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Ethylenediaminetetraacetic Acid (EDTA)-Induced Thrombocytopenia: A Case Report

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Abstract

Ethylenediaminetetraacetic Acid (EDTA)-Induced rombocytopenia is a fairly rare i ri. immunological mediated phenomenon characterized by a spuriously low platelet count on automated analyzers secondary to antiplatelet autoantibodies which cause platelets to aggregate in specimens ant coagulated with EDTA. e aggregations of platelets result in a false increase in leukocytes as giant platelets are counted as lymphocytes. Failure to detect this EDTA-Induced rombocytopenia could result in unnecessary laboratory investigations and super uous interventions. EDTA-induced thrombocytopenia is sometimes prevented by other anticoagulants such as sodium citrate or heparin. In this article we reported a case of a 23-year-old female with EDTA-induced thrombocytopenia and a falsely increased leukocyte count con rmed by the use of a citrated tube and a peripheral smear without platelet aggregation.

Keywords: ETDA induced-thrombocytopenia; Pseudothrombocytopenia; Citrate; Heparin; rombocytopenia; Platelet aggregation; Platelet clumping, Peripheral blood smear

Introduction

Ethylenediaminetetraacetic Acid (EDTA)-induced thrombocytopenia is a common laboratory phenomenon which requires distinction and di erentiation from a disease condition. It is de ned as an i ri. phenomenon of platelet aggregation resulting in spurious reporting of a low platelet count by automatic analyzers, which are typically EDTA-dependent [1]. Even though EDTA-induced thrombocytopenia can be seen in patients with known malignancies, it has also been observed in normal individuals. e main hallmark of EDTA-induced thrombocytopenia is platelet aggrega e)4 EDTA samples.

EDTA-induced thrombocytopenia can be diagnosed easily; but results are not properly analyzed (warning ags, histograms and blood lms) leading to misdiagnoses of patients and placing a nancial constraint with unnecessary transfusions and unwanted diagnostic testing.

Case Report

A 23-year-old female of Afro-Caribbean origin was referred to her primary care physician because thrombocytopenia was detected upon doing a Complete Blood Count (CBC) and di erential as a component of a routine medical. She was asymptomatic, with no history of drug usage, or recent infection. ere was no history of weight loss, melena, epistaxis, petechiae, ecchymosis or purpura. e initial CBC reveals normal parameters apart from an alarmingly low platelet count; 18 × 10^9/L and a leukocytes count of 11.2 × 10^9/L. A peripheral smear was subsequently prepared and it revealed platelet aggregations with moderate giant platelets. Family history, physical and systemic examination was unremarkable. We postulated that the low platelet count was due to EDTA-induced platelet aggregation. is was con rmed by a normal platelet and leukocyte count, 259 × 10^9/L and 8.6 × 10^9/L respectively, with specimen collected in a citrated tube and the absence of aggregated platelets on the peripheral smear.

Discussion

EDTA induced thrombocytopenia (also referred to as EDTA-induced Pseudothrombocytopenia (EDTA-PTCP) is a phenomenon caused by EDTA-dependent anti-platelet auto-antibodies that recognize platelet antigens modi ed by EDTA [4-9]. ese antiplatelet antibodies, usually IgG or IgM, and rarely IgA, recognize platelet antigens on the platelet membrane modi ed by EDTA [10-13]. In contrast to serious and potential life-threatening causes of thrombocytopenia [14-16]. EDTA-PTCP is solely an i ri. e ect without any clinical relevance [11]. Cation chelation by EDTA leads to a conformational change of the platelet membrane GPIIb-IIIa complex unmasking a cryptic epitope that becomes accessible for autoantibodies [17]. is leads to platelet clumping/aggregation i ri.

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"Unrecognized Pseudothrombocytopenia may result in unnecessary diagnostic testing and clinical concern. A microscopic examination can identify platelet clumping and repeat CBC tests using a di erent anticoagulant can a rm the diagnosis" [18]. In this case, we were able to con rm EDTA induced thrombocytopenia with the use of a citrated tube and a peripheral smear. Additionally, we also observed a signi cant reduction in the leukocytes count. While most reports indicate successful con rmation with the use of citrated tubes others have cited inconsistencies [10-13] which seem to eliminate citrated tubes and by extension heparin tubes, as reliable alternatives. According to one source, the best technique for obtaining accurate platelet counts in pseudothrombocytopenia subjects is to collect and examine blood sample at 37°C [6]. is approach has not proven to be most e ect as there have been reports that platelet clumping will still be present in about 20% of patients [20].

In the quest for a gold standard the use of aminoglycosides has been suggested. Studies have shown that the prior addition of aminoglycosides to anticoagulants completely prevented the aggregation of platelets in EDTA-dependent PTCP subjects although the mode of action is not known [10]. In addition, the supplementation of aminoglycosides to EDTA-anticoagulated samples a er blood withdrawal induced dissociation of aggregated platelets in blood samples from patients with EDTA-dependent PTCP [10,14,15]. Con rmation of EDTA induced thrombocytopenia is best helped by a method that is easy and perpetually e ective as is said of the addition of aminoglycosides either before or a er collecting the specimen.

In cases where aminoglycosides are not readily available the utilization of the citrated tube and testing at 37°C could prove bene cial in detecting EDTA induced thrombocytopenia even with minimal aggregation.

In conclusion, the case demonstrates the importance of not excluding EDTA-induced thrombocytopenia in instances where patients present with low platelet counts, platelet aggregation on peripheral smear and no physical ndings or history suggestive of thrombocytopenia. Detection of EDTA-induced thrombocytopenia is very important for physicians as well as laboratory personnel as it averts unnecessary laboratory investigations and super uous interventions. While sophisticated approaches to preventing EDTA-induced platelet aggregation, such as addition of aminoglycosides, exist, for developing countries the utilization of the citrated tube with correction for dilution remains a quick and easy means of detecting EDTA-induced thrombocytopenia.

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