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ESTIMATION OF HEMATOLOGICAL PROFILE OF HIV PATIENTS ON ARTIN VINDHYA REGION WITH SPECIAL EMPHASIS ON CD4 COUNT

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ABSTRACT

BACKGROUND

Clinically significant hematologic abnormalities are common in HIV infection. Early identification of the hematologic abnormalities would lead to appropriate planning of treatment strategies and prevent further complication. This study was conducted in order to know the pattern of these hematologic abnormalities and its correlation with CD4 count among HIV patients of Vindhya region who were on ART.

METHODOLOGY

This was a cross sectional, analytic study conducted in the Department of Medicine, SSMCRewa, M.P. between January 2020 to June 2021. The study group included a total number of 200 patients with HIV infection on ART. Patients were investigated for Hb%, total count, differential count and platelet count. CD4 count was obtained by flow cytometric analysis.

AIMS AND OBJECTIVES:

To analyse the hematological profile of people living with HIV/AIDS and To identify the possible correlation between CD4 count and hematological abnormalities.

RESULTS

Among 200 patients,52.0%were males and 48.0% were females.90.5% were from rural area.The maximum no. of cases had heterosexual mode of transmission, i.e. 179 (89.5%).Out of 145 anemic cases, maximum no. i.e. 68 (46.89%) cases had normocytic anemia followed by 42 (28.97%) cases of macrocytic anemia.Among patients who had ≤200 CD4 counts, 21.27% cases had severe anemia whereas among patients who had >500 CD4 counts none had severe anemia.11.0%ofpatients hadthrombocytopenia. Among patients who have ≤200 CD4 counts, 23.40% have thrombocytopenia whereas among patients who had>500 CD4 counts only 4.87% had thrombocytopenia.

CONCLUSIONS

Hematologic manifestations of HIV infection are common and frequent with progression of disease.

The Present Study revealed a significant increase in the number and severity of cases of anemia with decreasing CD4 cell count.

We have to provide proper awareness and education about the HIV safety measures, especially in young adolescents and adults, emphasizing to rural population.

It is important to simultaneously treat HIV patients for hematologic manifestations to reduce morbidity.

KEY WORDS- HIV, ART, Hematology, CD4 count, anemia, thrombocytopenia

INTRODUCTION:

AIDS (Acquired Immune Deficiency Syndrome) is a very serious infectious disease known to man. Since its discovery in 1981, the disease has attracted attention from health care professionals around the globe. Hematological abnormalities are well recognized in HIV disease and result from diverse influence on hematopoietic tissue. Hematological abnormalities are multi factorial in etiology and may be due to direct effects of HIV, manifestations of secondary infections and neoplasm or side effects of therapy. Hematological parameters are important monitoring tools for assessing treatment and prognosis in HIV.[1]

It is a major health challenge in the modern world causing damage in the resource poor south-east Asian countries. It involves almost all the systems in human body.[2,3]In 2019 at the national level, there were an estimated 23.49 lakh peoples living with HIV (PLHIV), with an adult HIV prevalence of 0.22%.[4]

HIV associated hematologic expressions seem to be dependent on the level of viral replication, as these abnormalities are severe in AIDS patients with high viraemia and decreased CD4 counts.[5]There are a few studies on hematological changes in HIV and a very few have correlated results with CD4 count.[6]

In this study of HIV patients of Vindhya region who were on ART, pattern of hematologic abnormalities and its correlation with CD4 count was studied.

METHODS

This was a cross sectional, analytical study. This study was carried in patients with HIV infection attending the Medicine department at Sanjay Gandhi memorial hospital attached to Shyam shah medical college, Rewa. Informed consent was obtained from each patient.

The study group included a total number of 200 patients with HIV infection on ART admitted in wards or attending the outpatient department or ART centre during January 2020 to June 2021 were evaluated for the conditions which could alter the Hematological parameters and if found so, they were excluded from the study.

Those included in the study were investigated for Hb%, total count, differential count and platelet count. CD4 count done by flow cytometric analysis was obtained.

Inclusion criteria

1. All patients with HIV infection on ART
2. HIV infection proven by ELISA & western blot assay.

Exclusion Criteria

1. Chronic infection like tuberculosis
2. Chronic alcoholics
3. History of Worm infestations
4. Chronic kidney disease
5. Drug related except HAART

All patients were selected without any bias of sex or duration of illness. Detailed history was recorded with respect to presenting symptoms, type of exposure and a complete general and systemic examination was carries out.

Patient's proforma was maintained which included the clinicodemographic particulars and investigations of the patients. The study was approved by Ethical Committee of the institute and informed consent was obtained from every case.

STATISTICAL METHODS

A total of 200 patients diagnosed with HIV and on ART for more than 1 year with inclusion and exclusion criteria were selected for the study.

Chi square test was used for statistical analysis. A p value<0.05 was considered significant.

RESULTS:

Table 1- Characteristic Profile

Gender	**No. of cases**	**Percentage**
Male	104	52.0%
Female	96	48.0%
Age Distribution		
≤14	10	5.0%
15-29	46	23.0%
30-49	120	60.0%
>50	24	12.0%
Residence		
Rural	181	90.5%
Urban	19	9.5%
Education		
Illiterate	40	20.0
Primary school	88	44.0
Secondary school	65	32.5
Graduate	07	3.5
Mode of transmission		
Heterosexual	179	89.5
Mother to child	19	9.5
Others	02	1.0
Built		
Normal	140	70.0
Thin	45	22.5
Overweight	15	7.5

Table 2- Investigational Profile

CD4 count		
≤200	47	23.5
201-500	112	56.0
>500	41	20.5
Hb% level in males (N=104)		
<7.0 (Severe anemia)	-	-
7.0 to 9.9 (Moderate anemia)	12	11.53
10.0 to 12.9 (Mild Anemia)	55	52.88
≥13.0 (Normal)	37	35.59
Hb% level in females (N=96)		
<7.0 (Severe anemia)	12	12.50

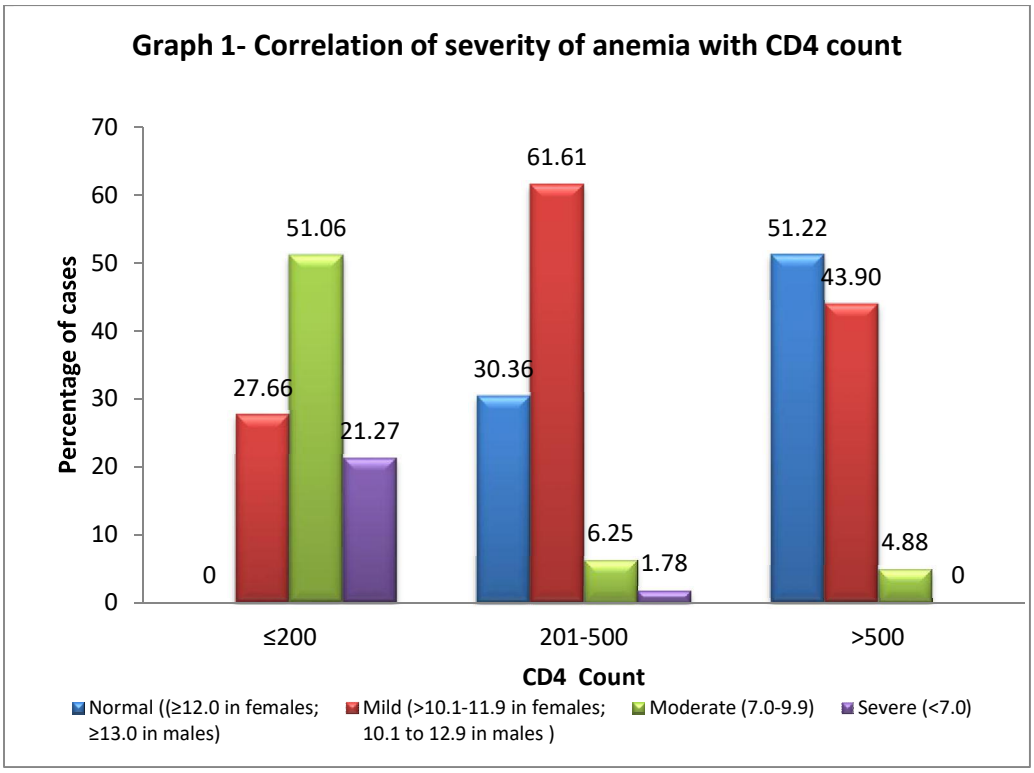
7.0 to 9.9 (Moderate anemia)	21	21.87
10.0 to 11.9 (Mild Anemia)	45	46.87
≥12.0 (Normal)	18	18.76
MCV in Anaemic Patients (N=145)		
Microcytic (<80)	35	24.14
Normocytic (80-100)	68	46.89
Macrocytic (>100)	42	28.97
Platelet count		
<1.5 lakh	22	11.0
1.5 - 4.5 lakh	174	87.0
>4.5 lakh	04	2.0

- Among 200 patients, 104(52.0%) were males and 96(48.0%) were females.
- The maximum no. of cases belongs to age group30-49years followed by 15-29 years.181 (90.5%) cases were from rural while 19 (9.5%) cases were from urban, showing the disease prevalence is high in rural area.
- The maximum no. of cases belongs to educational status of primary school (44%) and the least in graduate group (3.5%).
- The maximum no. 179 (89.5%) cases had heterosexual mode of transmission.
- Out of 200 cases, maximum no. 140 (70.0%) cases had normal built while 45 (22.5%) cases had thin built**.**
- Out of 200 cases maximum cases come under CD4 Count 201-500 i.e. 112 (56.6%) followed by CD4 Count ≤200 i.e. 47 (23.5%).
- Out of 104 male cases, the maximum no. of cases i.e. 55 (52.88%) belong to mild anemia followed by 37 (35.59%) normal cases.
- Out of 96 female cases, the maximum no. of cases i.e. 45 (46.87%) belong to mild anemia followed by 21 (21.87%) cases of moderate anemia.
- Out of 145 anemic cases, maximum no. i.e. 68 (46.89%) cases had normocytic anemia followed by 42 (28.97%) cases of macrocytic anemia.
- Out of 200 cases, Majorityofpatients 174(87.0%)had normal platelet tcount while11.0%ofpatients hadthrombocytopenia. (Table 1 and Table 2)

Table 3- Correlation of severity of anemia with CD4 count

SN	CD4 Count	Normal (≥12.0 in females; ≥13.0 in males)		Mild anemia (10.1-11.9 in females; 10.1 to 12.9 in males)		Moderate anemia (7.1-10)		Severe anemia (≤7.0)		Total	
		N	%	N	%	N	%	N	%	N	%
1	≤200	0	0	13	27.66	24	51.06	10	21.27	47	23.5
2	201-500	34	30.36	69	61.61	07	6.25	02	1.78	112	56.0
3	>500	21	51.22	18	43.90	02	4.88	-	-	41	20.5
	Total	**55**	**27.5**	**100**	**50.0**	**33**	**16.5**	**12**	**6.0**	**200**	**100.0**

Chi-square value : 98.233 p value : <0.0001

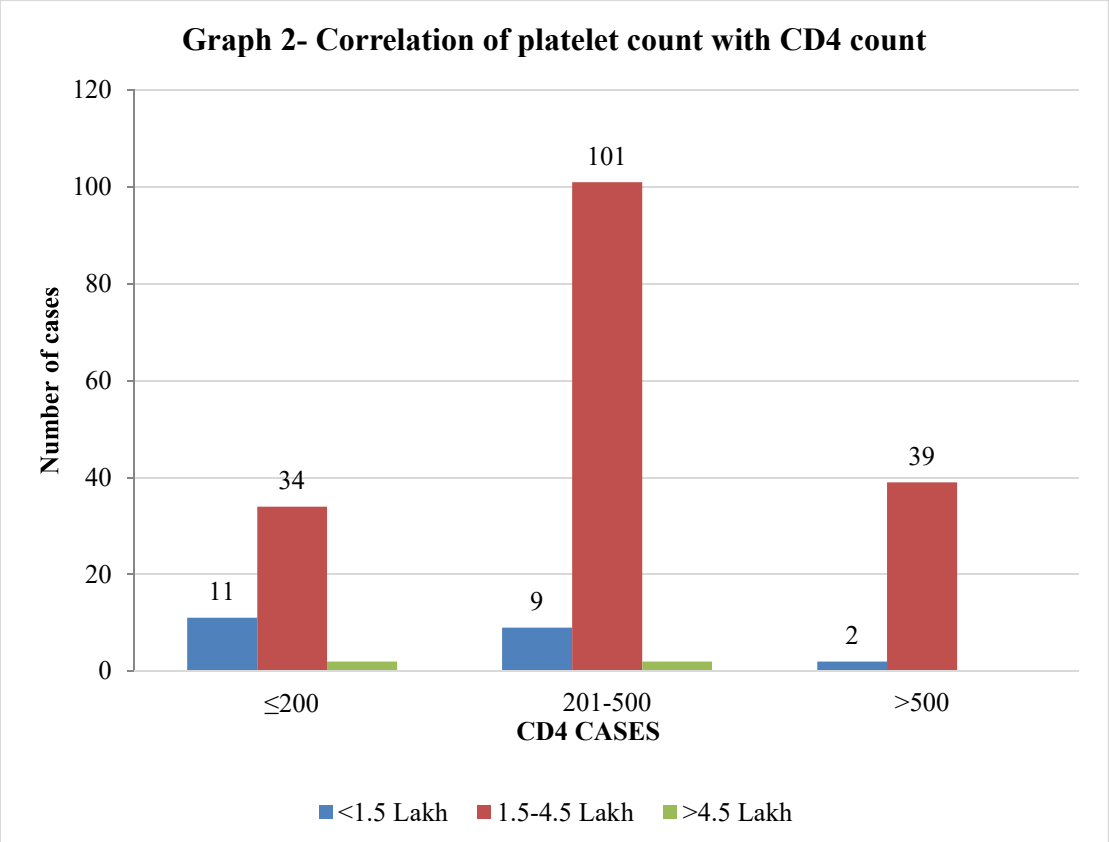


While analyzing the correlation (Table 3 and Graph 1), it is observed that among patients who have ≤200 CD4 counts, 21.27% cases have severe anemia whereas among patients who have >500 CD4 counts none has severe anemia (p value <0.0001).

Table 4- Correlation of platelet count with CD4 count

SN	CD4 Count	<1.5 lakh		1.5-4.5 Lakh		>4.5 lakh		Total	
		N	%	N	%	N	%	N	%
1	≤200	11	23.40	34	72.34	02	4.26	47	23.5
2	201-500	09	8.03	101	90.18	02	1.79	112	56.0
3	>500	02	4.87	39	95.13	-	-	41	20.5
	Total	22	11.0	174	87.0	04	2.0	200	100.0

Chi-square value : 12.509 p value : 0.0139



While analyzing the correlation (Table 4 and Graph 2), it is observed that among patients who have ≤200 CD4 counts, 23.40% have thrombocytopenia whereas among patients who have >500 CD4 counts only 4.87% have thrombocytopenia (p value < 0.0139).

DISCUSSION

In present study, among 200 cases, 104 patients (52.0%) were males and 96 patients (48.0%) were females showing male predominance. **Tekalign D. et al (2018)**[7]found that out of 320 HIV positive participants, 203 (63.4%) were females.

In present study, it was observed that maximum no. 120 (60.0%) cases belong to age group30-49years, followed by 46 (23.0%) cases of 15-29 years age, while the least 10 (5.0%) cases in ≤14 years age. This can be compared with **India HIV Estimates 2019**[4] which states Children living with HIV comprised 3.4% of the total PLHIV estimate.

Inthis study, out of 200 cases maximum cases come under CD4 Count 201-500 i.e. 112 (56.6%) followed by CD4 Count ≤200 i.e. 47 (23.5%). This can be compared with study done by **Parinitha S.S. et al (2012)**[6] which found that majority of cases (70%) had CD4 cell counts below 200 cells/mm3. Fifty-four cases (21.6%) had CD4 counts between 200 to 499 cells/mm3 and 21 (8.4%) cases had CD4 counts more than 500 cells/ mm3.

In this study, it was found that out of 200 cases, anemia was present in 145 (72.5%) cases. Prevalence of mild, moderate and severe anemia were 50%, 16.5% and 6.0% respectively. This is comparable to study conducted by **Crispus K. et al (2018)**[8] in which 67.38% (95/141) cases were anemic. In study conducted by **Vaughan J L et al (2017)**[9]anaemia was present in 183/307 (59.6%) of the HIV-positive patients. **Parinitha S.S. et al (2012)**[6]Among 250 patients, found anaemia in 210 (84%) cases. **Sharad A. et al (2013)**[10] found that the most common hematological abnormality was anemia, seen in 93.12% patients. **Minke H. W. Huibers et al (2020)**[11] found that among 199 patients enrolled in study 42.2% had very severe anaemia. In study conducted by **Tekalign D. et al**

(2018)[7] Overall, anemia was found in 25% (95% CI: 20.23 - 29.8%) of the study participants, of whom 2.5% (n=2) had severe and 21.2% (n=17) had moderate anemia.
In the present study, out of 145 anemic patients, majority 68 (46.89%) cases had normocytic anemia. This observation was comparable to study done by **Parinitha S.S. et al (2012)**[6]. They studied that the most common type of anemia was normocytic normochromic (40.4%). **Crispus K. et al (2018)**[8] found that out of the 95 participants with anemia, 89.47% (85/95) presented with normocytic-normochromic anemia, 8.42% (8/95) with microcytic-hypochromic anemia and 2.11% (2/95) with macrocytic-hypochromic anemia.
In the present study, 11% cases had thrombocytopenia. This is comparable to study done by **Vaughan J L et al (2017)** [9]in which Thrombocytopenia was present in 37/307 (12.1%) of the HIV-positive patients. **Crispus K. et al (2018)**[8] found that 26.24% (40/141) patients had thrombocytopenia. In study done by **Parinitha S.S. et al (2012)**[6] thrombocytopenia was seen in 18% of cases. Thrombocytopenia was noted in 6.3% (95% CI: 3.58-8.9%) of the study participants by **Tekalign D. et al (2018)**[7].

In the present study, in patients with CD4 Counts≤200, anemia was seen in 100% cases with p value of <0.0001. Prevalence of moderate and severe anemia was highest among patients with CD4 COUNT≤200; Out of 47 cases of CD4 COUNT≤200, 24 (51.06%) cases had moderate anemia and 10 (21.27%) cases had severe anemia whereas among 112 patients with CD4 Counts 201-500 , maximum number of cases 69 (61.61%) had mild anemia followed by 34 (30.36%) normal cases. This observation was comparable to study done by **Parinitha S.S. et al (2012)**[6]. They studied that, in patients with CD4 Counts below 200, anemia was seen in 91.4% cases.

In the present study, in patients with CD4 Counts≤200, thrombocytopenia was seen in 23.40% cases with p value of <0.0139. This observation was comparable to study done by **Parinitha S.S. et al (2012)**[6]. They studied that, in patients with CD4 Counts below 200, thrombocytopenia was seen in 21.7% cases.

CONCLUSION:

Hematologic manifestations of HIV infection are common and frequent with progression of disease.

The Present Study revealed a significant increase in the number and severity of cases of anemia with decreasing CD4 cell count.

We have to provide proper awareness and education about the HIV safety measures and mode of transmission regarding disease, especially in young adolescents and adults, emphasizing to rural population.

It is important to simultaneously treat HIV patients for hematologic manifestations to reduce morbidity.

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