http:// ijp.mums.ac.ir
Letter to the Editor (Pages: 799-800)

Spurious Hyperleukocytosis

*Amitabh Singh[1], Anirban Mandal[2], Bhavika Rishi[3], Puneet Sahi[4]

1 Senior Research Associate, Department of Pediatrics, AIIMS, New Delhi-110029, India.
2 Senior Resident, Department of Pediatrics, AIIMS, New Delhi-110029, India.
3 Senior Resident Department of Pathology, Lady Harding Medical College, New Delhi 110001, India.
4Senior Resident, Department of Pediatrics, Lady Harding Medical College, New Delhi 110001, India.

Introduction

A 4 month- old- baby girl, 1st born to non-consanguineous marriage, immunized for age, was brought with complaints of progressive pallor for 2 weeks, low grade fever for 1 week and increased irritability. There was no history of cough, cold, poor feeding, bleeding, jaundice or blood transfusion. There was no family history of any hematological disorders. On examination she had severe pallor, tachycardia, spleen was palpable 6 cm below left costal margin and liver 5 cm below right costal margin but there was no icterus or lymphadenopathy. Her hematological parameters were: Hemoglobin 4.2 gm/dl, Total leucocyte count 138,000/mm^3, with differential leucocyte count showing Polymorphs 23%, Lymphocyte 63%, Monocyte 9%, Eosinophil 5% and Platelet 336,000/mm^3. Peripheral smear revealed microcytic, hypochromic RBCs with marked aniso-poikilocytosis, pencil cells, target cells and numerous nRBC {243/100 White Blood Cells (WBC)} but there were no blasts or 'shift to left' of WBC. Manual Reticulocyte count was 15%. Her liver and renal function parameters were within normal limits. A diagnosis of β thalassemia major was considered and the same was confirmed with Hb High Performance Liquid Chromatography (HPLC) of the parents (Table. 1), who turned out to be β thalassemia carriers. The baby was given packed red blood cell transfusion under close cardiac monitoring and parents were counseled regarding the disease and further treatment options.

Hyperleukocytosis is an oncological emergency but is extremely rare in non malignant conditions. The total leukocyte counts are seen to be higher in β thalassemia patients. The automated hematology analyzer has been shown to give spurious results in cases of hemoglobinopathies (1). Nucleated RBCs (nRBCs) are immature RBCs, normally not seen in the peripheral blood beyond the neonatal period. Around 3-10 nRBCS per 100 WBC are present till day 5 of life (2). Beyond this period nRBCs in peripheral blood are associated with disruption of bone marrow architecture caused by malignancy, marrow fibrosis, marrow replacement by leukemic cells or metastatic tumor cells, or extramedullary hematopoiesis, indicating bone marrows reaction to stress (3). The cause of normoblastemia (increased nRBCs in peripheral blood) in Thalassemia major or any condition causing severe anemia is

* ***Corresponding Author:***

Amitabh Singh, MD, Department of Pediatrics, All India Institute of Medical Sciences, Ansari Nagar, New Delhi -110029.
E-mail: dramit_amy@yahoo.co.in

Received date: Jun 21, 2015; Accepted date: Jul 12, 2015

twofold. Due to hypoxia caused by severe anemia, there is compensatory erythropoiesis leading to rapid RBC production and release of immature RBC's in peripheral blood. Secondarily extramedullary erythropoiesis occurs in spleen and liver which releases immature RBCs in blood. Nucleated RBCs increases the WBC count in automated hematology analyzers. Most new generation analyzers give flags (WBC* R, NRBC, Review Slide, Blasts etc) to identify abnormal cells (4) and the samples should be reviewed manually (3).

Diagnosis of Thalassemia major in our child was based on parental study. The diagnosis remains presumptive in absence of HPLC on child's blood which was not done as child received blood transfusion before samples could be collected. In presence of two parents with thalassemia trait, there are 25 % chance of having a thalassemia major baby. Diagnosis of Thalassemia in infants less than 6 months can be made using age specific Hemoglobin F (HbF) ranges.

Hemoglobinopathies are common clinical condition encountered in pediatric practice associated with nRBC in peripheral blood which can give rise to spuriously high leukocyte counts leading to clinical dilemma. Presence of normoblast in blood can be a pointer to serious underlying illness and it alerts the clinician to search for the same. Therefore it is advised to report presence of nRBCs and calculate the corrected WBC count using the following formula, corrected WBC count (/mm3) = TLC X 100 ÷ {nRBC per 100 WBC + 100} and peripheral smear examination whenever in doubt.

Table 1: Parent's Hb HPLC

Parent	HbA*	HbA2**	HbF***
Father	84.9%	7.1%	<0.8
Mother	85.9%	5.2%	<0.8%

*Hemoglobin A; ** Hemoglobin A2; *** Hemoglobin F.

Conflicts of interests: None.

Acknowledgements: None.

References

1. Steele BW, Wu NC, Whitcomb C. White Blood Cell and Platelet Counting Performance by Hematology Analyzers: A Critical Evaluation. Lab. Hematol 2001; 7:255-66.
2. Miller DR, Baehner RL. Blood Diseases of Infancy and Childhood. 7th ed. St Louis, MO: Mosby; 1995:39-40.
3. Constantino BT, Cogionis B. Nucleated RBCs-Significance in the Peripheral Blood Film. Lab Med 2000; 4:223-29.
4. Lamchiagdhase P, Kurosaki J, Ariyaporn I. Evaluation of Nucleated Red Blood Cells in Thalassemia by the Coulter LH 750 Hematology Analyzer. J Hematol Transfus Med 2008; 19:27-34.