly diagnosed case is not in advanced state of disease. In well-established case progressive disease, opportunistic infections & drug induced anemia also contribute to the disease. We found no association between haemoglobin and gender or age. The mean hemoglobin levels did not significantly differ among various etiologies of anemia.

CONCLUSION

Mean age of the patients was 39 years and the disease was seen affecting people in the most productive years of their life. 72% of the subjects were male. CD4 count was lesser than 200/µl in 61% of patients and was greater than 200 in 39%of the patients. Thus the patients included in this study had advanced disease. Out of 100 patients 42% patient had moderate grade anemia and 58% had severe grade anemia patient with Mild grade anemia was not included in the study. Most of the patient had anemia of chronic disease when compared to other etiology. 54% of patient had anemia due to chronic disease, 12% had iron deficiency anemia, 11% had anemia due to vitamin B12 deficiency, 22 % had anemia due to zidovudine induced anemia and 1patient had anemia due Hemolysis. There was significant difference in hemoglobin values among patients who had CD4 count less than 200/µl (mean Hb 6.387gm/dl) and CD4 count greater than 200/µl (mean Hb 7.469gm/dl) (p=0.001).

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