Section: Paediatric

Original Research Article

HEMATOLOGICAL PROFILE OF HIV INFECTION IN CHILDREN

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Received : 02/08/2023
Received in revised form : 02/09/2023
Accepted : 17/09/2023

Keywords:
Hematological, HIV Infection, Paediatric.

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DOI: 10.47009/jamp.2023.5.5.349

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (5); 1780-1782

Abstract

Background: Hematological abnormalities like anemia, leucopenia, lymphopenia, thrombocytopenia and elevated ESR are among the most common pathological manifestation in children with HIV/AIDS. **Objective:** Aim of this study was to find out hematological parameters in HIV infected children before starting antiretroviral treatment. **Design:** A Cross sectional study. **Setting:** Study was conducted in the department of Pediatrics in collaboration with department of Pathology RIMS Imphal during the period of October 2013 to August 2015. **Participants:** Total 65 Children up to 12 years with HIV infection were clinically examined and tested for CBC and CD4 count. Data were analyzed using SPSS and P value was set at less than 0.05 for the statistical significance. **Results:** The mean ESR in this study was 43.35±31.21 mm in one hour. Elevated ESR (>15mm) was found in 43 (66.2 %) cases. 60% cases were found anemic with mean HB level 10.39±1.66 mg/dl with P- value of 0.046. 36.9% cases were mild anemic with HB level 9-11 gm/dl and 23.1% cases were moderately anemic with HB level 6-9 gm/dl. Thrombocytopenia (platelet count <1.5 lac/cmm) was present in 26.2% cases. Mean TLC count is decreasing with age. Neutropenia (count <40%) was present in 3 (4.6%) cases. Lymphopenia in 8 (12.3%) cases, and lymphocytosis in 7(10.8%) cases. In this study decline in CD4 count is observed with age. Mean CD4 count in age group <2 years, 2-5 years and >5 years were 1079.00±864.98 cells/cmm, 418.86±398.10 cells/cmm and 323.39±275.00 cells/cmm respectively (p=0.004). CD4 count was less than 400 cells/cmm in 44 (67.7%). **Conclusion:** From our study we concluded that Elevated ESR and low CD4 count was the most common hematological parameter affected followed by decrease in hemoglobin. Anemia and thrombocytopenia was more severe in lesser age children and CD4 counts was decreasing with increase in age.

INTRODUCTION

Human immunodeficiency virus (HIV) infection is a multisystem disease. Hematological abnormalities are among the most common pathological manifestation in children with HIV/AIDS. Impaired hematopoiesis, immune mediated peripheral destruction, opportunistic infections and drugs can cause anemia, leucopenia, lymphopenia, thrombocytopenia and elevated ESR.[1]

Aims and Objects

Aim of this study was to find out hematological parameters in HIV infected children before starting antiretroviral treatment.

MATERIALS AND METHODS

A Cross sectional study "Hematological profile of HIV infection in children" was conducted in the department of Pediatrics in collaboration with department of Pathology RIMS Imphal during the period of October 2013 to August 2015. Manipur is among high prevalance state of HIV infection and no such study has been conducted in North east region of India. Children aged more than 12 years and children receiving Antireteroviral therapy were excluded. Total 65 Children up to 12 years with HIV infection were clinically examined and tested for hematological parameters (CBC and CD4 count).

RESULTS

Out of 65 patients, 10 (15.4%) cases were less than 2 years, 21 (32.3%) cases were between 2 years to 5 years and 34 (52.3%) cases were 5 years to 12 years. The mean age of presentation was 5.65 years. Most number of patients belonged to Christian religion (44.6%) followed by Hindu (30.8%) and Muslim (24.6%). [Table 1]

ISSN (O): 2687-5365; ISSN (P): 2753-6556

In this study 60% cases were found anemic with mean HB level 10.39±1.66 mg/dl with P- value of 0.046. 36.9% cases were mild anemic with HB level 9-11gm/dl and 23.1% cases were moderately anemic with HB level 6-9 gm/dl. Anemia was more severe in child less than 2 years age gp with mean HB of 8.87±1.21. [Table 2]

The mean platelet count was 1.92±0.60 lac/cmm. Thrombocytopenia (platelet count <1.5 lac) was present in 26.2% cases. Median platelet count (1.53±0.49) was lowest in cases less than 2 years age. [Table 3]

Leukopenia was present only in 3(4.6%) cases and Leukocytosis in 4(6.2%) cases. It is also observed that mean TLC count is decreasing with age. Neutropenia (count <40%) was present in 3 (4.6%) cases. Lymphopenia in 8(12.3%) cases, and lymphocytosis in 7(10.8%) cases. [Table 4]

The mean ESR in this study was 43.35±31.21 mm in one hour. Elevated ESR (>15mm) was found in 43 (66.2 %) cases. [Table 5]

The overall mean CD4 Count in this study was 399.39±392.58 cells/cmm. CD4 count was less than 400 cells/cmm in 44 (67.7%). Mean CD4 count in age group <2 years, 2-5 years and >5 years were 1079.00±864.98 cells/cmm, 418.86±398.10 cells/cmm and 323.39±275.00 cells/cmm respectively (p=0.004). The overall mean CD4 count in this study was 399.39±392.58. CD4 count was less than 200 cells/cmm in 20 (6730.7-8%), 200-400cells/cmm in 24(36.9%) and more than 400 cells/cmm in 21(32.3%) children. [Table 6]

Table 1: Distribution of study subject by Hemoglobin percentage (%)

Hemoglobin %	Female		Male		Total	
	Number	%	Number	%	Number	%
6-9	8	23.5	7	22.6	15	23.1
9-11	15	44.1	9	29	24	36.9
Total	34	100	31	100	65	100

Table 2: Comparison of Hemoglobin of patients studied according to age in years

Study variable	Age in years			Total	p value
	<2 yr	2-5 yr	>5 yr		
Hemoglobin %	8.87±1.21	10.04±1.68	10.82±1.55	10.39±1.66	0.046*

Table 3: Distribution of study subject by Platelet Count

Platelet Count	Female		Male		Total	
	Number	%	Number	%	Number	%
0.5-1	0	0	2	6.5	2	3.1
1-1.5	11	32	4	12.9	15	23.1
Total	34	100	31	100	65	100

Table 4: Distribution of Total leucocyte count (TLC) according to age in years

TLC	Age in years			Total
	<2 yrs	2-5 yrs	>5 yrs	
<4000	0(0%)	1(3.6%)	2(5.9%)	3(4.6%)
4000-11000	3(100%)	25(89.3%)	30(88.2%)	58(89.2%)
>11000	0(0%)	2(7.1%)	2(5.9%)	4(6.2%)
Total	3(100%)	28(100%)	34(100%)	65(100%)

Table 5: Distribution of Erythrocyte sedimentation rate (ESR) in study population

ESR	Female		Male		Total	
	Number	%	Number	%	Number	%
0-15	11	32.4	11	35.5	22	33.8
>15	23	67.7	20	64.6	43	66.2
Total	34	100	31	100	65	100

Table 6: Distribution of CD4 Count levels according to gender

CD4 Count	Female		Male		Total	
	Number	%	Number	%	Number	%
<200	9	26.5	11	35.5	20	30.8
200-400	13	38.2	11	35.5	24	36.9
>400	12	35.3	9	29	21	32.3
Total	34	100	31	100	65	100

DISCUSSION

In this study 60% cases were found to be anemic with mean Hb level 10.39 ± 1.66 gm. Out of these 24 (36.9%) cases were mild anemic and 15 (23.1%) cases were moderately anemic. Lowest levels of Hb (mean ±SD 8.87±1.21) were found in cases with age <2 Years. The mean haemoglobin concentration decreased as disease progressed ($p < 0.05$).

Similar finding were also reported by Adetifa IM et al and Wanjari A et al, Adetifa IM et al in his study reported more cases with mild anemia (39.7%) than

ISSN (O): 2687-5365; ISSN (P): 2753-6556

moderate (32.3%).[2-5] While Wanjari A et al also found anemia in 58 (58%) who were not on ART.[3] Anemia in HIV patient is due to decrease production (opportunistics infections, bone marrow infiltration), Increased destruction(autoimmune factors), chronic infection, and adverse effect of antiretroviral drugs. Lowest levels of Hb among children aged less than 2 years may be because HIV is more progressive in younger age due to immature immune system.

Thrombocytopenia (platelet count <1.5 lacs/cmm) was present in 26.2% cases. Lowest mean (±SD) platelet counts (1.53±0.49) were found in cases less than 2 years age. In study by Patwardhan MS et al,[4] thrombocytopenia was present in as many as 13% of HIV-infected persons. Thrombocytopenia in HIV patient is due to immune mediated destruction of platelets (anti-glycoprotein (gp) IIb and/or gp-IIIa), decreased (ineffective) production of platelets from the infected megakaryocytes and toxic effect of drugs. High incidence of thrombocytopenia in this study may be due to less sample size. In this study mean platelet count was lowest in child age less than 2 years may be because HIV is more progressive in younger age and also because decrease in platelet count is first manifestation of infection induced bone marrow suppression.

Majority of cases 58 (89.2%) had TLC count within normal range (4000-11000 cells/cmm). Leucopenia was present only in 3 (4.6%) cases and Leucocytosis in 4 (6.2%) cases. Mean (±SD) TLC count was found to be 7200.78 ± 2592.47 cells/cmm. In this study mean (± SD) TLC count is decreasing with age may be due to progression of disease with age. Similarly leucopenia was also reported in other studies conducted by Shah I et al,[5] and Adetifa IM et al.[2] Reasons for leucopenia found in this study may be due to direct destruction of lymphocytes by HIV and absence of any comorbid infections during period of study.

Neutropenia (count <40%) was present in 3 (4.6%) cases. lymphopenia was present in 8(12.3%) cases and lymphocytosis in 7 (10.8%) cases. Shah I et al[5] in her study found higher number (24%) of cases with lymphopenia compared to present study. In patients with HIV infection, neutropenia can result from the disease or related malignancies, drug therapies, or opportunistic infections. HIV can cause neutropenia by directly or indirectly impairing hematopoiesis. With progression of disease with age number of leucocytes count decrease due to destruction of CD4 cells by HIV and antibody-dependent cytotoxicity.

Mean (±SD) TLC count was found to be 7200.78 ± 2592.47 cells/cmm. Leucopenia was present only in 3 (4.6%) cases and Leucocytosis in 4 (6.2%) cases. In this study mean (± SD) TLC count is decreasing with age may be due to progression of disease with age. Similarly leucopenia was also reported in other studies conducted by Shah I et al,[5] and Adetifa IM et al.[2] Reasons for leucopenia found in this study may be due to direct destruction of lymphocytes by HIV and absence of any comorbid infections during period of study.

The mean (± SD) ESR in this study is 43.35 ± 31.21 mm in 1hr. High level of ESR (>15mm) was found in 43 (66.2 %) cases. In present study mean value of ESR and prevalence of elevated ESR is low compared to study conducted by Shah I et al,[5] and Ndakotsu MA et al.[6] Elevated ESR may be due to chronic nature of HIV infection and low mean hemoglobin level in this study.

Overall Mean±(SD) CD4 Count was 323.39±275.00 cells/cmm (p=0.004, significant) and mean±(SD) CD4 count was 1079.00±864.98 cells/cmm, 418.86±398.10 cells/cmm, 323.39±275.00 cells/cmm in age group of <2 years, 2-5 years, >5 years respectively. These findings are in agreement with findings of Patwardhan MS et al4 and Wanjari A et al.[3] In this study decline in CD4 count is observed with age, which may be due to progression of disease with age. Decrease in CD4 count is due to direct destruction of CD4 cells.

CONCLUSION

From our study we concluded that Elevated ESR and low CD4 count was the most common hematological parameter affected followed by decrease in hemoglobin. Anemia and thrombocytopenia was more severe in lesser age children and CD4 counts was decreasing with increase in age.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556