Anaemia is the Most Common Haematological Manifestation of HIV Infected Patients

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ABSTRACT

BACKGROUND
HIV infection is a multisystem disease and haematological abnormalities are among the most common complications of HIV. Haematological manifestations are common throughout the course of HIV infection and may be due to direct effects of HIV, manifestations of secondary infections and neoplasm, or side effects of therapy. Haematological abnormalities such as impaired haematopoiesis, immune and non-immune mediated cytopenias and altered coagulation have been described in patients with HIV infection/AIDS. The aim of the study was to evaluate the various haematological parameters in HIV patients.

METHODS
Blood was collected in a sterile EDTA containing tube and processed as per our established laboratory protocol under universal precaution as per the guidelines of National Aids Control Organization (NACO, India). Complete blood counting including Hb%, PCV, red cell indices, platelet count and total white cell count and differential count were done by automated blood cell counter analyser. All cell count indices including WBC count with differential and platelet count, was further confirmed by manual oil immersion smear study method. Detailed peripheral blood examination was carried out after staining the blood film by Romanowsky stains (Leishman/May Grunwald Giemsa stain).

RESULTS
The most common haematologic abnormality was anaemia, seen in 93% (n=93) of patients among the total of 100 cases. Other haematological abnormalities detected were leucopenia in 2% of cases, neutropenia in 3% of cases, lymphocytopenia in 18% of cases and thrombocytopenia in 9% of cases.

CONCLUSIONS
Anaemia (Hb%) was the most commonly seen haematological parameter in our study. So, frequency of affected parameter in HIV infected was anaemia >lymphocytopenia >thrombocytopenia >neutropenia >leucopenia.

KEYWORDS
HIV, Anaemia, Leukopenia, Thrombocytopenia, Lymphocytopenia, Neutropenia
Anaemia is the most common haematological abnormality found in children and adults with HIV infection and its incidence increases with the clinical stage of disease, independent of CD4 count. (Howell WH, 1890; Wanchu A et al., 2009,1-2) The importance of finding and treating anaemia in adult with HIV infection is underscored by data from their study showing anaemia to be an independent prognostic factor Mocroft A. et al., 19999 in HIV infection. The aetiology of anaemia in adults with HIV infection is multifactorial, ranging from direct effects of HIV on haematopoietic stem cells and stromal elements to the effect of opportunistic infection and myelosuppressive drugs on haematopoiesis.

Common causes and mechanism of anaemia with HIV infection include: Decreased red cell production (opportunist infection, direct effect of HIV infection itself, myelosuppressive medications, decreased production of erythropoietin, hypogonadism. increased red cell destruction (autoimmune haemolytic anaemia, thrombotic Microangiopathy, disseminated intravascular coagulation), ineffective red cell production (folic acid and vitamin B12 deficiencies) (Treaty et al., 1983).

Leucopenia is common in HIV-infected individuals and, similar to anaemia, occurs with a frequency that generally correlates with the severity of the disease. Leucopenia typically involves both lymphocytes and granulocytes. Up to 70% of patients at advanced stage of AIDS present with low neutrophil counts Evans RH et al., 2000.4 However, as noted previously, a reduction in the absolute number of CD4+ T cells occur as one of the earliest immunologic abnormalities of HIV-infection, and the number of these cells declines progressively over-time. These autoimmune antibodies include antineutrophil antibodies, destroying neutrophils once they have matured in the bone marrow and have been released into the peripheral circulation of neutropenia, although this remains a potential mechanism of neutropenia Murphy MF et al., 19875 in HIV infection. Thrombocytopenia is a frequently reported complication of HIV infection and has been described in both adult and children Costello C, 2001.6 Two forms of HIV related thrombocytopenia are recognized: that associated with the pancytopenia seen in AIDS and solitary thrombocytopenia which occurs prior to development of AIDS. The mechanism of thrombocytopenia Volberding PA et al., 20047 in HIV infection appears to involve both increased platelet destruction as well as ineffective platelet production. Platelet survival was also decreased in HIV-infected patients without Thrombocytopenia Wanchu A et al., 2009; Kasthuri AS et al8, 2006; Arora D, 2011), although to a lesser extent.

METHODS

The present study was a one-year observational study conducted from 1st October 2016 to 31st September 2017 in haematology wing of Postgraduate Department of Pathology, Government Medical College, Jammu. One hundred patients, seropositive for HIV by ELISA were included in the study. Ethical clearance from the institutional ethical committee was obtained. These patients were observed in detail and complete data of each patient was prepared. Blood collected in a sterile EDTA containing tube and processed following our established laboratory protocol and universal precautions as per guideline of National AIDS Control Organisation (NACO, India).

Inclusion Criteria

Newly diagnosed patients of HIV who were attending HIV/AIDS clinic were included in the study. Source of registration of HIV patients were Voluntary Counseling and Testing Centre (VCTC), Government Medical College Hospital Jammu and patients detected to be HIV+ve at our institute as well as those referred from various peripheral health institutions.

Exclusion Criteria

Pregnant women, patients under 16 years of age, patients of malignancy not related to HIV disease and patients not willing to give consent were excluded from the study.

A complete blood counting including Hb%, PCV, Red cell indices, platelet count and total white cell count and differential was done by Automated blood cell counter analyser of all the patients. The all cell count indices including WBC count with differential and platelet count, was further confirmed by manual oil immersion smear study method. Detailed peripheral blood examination was carried out after staining the blood film by Romanowsky stains (Leishman/May Grunwald Giemsa stain). Written informed consent was taken from all.

RESULTS

Out of 100 patients included in this study, 58% (58) were males against 42% (42) females with the sex ratio of 1.38:1. Most of the males (50%) and females (45%) were in the age group of 31-40 years. Minimum age of the patient was 19 years and maximum age was 61 years. Most common age group was 21-40 years with mean age of 36.59 ± 9.12 (Table -1)

| Age Distribution (years) | Number of Patients (%) |
|-------------------------|------------------------|
| ≤20                     | Male (n=58) | Female (n=42) |
| 21-30                   | 1 (1.72)    | 3 (7.14)     |
| 31-40                   | 8 (13.79)   | 15 (35.71)   |
| 41-50                   | 11 (18.97)  | 2 (4.76)     |
| 51-60                   | 8 (13.79)   | 3 (7.14)     |
| >60                     | 1 (1.72)    | 0 (0.00)     |
| Mean Age ± SD           | 36.59 ± 9.12 |

Table 1. Distribution of Patients According to Age and Sex

Clinical profile and haematological parameters of these patients were analysed. 60% of the patients were symptomatic at the time of presentation and presented with
one or more than one clinical symptom such as fever, recurrent loose motions, anaemia, generalized weakness, arthralgia, tuberculosis, weight loss, seizures, oral ulcers skin lesions etc. and 40% patients were asymptomatic. Fever (23.33%) was the major clinical presentation followed by diarrhoea (16.66%) and extrapulmonary tuberculosis. (Table 2)

**DISCUSSION**

The present study was done in order to bring out the common haematological abnormalities encountered in HIV infection which is very important with the continuing rise in the prevalence of HIV infection in a developing country like India. In the present study, the result of data analysis obtained shows a predominance of males amongst 100 patients that is males constituted 58% (n=58) with male: female ratio of 1.38:1. Similar sex distribution results were obtained in studies of Mitra JK et al., (2015)\(^10\) with a male to female sex ratio of 1.12:1 and Devi CS et al., (2016) with a male to female sex ratio of 1.9:1.

The patient age in the present study was from more than 16 years and 71% of the patients were in the age group of 21 to 40 years with mean age of 36.59±9.12, which as per the fact is the sexually active part of life as well as highly productive age group. This is comparable with the findings of Mitra JK et al., (2015)\(^10\) where majority of the patients 21 to 40 years. This is also consistent with the findings of Devi CS et al., (2016), mean age of 39.8±10.7.

Parinitha SS and Kulkarni MH\(^12\) showed similar results with mean age of 34.55±9.63. In the present study compared to male age distribution, females were younger, 35.71% of them were between 21 to 30 years of age group.

In our study anaemia was present in 93% of cases. A similar observation was made by Kaloutsi et al., (1994) in 34/40 (85%) cases. Karcher et al., (1991) reported anaemia in 175/197 (89%) patients, and Tripathi et al., (2005) in 61/74 (82.4%) patients. However, Sitalakshmi et al., (2003) reported anaemia in 27/42 (64.2%) cases which is much lower as compared to the present study. Table 5 shows a comparison of number of anaemia cases in the present study with other studies. Of these patients, severe anaemia was observed in 6% of cases as compared to 7% (Wanchu A et al, 2009), 2.0% (Meidani A et al, 2012), 33% (Kasthuri AS et al., 2006) in various studies. 46% patients were moderately anaemic, 41% patients had mild anaemia and 7% patients had no anaemia. Overall frequency of anaemia in our study was comparable with other studies.

Anaemia was the most common haematological abnormality among all other parameters included in the study. Among the total of 100 cases included in the study, 93(93%) cases had anaemia and 7(7%) cases had normal haemoglobin. Anaemia was graded based on haemoglobin level into mild, moderate and severe (Table-3). Mild anaemia was seen in 26% of males (Hb range 10-13 gm) and 15% of females (Hb range 10-12 gm). Moderate anaemia (Hb range 7.0-9.9 gm) was seen in 46% of patients with sex distribution of 23% of males and 23% of females. Severe anaemia (Hb <7 gm.s) was seen in 6% of cases with sex distribution of 5% males and 1% female. Other

### Table 2. Distribution of Patients According to History

| History           | Number of Patients | Percentage |
|-------------------|--------------------|------------|
| Arthralgia        | 1                  | 1.0        |
| Asymptomatic      | 40                 | 40.0       |
| Chronic back ache | 1                  | 1.0        |
| Decreased appetite| 1                  | 1.0        |
| Diarrhoea         | 10                 | 10.0       |
| Disseminated TB   | 1                  | 1.0        |
| Extrapulmonary TB | 7                  | 7.0        |
| Left hemiparesis  | 1                  | 1.0        |
| Miliary TB        | 2                  | 2.0        |
| Pulmonary TB      | 2                  | 2.0        |
| Right axillary LAP/TB | 1 | 1.0 |
| Easy fatigability | 3                  | 3.0        |
| Fever             | 14                 | 14.0       |
| Fungal infection  | 2                  | 2.0        |
| Loss of weight    | 3                  | 3.0        |
| Lymphadenopathy   | 1                  | 1.0        |
| Oral ulcer        | 1                  | 1.0        |
| Seizures          | 2                  | 2.0        |
| Severe anaemia, chronic diarrhoea | 2 | 2.0 |
| Skin lesions      | 4                  | 4.0        |
| Urticaria         | 1                  | 1.0        |

**Table 3. Haematological Abnormalities**

**Table 4. Haematological Abnormalities in HIV Infected Patients**

**Table 5. Comparison of Number of Anaemia Cases in Present Study with Other Studies**

| Authors          | No. of Anaemia Cases | Total Cases | %   |
|------------------|----------------------|-------------|-----|
| Karcher et al    | 175                  | 197         | 89% |
| Tripathi et al   | 61                   | 74          | 82.4%|
| Sitalakshmi et al| 27                   | 42          | 64.2%|
| Kaloutsi et al   | 34                   | 40          | 85% |
| Parinitha et al  | 210                  | 256         | 84% |
| Rahman et al     | 103                  | 204         | 50.5%|
| Present study    | 93                   | 100         | 93% |
9% cases had thrombocytopenia which in agreement with the study carried by Patwardhan et al.,18 (2002) who had found thrombocytopenia in 13% of the cases. Sullivan et al.,19 (1997) reported one-year incidence of thrombocytopenia in 8.7% persons with one or more AIDS defining illness. We also observed leucopenia in 2% patients and neutropenia in 3% of cases. Neutropenia tend to occur concomitantly with anaemia, 10 to 30% of those with ARC may be neutropenic, this may progress to about three-quarters of those with AIDS (Zon et al,20 1987). Lymphopenia was seen in 18% of the cases. Similar observations were made by Tripathi et al.,15 (2005) in 25.6% cases.

CONCLUSIONS

HIV affects virtually all organ systems, including the haematopoietic system. Anaemia was the most common haematological abnormality. The recent surge of HIV infection has led to an increase in the incidence of haematological abnormalities. Early detection, exact cause and appropriate treatment of these abnormalities will reduce morbidity and mortality in HIV/AIDS patients. At the same time, campaign for health education and preventive measures should be a continuous process so that the affected individuals will come forward to these designated centers and avail the facilities. Health workers, social organizations and civil society should be educated so that they are aware of this permanent infection and take appropriate measures at all levels and this will help to overcome the social stigma attached to it. Further studies on more number of patients will provide better understanding of overall behaviour and prognosis of disease.

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