The incidence of pseudothrombocytopenia in automatic blood analyzers


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Abstract—The aim of the present work was to undertake an assessment of the incidence of pseudothrombocytopenia (PTCP) in patients referred for evaluation of thrombocytopenia in an outpatient hematology clinic.

Methods. Prospective assessment of 60 consecutive cases with platelet count <100 × 10^9/l in a hematology clinic during a 2-year period. Results: PTCP was the second most common cause for low platelet count, with an incidence of 17%. Platelet count of patients with PTCP at presentation was 42 ± 22 × 10^9/l, and when re-analyzed on fresh samples, 208 ± 39 × 10^9/l. The relatively high prevalence of pseudothrombocytopenia in our series was due to a lack of microscopic inspection of the blood smear in the primary care laboratories and considerable delay in sample processing.

Conclusions. PTCP should be considered in the assessment of low platelet count. While decreasing the transfer time of blood specimens may decrease PTCP incidence, microscopic inspection of the blood smear may avoid erroneous diagnosis of thrombocytopenia.

Key words: Automatic analyzer; hematologic tests; pseudothrombocytopenia; specimen handling; thrombocytopenia.

INTRODUCTION

Pseudothrombocytopenia (PTCP) is an in vitro artifact caused by anticoagulation of blood with ethylene-diamine-tetraacetic acid (EDTA) used for blood cell counting with electronic blood analyzers. The PTCP phenomenon is caused by formation of platelet aggregates that cannot be counted by automatic analyzers, but may show on platelet size histograms produced by modern equipment. Platelet antigens,
modified or exposed by the combined action of EDTA and low temperature, interact with antiplatelet autoantibodies and form platelet aggregates [1, 2]. The antiplatelet antibodies in PTCP are associated with antiphospholipid antibodies, but their presence has no clinical implication [3]. Likewise, there is no clinical evidence indicating an association of PTCP with either specific disease or a possible sensitization (i.e. medications, blood transfusion or pregnancy). Failure to recognize PTCP may result in misdiagnosis of thrombocytopenia and subsequent mismanagement of patients with a spuriously low platelet count.

The incidence of PTCP in hospitalized patients, especially those who are seriously ill, is estimated at between 0.1 and 2%, whereas that among healthy blood donors is estimated at 0.2% [4–7]. We present data on the incidence of PTCP among ambulatory patients referred to the hematology clinic because of significant thrombocytopenia.

MATERIALS AND METHODS

Sixty patients referred to the hematology unit of Rabin Medical Center, Golda Campus, for evaluation of thrombocytopenia (platelet count of <100 × 10^9/l) between August 1 1994 and July 31 1996 were included in the study. Most patients had their initial blood sample drawn 2–3 h before analysis at the primary care laboratory. To avoid sampling error due to imperfect homogenization, blood samples were mechanically rotated for at least 10 min before they were processed. Routine blood counts were carried out with a semi-automatic cell counter, Coulter model T 890 (Coulter Electronics, Hialeah, FL, USA) using 5% sodium EDTA as an anticoagulant (Vacutainer, Beckton Dickinson, NJ). PTCP was suspected in cases with a platelet count of less than 100 × 10^9/l, with evidence on peripheral blood smear of platelet clumping, platelet satellitism or giant platelets. Confirmation of PTCP was made by blood counts on fresh blood, analyzed immediately after it was drawn, which showed a platelet count of more than 150 × 10^9/l. In addition, blood samples in EDTA were incubated at room temperature for 1 and 4 h.

RESULTS

A thorough work-up of the thrombocytopenic patients showed that the most common disorder was idiopathic thrombocytopenic purpura (ITP) (Table 1). Other conditions associated with thrombocytopenia in this cohort included gestational thrombocytopenia, cirrhosis and Gaucher’s disease. PTCP was the second most common cause for the decreased platelet count, and was detected in 10 (17%) of the patients. There were six women and four men with PTCP, with a median age of 59 years (range 42–75). Six patients with PTCP had concomitant disease, some with more than one disorder. There were 3 cases of hypertension, 3 of diabetes mellitus, 2 of hyperlipidemia, 1 of ischemic heart disease, 1 of mitral valve prolapse and