

## Haematological Profile In HIV Infected Patients With Comparison To CD4 Count

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**Abstract:** Background: To study various hematological parameters in HIV positive patients, to determine CD4+T lymphocyte counts in HIV positive patients, to compare hematological parameters in patients on ART. Material And Methods: Hematological profile was done using HORIBA PENTRA XLR Hematology Analyzer and slides stained in Field stains & Leishman stain with CD4 Count was done using Partex Flow Cytometer. Result: Most commonly 54% cases are presented with Anaemia Followed by 11% cases with leukocytosis and 5% cases with thrombocytopenia. In anemias commonest is hypochromic microcytanaemiaseen in 61% of anaemic cases, followed by 37% patients with normochromic normocytic anemia. Conclusion: Anemia is the most common abnormality followed by leukocytosis followed by thrombocytopenia and leucopenia. Within the spectrum of all Anaemia Hypochromic Microcytanaemias the commonest. [Kothari R Natl J Integr Res Med, 2022; 13(3): 19-22, Published on Dated: 10/05/2022]

**Key Words:** HIV, CD4, Hematological Profile

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**Introduction:** Acquired immunodeficiency syndrome (AIDS) is a disease caused by retrovirus human immunodeficiency virus (HIV) and characterized by profound immunosuppression that leads to opportunistic infections, secondary neoplasms, and neurologic manifestations<sup>1</sup>. HIV infection is associated with very wide range of hematological abnormalities. HIV replicates not only in CD4 lymphocyte cells, but also in macrophages and dendritic cells. Such replication is followed by immune system depression. Hematological complications like mild-to-severe anaemia are related to HIV disease progression and subsequent reduced survival<sup>1</sup>.

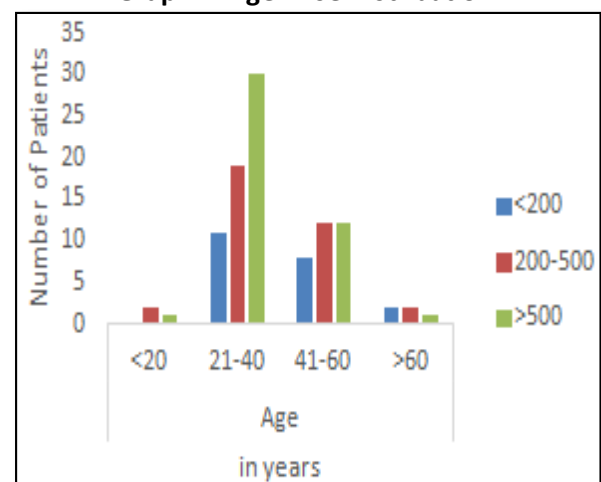
Although numerous complications occur in HIV-infected patients the foremost common hematological abnormalities are anaemia and neutropenia. Anaemia and neutropenia are generally caused by inadequate blood cell production due to bone marrow suppression by HIV infection mediated by abnormal cytokine expression and alteration of the bone marrow microenvironment. Anaemia in HIV-infected persons is associated with CD4 cell depletion and progression to AIDS. Neutropenia is frequently observed in advanced stages of HIV infection after development of AIDS. Thrombocytopenia is also frequently occurs in HIV-infected patients. These could be due to direct effects of HIV infection, secondary infections, neoplasms<sup>2</sup>.

**Material & Methods:** The present study was conducted on 100 HIV positive patients attending

ART clinic at PDU Civil Hospital, Rajkot who tested HIV positive. Prior permission of Institutional Ethical Committee (IEC) and Gujarat State AIDS Control Society (GSACS) was taken for this study. Patient's sample was taken in EDTA vacutainer. Complete hemogram including Hemoglobin, Total WBC Count, Platelet Count, calculated blood indices MCV, MCH, MCHC was analysed with automated hematological 5 part analyzer – HORIBA. CD4 count by Automated Partex flow cytometer. Peripheral Blood smear examination using Field stain and Leishman stain.

**Results:** Results are as follows.

**Graph 1: Age Wise Distribution**



The above graph shows within the present study highest no of patients are observed between 21-40 year of aged group with 50 % having >500 cells/cumm CD4 count.

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**Table 1: Peripheral Smear Morphology**

Smear Finding	No Of Patients (%)
Hypochromic Microcytic Anemia	33
Normochromic Normocytic Anemia	20
Macrocytic Anemia	1
Leukopenia	4
Leukocytosis	11
Thrombocytopenia	5
Thrombocytosis	3

Gender distribution of study population shows greater number of male patients i.e. 66% with male to female ratio is 2:1. Proportions of patients in various stages of HIV in present study population show that 60% of patients were in stage I (with 36 having CD4 > 500 cells/cumm.) followed by 29% in stage II (with 14 having CD4 count 200-500 cells/cumm.) Hb level in HIV positive patients show 31 (47%) of male with <13gm% of Hb and 35(53%) male with >13gm%

of Hb level. Whereas females show 23(69.7%) with <12gm% of Hb and 10(30.3%) of >12gm% of Hb level. Thus, in present study female are more commonly presented with anaemia than male. Total leucocyte count in present study population show more commonly presented in normal leucocyte count (i.e. between 4000-11000) 85 % patients and 4 % of patients show leucopenia and 11 % patients show leucocytosis.

**Table 2: Comparison Of CD4 Count With Anaemia**

CD4 Count	Total Male	Male With Anaemia	%	Total Female	Female With Anaemia	%
<200	13	9	69.2	8	8	100.0
200-500	23	14	60.9	12	9	75.0
>500	30	8	26.7	13	6	46.2
	66	31	47.0	33	23	69.7

Platelet distribution shows 92 % of patients with normal platelet count and 5 % with thrombocytopenia & 3 % with thrombocytosis. Most commonly patients 54 are presented with Anaemia, Followed by 11 with leukocytosis and 5 with thrombocytopenia. Whereas, leukopenia is

seen in 4 and thrombocytosis is seen in 3 patients. 8 females with CD4 count < 200 cells/cumm have Anaemia while 9 males out of 13 were anemic with CD4 count < 200 cells/cumm.

**Table 3: Type Of Anaemia With Comparison To CD4 Count**

CD4	<200		200-500		>500	
	M	F	M	F	M	F
NNA	3	1	7	3	3	3
HCMCA	6	7	7	5	5	3
Macrocytic	0	0	0	1	0	0
Total	9	8	14	9	8	6

Patients with CD4 count between 200-500 cells/cumm have almost similar leucocytosis with CD4 <200 cells/cumm. Patients with CD4 count <200 cells/cumm having more thrombocytopenia (60%). Patients with CD4 Count > 500 cells/cumm having normal MCV more commonly.

Patients with CD4 Count > 500 cells/cumm having normal MCH more commonly. Patients with CD4 Count > 500 cells/cumm having normal MCHC more commonly. In Anemias most common is

hypochromic microcytic anaemia seen in 33 patients which is 61% of anaemia cases, followed by 20 (37%) patients with normochromic normocytic anemia. Level of CD4 count in the study population show 44(%) patients in >500 CD4/Cumm followed by 35(%) and 21(%) in 200-500 CD4 count/Cumm and <200 cells/Cumm respectively. For Correlation of CD4 count with Blood parameters Pearson's Correlation used. In which R value is Positive for Hb, Platelets, MCV, MCH. And Negative for Total WBC count and

MCHC. Among this p value is only significant for Hb and CD4 Correlation as its 0.003 which is <0.05. Pearson's correlation (also called

Pearson's R) is a correlation coefficient commonly used in linear regression.

**Table 4: Correlation Between CD4 Count And Blood Parameters**

Correlation Between CD4 And Other Parameter	R Value	P Value	Mean	SD
CD4	-	-	486.90	305.97
Hb	0.298	0.003	12.45	2.11
TC	-0.060	0.551	7579.90	3004.37
Platelets	0.107	0.288	2.59	0.87
MCV	0.171	0.090	81.79	10.85
MCH	0.166	0.09	27.66	3.58
MCHC	-0.66	0.513	33.85	1.24

**Discussion:** Majority of the HIV infected patients succumb to a variety of hematological aberrations. 100 HIV infected patients who were diagnosed positive at the ART clinic at PDU Civil Hospital, Rajkot were selected and analyzed for this study. Chakravarthy (2006) has shown highest number of males 80.9% and lowest number of females 19.1%. Amballi (2007) has shown highest number of females 59% and lowest number of males 41% while Present study has 66% males and 33% females, with male to female ratio of 2:1 which is in accordance to all the contemporary studies done.

Dikshit (2009) , Atilie (2008) , Friel (2009) had highest preeminence of anaemic cases which are 65.5%, 74.6% and 70% respectively and Patron (2008) has shown lowest preeminence of cases (51%). Present study shows 54% cases of anaemia which is less than that shown by Dikshit (2009), Atilie (2008), Friel (2009) because most of the patients in present study are on ART under NACO guidelines.

The maximum percentage of cases of thrombocytopenias are seen with Friel (2009) which is 40% and minimum percentage of cases of thrombocytopenias are seen with Atilie (2008) which is 4.8%. Present study shows thrombocytopenia in 5% cases which is similar to that shown by Atilie (2008) (4.8%), but less than that shown by Patron (1999) (15%) and Friel (2009) (40%). Erhabor (2005) and Patwardhan (2002) shows anaemia in 64% and 61% cases respectively.

Present study shows Normocytic Normochromic anaemia in 20 % cases which is less than the aforementioned and similar to Avani(2017). It is the most rampant anaemia in the present study

group and is more prevalent among the ones with higher CD4 count. Subnormal MCV (<76fl) is seen in 28% cases in present study which is lower than that shown by Daniel (2011) and Mathieu (2013) which are 30.9% and 64.9% respectively. And more than that shown by Avani (2017) which is 24.55%.

Avani (2017) showed low MCH in 27.27% cases which is lower than that shown by present study which is 49%. While Daniel (2011) comparable results of 40.9 %.

Daniel (2011) showed 26.8% cases with low MCHC which is higher than that showed in present study that is 3% as overall patients presenting with anaemia is less in present study.

**Conclusion:** The analysis made from the current study has shown maximum number of cases in the age group between 21-40 years, with a predilection for males.

Retrospective analysis of this study has shown that majority of the patients were found to be in HIV stage – I and having CD4 count >500 cells/cumm.

Among all the hematological abnormalities, anaemia is the most common abnormality followed by leukocytosis followed by thrombocytopenia and leucopenia.

In the spectrum of all anemia, Hypochromic microcytic anaemia occupies the forerunner position followed by Normochromic normocytic anaemia and succeeded by Macrocytic anaemia being the least. The role of CD4 count as a prognostic factor is evident by the fact that most of the patients having normal CD4

count show better hematological parameters and outcome than the ones with low CD4 count.

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