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Original Article

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Study on Hematological Profile in HIV Patients and its Correlation with who Clinical Staging

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ABSTRACT

Introduction: A spectrum of hematological manifestations are seen at every stage of human immunodeficiency virus (HIV) infection, and they often pose a great challenge in the Diagnosis and management.
Out of all complications, Hematological abnormalities, Anemia is the most common abnormality seen in HIV s patients and its incidence is strongly associated with the progression of the disease.
Objectives: The present study aims to study the hematological manifestation in newly detected HIV patients & to study the relationship between various haematological manifestation with WHO clinical staging.
Methodology: It is a observational and descriptive study done at ART CENTRE VIMS, BALLARI, with a sample size of 108 cases. Patients who filled the inclusion criteria are assessed as per proforma specially designed for study.
Conclusion: The study concluded that anaemia was the most common haematological abnormality followed by elevated ESR, thrombocytopenia, leucopenia. CD4 count is the best predictor of WHO staging.

Key Words: *HIV, Anaemia, WHO staging*

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INTRODUCTION

AIDS(Acquired immunodeficiency syndrome) is primarily caused by HIV. It is characterized by progressive weakening of the immune system attributed to the decrease in the number of circulating CD4+ T-helper cells, and decline in CD4 cells, If not treated on time can lead to multisystem disease[1].

Out of all complications, Hematological abnormalities and their complications are the most common causes of morbidity and mortality in HIV-infected individuals[2]. Hematological aberrancies become more severe during the late stagesof the disease signifying the importance of active virus replication and high levels of viremia in the causation of disease. They hinder thetreatment directed at HIV(Human Immunodeficiency virus) and the opportunistic infections and malignancies of AIDS[3].

Anemia is the most common hematological abnormality associated with HIV infection. On the other hand, thrombocytopenia occurs by immune-mediated destruction of the platelets, inaddition to inadequate platelet production. The severity and the incidence of cytopenia are usually correlated with the stage of the disease. These manifestations also reflect the underlying immune status if interpreted cautiously, especially if the patient is on regular follow-up.

Hematological abnormalities can be the initial presentation of HIV infection. Patients might be asymptomatic due to the HIV infection and the reason for referral to a physician is usually the abnormal blood count or lymphoid disorders. By considering the possibility of HIV infection, there is an opportunity to diagnose and treat the patients earlier and prevent the transmission of infection[4].

Hematological abnormalities might be the direct result of HIV infection or due to secondary infections, neoplasms, and side effects of the therapy. Early diagnosis and treatment for hematological abnormalities are key factors that contribute to reduction in the morbidity and mortality[5].

AIMS AND OBJECTIVES

The present study aims to study the hematological manifestation in newly detected HIV patients & to study the relationship between various hematological manifestation with WHO clinical staging.

METHODOLOGY:

This Observational-Descriptive study was conducted in the department of General medicine and Antiretroviral therapy centre at Vijaynagar Institute of Medical science, Ballari, Karnataka, India. A total of 108 subjects were selected after explaining the purpose of the study and procedure in detail to the patient and obtaining their written consent from each patient. Data collection was by clinical history, examination and investigations. Blood sample were collected in EDTA tube for hematological test including Hb, TLC, differential count, MCV, platlet, CD4 T cell count, ESR and Peripheral smear. Hematological profile were done in clinical pathological lab MCH,VIMS Ballari and CD4 positive Tcells count from ART clinic, VIMS Ballari. Stage wise data were collected and the means were compared using one-way Anova test. The correlations between the results were assessed with help of one sample T test. The entire data of hematological values were divided into quartiles using statistical software and the sensitivity, specificity, positive and negative predictive values were calculated for quartile limits with hematological parameters other than CD4 count. The observation were analysed in comparisonwith available literature and conculsion were made.

Inclusion criteria

- Newly diagnosed HIV patients who are not on ART drugs.
- Age above 18years.

Exclusion criteria

- All patients with unrelated documented chronic diseases that are likely to alter thehematological profile like chronic renal or hepatic diseases, malignancies, hematological diseases.
- HIV infected patients on drugs that are likely to alter the hematological profile cytotoxic and immune modulating chemotherapy.
- Inter current infection unrelated to HIV which has significant effect onhematological profile.
- Pregnant and lactating women
- HIV Infected patients not willing to participate in the study.
- Age less than 15years.
- HIV patients who are on Antiretroviral therapy.

RESULTS:

In the present of study 46.3% of patients were in stage 1, 25.9% were in stage 2, 20.4% were instage 3 and 7.4% were in stage 4(Table 1). Staging was done according WHO clinical staging[6].

Table 1 :HIV stage distribution among subjects

		Number ofcases	%
HIV Stage	Stage 1	50	46.3%
	Stage 2	28	25.9%
	Stage 3	22	20.4%
	Stage 4	8	7.4%
	Total	108	100.0%

In the study among subjects with stage 1, majority 28% were in the age group 21 to 30 years, in stage 2, majority 35.7% of subjects were in the age group 31 to 40 years, in stage 3, majority 54.5% of subjects were in the age group 41 to 50 years, among subjects in the stage 4, majority25% of subjects were in the age group 21 to 30 years, 31 to 40 years, 41 to 50 years and >60 years respectively. There was significant difference in age distribution with respect to stage of HIV(Table 2).

Table 2: Age distribution among HIV subjects with respect to Stage of HIV

		HIV Stage									
		Stage 1		Stage 2		Stage 3		Stage 4		Total	
		No of cases	%	No of cases	%	No of cases	%	No of cases	%	No of cases	%
Age	<20 years	4	8.0%	2	7.1%	0	0.0%	0	0.0%	6	5.6%
	21 to 30 years	14	28.0%	6	21.4%	4	18.2%	2	25.0%	26	24.1%
	31 to 40 years	10	20.0%	10	35.7%	2	9.1%	2	25.0%	24	22.2%
	41 to 50 years	13	26.0%	6	21.4%	12	54.5%	2	25.0%	33	30.6%

	51 to 60 years	7	14.0%	4	14.3%	4	18.2%	0	0.0%	15	13.9%
	>60 years	2	4.0%	0	0.0%	0	0.0%	2	25.0%	4	3.7%
	Total	50	100.0%	28	100.0%	22	100.0%	8	100.0%	108	100.0%

Mean age of subjects in stage 1 was 37.90 ± 12.954 years, among subjects in stage 2 was 37.93 ± 11.376 years, among subjects in stage 3 was 42.55 ± 9.282 years and among subjects in stage 4 was 42.75 ± 13.946 years. There was no significant difference in age distribution with respect tostage of HIV(Table 3).

Table 1: Mean age distribution comparison with respective stage of HIV

	N	Mean	SD	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Stage 1	50	37.90	12.954	34.22	41.58	19	70
Stage 2	28	37.93	11.376	33.52	42.34	20	60
Stage 3	22	42.55	9.282	38.43	46.66	27	55
Stage 4	8	42.75	13.946	31.09	54.41	27	63
Total	108	39.21	11.983	36.93	41.50	19	70

In the study among subjects in stage 1, 66% were males and 34% were females, among subjectsin stage 2, 57.1% were males and 42.9% were females, among subjects in stage 3, 63.6% were males and 36.4% were females and among subjects in stage 4, 25% were males and 75% were females. There was no significant difference in sex distribution with respect to HIV stage(Table4).

Table 03: Gender distribution among HIV subjects with respect to Stage of HIV

		HIV Stage									
		Stage 1		Stage 2		Stage 3		Stage 4		Total	
		No of cases	%	No of cases	%	No of cases	%	No of cases	%	No of cases	%
Sex	Female	17	34.0%	12	42.9%	14	63.6%	2	25.0%	45	41.7%
	Male	33	66.0%	16	57.1%	8	36.4%	6	75.0%	63	58.3%
	Total	50	100.0%	28	100.0%	22	100.0%	8	100.0%	108	100.0%

Mean Hb among subjects in stage 1 was 12.900 ± 2.5027 gm%, among subjects in stage 2 was

12.114 ± 2.22 gm%, among subjects in stage 3 was 10.57 ± 2.49 gm% and among subjects in stage 4 was 9.350 ± 1.26 gm%. There was significant difference in mean Hb between stages of HIV. Mean Hb was lowest in Stage 4(Table 5).

Table 4: Hb distribution among HIV subjects with respect to Stage of HIV

	N	Mean	SD	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Stage 1	50	12.900	2.5027	12.189	13.611	9.2	16.7
Stage 2	28	12.114	2.2254	11.251	12.977	8.5	15.9
Stage 3	22	10.573	2.4980	9.465	11.680	7.4	15.5
Stage 4	8	9.350	1.2660	8.292	10.408	7.4	10.3
Total	108	11.959	2.6022	11.463	12.456	7.4	16.7

Mean Total Leucocyte co Count among subjects in stage 1 was 7630.40 ± 2255.004, among subjects in stage 2 was 6375.71 ± 2945.602, among subjects in stage 3 was 7929.09 ± 3495.045 and among subjects in stage 4 was 5950.00 ± 3111.729. There was no significant difference in mean Total count between stages of HIV. Mean Total count was lowest in Stage 4(Table 06).

Table 06: showing Total Count distribution among HIV subjects with respect to Stage of HIV

	N	Mean	SD	95% Confidence Interval forMean		Minimum	Maximum
				Lower Bound	Upper Bound		
Stage 1	**50**	**7630.40**	**2255.004**	**6989.53**	**8271.27**	**3800**	**12000**
Stage 2	**28**	**6375.71**	**2945.602**	**5233.53**	**7517.90**	**1180**	**12800**
Stage 3	**22**	**7929.09**	**3495.045**	**6379.47**	**9478.71**	**3200**	**12200**
Stage 4	**8**	**5950.00**	**3111.729**	**3348.53**	**8551.47**	**3800**	**10900**
Total	**108**	**7241.48**	**2835.081**	**6700.68**	**7782.29**	**1180**	**12800**

Mean Platelets among subjects in stage 1 was 2.5372 ± 0.97347, among subjects in stage 2 was 2.2521 ± 0.96697, among subjects in stage 3 was 1.5900 ± 0.58398 and among subjects in stage 4 was 1.4875 ± 0.54224. There was significant difference in mean Platelets between stages of HIV. Mean Platelets was Lowest in Stage 4(Table 07).

Table 07: Platelets distribution among HIV subjects with respect to Stage of HIV

	N	Mean	SD	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Stage 1	**50**	**2.5372**	**0.97347**	**2.2605**	**2.8139**	**1.20**	**4.30**
Stage 2	**28**	**2.2521**	**0.96697**	**1.8772**	**2.6271**	**.86**	**4.30**
Stage 3	**22**	**1.5900**	**0.58398**	**1.3311**	**1.8489**	**.69**	**2.50**
Stage 4	**8**	**1.4875**	**0.54224**	**1.0342**	**1.9408**	**.86**	**2.24**
Total	**108**	**2.1926**	**0.96142**	**2.0092**	**2.3760**	**.69**	**4.30**

Mean CD4 count among subjects in stage 1 was 403.84 ± 246.971, among subjects in stage 2 was 243.43 ± 164.793, among subjects in stage 3 was 114.00 ± 39.274 and among subjects in stage 4 was 53.25 ± 32.823. There was significant difference in mean CD4 between stages of HIV. Mean CD4 was Lowest in Stage 4(Table 08).

Table 08: CD4 distribution among HIV subjects with respect to Stage of HIV

	N	Mean	SD	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Stage 1	**50**	**403.84**	**246.971**	**333.65**	**474.03**	**128**	**973**
Stage 2	**28**	**243.43**	**164.793**	**179.53**	**307.33**	**28**	**586**
Stage 3	**22**	**114.00**	**39.274**	**96.59**	**131.41**	**35**	**178**
Stage 4	**8**	**53.25**	**32.823**	**25.81**	**80.69**	**14**	**88**
Total	**108**	**277.24**	**228.422**	**233.67**	**320.81**	**14**	**973**

Mean ESR count among subjects in stage 1 was 12.72 ± 4.454, among subjects in stage 2 was 14.29 ± 5.843, among subjects in stage 3 was 26.82 ± 2.954 and among subjects in stage 4 was 27.00 ± 5.292. There was significant difference in mean ESR between stages of HIV. Mean ESRwas Highest in Stage 4(Table 09).

Table 09: ESR distribution among HIV subjects with respect to Stage of HIV

	N	Mean	SD	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Stage 1	**50**	**12.72**	**4.454**	**11.45**	**13.99**	**8**	**22**
Stage 2	**28**	**14.29**	**5.843**	**12.02**	**16.55**	**9**	**30**
Stage 3	**22**	**26.82**	**2.954**	**25.51**	**28.13**	**24**	**33**
Stage 4	**8**	**27.00**	**5.292**	**22.58**	**31.42**	**22**	**35**
Total	**108**	**17.06**	**7.683**	**15.59**	**18.52**	**8**	**35**

In the study among subjects in Stage 1, 44% had anemia, among subjects in Stage 2, 64.3% had anemia, among subjects in stage 3, 81.8% had anemia and among subjects in stage 4, 100% had anemia. There was significant difference in anemia with respect to HIV stage(Table 10).

Table 10: Association between HIV stage and Haemoglobin

		HIV Stage									
		Stage 1		Stage 2		Stage 3		Stage 4		Total	
		Count	%	Count	%	Count	%	Count	%	Count	%
Hb	Normal	28	56.0%	10	35.7%	4	18.2%	0	0.0%	42	38.9%
	Anemia	22	44.0%	18	64.3%	18	81.8%	8	100.0%	66	61.1%
	Total	50	100.0%	28	100.0%	22	100.0%	8	100.0%	108	100.0%

In Stage 1, 4% had leucopenia, 12% had leucocytosis. In stage 2, 28.6% had leucopenia and 7.1% had leucocytosis, in Stage 3, 18.2% had leucopenia and 36.4% had leucocytosis and in stage 4, 50% had leucopenia and 0% had leucocytosis. There was significant difference in Totalcount with respect to stage of HIV.

DISCUSSION

This study was conducted in all age groups above 15 years. Minimum age was 19 years and maximum age 68 years. Most of the cases belonged to the age 20-50 years age group. The total number of people living with AIDS in India was estimated at around 23.18 lakh out of which 96.5% belongs to age above 15 and other 3.5% belong to the age below 15.The total number of cases was 108,among 63 were males and 45 were females. The ratio was 1.4:1 which similar to the most of the studies conducted.

The most common hematological abnormalities found in this study was Anemia(61.1%), Elevated ESR (34.3%), Thrombocytopenia (31.5%), Leukopenia(16.7%),leukocytosis(14.8%). Among 108 patients 66 patients (61.1%) had anemia. It increased as the WHO stage progress,the study among subjects in Stage 1, 44% had anemia, among subjects in Stage 2, 64.3% had anemia, among subjects in stage 3, 81.8% had anemia and among subjects in stage 4, 100% had anemia.

In Stage 1, 4% had leucopenia, 12% had leucocytosis. In stage 2, 28.6% had leucopenia and 7.1% had leucocytosis, in Stage 3, 18.2% had leucopenia and 36.4% had leucocytosis and in stage 4, 50% had leucopenia and 0% had leucocytosis.

In the study among subjects with Stage 1, CD4 count was >500 cells/mm3 in 68%, 200 to 499 cells/mm3 in 28% and <200 cells/mm3 in 04%. Among subjects with Stage 2, CD4 count was >500 cells/mm3 in 50%, 200 to 499 cells/mm3 in 28.57% and <200 cells/mm3 in 21.42%. Among subjects with Stage 3, CD4 count was >500 cells/mm3 in 18.18%, 200 to 499 cells/mm3 in 36.36% and <200 cells/mm3 in 45.45%. Among subjects with Stage 4, CD4 count was >500 cells/mm3 in 0%, 200 to 499 cells/mm3 in 25% and <200 cells/mm3 in 75%.

In the study among subjects with Stage 1, 10% had raised ESR, among subjects with stage 2, 28.58% had raised

ESR, among subjects with stage 3, 72.72% had raised ESR, among subjects with stage 4, 100% had raised ESR. There was significant difference in ESR with respect to HIVstaging.

CONCLUSION

Anemia was the most common hematological abnormality followed by elevated ESR, Thrombocytopenia, leukopenia, leukocytosis. Hemoglobin level, ESR, TLC, CD4 count, Thrombocytopenia were correlated with the WHO staging of HIV infection. Anemia, leukopenia, thrombocytopenia significantly common in stage 3 and 4. CD4 is the best predictorof WHO staging.

REFERENCES

1. HIV[Internet].Cdc.gov.2023.Availablefrom: https://www.cdc.gov/hiv/default.html
2. Dikshit B, Wanchu A, Sachdeva RK, Sharma A, Das R(2009). Profile of hematological abnormalities of Indian HIV infected individuals. BMC Blood Disord; 9:5.doi: 10.1186/1471-2326-9-5. PMID: 19678930; PMCID: PMC2741436.
3. National AIDS Control Organization [Internet]. Gov.in. Available from:https://naco.gov.in/
4. Munyazesa E, Emile I, Mutimura E, Hoover DR, Shi Q, McGinn AP, et al(2012). Assessment of haematological parameters in HIV-infected and uninfected Rwandan women: a cross-sectional study. BMJ Open;2(6):e001600.
5. S. Suja, T. Saravanan, S. Karthikeyan et.al(2020). Profile of hematological abnormalities and itscorrelation with absolute CD4 count and human immunodeficiency virus viral load in human immunodeficiency virus-infected patients in a tertiary care hospital Indian J Sex Transm Dis AIDS; 41(2): 156–161.
6. HIV info [Internet]. Nih.gov. . Available from: https://hivinfo.nih.gov/home-page