

PACIFIC JOURNAL OF MEDICAL SCIENCES

{Formerly: Medical Sciences Bulletin}

ISSN: 2072 – 1625



Pac. J. Med. Sci. (PJMS)

www.pacjmedsci.com. Email: pacjmedsci@gmail.com.

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ABSTRACT

Abnormal haematology parameters in patients with HIV / AIDS are common. Anaemia is a frequent complication among these patients and it is usually associated with serious complications. Neutropenia and eosinophilia are common in the advanced stages of AIDS. It is therefore important to determine the haematology parameters in HIV /AIDS patients. This prospective study was carried out between July and September 2008. A total of 113 case notes of HIV / AIDS patients attending the Heduru Clinic were randomly selected. Their certified full blood count electronic results were obtained from the Haematology laboratory in Port Moresby General Hospital. Detailed re-examination of the fixed stained peripheral blood film of each patient was carried out using high-powered microscope. Gender distribution of the 113 case notes indicated 46 (41%) males and 67 (59%) females. Analysis of the data indicated high frequency of anaemia among the patients. Microcytic hypochromic anaemia was prevalence among 47.8% of the patients, macroscopic hypochromic anaemia 29.2% and normochromic normocytic anaemia 23.0%. Blood film showed presence of anisocytosis and poikilocytosis. Although only one patient had leucocytosis, leucopenia was prevalent among 20.4% of the patients; of these mild leucopenia was more frequent than moderate leucopenia. A total of 51 (45.1%) patients had Eosinophilia; of these 76.5% had mild eosinophilia, 17.6% moderate eosinophilia and 5.9% marked eosinophilia. Thrombocytopenia was observed in 21.2% and 0.9% with induced pseudothrombocytopenia. It is hoped that these findings will serve as base line for more detailed studies, and support the need to strongly advocate for routine monitoring of full blood count haematological parameters of HIV/AIDS patients in Papua New Guinean.

KEYWORDS: HIV/AIDS, Anaemia; Lymphocytopenia, Eosinophilia, Thrombocytopenia, Neutropenia, Monocytosis

(Submitted November 2012 Accepted June 2013)

INTRODUCTION

The full blood count (FBC) refers to the different types of cells in the blood [1]. FBC is one of the important laboratory investigations in HIV/AIDS patients because of the reported high prevalence (30 to 40%) of anaemia, leucopenia and thrombocytopenia [2]. In anaemia of chronic diseases caused by HIV/AIDS there are reported variations in the parameters and functions of erythrocytes, leucocytes and thrombocytes [3]. Some researchers indicated that microcytic and macrocytic hypochromic anaemia [4] are linked with the HIV and the managements for HIV/AIDS [5,6]. Papua New Guinea (PNG) the prevalence of anaemia, lymphocytopenia, eosinophilia, thrombocytopenia, neutropenia and monocytosis among HIV/AIDS patients attending the weekly HIV Heduru clinic in Port Moresby General Hospital (PMGH) have not been fully investigated.

The major aim of this study was to assess the prevalence of cytopenia and cytophilia in HIV/AIDS patients attending Heduru clinic in PMGH.

The objectives were to use the case notes at Heduru Clinic and FBC parameters electronic results in the PMGH Haematology laboratory to determine if microcytic hypochromic anaemia, macrocytic hypochromic anaemia, normochromic normocytic anaemia, leucopenia, lymphocytopenia, eosinophilia,

thrombocytopenia, neutropenia and monocytosis are prevalent in HIV/AIDS patients in PNG.

SUBJECTS AND METHODS:

This was a retrospective study carried out between July and September in 2008. The study site was the Heduru Clinic, which is the major sexually transmitted disease clinic in PMGH the major general and referral hospital in the National Capital District (NCD) PNG.

A total of 113 randomly selected case notes of HIV/AIDS patients in Heduru Clinic and their corresponding FBC parameters electronic results in the PMGH Haematology laboratory were obtained. The fixed stained peripheral blood film for each patient was obtained and re-examined in detail with high-power microscope for red blood cell morphology, leucocyte morphology and platelet morphology. The re-examination of each slide was carried out by two qualified laboratory scientists. The independent findings in each slide were compared before accepting the final result. Ethical clearance and permission for this study was obtained from the School of Medicine and Health Sciences (SMHS), University of Papua New Guinea (UPNG) ethics and research grant committee and the authorities in PMGH.

RESULTS

The age range of the 113 patients was 10 to 60 years. Gender distribution of the patients indicated 67 (59.3%) females and 46 (40.7%)

males. Among the female patients 37.3% were in the 20 to 29 years age group and 40.3% in the 30 to 39 years age group. For the male patients 21.7% were in the 20 to 29 years age group and 41.3% in the 30 to 39 years age group. Using the World Health Organization (WHO) cut-offs for anaemia [7], indicated a prevalence rate of 31.0% among all the patients; of these 28.6% had severe anaemia. Gender distribution of the 35 anaemic patients indicated 67.7% females and 34.3% males. Among the female patients 51.1% had mild anaemia and 17.4% had severe anaemia; For the male patients 41.7% had mild anaemia and 50.0% had severe anaemia.

Blood film from the 113 patients showed variation in in size (anisocytosis) and shape (poikilocytosis) that are typical of different anaemia. Microcytes, target cells, stomatocytes and elongated cell such as ovalocytes were more frequent than the macrocyte, target cells and stomatocytes. In addition red cell morphology was variable with majority microcytic hypochromic (47.8%), followed by macrocytic hypochromic (29.2%) and normochromic normocytic (23.0%).

Total leucocyte counts were graded as normal ($4-11 \times 10^9/L$), mild leucopenia ($3-3.9 \times 10^9/L$), moderate leucopenia ($2-2.9 \times 10^9/L$), severe leucopenia ($<1.9 \times 10^9/L$) and leucocytosis ($>11 \times 10^9/L$). Although only one patient had leucocytosis, 20.4% had leucopenia. Mild leucopenia was common than moderate leucopenia. Immature granulocytes were identified in two patients.

Neutropenia, defined as less than $2.5 \times 10^9/L$ of neutrophil absolute value occurred in 34.5% of the patients and neutrophilia (more than $7.5 \times 10^9/L$) was observed in only 0.9% of the patients. Hypersigmented neutrophils occurred in the macrocytic hypochromic anaemia.

Lymphocytopenia, defined as less than $1.5 \times 10^9/L$ of lymphocyte absolute value occurred in 67.30% and lymphocytosis in 1.7% of the patients. Atypical lymphocytes occurred in 3.5% of the patients.

Monocytosis, defined as more than $0.8 \times 10^9/L$ of monocyte absolute value occurred in 5.3% of the patients.

Eosinophilia, defined as more than $0.44 \times 10^9/L$ of eosinophil absolute value was prevalence in 45.1% of the patients; of these patients 74.5% had mild eosinophilia, 19.6% with moderate eosinophilia and 5.9% with marked eosinophilia.

Platelet counts were graded as normal ($150-400 \times 10^9/L$), mild thrombocytopenia ($100-149 \times 10^9/L$), moderate thrombocytopenia ($50-99 \times 10^9/L$), severe thrombocytopenia ($< 50 \times 10^9/L$) and thrombocytosis ($>400 \times 10^9/L$).

Normal platelet count was observed in 77.0%, and thrombocytopenia in 21.2% of the patients. Mild thrombocytopenia ($100-149 \times 10^3/\mu l$) was common (79.2%) than moderate thrombocytopenia ($50-99 \times 10^3/\mu l$) (20.8%). Six had abnormal distribution of platelets that appeared anisothrombocytes morphologically. Mild to moderate thrombocytosis was observed in 3.0% of the female patients.

DISCUSSION:

HIV/AIDS is still a global health crisis with majority of the patients in the developing countries [8,9]. Although haematological abnormalities are common manifestations of HIV/AIDS patients, and may have considerable impact on their well-being, treatment and care, very few studies on haematological parameters have been undertaken in PNG. Our findings are supported by prior investigations of adult patients with neutropenia [1,10-12], thrombocytopenia [6,13-14] and lymphopenia [4,15]. The data indicated that HIV/AIDS was common among the so called early adulthood (age group 20 to 40 years) rather than the premature adulthood (age group 10 to 19 years). The gender distribution observed in this study is similar for other sexually transmitted infections, for example gonorrhoea patients attending the same clinic.

In this study anaemia was prevalent among the patients. Majority of the patients had mild anaemia with haemoglobin 8-14 g/dl for men and 8-12 g/dl for women rather than severe anaemia defined as haemoglobin less than 8 g/dl for both males and females.

The severity of anaemia in the present study ranges from microcytic hypochromic anaemia, macrocytic hypochromic anaemia and normochromic hypochromic anaemia. The findings are supported by other studies reported for adult patients with anaemia [17-19,20].

Blood film from the 113 patients in this study showed anisocytosis and poikilocytosis found in different anaemia. Microcytes, target cells,

stomatocytes and elongated cell especially ovalocytes were more frequent than the macrocytes, target cells and stomatocytes. These findings are found in iron deficiency, anaemia of chronic disease and other nutritional deficiency including folate or vitamin B12 deficiency [1,3,21]. Ovalocytes has been reported to be common among individuals in Melanesian and Asian countries and protects against malaria [22].

Mild leucopenia was common in among the patients. Differential counts absolute values revealed lymphocytopenia (67.3%) and eosinophilia (45.1%) were more common followed by neutropenia (34.5%) and monocytosis (5.3%), these findings are similar to those reported by other researchers [10-11,18-19,23-24]. Hypersigmented neutrophils are an early sign of megaloblastosis associated with nutrition deficiency such as folic acid or vitamin B12. The high level of neutropenia observed in this study is common in HIV/AIDS patients; this is similar to findings reported by other researchers [10-11,23-24, 25]. Anaemia and neutropenia in female HIV/AIDS patients were strongly associated with lower CD4 cell counts [23], in this study the CD4 count was not available to indicate its association to decrease level of neutrophil absolute value. However, the normal functions of neutrophils will be affected as a result of underlying opportunistic bacterial infections. Neutropenia, due to bone-marrow suppression caused by anti-HIV drugs and the virus infecting haemopoietic progenitor cells have been reported [3,18]. Antigranulocyte antibodies

have been described in HIV/AIDS patients [26], and neutropenia observed in these patients may be attributed to decreased production of granulocyte colony-stimulating factor [27]. Although only one patient was found with neutrophilia, in some cases the presence of neutrophilia was most probably due to stress and drugs [3]. Stress and drugs triggers the haemopoietic granulocyte series to proliferate, differentiate and into mature neutrophils have been reported [27]. Protozoa and helminthes opportunistic infections are commonly associated to HIV/AIDS [20]. Therefore it is not surprising to observe a high number of eosinophil counts in the present study. Monocytosis is associated with chronic infection such as tuberculosis and efforts should be made in microbiological monitoring of ART for wide variety of bacterial and fungal common opportunistic pathogens in the HIV/AIDS patients [3,28]. Primary infection of HIV associated with heterophil-negative mononucleosis can be seen in high titer viraemia. Thrombocytopenia was found in 21.2% of the patients; this finding is similar to other studies elsewhere [20, 29]. Platelet number and morphology findings revealed mild thrombocytopenia was common than moderate thrombocytopenia. Some of the thrombocytopenic patients had abnormal platelet distribution and when examined morphologically were diagnosed with anisothrombocytes. Abnormal platelet distribution may be associated with splenomegaly and liver disease [1], which is not surprising for some HIV/AIDS patients. Thrombocytopenia in splenomegaly is actually

platelet pooling apart from normal 30 percent of platelet in the spleen. Anisothrombocytes is found in Wiskott-Aldrich syndrome and its presence in HIV/AIDS patients is uncommon. Few of the patients in the present study had very mild thrombocytosis suggesting a reactive thrombocytosis rather than essential thrombocytosis myeloproliferative disorders [3]. It has been reported [15] that HIV/AIDS patients on HAART were the category with mild to moderate to even severe thrombocytopenia. Mild thrombocytopenia may be due to HIV infection of megakaryocytes that express a functional CD4 molecule [15]. In the present study mild thrombocytopenia was found in patients with microcytic hypochromic anaemia.

CONCLUSION:

Anaemia, leucopenia, eosinophilia, thrombocytopenia, neutropenia and monocytosis were prevalent among HIV/AIDS patients in the present study. Anaemia was prevalent in the patients, especially those with microcytic hypochromic anaemia, megaloblastic anaemia and normochromic normocytic anaemia. Although neutropenia and monocytosis are associated with opportunistic and chronic infections, mild thrombocytopenia was more common than moderate thrombocytopenia.

As anaemia, leucopenia and eosinophilia are the most common FBC abnormalities observed in the present study it is important to routinely assess these parameters for timely and adequate clinical management of patients in Heduru clinic in PMGH.

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