Platelet Satellitism in a Patient with Bronchial Asthma

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ABSTRACT

Platelet satellitism is uncommon phenomenon characterized by formation of platelet rosette around polymorphonuclear leucocytes in blood smear prepared from Ethylenediaminetetraacetic acid anticoagulated blood. This phenomenon may cause reporting of spurious thrombocytopenia unless proper examination of blood smears. Here we describe a case of platelet satellitism in a 29 year old female which has been incidentally found on evaluation of eosinophilia in a bronchial asthma patient.

KEY WORDS

Ethylenediaminetetraacetic acid, Platelet satellitism, Pseudothrombocytopenia

INTRODUCTION

Platelet satellitism is a rare and interesting in-vitro phenomenon observed in a blood smear prepared form blood sample anticoagulated with Ethylenediaminetetraacetic acid (EDTA).[1,2]

It is characterize by platelet rosetting around neutrophils and occasionally in other blood cell too, resulting in pseudo thrombocytopenia.[3] To date, exact mechanism of platelet satellitism is not clearly understood.[4] However it is postulated that immunologic phenomenon due to presence of natural antibodies or non-immunologic mechanism due to thrombospondin causes platelets to aggregate around polymorphonuclear leukocyte.[1] We present a case of Platelet satellitism in a patient diagnosed with bronchial asthma.

CASE REPORT

A 29 year old female came for follow-up in medicine outpatient department with the history of bronchial asthma under medication. She presented with chief complain of worsening shortness of breath and cough. The patient underwent routine investigation of full blood count (FBC). Blood count was performed in automated hematology analyzer. Her hematological report showed Hemoglobin concentration (Hb) 12.5 g/dl, White blood cell Count (WBC) 14.0 X 109/L, and Differential Leukocyte Count (DLC) showed Neutrophil 46%, Lymphocyte 16%, Monocyte 03% and Eosinophil 35%. Her red cell indices were within normal range. Platelet count was 135 X 109/L. Blood smear was prepared and stained with Wright stain for confirmation of eosinophilia and mild thrombocytopenia. Incidentally, examination of blood smear revealed platelet satellitism in majority of neutrophils but not in any other blood cells (fig. 1 and 2).

Blood sample was again collected in tri-sodium citrate as anticoagulant. Direct blood smear was also prepared from capillary puncture. Her platelet count increased to 212 X 109/L from citrated blood after correction for dilution.

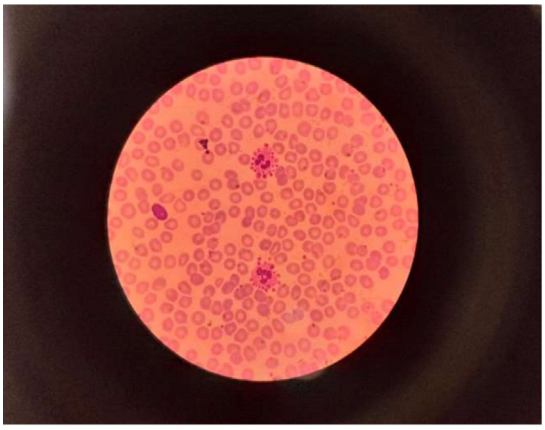

Figure 1. Platelet satellitism around Neutrophils

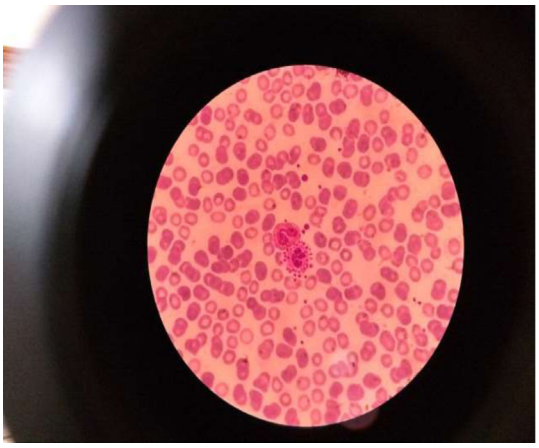

Figure 2. Platelet satellitism around Neutrophil but not in Eosinophil

Platelet satellitism was absent in blood smear prepared form citrated blood and direct smear form capillary puncture.

Patient was admitted to medicine ward for her treatment of acute severe bronchial asthma. During her hospital stay she received antibiotic and systemic steroid. After 3 days of treatment, she again underwent laboratory investigation. Her CBC in EDTA anticoagulated blood was within normal range [Hb 13.0 gm/dl, TLC 4.5 X 109/L cells/cu.mm, DLC (Neutrophil 48%, Lymphocyte 45%, Monocyte 04% and Eosinophil 03%) and platelet count 230 X 109/l]. In Blood smear, we did not observe any platelet satellitism. It was interesting that, with recovery of severe symptoms and normal CBC parameters, platelet satellitism disappeared in EDTA anticoagulated blood smear within few days.

In most of reported cases, platelet satellitism was reported as a cause of pseudothrombocytopenia. We observed increment of platelet count to normal range in blood sample anticoagulated with citrate. Platelet satellitism disappeared in EDTA anticoagulated blood sample within few days of treatment.

DISCUSSION

Platelet satellitism is an in-vitro phenomenon of platelet rosetting around mature neutrohils observed in EDTA treated blood smear at room temperature but not in blood smear from capillary puncture or blood anticoagulated with heparin and tri-sodium citrate.[2,5]

Platelet satellitism was initially reported by Field and MacLeod in 1963 in British Medical Journal.[6] Since then, platelet satellitism has been reported only in about 100 cases suffering from different disease as well as healthy individual from different age group.[2,3] Till date, the underlying mechanism of platelet satellitism is not well understood but there is evidence that platelet satellitism is mediated by activation of EDTA dependent IgG autoantibodies directed against the glycoprotein IIb/IIIa complex of the platelets and the Fc(γ) receptor III (FcγRIII) of neutrophils.[1,7,8] It is believed that EDTA, a calcium chelating ion causes alteration in the platelet glycoprotein IIb/IIIa and neutrophil Fc(γ) receptor exposing antigenic structure in membrane which is recognize by autoantibodies IgG resulting in formation of platelet satellitism.[7,8] It is still unclear about the production of IgG auto antibodies and their interaction mechanism with target molecule of platelet and neutrophil in patient with platelet satellitism.[3] There is also another proposed non immunologic mechanism of platelet satellitism mediated by thrombospondin or other alpha granule protein like P-selectin.[4,7]

Although the exact mechanism of such platelet satellitism in an inflammatory condition is unknown, we speculate the immunological mechanism where IgG antibodies developed in eosinophilia induced inflammatory response in bronchial asthma causes platelet satellitism in presence of EDTA. After normalization of eosinophil count and subsiding inflammatory response by drug treatment, there was sudden disappearance of platelet satellitism mechanism. There is also a reported case where platelet satellitism was seen in a 5 year old boy with the history of bronchial asthma.[9]

The clinical significance of this phenomenon is related to pseudothrombocytopenia or spurious platelet count, as in this case. Failure to recognize platelet satellitism as the cause of pseudothrombocytopenia leads to unnecessary investigation and treatment. This in-vitro phenomenon emphasizes the importance of peripheral blood smear in reporting platelet count to reduce misdiagnosis of thrombocytopenia. Further study is required to understand the association of platelet satellitism in different clinically relevant inflammatory disease.

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