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CONTENTS

ORIGINAL ARTICLES

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ORIGINAL ARTICLES

Haematologic features of the Human Immunodeficiency Virus (HIV) Infection in Black children in Harare

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SUMMARY

Forty six Black Zimbabwean children aged between three months and seven years who were admitted into Parirenyatwa Central Hospital with serologically positive and symptomatic HIV infection were investigated for their haematologic profiles. Tests done included full blood counts, manual white cell differential counts, coagulation screening tests and bone marrow aspiration in clinically indicated cases.

Anaemia was found in 84 pc, leucocytosis in 60 pc and thrombocytopaenia in 30 pc of the cases. In contrast to reports in adults leucopaenia or neutropaenia were not seen. Coagulation profiles were mostly normal but presumptive diagnosis of circulating coagulation inhibitor was made in one case.

Morphological changes suggestive of myeloid dysplasia and in particular dysgranulopoiesis were commonly seen. Bone marrow aspirates examined in eight of the children all showed hyper or normal cellularity with adequate and productive megakaryocytes.

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INTRODUCTION

A variety of haematologic abnormalities have been described in patients with HIV infection and AIDS.[1,2] Few reports however, describe the changes in African children. The aim of this study is to document the haematologic features seen in children with HIV infection admitted into the Parirenyatwa Hospital in Harare.

MATERIALS AND METHODS

Patients: Children were considered infected with the HIV virus if they presented with clinical features suggestive of HIV infection and they had a positive serological test. The clinical features met the Centre for Disease Control criteria for diagnosis of HIV infection.[3] In children below 15 months of age, the added criteria of demonstrating the presence of the virus in blood or evidence of immune dysfunction[3] were not met because of unavailability of resources to perform the tests. Therefore the diagnosis of HIV infection in children was made if they fulfilled both criteria above, irrespective of age. This definition is similar to that used by Nkrumah *et al*[4] and Topley[5] also in Zimbabwe.

The presence of anti-HIV-I antibodies was detected by two ELISA methods and in doubtful cases confirmed by Western Blot. Parents were offered pre and post test counselling. Forty six patients aged three months to seven years fulfilled the above criteria and formed the subjects of the study. The patients were all known to have acquired the infection perinatally and none was on AZT or any other antiviral agent nor on cotrimoxazole prophylaxis. Other antimicrobial agents were however, used as indicated.

Methods: All the children had the following tests done: automated full blood counts (Coulter JS), blood film examination, manual 200-cell white cell differential counts, coagulation screening tests comprising prothrombin time (PT), activated partial thromboplas-

tin time (APTT) and thrombin clotting time (TT). Correction tests and where indicated coagulation factor assays were done in cases of prolonged clotting times. Bone marrow aspiration (BMA) was done in cases of clinical bleeding and in those with platelet counts less than 100 x 10^9/1.

Samples for coagulation tests were separated immediately and the plasma kept on ice and tested within one hour. Samples for blood counts and bone marrow aspirates were processed within two hours.

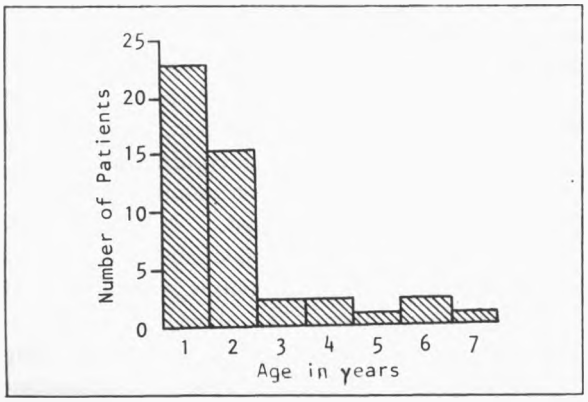
RESULTS

The age distribution of the children is show in Figure I and the main abnormal peripheral blood findings are summarised in Table I.

Table I: Abnormal blood counts in 46 children with HIV infection.

	Blood count			No	pc
Anaemie	Hb	<	11g/dl	39	84
Leucocytosis	WBC	>	11 x 10^9/1	27	59
Leucopaenia	WBC	<	3,0 x 10^9/1	0	0
Neutrophilia	N	>	7,5 x 10^9/1	12	26
Neutropaenia	N	<	1,5 x 10^9/1	0	0
Lymphocytosis	L	>	7,0 x 10^9/1	18	39
Lymphopaenia	L	<	2,5 x 10^9/1	8	17
Eosinophilia	Eo	>	0,5 x 10^9/1	2	4
Monocytosis	M	>	1,0 x 10^9/1	5	10
Thrombocytopaenia	Plt	<	150 x 10^9/1	14	30

Figure I: Age distribution of children with HIV infection.



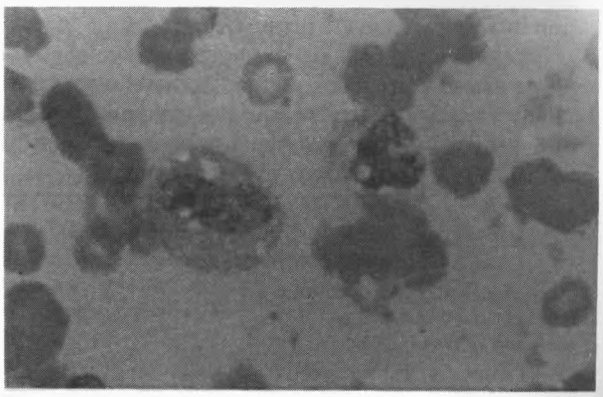
Anaemia: The bulk of the children (84 pc) were anemic with a haemoglobin concentration below 11g/dl. About half the anaemic children had a normochromic and normocytic blood picture while 40 pc had a hypochromic and microcytic anaemia with MCV and MCH below 75fl and 25pg respectively. The remaining 10 pc had significant macrocytosis with MCV above 100fl.

Leucocytosis and leucopaenia: About 60 pc of the children had leucocytosis (total WBC above 11x10^9/1) with about equal proportions showing predominant neutrophilia and lymphocytosis. There was a left shift of neutrophils in about half the cases showing neutrophilia and in about 20 pc of those with normal white cells counts. A common qualitative abnormality of granulocytes was cytoplasmic vacuolation which was found in about 50 pc of the cases (Figure II). Toxic granulations and Dohle bodies were less commonly seen. Some neutrophils exhibited cytoplasmic budding or extensions which contained no granules and stained pale blue; these could be confluent Dohle bodies.

Monocytes were increased in only about 10 pc of the cases and showed heavy cytoplasmic vacuolation. Only two children showed significant eosinophilia of greater than 0,5 x 10^9/1. No cases of leucopaenia (wbc less than 3,0 x 10^9/1) or neutropaenia (less than 1,5 x 10^9/1) were seen but there was lymphopoenia of less than 2,0 x 10^9/1 in 17 pc of the children.

Thrombocytopaenia: Fourteen children (30 pc) had platelet counts below 150 x 10^9/1. Thrombolcytopaenia was mild (100 – 149 x 10^9/1) in eight cases (17 pc); moderate (50-99 x 10^9/1) in three cases (6,5 pc) and

Figure II: Monocyte and band neutrophil showing cytoplasmic vacuolations.



severe (less than 50 x 10^9/1) in three cases (6,5 pc) with one of the latter having severe expistaxis.

Bone marrow findings: Bone marrow aspiration was performed in the eight children, two of whom were bleeding while six had moderate or severe thrombocytopaenia without clinical bleeding. The findings are shown in Table II. All marrows had hyper or normal cellularity with adequate and productive megakaryocytes. In the erythroid series, dysplasia was seen as irregularity or lobulation of nuclei, presence of nuclear remnants in the cytoplasm and basophilic stippling. Myeloid dysplasia manifested as cytoplasmic vacuolation of granulocytic precursors and hypogranularity in a few cases. Megakaryocytes dysplasia was minimal.

Table II: Bone marrow aspiration findings in eight children with HIV infection.

	No	pc
Normo — or hypercelluar marrow	8	100
Adequate megakaryocytes	8	100
Low myeloid/etythroid ratio (< 2:1)	1	12
High myeloid/erythriod ratio (> 10:1)	2	25
Myeloid dysplasia/dysgranulopiesis	5	62
Erythroid dysplasia	2	25
Lymphocytosis (> 40 pc)	2	25
Plasmacytosis (> 5 pc)	1	12
Histiocytosis	1	12

Bone marrow lymphocytosis of greater than 40 pc was found in two aspirates and mild plasmacytosis of 5 pc was found in one. The lymphocytes and plasma cells were normal in morphology. The presence or absence of lymphoid or plasma cell aggregates or increased fibrosis could not be determined as only one aspirate was accompanied with a trephine biopsy.

One aspirate showed marked infiltration by histiocytes with eccentric nuclei and copious pale and fibrillar cytoplasm. These were probably pseudo-Gaucher cells.[6] The patient had severe thrombocytopaenia with epistaxis but no significant hepatosplenomegaly. Bone marrow aspirates were not cultured.

Coagulation screening tests: Prothrombin time and partial thromboplastin time were normal except for two children who had prolonged APTT. One of the two children was bleeding and also had prolonged PT and TT with other evidence of disseminated intravascular coagulation. The other child had normal PT and the moderately prolonged APTT (60:35 seconds) was not corrected by mixing with 50 pc normal plasma before or after incubation at 37°C for two hours.

This suggested the presence of a circulating inhibitor but further tests were not done to establish whether it was a lupus anticoagulant or anticardiolipin antibody.

DISCUSSION

The haematologic findings in this study broadly agree with those reported in other studies.[2,7] The most common complication seen was anaemia which was most probably multifactorial. It could be nutritional or due to HIV infection *per se* or other infections such as pneumonia.

Thrombocytopaenia was found in 30 pc of patients; non-vital causes such as malaria were excluded. Though tests for specific anti-platelet antibodies or platelet-associated immunoglobulins were not done, thrombocytopaenia in our patients was probably not due to auto-immune causes since classic immune thrombocytopaenic purpura is usually acute and self limiting and recovery is the rule in the age group of most of our patients.

Our results confirm the finding by others that thrombocytopaenia is an early and common feature of HIV infection children.[2,8,9] It is therefore advisable in children with unexplained thrombocytopaenia to exclude HIV infection before embarking on invasive investigations.

In contrast to reports in adults[10] leucopaenia and neutropaenia were not found as features of HIV infection in these children. On the contrary about 60 pc of them had leucocytosis with half being predominantly neutrophilic. Sandhaus *et al*[2] also did not observe leucopaeia in their small series. Leucocytosis could be secondary to infection.

The presence of vacuolated monocytes has been described in HIV infection[1] and this feature was very conspicuous in our study. Particular attention has, however, not been drawn to vacuolations in peripheral blood neutrophils and immature granulocytes, a phenomenon we observed in nearly 50 pc of our patients. These changes could not have been storage artefacts since samples were processed within two hours and neutrophil vacuolations were only occasionally observed and few in routine samples from non HIV-infected children.

It is not clear whether these vacuolations were the result of intense phagocytic activity or a further sign of myeloid dysplasia. Features of dysgranulopoiesis which have previously been described include hypogranularity[11] and giant neutrophils with increased peroxiadase activity.[12] Functional impairment of neutrophils in childhood HIV infection has also been demonstrated in at least one study.[13]

The frequency of prolonged APTT attributable to circulating coagulation inhibitors appeared to be lower in our study (1 in 46) than has been reported[14] and bleeding or thrombosis due to inhibitors was not encountered.

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