

## Case Report

# Pseudothrombocytopenia: early recognition avoids unnecessary intervention

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## ABSTRACT

Ethylenediaminetetraacetic acid dependent pseudothrombocytopenia (EDTA-PTCP) is the phenomenon of a spurious low platelet count due to EDTA induced aggregation of platelets. Failure to identify this can lead to unwarranted diagnostic testing, platelet transfusions and deferring emergency surgeries. An adolescent girl child was referred for acute febrile illness with thrombocytopenia. Peripheral smear examination of EDTA sample revealed platelet clumping. WBC and platelet histograms also supported the same. Repeat platelet counts in sodium citrate and heparin confirmed EDTA-PTCP.

**Keywords:** EDTA, Platelet clumping, Pseudothrombocytopenia

## INTRODUCTION

Ethylenediaminetetraacetic acid dependent pseudothrombocytopenia (EDTA-PTCP) is an in vitro phenomenon of platelet aggregation that results in spurious reporting of a low platelet count by automatic cell counters, typically in EDTA blood sample.<sup>1</sup> This can be recognized by platelet clumps in the peripheral smear of EDTA sample. Its prevalence in hospitalised patients was reported as 0.1-2.0% and 17% in outpatient clinic.<sup>2,3</sup>

In this study, we report a case of pseudothrombocytopenia in a 17 year old girl to emphasize that early recognition of this entity avoids unnecessary platelet transfusions and undue delay in emergency surgical intervention.

## CASE REPORT

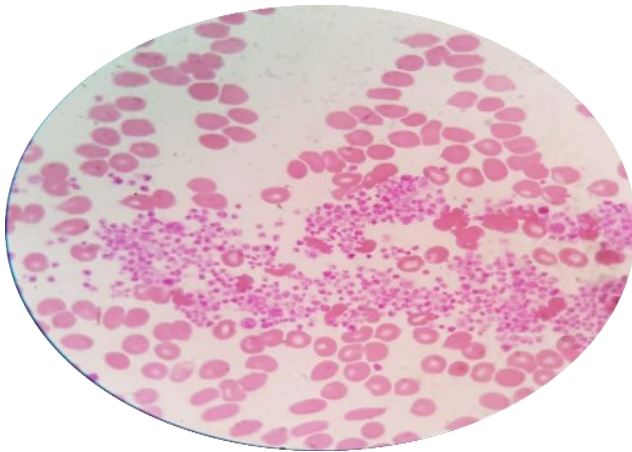
A 17 years old girl child was referred to us for acute febrile illness with thrombocytopenia. There was a drop in platelet count from 1,60,000/cu mm done on day 5 of

fever to 44,000/cu mm on day 9. She had a history of contact with pets. She was on day 5 of her menstrual cycle with minimal bleeding. She had no other bleeding manifestations. On arrival she was febrile, dehydrated, systemic examination was normal. There was an eschar in her left axillary region (Figure 1).



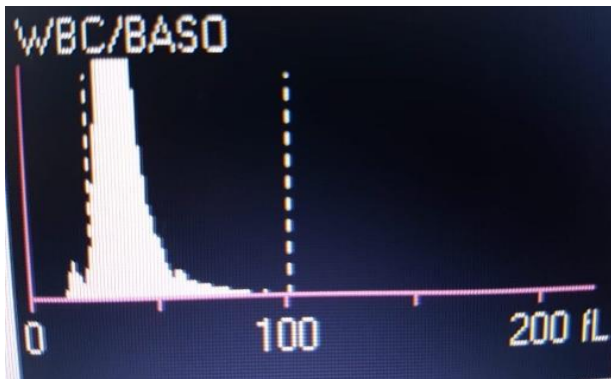
**Figure 1: Eschar present in the left axillary region of the patient.**

She was treated with C. doxycycline injection, ceftriaxone injection, azithromycin suspecting scrub typhus. Gynaecologist suggested to start T. norethindrone acetate. Her complete blood count in an EDTA sample done in an automated analyser on day 10 of fever revealed white blood cell counts of 8400/cu mm and platelets dropped further from 44,000/cu mm to 27,000/cu mm. She had no petechiae, ecchymosis, bruises, any other bleeding manifestation, generalised lymphadenopathy or hepatosplenomegaly. Her urine output was adequate and she was hemodynamically stable. Though the platelet counts were low, clumps of platelets were seen in peripheral smear (Figure 2).



**Figure 2: Peripheral smear in an EDTA sample with platelet clumping.**

WBC histogram showed a left peak (Figure 3).

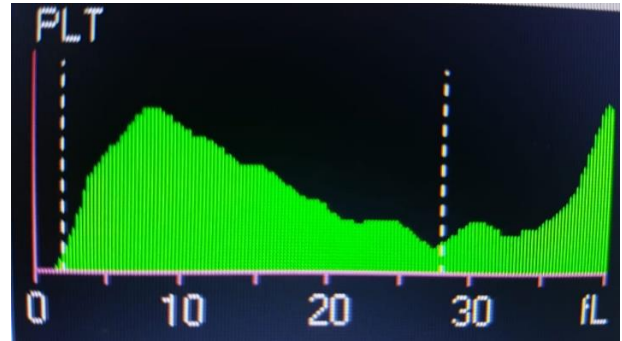


**Figure 3: Left peak in WBC histogram.**

Platelet histogram revealed saw-tooth appearance (Figure 4).

Hence, we considered that this low platelet count was due to EDTA-PTCP. Therefore, we repeated platelet counts in test tubes containing sodium citrate and heparin which was 91000/cu mm and 69000/cu mm respectively. Her IgM scrub typhus was positive and Weil-Felix for rickettsia revealed agglutination with OX-2 and OX-K antigen. Dengue IgM and IgG Elisa was negative. With

the given management, her fever spikes settled and she was discharged. She did not receive any transfusions.



**Figure 4: Saw-tooth appearance in platelet histogram.**

## DISCUSSION

EDTA induced pseudothrombocytopenia was first reported by Gowland et al.<sup>4</sup>

EDTA has been recommended as the anticoagulant of choice for haematological testing because of its stability in cell counting and sizing. It allows the best preservation of cellular components and morphology of blood cells.<sup>5</sup>

Five basic criteria should be fulfilled to raise the clinical suspicion of EDTA-dependent pseudothrombocytopenia, i.e., (I) abnormal platelet count, typically  $<100 \times 10^9/l$ ; (II) occurrence of thrombocytopenia in EDTA-anticoagulated samples at room temperature, but to a much lesser extent in samples collected with other anticoagulants and/or kept warmed at  $\sim 37^\circ\text{C}$ ; (III) time-dependent fall of platelet count in the EDTA specimen; (IV) evidence of platelet aggregates and clumps in EDTA-anticoagulated samples with either automated cell counting or microscopic analysis; (V) lack of signs or symptoms of platelet disorders.<sup>6</sup>

EDTA PTCP is attributed to calcium chelating property of EDTA leading to a conformational change of the platelet membrane glycoprotein, GPIIb-IIIa complex which enables binding of antiplatelet antibodies to these complexes causing platelet agglutination.<sup>7</sup> Platelet agglutinins generally belong to the immunoglobulin G.<sup>8</sup>

Anticoagulants, such as heparin or sodium citrate, are usually used for obtaining accurate platelet counts in EDTA-dependent PTCP. However, 20% of cases with EDTA induced PTCP show the phenomenon in citrate anticoagulant as well.<sup>8</sup>

When a patient presents with an abnormally low platelet count without bleeding manifestations, family history or haematological disease, pseudothrombocytopenia should be suspected. EDTA-PTCP can be confirmed by peripheral smear examination for platelet aggregation. Also, inspecting CBC histograms and flags of haematology analysers can contribute in detecting

EDTA-PTCP.<sup>5</sup> In a WBC histogram, the largest platelet aggregates are displayed as a peculiar left peak in the ghost zone (<50 femtoliters) suggesting platelet clumping.<sup>9</sup> Multiple peaks (saw-tooth or serrated appearance) in a platelet histogram suggests platelet clumping.<sup>10</sup>

## CONCLUSION

To conclude, all cases of thrombocytopenia should be confirmed with peripheral smear examination. Pseudothrombocytopenia should be suspected if platelet clumping is noticed in smear examination but low platelet counts are obtained from an automated analyser.

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