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A Case of Term Pregnant Woman with Pseudothrombocytopenia: An Overlooked Phenomenon

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Authors' contributions

This work was carried out in collaboration between all authors. Author EK designed the study, examined the case, and wrote the first draft of the manuscript. Author KK managed the literature searches, analyses of the study performed the peripheral blood smear examinations. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Objective: To report a case of pregnant woman with low thrombocyte count which in fact has spurious thrombocytopenia.
Methods: A 40-week pregnant woman was admitted to our obstetric clinic with complaint and signs of active labour. She was hospitalized and followed for the vaginal birth.
Results: On laboratory examination, the low platelet (Plt) count as 42 x 103/mm^3 was measured by using blood samples with ethylenediaminetetraacetic acid (EDTA). Patient had no history for echymosis, bleeding disorders and bruising. She underwent a differential diagnosis for thrombocytopenia in term pregnancy for preeclampsia, HELLP syndrome, acute fatty liver disease or immune thrombocytopenic purpura and no pathology was found. The peripheral blood smear showed platelet (plt) clustering with normal count as 181 x 103/mm^3. She diagnosed as pseudothrombocytopenia. The patient delivered a healthy baby with vaginal way and had no bleeding complication in pospartum period.
Conclusion: Thrombocytopenia in pregnancy is a challenging and important issue for obstetrician.

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We aimed to point out that low Plt count doesn't indicate always a serious disease in term pregnancy. Pseudothrombocytopenia should be kept in mind which may cause unnecessary laboratory examination and treatments.

Keywords: Thrombocytopenia; pregnancy.

1. INTRODUCTION

Thrombocytopenia is caused by disorders in platelet production or degredation in general. Thrombocytopenia is classically defined as platelet count of less than 150 x 10^3/mm^3 and it is a common haematologic abnormality during pregnancy and labour. The overall incidence in pregnancy is reported to be 8% [1]. Thrombocytopenia during pregnancy can be a serious and life-threatening condition. The most common cause is gestational thrombocyopenia which account almost three-fourth of all cases [2]. The other causes of thrombocytopenia during pregnancy are preeclampsia and eclampsia (including HELLP syndrome) constituing 2% [3], autoimmune thrombocytopenias, disseminated intravascular coagulation, thrombotic thrombocytopenic purpura. It is reported that pregnant women with low thrombocyte levels have high risk of obstetric bleeding particularly if they need a caesarean section [9], especially when plt counts are less than 50 x 10^3/mm^3. The blood count is done ussually with automated analyser using tubes containing EDTA. EDTA is a well-known anticoagulant and used to inhibits clotting by removing or chelating calcium from blood [4]. Also heparine or sodium citrate are used less common in tubes for blood count.Pseudo-thrombocytopenia (PTP) is defined by falsely low platelet counts on automated analysers and is caused by in vitro phenomena including large platelet aggregates in blood samples. Platelet aggregates on account of their large size are frequently not included in the platelet window of auto-analysers, but are counted as leukocytes, leading to misleadingly low platelet counts and high leukocyte counts. EDTA-dependent pseudothrombocytopenia is a common phneomenon and Its prevalence is reported to vary between 0.1-2% among hospitalized patients [5,6]. The exact mechanism of EDTA-related thrombocyte aggregation is not known but it is hypothesized that EDTA leads to a conformational change of the platelet membrane GPIIb- IIIa complex unmasking a cryptic epitope, that becomes accessible for autoantibodies [7]. Ohnuma et al reported that a prospective study of 20,761 routine clinical blood specimens was conducted to evaluate the incidence and causes of thrombocytopenia [8]. It revealed that the incidence was 0.15% and 72% of which had EDTA induced platelet clumping, 28% had spuriously low platelet counts due to large platelets.

Pseudothrombocytopenia has never been reported to cause a bleeding tendency or dysfunction of thrombocytes [9]. The diagnosis of low platelets due to pseudothrombocytopenia can be revealed with a simple and easy way with a peripheral blood smear examination and the normal count of platelets and aggregates of thrombocytes will provide a differential diagnosis from other serious disease and would prevent additional unwarranted investigations, platelet transfusions, clinician's anxiety and cancelling of surgical procedures like caeserean section. Despite its harmlessness, EDTA-dependent pseudothrombocytopenia frequently leads to time-consuming, costly and even invasive diagnostic investigations. Here we aimed to report a case of-25 year old, 40 week pregnant woman who was presented as a case of pseudothrombocytopenia and active labour and found to have EDTA induced pseudothrombocytopenia and gave vaginal birth with no associated pathologies.

2. CASE

A 25-year old woman with gravida 2 parity 1 was admitted to van ipekyolu women and children's disease hospital emergency obstetric unite with complaints of contractions and vaginal bleeding at october 2014. On her examination, she was diagnosed in active labour with 5 centimeter cervical dilatation and 60% cervical effacement. Her vital signs were normal and she was hospitalized in labour room for delivery. On her obstetric examination, she was 40-week pregnant with head presentation and with a previous vaginal delivery. Fetal ultrasound showed an age appropriate fetal development without signs of any abnormality. It was decided to undergone vaginal delivery. She was not taking any medication.

Laboratory test revealed a thrombovytopenia with count of 42 x 10^3/mm^3 and normal

hemoglobin level of 13 gr/dl and normal white blood cell count of 5600/mm^3 from examination of EDTA blood by an automated hematology analyzer parameters (Cell Dyne 3700 Abbott, Diagnostics) which may cause thrombocytopenia in pregnancy. In relation to hemolysis, liver function and coagulation (LDH, AST, ALT, bilirubin, aPTT, PT, INR) were examined and it is found that in normal ranges. Urine sample was collected and no proteinuria was detected. So she had no preeclampsia-eclampsia or HELLP syndrome.

The patient was consulted to a hematologist due to isolated thrombocytopenia and a peripheral blood smear from capillary blood without anticoagulant was taken and on examination, it was seen that platelet clustering making it falsely low count in automated blood analyser and a blood smear was taken from EDTA-anticoagulated blood tube and it revealed platelets clustering (Fig. 1). So EDTA-dependent pseudothrombocytopenia was suspected and confirmed by a normal platelet count when examining heparin-anticoagulated blood in automated blood analyser (181 x 10^3/mm^3). Also blood smear of the heparin-anticoagulated blood tube was performed and it revealed a normal peripheral smear with normal thrombocyte count (Fig. 2). Review of previous laboratory test of patient revealed low platelet count as well.

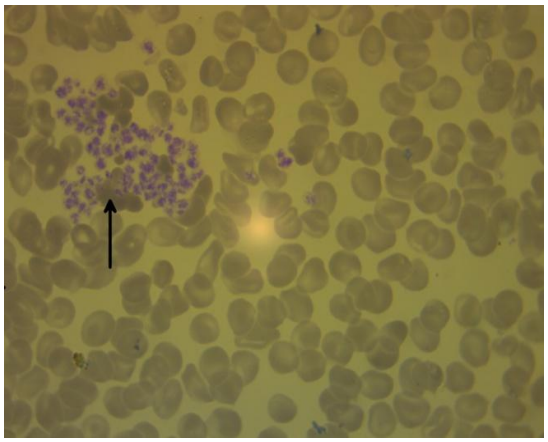

Fig. 1. Shows a peripheral blood smear with platelet clustering

The patient was followed up for normal vaginal delivery and she delivered a 3300 gr-male healthy baby with no obstetric bleeding or complications. On neonatal examination, no pathologic findings regarding neonatal thrombocyte count were observed.

2.1 Informed Consent

All authors declare that 'written informed consent was obtained from the patient for publication of this case report and accompanying images.

2.2 Ethıcal Concerns

This case report has no ethical concerns and this study is not against the public interest, or that the release of information is allowed by legislation.

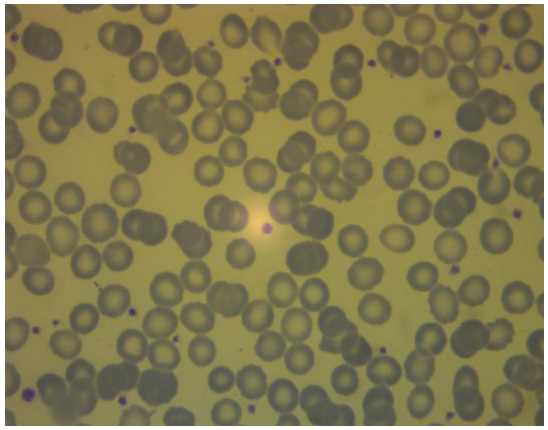

Fig. 2. Shows heparine-anticoagulated normal peripheral smear with normal thrombocyte count

3. DISCUSSION

We aimed to report a case of spurious thrombocytopenia in a term pregnant woman in active labour which lead to a great anxiety for both physcian and mother. In a case of thrombocytopenia in pregnant, it must be clarified whether platelet count is low or not in fact.

Overall, about 75% of cases of thrombocytopaenia in pregnancy are due to gestational thrombocytopaenia; 15-20% secondary to hypertensive disorders; 3-4% due to an immune process and the remaining 1–2% made up of rare constitutional thrombocytopaenias, infections and malignancies [10]. Though the platelet count in patients with gestational thrombocytopenia usually remains above 110 x 10^3/mm^3, a platelet count as low as 70 x 10^3/mm^3 in otherwise healthy pregnant women with no history of immune-mediated thrombocytopenia purpura (ITP) may be consistent with this disorder. Our case was examined for these differential diagnosis and revealed no disease regarding pregnancy-

associated thrombocytopenia. Another and important differential diagnosis may be about the spleen disease such as hypersplenism. As known, spleen is a storage organ and stores one third of body's platelets. Because of increased sequestering of platelets, thrombocytopenia can be seen in hypersplenism so this disease must be ruled out in a pregnant woman with thrombocytopenia [11].

Preeclampsia affects approximately 6% of all pregnancies, most often those of primigravidas less than 20 or greater than 30 years of age. Thrombocytopenia develops in approximately 50% of patients with preeclampsia, with the severity usually proportional to that of the underlying disease [3]. Though the pathogenesis of thrombocytopenia in patients with preeclampsia is not well understood, it may involve enhanced platelet clearance due to adhesion of circulating platelets to damaged or activated endothelium, accelerated platelet activation due to hemostatic system activity and thrombin generation, and/or clearance of IgG-coated platelets by the reticuloendothelial system.

The low or high thrombocyte count reported from an automated analyser must be confirmed by another method. Thrombocytopenia must be evaluated with preripheral blood smear. Pseudothrombocytopenia is a spurious thrombocytopenia mostly caused by EDTA conatining tube and it is a common laboratory phenomenon with a prevelance ranging from 0.1-2% in hospitalized patients [6]. it is reported that it may be transferred from mother to fetus following transplacental passage of the offending antibody [12,13] and the pathogenesis is explained by an in vitro artifact attributable to platelet clumping caused by EDTA-dependent antiplatelet antibodies [14]. Our patients' history was negative for any bleeding disorders or easy bruising and her laboratory analysis were normal except for low platelet counts. Pseudothrombocytopenia was diagnosed in a simple way with a peripheral blood smear examination and a second examnination of blood count with tube containing heparin in automated analyser. She was delivered without any complication and also anxiety both for mother and physician.

Obstetricians should be aware of this artifact so that diagnostic and therapeutic interventions would not be withhold and unnecessary anxiety will be prevented. It has been reported that patients whose laboratory blood test spuriously indicated thrombocytopenia but have no bleeding tendency and normal platelet function have been overtreated inappropriately with corticosteroids and diagnosed erroneously as idiophatic thrombocytopenic purpura [7]. Because of the EDTA-dependent pseudothrombocytopenia has never been associated with hemorrhagic diatesis or platelet dysfunction, as in our case, low platelet doesn't mean always a serious disease it may be an artifact of laboratory so a detailed differential diagnosis should be done.

4. CONCLUSION

In conclusion, in this case, we are suggesting that pseudothrombocytopenia should be kept in mind in cases with low platelet counts, who had no history, physical or laboratory examination findings consistent with thrombocytopenia or associated serious disease. Low platelet count in pregnant woman is an alarming finding for obstetrician but with a simple peripheral blood smear and additional sampling with different anticoagulant containing tube would be very crucial and helpful for exact diagnosis and it would prevent overtreatmnet.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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