Case Report

# Spurious thrombocytopenia in the mother and baby – A red herring clinical entity

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## ABSTRACT

Spurious thrombocytopenia or pseudothrombocytopenia (PTCP) is an important clinical entity, in which the presence of autoantibodies or anticoagulants used during blood sampling causes *in vitro* clumping of platelet and thereby resulting in a falsely low automated platelet count. The most common cause of platelet clumping is ethylenediaminetetraacetic acid used as an anticoagulant in the blood samples. The other reasons for PTCP include the presence of autoantibodies such as cold agglutinin, giant platelet, and platelet satellitism. There are very few cases of spurious thrombocytopenia in the newborn period published in the literature. We are reporting a case of PTCP due to platelet satellitism in a baby born to a mother with a similar condition.

**Key words:** Pseudothrombocytopenia, Spurious thrombocytopenia, Platelet satellitism

Pseudothrombocytopenia (PTCP) or spurious thrombocytopenia occurs when the anticoagulant used for testing the blood specimen causes clumping of platelets *in vitro*, resulting in falsely low platelet counts. It occurs most often in ethylenediaminetetraacetic acid (EDTA) anti-coagulated blood; however, other anticoagulants (citrate, heparin, and oxalate) have also been implicated in several articles [1,2]. The reported incidence of PTCP is 0.15% in the general population [3]. The mechanism for this is not fully understood; however, it has been shown that platelet satellitism is an *in vitro* phenomenon caused by EDTA-dependent IgG auto-antibodies (antiplatelet and antineutrophil) present in the patient sera. The primary target antigens reported are the glycoprotein IIb/IIIa complex of the platelet membrane and the neutrophil Fcγ receptor III (FcγRIII) [1]. These auto-antibodies are naturally present in some individuals and no clear correlation between the presence of antibodies and specific clinical conditions or use of drugs has been reported in the literature. The occurrence of this rare phenomenon may result in unnecessary delay in surgical procedures, over investigation for causes of thrombocytopenia, or unwarranted platelet transfusion in emergency settings [1].

## CASE REPORT

A 20-year-old primigravida mother was referred from the periphery in view of low platelet counts (10,000/µL) in her third trimester. She was immunized and had an uneventful antenatal period.

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Antenatal sonograms including dating and anomaly scans were within normal limits. She was found to have anemia (Hemoglobin – 10.5 g/dL) with thrombocytopenia on her routine third-trimester antenatal visit, for which she was evaluated completely and found to have PTCP with dimorphic anemia. She was treated with oral iron supplementation. She did not have any other antenatal risk factors such as gestational diabetes, pregnancy-induced hypertension, or hypothyroidism. Maternal weight gain during pregnancy was 12 kg (maternal weight on full-term was 72 kg).

She underwent an emergency C-section due to non-progression of labor and gave birth to a healthy male baby of 3.5 kg, with APGAR scores of 8/10 (1 min) and 10/10 (5 min). The baby did not require any active neonatal resuscitation. On examination, the baby was found to be active, alert with a good tone, and cried after birth. The heart rate was 140/min and there was no tachypnea (respiratory rate 40/min). All four limb saturations were also normal. Systemic examination was normal. The baby was roomed in with the mother on day 1 of life. The complete blood counts done using EDTA whole blood sample on a hematology analyzer revealed a platelet count of 32,000/µL. The other complete blood count parameters were within normal limits. A peripheral blood smear examination with manual counting showed platelet clumping with satellitism and the platelet count was found to be normal (3 Lakh/µL) (Fig. 1). Hence, a diagnosis of spurious thrombocytopenia secondary to platelet reaction with EDTA was confirmed.

Maternal peripheral smear also demonstrated a similar result with platelet clumping and normal platelet count on peripheral smear. A repeat platelet count on the citrate sample was normal

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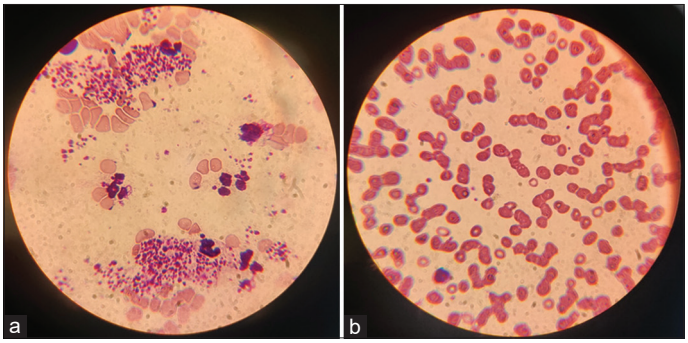


**Figure 1: (a) Light microscopic picture showing platelet clumping; (b) normal peripheral smear without platelet clumping**

for both the baby and the mother. The baby was stable throughout the hospital stay and was discharged on day 4 of life.

## DISCUSSION

There is a scarcity of literature regarding spurious thrombocytopenia in mothers resulting in similar laboratory artifacts in the newborn baby. In a report by Solanki and Korterink, the babies born to healthy pregnant women with spurious thrombocytopenia transiently exhibited the phenomenon of platelet clumping *in vitro*, probably due to transplacental transfer of the platelet agglutinin from the mother [4,5]. Recognition of this laboratory artifact is important to avoid unwarranted investigations and inappropriate management of the mother and infant. Careful examination of a blood smear and repeat blood count collected in citrate or heparin bottle can safeguard against being misled by spurious thrombocytopenia [6].

EDTA-dependent mechanism of PTCP occurs due to a conformational change of platelet surface glycoprotein IIb/IIIa (GPIIb/IIIa) caused by EDTA, which allows natural IgM or IgG auto-antibodies to bind to GPIIb/IIIa, leading to platelet agglutination. This phenomenon occurs *in vitro* blood samples only and has no known associated clinical significance [7].

Optical fluorescence platelet counting of BC-6800 Hematology Analyzer is effective for the correction of spurious low platelet counts in EDTA-PTCP patients, and its dissociation effect on EDTA-PTCP samples was independent of fluorescent dye staining [8,9].

Other known risk factors for PTCP due to platelet clumping include active viral infections, capillary or central line blood collection, autoimmune conditions such as rheumatoid arthritis, and medications, such as the GPIIb/IIIa inhibitor abciximab used for the treatment of acute coronary syndrome when undergoing percutaneous coronary intervention [10].

## CONCLUSION

PTCP or spurious thrombocytopenia is an *in vitro* sampling-related hematological abnormality, which can mislead the clinician to a more critical and clinically significant condition of thrombocytopenia. The phenomenon occurs when the anticoagulant used while testing the blood sample causes clumping of platelets which mimic a low platelet count. A high index of suspicion and careful examination of peripheral smear is essential to diagnose PTCP and a repeat complete blood count with heparin or citrate anti-coagulated samples may help in obtaining correct platelet counts.

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