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Original article:

Assessments of leukocyte in HIV infection: A cross sectional study

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Abstract:

Introduction: Hematological abnormalities are a common complication of HIV infection. Anemia is the most common abnormality found in the people living with HIV. Anemia is followed by leucopenia and thrombocytopenia. Aim of our study was to collect the data from India and study the DLC profile and its gender specific variation in HIV infection in India.

Materials and Methods: Two hundred PLWH of age group 18-60 years were included in the study. Study conducted from June 2013 to June 2014 at tertiary care hospital and medical teaching institute in south central India. Out of 200 subjects 99 were Male and 101 female, Complete blood count done on ERMA-PCE 210 blood cell counter.DLC profile studied in details including TLC,ALC,ANC,etc.

Results: The results of study indicated prevalence of leucopenia 2.5%,leukocytosis 3.5% and lymphopenia 0.5%. No significant relation in TLC and sex found (p=0.148).

Conclusions: DLC profile altered in HIV infection but no significant relation found as compare to sex.

Keywords : DLC, HIV/AIDS, people living with HIV/AIDS

INTRODUCTION

In India, the first evidence of HIV infection in sex workers in Chennai, Madurai and Vellore was obtained in 1986-1987. Since then, there has been an explosive increase in HIV transmission which led to a very rapid growth in the numbers of HIV positive persons and AIDS cases[1,2]India has the second highest burden in the world after South Africa and Nigeria so for as the HIV/AIDS cases are concerned. India has an estimated 2.5 to 3.1 million people living with HIV/AIDS (PLWH) including children under 15 years and those aged 50 and beyond as per the National AIDS Control Organization (NACO) and UNAIDS[3,4]The Human Immune-deficiency Virus (HIV) is a retrovirus that infects cells of the immune system, destroying or impairing their function. As the infections progresses, the immune system becomes weaker, and the person becomes more susceptible to infections.

The most advanced stage of HIV infection is Acquired Immunodeficiency Syndrome (AIDS)[5].HIV/AIDS is the major health challenge in the modern world and causing devastation in the resource poor south-east Asian countries.

It involves almost all the systems in human body. Disorders of hematopoietic system including lymphadenopathy, anemia, leucopenia and/or thrombocytopenia are common throughout the course of HIV infection. Studies have unequivocally demonstrated that anemia is associated with quality

of life decrements, decreased survival and increased disease progression in adults with HIV infection[6,7]

Some of the studies regarding DLC profile in HIV infection found very high prevalence of leukopenia neutropenia and lymphopenia in HIV infection. But most of them were from western and African countries [8,9,10].

Most of the world wide studies in HIV infections are focused on CD4 count and hemoglobin i.e. studyof anemia. Less data and studies are available on DLC profile characteristics in HIV infection.

So we decided to study the complete DLC profile in HIV infection and try to obtain baseline data for Indian population and focus on information about gender specific variation in DLC in same population.

MATERIALS AND METHODS

This study was conducted at tertiary care hospital and teaching institute situated in south central India. This institute is also a reputed ART center and ICTC center under NACO supervision. This institute provides all medical care and ART to the people living with HIV of surrounding eight to ten districts. This study was descriptive cross-sectional study.

All the subjects male and females were people living with HIV (PLWH) who were diagnosed cases of HIV infection at various ICTC center under NACO supervision including present institute.

HIV infection diagnosed Subjects both male and female of age between 18-60 years were selected. Subjects who have given the written informed consent were included in study.

Subjects below 18 years and above 60 years, subjects with known hematological disorders like sickle cell anemia thalassemia, hemophilia etc. subjects with history of resent blood transfusion female subject with ANC care and subjects with terminal illness. Subjects who have not given the written informed consent excluded from study.

The purpose of the study was explained to the participant and their questions regarding the study were solved. After obtaining written informed consent all the subjects were thoroughly examined for general and systemic examination. Socio-demographic variable and patient history was collected through structured questionnaire after the informed consent given by the subject.

After giving the written informed consent subjects were enrolled for the study. With the subjects sitting comfortably on chair with all aseptic precaution 5 ml venous blood collected from ante cubital vein in EDTA bulb .All the samples were collected between 9:00 a.m.to 12:00 p.m.

All the samples were analyzed within two hours of sample collection.

INVESTIGATION

All the hematological parameters Hemoglobin, Total Leukocyte Count(TLC), Red blood cell count(RBC), Differential Leukocyte Count (DLC),,Platelet Count, Erythrocyte Sedimentation Rate (ESR)etc were studied on ERMA-PCE 210 blood cell counter.

DATA ANALYSIS

Data analysis was carried out using Statistical Package for Social Science (SPSS) version 16.0.P value < 0.05 considered as significant and p value > 0.05 non-significant.

ETHICAL CONSIDERATION

Present study was part of research work “Study of some hematological parameter changes in people living with HIV/AIDS” and approved by the local ethical committee of institute via letter No/Pharm/IEC/Approv letter 598/11.

RESULTS AND OBSERVATION

Socio-demographic variables are shown in Table No.1.Among two hundred subjects selected for study 101(51.5%) were females and 99(49.5%) were males. In different age groups, 18-30years, 31-40years, 41-50years and 51-60years the number of subjects were 49(24.5%), 92(46%), 41-50 42(21%), 51-6017(8.5%) respectively.

The 141 (70.5%) subjects were in age 18-40 years which is sexually active age of the society.Among two hundred subjects 167(83.5%) subjects were on ART and 33(16.5%) subjects were not on ART.

All hematological parameters with highest, lowest and mean values are shown in Table No.2

Table NO.3 shows leuocyte profile.

Leucopena: TLC <4000/cumm.In male 2 (2.62%) and in female 2(1.98%) shows leucopenia.Leucocytosis: TLC > 11000/cumm **.**In males 6(6.06%) and in females 1(0.99%) shows leukocytosis.Maleshow high prevalence of leukocytosis.Normal: TLC 4000 – 11000/cumm.In male 91(91/91 %/) and in females 98(97.02%) shows normal TLC.No significant relation in TLC and sex found (p=0.148).Absolute neutrophil count (ANC):1. Normal: ANC > 1000/cumm 2.Neutropenia: ANC <1000/cumm.100% male and female shows normal ANC.No neutropenia found.A(ALC):1. Normal: ALC > 800/cumm . 2. Lymphopenia: ALC < 800/cumm.Lymphopenia observed in only male 1(1.01%).In female 101(100%) and in male 98(98.98%) subjects shows normal ALC. No significant relation in ALC and sex found (p=0.349).

TABLE NO. 1. SOCIO-DEMOGRAPHIC VARIABLES

SOCIO-DEMOGRAPHIC VARIABLES	SUB-GROUPS	NO.OF SUBJECTS (%)
AGE	18-30 years	49(24.5%)
	31-40 years	92(46%)
	41-50 years	42(21%)
	51-60 years	17(8.5%)
SEX	MALE	99(49.5%)
	FEMALE	101(50.5%)
ART	YES	167(83.5%)
	NO	33(16.5%)

TABLE NO.2 .HIGHEST, LOWEST AND MEAN VALUES

PARAMETER	HIGHEST	LOWEST	MEAN
HB	15gm/dl	6.5 gm./dl	11.0575 gm./dl
RBC	6.1million/ mm3	2.07/ mm3	4.0655 / mm3
PCV	47%	21%	34.055%
MCV	124fl	51fl	85.09fl
MCH	39pg/cell	15pg/cell	27.9pg/cell
MCHC	39 gm./dl	20 gm./dl	32.13 gm./dl
TLC	20700 / mm3	3100/ mm3	7037.5/ mm3
ANC	17881 / mm3	1705/ mm3	4517/ mm3
ALC	4428/ mm3	252/ mm3	2179.355/ mm3
AMC	492/ mm3	0	145.755 / mm3
AEC	525/ mm3	0	194.13 / mm3
ABC	0	0	0
PLATELET	4.1lakh/ mm3	0.63lakh/ mm3	2.06935lakh/ mm3
ESR *	36mm	7mm	19.798mm

* At the end of 1 hour

TABLE NO.3. TLC, ANC ALC ACCORDING TO SEX

PARAMETER		MALE (N=99) (%)	FEMALE (N=101) (%)	Chi-square	P
TLC	<4000	2(2.02)	2(1.98)		
	4000-11000	91(91.91)	98(97.02)	3.84	0.148
	>11000	6(6.06)	1(0.99)		
ANC	<1000	0(0)	0(0)	NA	NA
	>1000	99(100)	101(100)		
ALC	<800	1(1.01)	0	1.03	0.349
	>800	98(98.98)	101(100)		

DISCUSSION

Present study was carried out to study the DLC profile characteristics in HIV infection at tertiary level hospital and teaching institute in India.Two hundred peoples living with HIV in age group 18-60 years of both sexes i.e. male and female were recruited for this study. All the hematological parameters Hemoglobin, Total Leukocyte Count (TLC), Red blood cell count (RBC), Differential Leukocyte Count (DLC), Platelet Countetc were studied.

In present study only 2% subjects shows leucopenia .Similar result were observed by Sharma et al and Erhabor et al .Other studies by Kotwal et al Ambali et al and Pande et al shows more percentage of subjects with leucopenia than present study. This difference in the leucopenia may be due to the effect of ART as the subjects in both Kotwal et al andAmbali et al were not on ART and most of the subject in present study were on ART .In present study Leucopenia may be due to depletion of CD4 due to HIV infection.[11,12,13]In present study 3.5% subjects shows leukocytosis. Results were in agreement with other studies by Sharmaet alandRudresh et al .Male show high prevalence of leukocytosis as compare to females in present study.In present study Leukocytosis may be due to the various opportunistic and other chronic and acute infections frequently encountered in HIV infection.[14] No significant relation in TLC and sex found (p=0.148) But prevalence of both leucopenia and leukocytosis was low in PLWH on ART as compare to non-ART. Prevalence of both leucopenia and leukocytosis was high in age 51-60 years as compare to other age groups.This may be due to decreased immunity as age advances.

In present study 0.5% subjects show lymphopenia. But most of other studies found relatively high prevalence of lymphopenia such as Rudresh et al Adediran et al and Se Youn Choi et al .[15]. Rudresh et al attributed high lymphopenia may be due to result of direct attack of lymphocytes by HIV through CD4 binding sites. Subjects in AIDS group shows high prevalence of lymphopenia. In study by Se Youn Choi et al the patients previously taken ART were excluded so all the patients were without ART.As in our study most of the subjects were on ART and we excluded the subjects with terminal illness from our study it may result in low prevalence of lymphopenia in present study.

In present study we did not found neutropenia. Dikshit et al shows similar result with no neutropenia found.But some other studies by Adediran et al ,Erhabor et al and Se Youn Choi et al found high prevalence of neutropenia as compare to present study The more prevalence of neutropenia is due to the more advanced AIDS condition.

One of the cause for high prevalence of neutropenia in the study by Se Youn Choi et almay be thatsubjects on ART were excluded from the study.In present study most of the subject were on ART and we excluded the subject with terminal illness may also one of the reason for low prevalence of neutropenia in this study.

Present study was cross sectional study and no baseline data for comparison was available.Most of the subjects were on ART and many studies shows that ART increase the CD4 count as well as improve other hematological parameters which may interfere the outcomes of the study.

CONCLUSION

From present study we conclude that DLC profile is altered in HIV infection showing increased incidence of leucopenia ,lymphopenia and neutropenia. These effects may be due to direct effect of virus on hemopoeitic stem cells and also due to consequences of opportunistic infections encountered during the course of illness Further study is needed considering ART. As ARTshowed positive effect on these altered DLC profile in HIV infection.

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