

Platelet Satellitism: An Infrequent Cause of Spurious Thrombocytopenia

Tahir Jameel,¹ Khalid Mehmood,² Imrana Tanveer,³ Asma Saadia⁴

Abstract

Platelet adherence to Neutrophilic leucocytes or so called 'Platelet satellitism' is an infrequent phenomenon. This finding was observed in a healthy person undergoing routine checkup. Multiple blood smears prepared from peripheral blood collected in Ethylene Diamine Tetra acetic Acid (EDTA) showed evidence of platelet satellitism with the Neutrophils only. Adherence was not observed with any other cell type. Platelet satellitism totally disappeared when samples were collected in heparin or tri-sodium citrate.

Key words: Platelet Satellitism, Neutrophils, EDTA.

Department of Pathology, Ittefaq Hospital (Trust), Model Town, Lahore

Introduction

Clumping of platelets to the Neutrophils in a rosette formation is known as 'Platelet Satellitism'. In 1963 this in – vitro phenomenon was reported for the first time by Field and MacLoad in peripheral blood collected in EDTA.¹ Since then around 100 cases have been reported in literature.² The mechanism of this

Jameel T.¹

Consultant Haematologist

Department of Pathology, Ittefaq Hospital (Trust), Model Town, Lahore

Mehmood K.²

Department of Pathology, Ittefaq Hospital (Trust), Model Town, Lahore

Tanveer I.³

Department of Pathology, Ittefaq Hospital (Trust), Model Town, Lahore

Saadia A.⁴

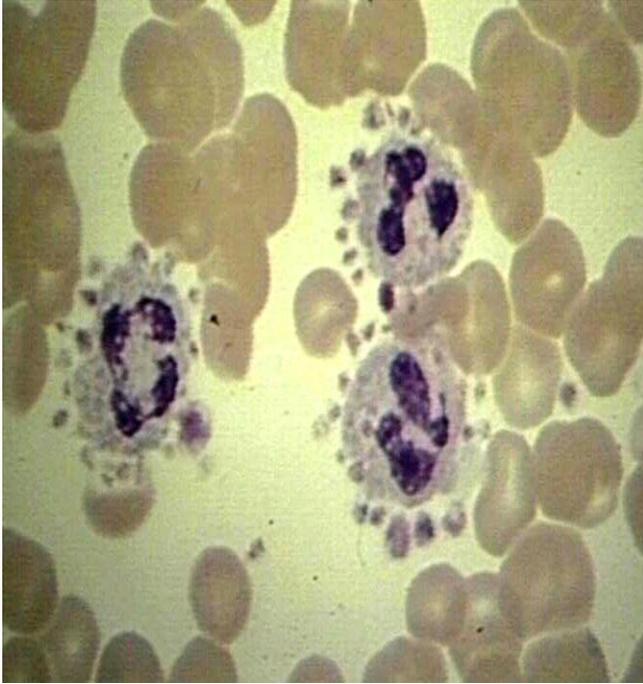


Figure 1: Platelet satellitism around Neutrophils.

platelet adhesion to PMN is not clearly understood, but there is ample evidence that autoantibodies directed to the glycoprotein IIb/IIIa complex on the platelet membrane, as well against the neutrophil Fc receptor, are involved.³

There is a possibility that the epitopes for those antibodies are usually hidden in leukocyte and platelet membranes and that membrane changes induced by EDTA expose them; which would explain why satellitism is observed exclusively with this specific anti-coagulant.⁴

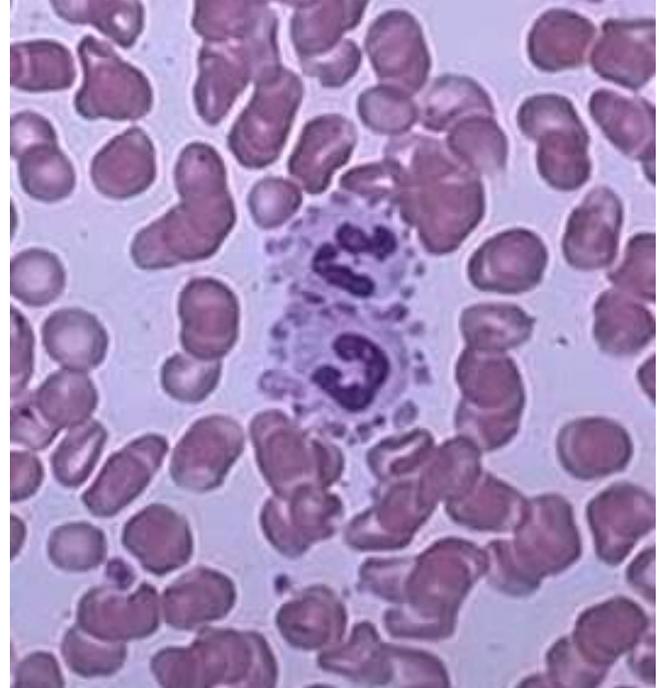


Figure 2: Platelet satellitism around two Neutrophils.

The clinical importance of this condition resides in its association with thrombocytopenia or pseudo-neutropenia in CBC. As such platelet satellitism has not been directly associated with any systemic disorder but platelet satellitism has been observed incidentally in various disease states.⁵

Case Report

A 55 year old male having apparently good health underwent blood CBC test for routine checkup. Platelet count was found to be $100 \times 10^9/l$. Peripheral smear revealed a very interesting finding of rosetting / satellitism of number of platelets to almost each and every PMN This binding was seen particularly exclusively to neutrophils (Figure 1 and 2) sparing all other cells of the myeloid series including Eosinophils, Basophils and Monocytes. The phenomenon of platelet satellitism was observed only in EDTA anticoagulated blood. Sample of blood anticoagulated with either Heparin or Citrate did not reveal any rosetting and the platelet count was found to be within normal range ($242 \times 10^9/L$).

Materials and Methods

Blood samples were collected in standard manner in vacutainer tubes containing K₃EDTA, sodium Citrate and sodium heparin as anticoagulant. The complete blood counts (CBC) were carried out on electronic counter (Sysmex XT1800i).

All related tests of the coagulation profile including bleeding time, coagulation time, Prothrombin time and Partial thromboplastin time were within normal limits. Antinuclear antibody screening did not reveal any abnormality. In the absence of any positive finding serial monitoring was suggested.

Discussion

Platelet resetting or satellitism is described as an uncommon finding characterized by formation of platelet rosettes around polymorphonuclear (PMN) leucocytes, which are seen in Giemsa – stained peripheral blood smears prepared from EDTA – anticoagulated blood samples, but not seen when others anticoagulants such as heparin, acid – citrate dextrose, or citrate, are used.⁶

On ultra-structural analysis, most of the platelet profiles are seen to be attached to the polymorph surface by broad areas of contact. Examination of these areas of contact at high magnification reveals an intercellular material of low electron density. This material appears to form strands, which bridge the intercellular space and span the entire area formed by the apposing plasma membranes.⁷ Phagocytosis of entire platelets has also been reported occasionally by the polymorphonuclear cells. The platelet profiles that participate in rosette formation reveal a large number of glycogen particles, compared with unattached ones.⁸

Platelet satellitism being a rare finding, as only about 100 cases have been described in the literature concerning platelet satellitism,⁶ may be seen in any age; although most of individuals revealing this phenomenon are asymptomatic. The finding has been reported in a variety of clinical conditions, such as pregnancy, autoimmune disorders, Behcet's disease, thromboembolism³ and malignant disorders like mantle cell lymphoma.⁹

The amount of satellitosis has no association with the severity of clinical disease. Individuals having platelet satellitism have been followed for 15 to 20 years without any ill effects.¹⁰ There always remains the risk of inaccurate reporting of a spurious thrombocytopenia which may lead to undue diagnostic workup, cancellation of surgery, unnecessary surgery (splenectomy), or even platelet transfusions while planning for major surgical procedures.

Note: This interesting finding was observed in my Blood sample. When I got my Blood CBC checked for the purpose of routine medical checkup. It can be mentioned as first reported case of Platelet satellitism in a haematologist himself.

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