



BMH Medical Journal 2016;3(1):15-18 **Case Report**

## **EDTA Dependent Pseudothrombocytopenia In A Patient With Scrub Typhus - A Case Report**

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### **Abstract**

We report a case of EDTA induced pseudothrombocytopenia (EDTA-PTCP) in a patient with scrub typhus who was referred as a case of pyrexia of unknown origin (PUO) with marked thrombocytopenia and treated with platelet transfusion. Blood smear examination revealed numerous platelet aggregates. CBC analysis using citrate and lithium-heparin as anticoagulants as well as a peculiar WBC histogram aided in prompt diagnosis of the condition.

The prevalence of EDTA-PTCP in general hospital population is approximately 0.1%. It is usually not associated with hemorrhagic manifestations. Hence cases of thrombocytopenia should be carefully evaluated to rule out this form of artefactual thrombocytopenia. Timely diagnosis of this innocuous but misleading in vitro phenomenon can save the patient from unnecessary transfusions and invasive procedures.

**Key Words:** EDTA, pseudothrombocytopenia, scrub typhus

### **Introduction**

Ethylenediaminetetraacetic acid (EDTA) is the most common anticoagulant used in routine haematological tests in view of its calcium chelating property. When EDTA anticoagulated blood sample is used in automated hematology analysers, a peculiar phenomenon of EDTA-dependent pseudothrombocytopenia (EDTA-PTCP) can occur which can cause spurious low platelet counts. Its prevalence in the general hospital population is approximately 0.1% [1].

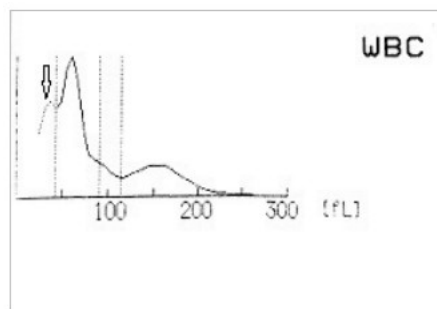
This consists of in vitro platelet clumping due to anti-platelet antibodies in blood anticoagulated with EDTA. It can be confirmed by platelet agglutination in blood smear, platelet count normalisation in citrate sample and characteristic leukocyte histogram [2]. Since unrecognized EDTA-PTCP may lead to inappropriate treatment, it should always be considered as a possible differential in patients with thrombocytopenia. We are reporting a case of EDTA- PTCP in a patient diagnosed with scrub typhus.

### Case report

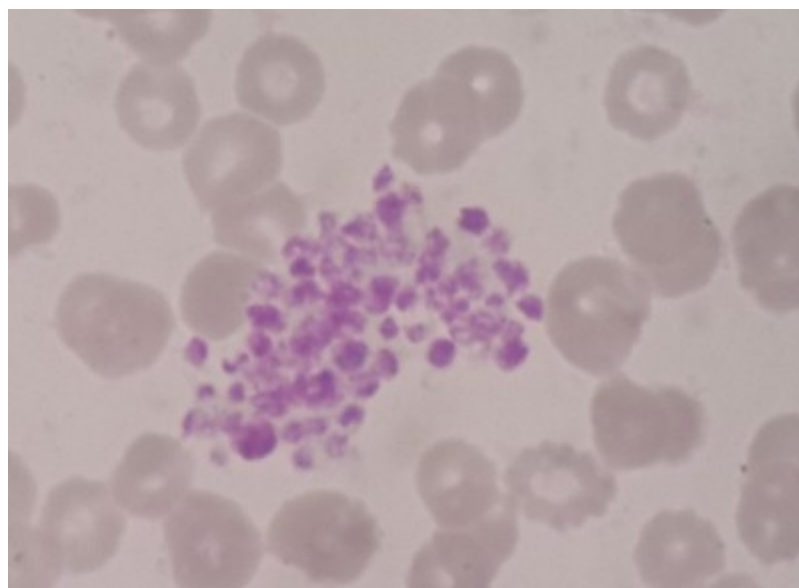
A 60-year-old patient was referred from a local hospital with fever of 2 weeks duration and persistent fall in platelet count ( $16 \times 10^3/\text{micro-liters}$ ). There was associated bodyache, nausea and vomiting and was given 4 units of platelet concentrate. The patient neither had any past history of bleeding or family history of hemorrhagic disorders nor used any medications. Physical examination revealed an eschar classical of scrub typhus (**Figure 1**). There was no bleeding manifestations, lymphadenopathy or organomegaly or jaundice. In our lab, an initial evaluation using EDTA anticoagulated blood revealed thrombocytopenia ( $39 \times 10^3/\text{micro-liters}$ ) and leucocytosis ( $18.8 \times 10^3/\text{micro-liters}$ ) and WBC histogram revealed a peculiar peak on the left side (**Figure 2**) (Sysmex KX21).



**Figure 1:** Typical eschar of scrub typhus.



**Figure 2:** Typical WBC histogram of pseudothrombocytopenia in the EDTA sample. In histogram, the largest aggregates are displayed as a peculiar peak on the left side (arrowhead).



**Figure 3:** Blood smear from EDTA sample showing platelet aggregates.

The peripheral smear examination using same blood showed platelet clumping (**Figure 3**) and neutrophilia with toxic granulation. Due to platelet clumping on blood smear and the peculiar WBC histogram, CBC and blood film examination using sodium citrate and lithium-heparin as anticoagulants were performed and both were found to be normal except for a slightly higher platelet count with lithium-heparin.

All biochemical tests were within normal limits. Serological tests for dengue fever, leptospirosis, Hepatitis B, Hepatitis C, HIV, typhoid and malaria were negative. Weil Felix test showed positivity suggestive of scrub typhus. Patient was treated with doxycycline and piperacillin and improved clinically.

The case was diagnosed as EDTA induced Pseudo-Thrombocytopenia due to lack of physical signs of thrombocytopenia, repeated platelet clumping on peripheral smear, a normal platelet count with citrate anticoagulated blood and a characteristic WBC histogram.

## Discussion

Most cases of thrombocytopenia fall into two major categories: impaired platelet production or accelerated platelet destruction. However, when a patient presents with an abnormally low platelet count without a history suggestive of thrombocytopenia, pseudothrombocytopenia should be suspected [3]. The term pseudothrombocytopenia defines a state with a falsely low platelet count reported by automated hematology analyzers due to platelet clumping [1]). This clumping is attributed to an alteration of the platelet surface glycoprotein IIb-IIIa when they are incubated with a calcium chelator such as EDTA [4]. Immunoglobulins of both the IgG and IgM types which act as anti-platelet autoantibodies then react to these modified platelet antigens to form large agglutinates. It has been reported in patients with various diseases including sepsis, multiple myeloma, acute myocardial infarction, breast cancer as well as neuroendocrine carcinoma [5-9].

If thrombocytopenia and a left sided peak in WBC histogram are detected by automated analyzers in EDTA-anticoagulated blood, visual evaluation of the peripheral blood smear should be carried out. In addition to this, the platelet count should be determined in blood collected into sodium citrate and lithium-heparin tubes. In our case, the peripheral blood smear showed numerous platelet clumps and the platelet count was normalised in blood anticoagulated with sodium citrate and lithium-heparin.

Relevance of blood smear examination in cases of pyrexia of unknown origin with thrombocytopenia as well as timely diagnosis of EDTA-PTCP to avoid inadvertent therapeutic procedures is also highlighted here.

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