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Orignal Article

CD4 Count and Gender-Based Hematological Profile of HIV Patients in Punjab, Pakistan

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ABSTRACT

Human Immunodeficiency Virus (HIV) belong to family of human retroviruses of lentivirus subfamily. This virus hits the patient's immune system by destroying important cells that fight against disease and infection. **Objective:** To observe the biochemical parameters such as anemia, Complete blood count (CBC), Hb Level, Platelets count, Total Leucocytes count TLC among HIV patients **Methods:** Different parameters like Total Leucocytes count TLC, Hb level, platelets count and among male and female were observed. Study of different parameters in HIV patients from different areas of Punjab, Pakistan. Complete blood count (CBC), Hb Level, HIV, Platelets count, Total Leucocytes count TLC was done using kits and screening methods. RNA extraction and PCR was done for future analysis. **Results:** HIV-positive males develop anemia and about 9.3% patients are suffering from leukocytosis. Some HIV positive males (12%) developed thrombocytopenia while 8% had thrombocytosis **Conclusions:** It is estimated that WBC, Platelets and Hb is significantly decreased, while WBC is increased in some cases and interestingly platelets were also increased in some cases

INTRODUCTION

Human Immunodeficiency Virus (HIV) belong to family of human retroviruses of lentivirus subfamily [1]. HIV infection is categorized by a progressive destruction of the body's system which successively become the explanation for number of infections, immunological and hematological complications [2]. An estimated 35.3 million people globally live with HIV. HIV is currently incurable due to the presence of HIV provirus integrated into the host DNA of long-lasting memory cells of the system bereft of active replication [3]. Drugs are available to suppress HIV but to not eradicate the virus. It makes the lifelong treatment necessary which may cause drug toxicities and viral resistance [4]. Some HIV infected patients will reach AIDS (Acquired Immunodeficiency syndrome). It is a scientific disorder during which severe impairment and progressive damage of both cellular and humoral immune reaction occur [5]. The explanation for spread of HIV infection in several areas of world are different. Men who roll in the hay with men (MSM) and feminine sex workers (FSW) contribute significantly to HIV transmission in most countries of the planet (Organization, 2016). In China the epidemic of HIV is caused by the high prevalence among MSM. It involves improved, hands-on, and operative HIV prevention interventions [6]. About 1.5 million people live with HIV in Kenya. The most explanation for its men who having sex with men (MSM) and feminine sex workers (FSW) [7]. T cell play a key role in several diseases. T lymphocytes express a T-cell receptor (TCR) for the popularity of specific peptide [8]. The incidence of opportunistic infections also depends upon the extent of immune suppression (occurs when CD4 count is <1200/mm3) [9]. A complete blood count is that the most ordinarily performed laboratory test. Complete blood count (CBC) is performed in patients who are vulnerable to anemia, polycythemia, infection,

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leukemia, or thrombophilia [10]. World health organization (WHO) defined anemia as level of hemoglobin (Hb) <12g/dL and <13g/dL in men [11]. Anemia is caused by the multiple factors so for classification and diagnosis the underlying physiological mechanism and patient history must considered into account [12]. Anemia and leukopenia (decrease in the number of leucocytes) [13]. Thrombocytopenia is another hematological abnormality associated with HIV infection [14]. Normal value of platelets ranges from 150 to 450 109 /L. [15]. Thrombocytopenia is defined as the platelets count below 150 × 109 /L. Thrombocytopenia may be congenital or acquired. Thrombocytopenia is also cause due to serious underlying medical condition. [16]. Normally before the introduction of combined antiretroviral therapy (cART), the prevalence of thrombocytopenia associated HIV infections ranges from 5% to 30% [17]. A basic role of CD4 effector T cells is the production of cytokines. On the basis of cytokines, they express, CD4 T cells can be classified into different subsets having distinct functions [18]. CD4 T cell lymphocyte count is the important parameter in the evaluation of immune function of HIV/AIDS patients. CD4 count also guide us about disease prognosis, antiretroviral treatment eligibility and clinical management of treated patients [19]. The delay in the availability of CD4 test can result can delay in adequate patient assessment and providing the information about the stage of HIV infection. It can also lead to delay in initiating the ATV and prophylaxis in newly diagnosed patients [20]. The aim of our study is observe values like Anemia, Complete blood count (CBC), Hb Level, Platelets count, Total Leucocytes count TLC among all of the patients who were registered in PACP treatment centers that are located in Lahore, DG Khan, Faisalabad, Kotmomin, Multan, Rahim Yar Khan, Sargodha and Sheikhupura in Punjab, Pakistan. We have studied samples only who were living in Punjab, Pakistan.

METHODS

The samples were stored at 4°C. Venous blood samples of volume 3ml to 5ml were collected in EDTA (Ethylenediaminetetraacetic acid) anticoagulant vials with the help of 5ml disposable syringes in collection centers. They were then transported to Punjab AIDS Control Program laboratory located in Lahore [21]. Screening of samples were done on Uni-GoldTMHIV by Trinity Biotech screening kits (immunochromatographic rapid test for antibodies to HIV) [22]. Complete Blood Count (CBC) was performed to check the hematological profile of patients. It was performed on [23]. CD4 count was done on Alere [24]. Automated PCR was done in three steps, 1) extraction, 2) amplification and 3) data analysis using Qiagen PCR kits. Extraction is done on QIAGEN manual extraction kit, QIAamp Kit was used for amplification.

RESULTS

The participants included, 74% males, 24% females and 2% transgender (TG). While the analysis of age range shows that the percentage of female in every age range is less than males, while TG are within the range of 25-34. Screening was done and only samples that were shown positive in rapid screening kit were included in the study. CBC results showed that 26.20% of all patients had leucopenia, and 9.305 patients had leukocytosis. 15% patients had lymphocytopenia and 48% had lymphocytosis as shown in Figure 1. 13% patient have thrombocytopenia and 6% have thrombocytosis as shown in 0% of patients have anemia (Table 1, Figure 1). Among males 27% had leucopenia, 11% had leukocytosis (Table 1, Figure 1). Among females 27% had leucopenia while 4% have leukocytosis (Figure 1). TG does not acquire leucopenia. Relation of CD4 count with Total Leucocyte Count (TLC), . 12% of HIV positive males developed thrombocytopenia while 8% have thrombocytosis , 7.1.14% of (Table 1, Figure 1). HIV positive females developed thrombocytopenia. Transgenders did not develop thrombocytopenia or thrombocytosis. 3.39% of HIV positive males developed anemia. 74% of HIV positive males develop anemia shown in graph 8.2. 50% of TG develop mild anemia.CD4 count estimations showed that 6% of patients had CD4 count <50, 9% had CD4 count between 50-200,39% had 201-500, 46% and >500. PCR result showed that 37% of HIV patients had ND viral load, 11% had <1000, 10% had between 1001-1000, 12% had between 10001-10000, and 30% had >100000. Analysis of age ranges with PCR values shows that Patients having viral load >100000 are more among the 25-34 and 35-44 age groups. Percentage of Male is about 3 times more than the percentage of female. It makes the ratio of 1:3. Only 2% TG are present in our data.

Abnormalities	HIV patients % (n=118)
Leucopenia + Thrombocytopenia	3.3%
Leucopenia + Thrombocytosis	0%
Leukocytosis + Thrombocytopenia	0.8%
Leucopenia +Anemia	11%
Leukocytosis + Anemia	0.8%
Thrombocytopenia + Anemia	8.4%
Thrombocytosis + Anemia	5.9%
Leukocytosis + Thrombocytosis	3.3%

Table 1: Patients having more than 1 hematological abnormalities

11% of patients had Anemia and leucopenia at the same time and 8.4% had thrombocytopenia and Anemia at the same time and 5.9% have thrombocytosis and Anemia at the same time and 3.3 % are suffering from both leucopenia and thrombocytopenia and 3.3 % had leukocytosis and thrombocytosis(Figure 1).

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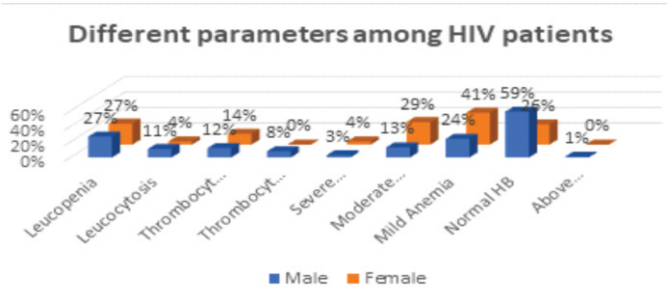

Figure 1: Graph Analysis of TLC, Platelet count, and Hb Level among HIV Males and Females

DISCUSSION

In HIV patients CD4 count is considered as a marker of immune senescence. It predicts mortality rate in most of the HIV patients [25]. Patients who have cd4 count less than 100 cells/ml are strong predictor of mortality, while in the patients who have higher CD4 levels chances of survival is more [26,27]. Patients having CD4 count <200 cells per ul are suffering from AIDS [28]. From samples 11% of patients are children / under age 15, while among all the patients 74% are males, 24% are female and 2% are TG [29]. It suggests that circumcision is more likely for health reasons than just for religious practice [30]. Interestingly HIV prevalence and incidence is high among MSM and MSW than TG. In a study conducted by Pasupathi et al. Hb and platelets count was decreased but WBC was significantly increased [31]. Regarding Leucocyte count some patients like 9.3% (11) of patients are suffering from leukocytosis showing more adherence of patients to their chemoprophylactic therapy and ART. This percentage is much higher than the findings of Ako in 2018 [32]. While 6% of the patients had thrombocytosis and all of them had anemia showing its association with erythropoietin (EPO) (hormone secreted by kidney to stimulate production of blood cells) that shows the risk of lung diseases [33-36].

CONCLUSIONS

In current study, the biochemical parameters WBC, platelets, Hb decreased significantly, however in some cases, WBC and platelet level was raised.

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