

Original article:

Anemia is most common Hematological manifestation of HIV infected patients

Sharma S¹, Moorjani OP², Panchonia A³

¹Dr.Sachin Sharma ,Pathologist,govt civil hospital Mhow, Indore M.P.

²Dr.O.P.Moorjani Associate proff.Bundelkhand Medical college Sagar M.P.

³Dr.A.Panchonia ,Associate proff. MGM Medical college with M.Y. Hospital Indore M.P.

Corresponding author:*Dr.Sachin Sharma

Date of submission: 22 May 2014; Date of Publication: 29 June 2014

Abstract:

Introduction: The pathogenesis of the haematological manifestations of human immunodeficiency virus (HIV) and Discuss relevant laboratory findings as anaemia, leucopenia, thrombocytopenia and eosinophilia in hiv infection. Establish care guidelines for HIV infected person and altered haematopoiesis resulting in anaemia, leucopenia, thrombocytopenia and eosinophilia .

Methodology: Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol and by universal precaution as per the guideline of National aids control organization (NACO, India). A complete blood counting including HB%, PCV, Red cell indices ,platelet count and total white cell count and differential was done by Automated blood cell counter analyzer of all the patient on antiretroviral therapy .The all cell count indices including WBC count with differential and platelet count, was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B Stain and Leishman stain.

Results: Out of the 300 study cases anaemia is most commonly affected hematological parameter in the study. Anemia is most common finding with 215 cases (71.6%, n=300) while eosinophilia is least common with 49 cases(16.3%, n=300)

Conclusion: Anaemia (Hb%) is Most commonly affected hematological parameter in our study. So frequency of affected parameter in hiv infection is anaemia > leucopenia > thrombocytopenia > eosinophilia.

Keywords: Anaemia , Leucopenia, Thrombocytopenia , Eosinophilia

INTRODUCTION

Anaemia is the most common haematological abnormality [12],[1] found in adult with HIV infection. The importance of finding and treating anaemia in adult with HIV infection is underscored by data from their study showing anaemia to be an independent prognostic factor [8] in HIV infection. The prognostic significance of anaemia at baseline is statistically significant in multiple retrospective studies in adults in the United States and Europe both in the pre-highly active antiretroviral therapy (HAART) and HAART eras. The etiology of anaemia in adult with HIV infection is

multifactorial, and managing anaemia can involve a variety of modalities. HIV infection and its direct effects on HSCs and stromal elements can lead to anaemia [3],[2]. Opportunistic infection and myelosuppressive drugs might also cause anaemia. Leucopenia is common in HIV-infected individuals and, similar to anaemia, occurs with a frequency that generally correlates with the severity of the clinically syndrome. Between 57-85% of patients with AIDS and 10-21% of patients with ARC are leucopenic, while <5% of asymptomatic seropositive patients present with leucopenia. Leucopenia typically involves both lymphocytes

and granulocytes, with AIDS. However, as noted previously, a reduction in the absolute number of CD4+ T cells occur as one of the earliest immunologic abnormalities of HIV-infection, and the number of these cells declines progressively over-time. These autoimmune antibodies include antineutrophil antibodies, destroying neutrophils once they have matured in the bone marrow and have been released into the peripheral circulation of neutropenia, although this remains a potential mechanism of neutropenia [9] in HIV infection.

The mechanism of thrombocytopenia [11] in HIV infection appears to involve both increased platelet destruction as well as ineffective platelet production. Platelet survival was also decreased in HIV-infected patients without thrombocytopenia [1] [7][6], although to a lesser extent. Most but not all reports indicate that there is a significant platelet sequestration and/or destruction in the spleen in HIV-associated thrombocytopenia. One report indicated that platelet destruction was the prominent factor early in the course of disease, while decreased platelet production was the prominent factor later in the course of disease.

MATERIAL & METHODS

Study area and design: The present study was conducted at the Department of Pathology MGM Medical College associated with M.Y. Hospital Indore, M.P. The study was designed as a observational hospital based study over a period of time from 2010 to 2012 years.

Ethical consideration : Detailed general, systemic examination along with complete details of patient and informed consent was obtained from all study participant do from ART Center of M.Y. Hospital Indore during the time of registration at center.

Patients selection criteria : The study targeted medically diagnosed HIV positive cases with the help of ELISA technique and confirmed by

western blot under the guideline of National aids control organization (NACO, India) over period of time from 2010 to 2012.

All studied 300 cases registered at ART Center and on HAART between the age of 5 to 69 years who are schedule to visit the hospital at regular intervals of time for routine medical review was studied.

Laboratory investigations: Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol and by universal precaution as per the guideline of National aids control organization (NACO, India).

A complete blood counting including HB%,PCV, Red cell indices ,platelet count and total white cell count and differential was done by Automated blood cell counter analyzer of all the patient on antiretroviral therapy .The all cell count indices including WBC count with differential and platelet count, was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B stain and leishman stain.

COMPLETE BLOOD COUNT (CBC) AND PERIPHERAL SMEAR:

Materials: Purple vacutainer tube or capillary collector (EDTA), Slides and blue capillary tube, Needle or lancet, Vacutainer holder, Alcohol swab, Cotton balls, Absorbent materials, Slide case

Procedure:

1. Specimen is collected into EDTA (purple) vacutainer. (5 or 7ml volume)

- Blood smears must be made from freshly collected specimen and must be prepared within four hours of collection. A well-made peripheral smear is thick at the frosted end and becomes progressively thinner toward the opposite end. The “zone of morphology” (area of optimal thickness for light microscopic examination) should be at least 2 cm in length. The smear should occupy the central area of the slide and be margin-free at the edges.

Hematological examination:

Hematological examination including HB%, PCV, Red cell indices, platelet count and total white cell count with differential count should be done on peripheral smears stained with field A and B stain

Following Base line investigation were done for all 300 patients:

Hemoglobin in grams/dl–(Cyanmethhaemoglobin method of automated blood cell counter analyzer) and further confirmation by Sahli’s manual method in case of suspicious readings.RBC counting and RBC indices parameters MCV, MCH, MCHC,

PCV & RDW - automated cell counter analyzer RBC morphology study under oil immersion manual stained smear study method .Total and differential leukocyte count - automated cell counter analyzer & confirmed by oil immersion manual stained smear study method ,Platelets counts - automated cell counter analyzer & confirmed by oil immersion manual stained smear study method Other counting parameters and morphological changes done under automated cell counter analyzer & confirmed by manual oil immersion smear study method.

RESULTS

Table .1 Distribution of hematological parameters

Total No. of Case	300	% (n=300)
Thrombocytopenia	70	23.3%
Eosinophilia	49	16.3%
Leucopenia	86	28.6%
Anaemia (Hb%)	215	71.6%

[Out of the 300 study cases anaemia is most commonly affected hematological parameter in the study. Anaemia is most common with 215 cases (71.6%, n=300) while eosinophilia is least common cases 49(16.3%, n=300), frequency of affected parameter anaemia > leucopenia > thrombocytopenia > eosinophilia.]

Table. 2 Distribution of hematological parameters in female.

Total No. of Female case	112	% (n=112)
Thrombocytopenia	29	25.89%
Eosinophilia	17	15.17%
Leucopenia	33	29.46%
Anaemia (Hb%)	68	60.71%

[Out of the 112 studied cases of female, anaemia is most commonly affected hematological parameter in the study. Anaemia found 68 cases with (60.71%, n=112) while eosinophilia is least common finding with 17 cases (15.17%, n=112)]

Table. 3 Distribution of hematological parameters in male

Total No. of Male Case	188	% (n=188)
Thrombo cytopenia	41	21.80%
Eosinophilia	32	17.02%
Leucopenia	53	28.19%
Anaemia (Hb%)	147	78.19%

[Out of the 188 study cases of male anaemia is most commonly affected hematological parameter in the study. Anaemia is seen in 147 cases (78.19%, n=188) while eosinophilia is least common finding with 32 cases (17.02%, n=188)]

Table 4. Sex distribution of hematological parameters

Parameters	Female	Male	Total
Thrombocytopenia	25.89%	21.80%	23.3%
Eosinophilia	15.15%	17.02%	16.3%
Leucopenia	29.46%	28.19%	28.6%
Anaemia	60.71%	78.19%	71.6%

[Data analysis in following hematological parameters with the difference of sex distribution under the Extended Mantel-Haenszel test for trend of chi –Squares test.

- Chi-sq. test X2 Value = 1.388 [DF = 1] 2-sided P = 0.239
- For trend in a given direction: P = 0.119]

DISCUSSION

Anaemia is defined when Hb% < 13gm/dl for male and Hb<12gm/dl for female with the reference of WHO anaemia criteria and various other studies like by Deepak Arora et al. and Ajay Wanchu et al. In our study shows similar results as Deepak Arora et al [6].In this study anaemia in males was reported to be 89% while in female 71.4%. Similar result of our study to be found by Ajay Wanchu et al.[1]in the “profile of hematological abnormality of Indian HIV infected individual” in PGI Chandigarh over a period of 2 years from 2007-09 India when sample size n=200. This study also shows that anaemia is most common hematological finding in HIV positive cases. Anaemia was reported in seen 65.5% cases (131/200).According to Mocroft A. et al[8]. Anaemia is an independent predictive marker for clinical prognosis in HIV

infected patient from across Europe, Euro SIDA study group.

Anaemia (Hb%) : Most common hematological parameter in our study. Anaemia 215 cases (71.6% (n=300)) in which male were 147(78.19%, n=188) and female cases were 68 (60.71%, n=112). Anaemia is defined when Hb% < 13gm/dl for male and Hb<12gm/dl for female with the reference of WHO anaemia criteria. Mean Corpuscular Volume (MCV): MCV is also significant haematological parameters in HIV positive cases because MCV is related with morphological anaemia. Cut-off value of MCV is in reference with Robbins text book of basis of disease 8/e and MCV < 80 fl - microcytosis , 80-96- Normocytic and 96 – Macrocytosis.

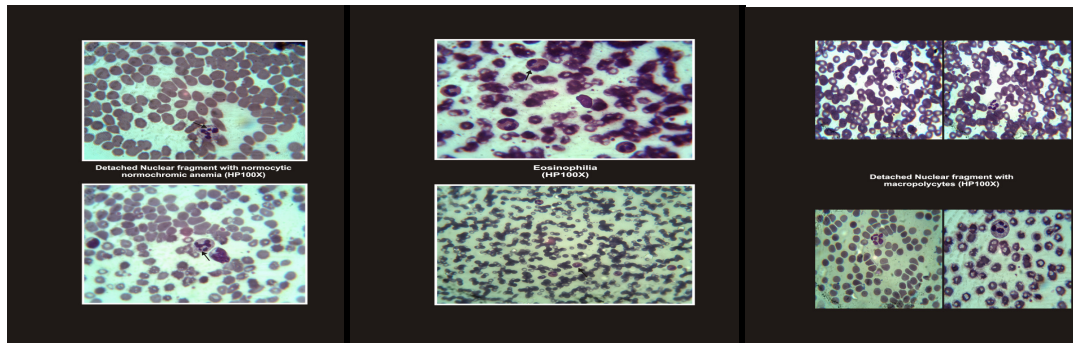
Thrombocytopenia is another significant hematological parameters in HIV positive cases.

Defined thrombocytopenia when platelet count is <1,50,000/cumm, Defined thrombocytopenia when platelet count is <1,50,000/cumm, labeled as thrombocytopenia with the reference of Ajay Wanchu et al[1] In this study 7% cases shows thrombocytopenia when sample size n=200. Kasthuri AS et al [7] in a “study of hematological manifestation of HIV infection at HIV tertiary care center” over a period of time from March 1998 to August 1999 ,In this study 46% cases shows thrombocytopenia when platelet count is <1.5 lakh/cumm. Similar result of our study was also to be found by Deepak Arora [6] in the “longitudinal changes in hematological manifestation of HIV infection in the multicentre AIDS cohort study in department of microbiology Adesh Institute of Medical Science and Research Bathinda” over a 2 year period of time from 2007 to 2009. In this study thrombocytopenia was reported in 40% cases in which male were 22.22% and female were 7.14%.In our study 70 (23.3%, n=300) cases shows thrombocytopenia in which 41 cases (21.80%, (16.3% n=300) case. In male 32 case (17.02% n=188) & female 17 case (15.17% n=112) shows Eosinophilia.

n=188) affected male and 29 cases (25.89%, n=112) affected female .Similar result by Murphy MF et al.[9] – “Incidence and mechanism of neutropenia and thrombocytopenia in patient with human immunodeficiency virus infection” .In this study 30% show thrombocytopenia when sample size n=60.

Leucopenia is another significant hematological parameters in HIV positive cases.

Leucopenia is defined when total leucocyte count is <4000/cumm with the reference by Dacie and Lewis practical haematological book 10/e and Shirish M Kothalkar Essentials of haematology 1/e with various study.Eosinophilia is rare haematological parameter of HIV positive case. Eosinophilia is defined when eosinophil count >8% of total Leukocyte count. Similar result to be found by Daniel J. Skiest [4] “Clinical significance of eosinophilia In HIV infected individual n=126,42 cases, 33.35% shows eosinophilia. In our study it is a least common Haematological parameter with 49 case.



CONCLUSION

In our study of 300 cases, where 188 (62.66%.n=300) are males while 112 (37.34%.n=300) are females ,highest prevalence of hematological manifestation of HIV positive patient i.e. 44% is found between 31-40 years of

age. Anaemia (Hb%) : Most common hematological parameter in our study. Anaemia 215 cases (71.6% (n=300)) in which male were 147(78.19%, n=188) and female cases were 68 (60.71%, n=112). Thrombocytopenia is another

significant hematological parameters in HIV positive cases.

In our study 70 (23.3%, n=300) cases show thrombocytopenia in which 41 cases (21.80%, n=188) affected male and 29 cases (25.89%, n=112) affected are female.

Leucopenia is another significant hematological parameters in HIV positive cases. In our study 86 (28.6% n=300) out of 300 case of HIV positive patient show Leucopenia. 53 case (28.19% n=188) are of male and 33 case (29.46% n=112) of

female. Eosinophilia is rare haematological parameter of HIV positive case. In our study it is a least common haematological parameter with 49 case (16.3% n=300) case. In male 32 case (17.02% n=188) & female 17 case (15.17% n=112) show eosinophilia.

ACKNOWLEDGEMENT

I will convey special thanks to my guide Professor Dr.C.V.Kulkarni and coguide Dr. A. Panchonia to given me an immense support and valuable needy guidance for this work.

REFERENCES

1. Ajay Wanchu et al. in the "profile of hematological abnormality of Indian HIV infected individual" in PGI Chandigarh over a period of 2 years from 2007-09 India when sample size n=200. In this study also show anaemia is most common hematological finding in HIV positive cases. (BMC blood disorders 2009, 9:5doi:10-1186/1417-2325-9-5)
2. Baillieres best tract res "Hematological aspect of HIV infection." Evans RH Scadden DT, Harvard Medical School, Boston USA. (Clinical hematology 2000 June 13 (2) : 215-30.)
3. Barbara J. Bain et al. - "The haematological features of HIV infection" at Department of haematology, St. Mary Hospital Campus of Imperial College, London (American J. Of Haematology, 2008;(83):738)
4. Daniel J. Skest "Clinical significance of eosinophilia In HIV infected individual n=126,42 cases, 33.35% shows eosinophilia.(American Journal of medicine vol. 120 (5)449-453 May 1997)
5. Daniel Nii Aryee Tagoe et al in a case control study of " profiling hematological changes in HIV patient attending fevers clinic" at the central regional hospital in Cape Coast Ghana , over a six month period when sample size n=150 (Archives of applied science research ,2011,3(5) 326-33)
6. Deepak Arora in the "longitudinal changes in hematological manifestation of HIV infection in the multicentre AIDS cohort study in department of microbiology Adesh Institute of Medical Science and Research Bathinda" over a 2 year period of time from 2007 to 2009. [Biomedical research 2011, 22(1):103-106].
7. Kasthuri AS et al. in a study of "hematological manifestation of HIV infection at HIV tertiary care" center over a period time March 1998 to August 1999. Majority was in patient and a few outpatients Bangalore. Sample size (n=100) HIV infected patient. (Indian Journal sex transmission disease 2006 vol. 27 No. 1-9.
8. Mocroft A. et al. anaemia is an independent predictive marker for clinical prognosis in HIV infected patient from across Europe, Euro SIDA study group (AIDS 1999; (28):943-50.)
9. Murphy MF et al. - "Incidence and mechanism of neutropenia and thrombocytopenia in patient with human immunodeficiency virus infection" (British J. Hematol. 1987; (66)337-340.)
10. Siguez Burbano et al. - "Thrombocytopenia in HIV disease clinical Relevance Physiopathology and Management" (Curr. Medi. Chem. 2008; 3:365-376.)
11. Volberding PA Levine AM Dieterich D. et al. anaemia in HIV infection: clinical impact and evidence based management strategies (Clini. Infect. Dis. 2004; 38, 1454-1463).