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Case Report

Pseudothrombocytosis in a Patient with Heterozygous Beta-Thalassaemia

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ABSTRACT

Although the modern haematology analyzers provide reliable full blood counts, there are interferences on the measurement of platelet counts, especially in patients which have a wide variety of abnormal erythrocytes. We report a patient with heterozygous beta- thalassaemia and pseudothrombocytosis (spurious elevation of platelet count). The case emphasizes, that impedance method is associated with spuriously high platelet counts in thalassemia patients. Optical platelet counts and blood smear review are recommended alternative platelet counting methods in patients with abnormal red blood cells.

Key words: pseudothrombocytosis, spurious platelet count, thalasseamia

INTRODUCTION

The reporting the correct platelet counts is part of standard operating procedure in a hematology laboratory. Automated counting of platelets was been started up since the 1950s when the electrical impedance principle was introduced by Wallace Coulter. Although the modern haematology analyzers provide reliable full blood counts, automated platelet counting creates serious difficulties in the presence of erythrocytes ≤25 fl (microcytes, microspherocytes, and fragmented erythrocytes), fragmented leukocytes, lipid droplets and bacteria. In these cases the analyzers are not able to distinguish the blood cells, the evidence, which is associated with pseudothrombocytosis (spurious thrombocytosis). [1,2] Flags generated in several of these situations alert the operator on possible abnormal findings and may identify the problem. [3]

CASE HISTORY

We present a case of 50-year-old female patient with heterogeneous beta-thalassaemia and falsely increased platelet count due to the presence of microcytosis and fragmented erythrocytes in the blood. Te platelet counts (PLT), as measured in our laboratory by electric impedance method (PLT-I) on Sysmex XN 1000 hematology analyzer, was $1617x10^9$/L with abnormal platelet distribution on the RBC/PLT histograms (Figure 1). The other laboratory examinations revealed hemoglobin (Hb) 106 g/L, red blood cells (RBC) $6.05x10^{12}$/L, mean corpuscular volume (MCV) 55.3 fl, mean corpuscular hemoglobin (MCH) 17.4 pg, red cell distribution width 18.2%, reticulocytes (RET) 6.2%, white blood cells (WBC) $8.67x10^9$/L, segmented neutrophils

65%, lymphocytes 27%, monocytes 5%, basophils 3%; normal serum ferritin; Virological screening for HBV, HCV, HIV was negative; Wasserman test was negative;. HbA+HbF-94,4% (reference range 96-98%), HbA2 - 5,6% (reference range 2-4%), HbF 0.45% (reference range <2%); peripheral blood smear showed anisocytosis, microcytosis, hypochromia, polychromatophilia, poikilocytosis, fragmented erythrocytes and target cells, thrombocytosis was not evident (Figure 2). It should be noted, that some microcytes and fragmented erythrocytes were the same size as platelets and for this reason they were counted in RBC/PLT channel as platelets. Manual microscopic platelets counting performed in the Bürker's counting chamber showed lower platelet count ($102x10^9$/L) compared with the PLT-I method. Based on negative results from the bone marrow examination and bcr-able and JAK-2 mutations investigation, chronic myeloprolipherative disease was ruled out. We acquired PLT counts from the same sample, using the automated optical fluorescent (PLT-O) approach and we detected PLT count $116x10^9$/L.

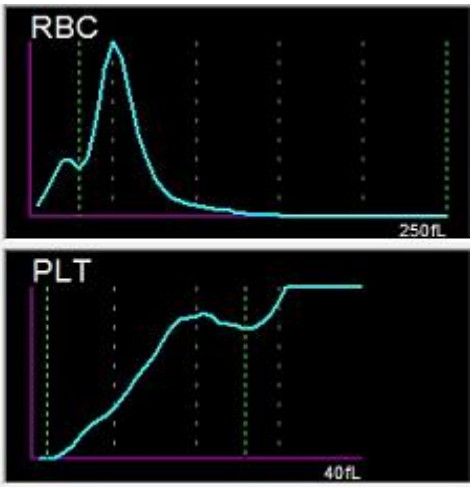

Figure 1. Abnormal platelet distribution on the RBC/PLT histogram. The PLT curve did not reach the basal line. There was an inaccurate separation between platelets and red blood cell populations.

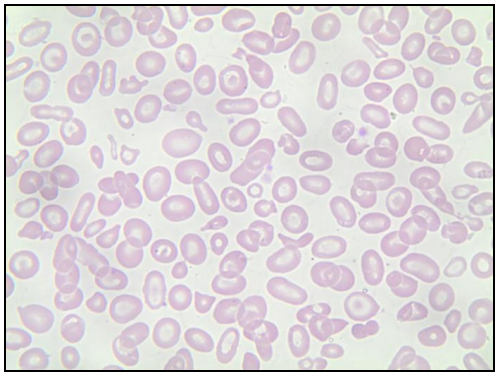

Figure 2. Peripheral blood smear (MGGx1000). Extreme degree of anisomicrocytosis, poikilocytosis and fragmented erythrocytes.

DISCUSSION

The first case of pseudothrombocytosis in the literature was reported by Stass et al (1977) in a patient with hairy cell leukemia. [4] Circulating fragments of tumor cells were noted in the peripheral blood in cases with acute monocytic leukemia associated with tumor lysis syndrome, resulting in falsely elevated platelet counts. [5] This phenomenon was associated with microcytosis in iron deficiency anemia and thalassemia syndromes, in cases with fragmentation of red blood cells due to intravascular hemolysis, disseminated intravascular coagulopathy and in samples with fungal or bacteria contaminations. [1,3,6]

The methods commonly used for routine platelet counting include electrical impedance and optical scatter with or without fluorescence detection. There is a high level of discrepancy between these methods in patients which usually have a wide variety of abnormal erythrocytes. [1,7] Impedance method is impossible to distinguish large platelets from extremely small red cells or fragments of red cells. [8,9] Optical fluorescence count on Sysmex XN 1000 is performed in the reticulocyte channel in addition to the impedance count. Use of a fluorescent dye to stain nucleic acids of reticulocytes and platelets is better for good separation between red blood cells, microspherocytes, fragmented erythrocytes and platelets. [8,10]

CONCLUSION

This evidence approved, that impedance method was associated with spuriously high platelet counts in thalassemia patients. Optical platelet counts and blood smear review are recommended alternative PLT counting methods in patients with abnormal red blood cells.

Consent to participate
Consent was taken from the patient
Competing interests
The author declares that no competing interests.

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