

**CLINICAL, HAEMATOLOGICAL AND BIOCHEMICAL PROFILE OF HIV PATIENTS
PRIOR TO ANTI RETROVIRAL THERAPY IN A RURAL TERTIARY CARE CENTRE
OF SOUTH INDIA**Poornima. H^{1*} and Jithin Raj. P²¹Additional Professor, Department of General Medicine, Government Medical College, Alappuzha, Kerala, India.²Resident, Department of General Medicine, Government Medical College, Alappuzha, Kerala, India.***Corresponding Author: Dr. Poornima. H**

Additional Professor, Department of General Medicine, Government Medical College, Alappuzha, Kerala, India.

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ABSTRACT

Background: Acquired immune deficiency syndrome (AIDS) affects all systems in our body. WHO has divided this infection into 4 classes. Another important marker for disease progression is CD4 count. Purpose of the study is to find out the clinical, hematological and biochemical profiles of HIV patients who are not started on Anti Retroviral Therapy (ART) yet and the correlation with the WHO stage and CD4 count. **Method:** 100 patients of age 13 years or above who attended ART centre or medicine wards of a tertiary care centre in south India with HIV infection were included in the study prior to initiation of ART. Duration of the study was 1 year. Fasting blood sample was sent for complete blood count, sodium, potassium, blood sugar, cholesterol, triglyceride and albumin estimation. **Results:** Among the hematologic abnormalities, only anemia revealed a statistically significant correlation with WHO staging. Biochemical abnormalities which included hyponatremia, hypokalemia, elevated fasting blood sugar, serum cholesterol and serum triglyceride levels also revealed statistically significant correlation with WHO staging. No hematological or biochemical abnormality was statistically correlated with CD4 count. **Conclusion:** All these hematological abnormalities are present in the advanced stage compared to early stage. So patients in the advanced stage should be screened for these complications.

KEYWORDS: Human immunodeficiency virus, Acquired Immunodeficiency syndrome, hematological abnormalities, biochemical profile.

INTRODUCTION

In 1986, the first known case of HIV was diagnosed by Dr. Suniti Solomon amongst female sex workers in Chennai, Tamil Nadu. National Aids Control Organization of India estimated that 21.26 lakhs people live with HIV/AIDS in India in 2015. HIV affects all systems in our body.

Disorders of the hematopoietic system including lymphadenopathy, anemia, leucopenia, and/or thrombocytopenia are common throughout the course of HIV infection and may be the direct result of HIV, manifestations of secondary infections and neoplasms or side effects of therapy. Hyponatremia and hyperkalemia are the two major electrolyte disorders that may be associated with HIV infection. In addition, lactic acidosis, hypophosphatemia have been described. There is a high prevalence (30%) of abnormal renal function among patients with HIV disease. CKD is increasingly a cause of morbidity among people with HIV infection. Advanced stages of HIV infection are characterized by low plasma levels of total cholesterol, high-density

lipoprotein cholesterol, low-density lipoprotein cholesterol, and elevated triglycerides.

MATERIALS AND METHODS

All patients with HIV infection attending ART centre or medicine wards of a tertiary care centre in south India were included in the study. All patients were of age 13 years or above who have not started on ART yet. Duration of the study was twelve months. The variables used in the study are age, sex, hematological parameters including hemoglobin, total count, differential count, platelet count, ESR and biochemical parameters like serum albumin, creatinine, sodium, potassium. Fasting blood sample was sent for glucose, cholesterol and triglyceride levels. Results were analyzed based on their correlation with WHO staging and CD4 counts. Patients with chronic infections like tuberculosis, chronic kidney and liver diseases were excluded. Those patients on drugs causing anemia, thrombocytopenia or leucopenia and antiretroviral therapy were also excluded. So were alcoholics, patients below 13 years and those who were unwilling to participate in the study. Data was analyzed using SPSS software. Quantitative variables were

expressed in Mean with Standard deviation and median with interquartile range as appropriate. Qualitative variables were expressed as proportions or percentages. Fischer exact test, Chi square test and Mann-Whitney U tests were used to find out association and a p value of <0.05 was considered statistically significant.

RESULTS

The observation was made in 100 HIV patients who fulfilled the inclusion criteria. Mean age of the study population was 36.34 years. About 55% were in 31-40 years. 64% were males and 36% were females. The male female ratio was 3:2. The mean of the total WBC count in our study was 5982±2200 cells/mm³. Total count varied between 2000 and 10000. 40% of them had leucopenia. In a study by Amanda *et al*^[1] the percentage of leucopenia at the diagnosis was found to be 25%. In another study by Erhabor *et al*^[2] it was 62%.

The mean neutrophil count was 54±12%. Amballietal^[3] found that 42% of HIV patients have neutropenia. In our study, 18 were in Stage III and IV. 2 patients were in Stage I. In the multistate adult and adolescent spectrum of HIV disease surveillance project, neutropenia was detected in 10% and 50% of asymptomatic and advanced stage respectively. The occurrence is less in our study.

The mean lymphocyte count was 29.77±8.4%. The median CD4 count was 90 cells/mm³. CD4 count varied between 17 and 486. Lymphocytopenia was seen in 30% and CD4 count <200 in around 87%. In the study conducted by Amballi *et al*^[3], the median CD4 count was 160 cells/mm³. They detected lymphocytopenia in 24.3% and CD4 count <20 in 24.3%. But our findings are in accordance with WHO document and clinical staging of HIV/AIDS for adults and adolescents; this ascertained both lymphocytopenia and CD4 depletion in HIV/AIDS.^[5]

The platelet count varied between 0.6 and 3.3 lakh/mm³. The mean count was 1.89±0.4 lakh/mm³. Thrombocytopenia was detected in 40% the cases. In a study by Khandekar *et al*^[6] the incidence was only 9%. Pechere *et al*^[7] detected thrombocytopenia in 40% the cases during the course of illness. In our study, it was 37% in early stage and 45% in advanced stages of the disease.

The mean hemoglobin in our study was 11.43±1.45 g/dL. It varied between 8.8 and 14.2 g%. 80 patients had anemia out of which 55(85.94%) were males and 23(63.89%) were females. The occurrence of anemia was more among males. Amballi *et al*^[3] found out anemia in 52% of PLHAs₃. Anemia was reported as a consistent hematological abnormality associated with HIV/AIDS by Ogun *et al*^[8]. Mean ESR was 24.6 ± 11g%. Elevated ESR was found in 41% of the patients. It varied between 10 and 50 mm/hr. The ESR elevation is not specific for any disease process. But it may be due to increased

infections and infestations in these patients due to their immunosuppression.

The analysis revealed that the association between WHO staging and the thrombocytopenia, leucopenia, neutropenia and lymphopenia are not statistically significant. But the correlation between anemia and WHO staging was statistically significant. The occurrence of anemia was 22 out of 29(75%) in stage II, 48 out of 55(87%) in stage III and 9 out of 12(75%) in stage IV. It was slightly higher in stage III.

In our study among patients with CD4 count <200, 70% had anemia, 45% had elevated ESR, 26% had neutropenia, 28% had lymphopenia and 35% had thrombocytopenia. Among patients with CD4 >200 10% had anemia, 7% had raised ESR, 4% had leucopenia, 4% had neutropenia, 2% had lymphocytopenia and 6% had thrombocytopenia. This indicates a higher incidence of cytopenias with the disease progression. But the correlation with CD4 count was found to be statistically not significant.

Hyponatremia was found in 24 (24%). All these patients were in either WHO stage III or IV. All the patients in stage IV had hyponatremia. Hypokalemia was detected in 12 patients (12%). All those patients are in WHO stage III or IV. Out of the 12 patients in stage IV, 10 had hypokalemia.

Serum creatinine was deranged in 25 patients (25%). 6 of them in stage II, 13 in stage III and 6 in stage IV. But there is no statistically significant correlation with WHO stage or CD4 count. In a study done by Crum-Cianflone *et al*^[9], there was 3% prevalence of renal dysfunction in HIV infection¹⁰. Our statistics gives a different picture with a high rate. This change may be due to relative increase in advanced stages of the disease in our study compared to other studies.

Serum albumin was decreased in 27 patients(27%). 1 of them in stage I, 6 of them in stage II, 15 in stage III and 5 in stage IV. But there is no statistically significant correlation between alteration in serum albumin level and WHO stage or CD4 count. CD4 count of 200 and lower was the major cofactor for low serum albumin among HIV-infected individuals in different studies done worldwide. But it is not holding good in our study. The prevalence of hypoalbuminemia is varied widely in different studies. In our study, it is 27% which is a mid value between these two.

Fasting blood glucose level was found to be elevated values of in 13 (13%) patients is in stage I, 2 in stage II, 4 in stage III and 6 of the patients in stage IV. There is statistically significant correlation with WHO stage but not with the CD4 count.

Serum cholesterol was elevated in 14 (14%). All were in either WHO stage II, III or IV. 8 of the patients in stage

IV had elevated serum cholesterol level. There is statistically significant correlation with WHO stage and elevated values of serum cholesterol. In our study altered triglyceride level was seen in 20% of the cases.

DISCUSSION

The sex ratio in India at the time of diagnosis is 8:3 and in western countries, it is 7:3⁽¹¹⁾. In our study, alcoholics were excluded. This might be the reason behind the alteration of the ratio as most males were alcoholics. Majority of the patients belonged to stage III at the time of diagnosis. Only 4 were in stage I. This implies that it is difficult to find out the HIV infection in early asymptomatic period. In our study, the higher incidence of leucopenia at the time of diagnosis might have been due to the delay in diagnosis. The counseling and screening should be intensified in order to pick up cases early. 12% had neutropenia. Patients in the advanced stage with low neutrophil count are at greater risk of having opportunistic infections. In our study due to more number of patients with advanced disease, there is increase in lymphocytopenia and CD4 <200/microlitre. In our patients, 80% had anemia and 87% had CD4 <200. Both are very bad prognostic factors. So there is increased chance of morbidities and mortality in our patients.

This indicates a higher incidence of cytopenias with the disease progression. But the correlation with CD4 count was found to be statistically not significant. There is statistically significant correlation between hyponatremia and hypokalemia with WHO stage but not with the CD4 count. In our study, the presence of hypokalemia is slightly less compared to other studies. It may be due to the exclusion of patients who are prone to develop hypokalemia like those with chronic diseases or on hypokalemia producing drugs. In different studies, it is postulated that there is significant relation between WHO staging and alteration in serum creatinine which is not obtained in our study.

CONCLUSION

The present study was undertaken to find out the clinical, hematological and biochemical profile in HIV seropositive patients who were not started on antiretroviral therapy yet. 100 patients were included in the study. A Complete hemogram, serum sodium, potassium, creatinine, albumin, fasting blood sugar, fasting cholesterol and triglyceride levels were tested in all patients. The findings obtained in this study are as follows;

4 patients were in WHO stage I, 29 were in WHO stage II, 55 in WHO stage III and 12 in stage IV. Males (64%) were more than female (36%). The age group with the maximum number of patients was between 31 and 40(56%). Anemia revealed statistically significant correlation with WHO staging. Hyponatremia, hypokalemia, fasting blood sugar, serum cholesterol and serum triglyceride levels also had statistically significant

correlation with WHO staging. No hematological or biochemical abnormality was statistically correlated with CD4 count.

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