Case Report

**PSUEDO-THROMBOCYTOPENIA AMID THROMBOCYTOPENIA– A RARE ENTITY WITH DIAGNOSTIC DILEMMA**

*Kaur M.*, Kaur R.², Rana A.P.S.³, Phutela R.¹, Kaur U.¹ and Puri A.¹

¹Department of Pathology, G.G.S. Medical College, Faridkot, India
²Department of Medicine, G.G.S. Medical College, Faridkot, India
³Department of Surgery, G.G.S. Medical College, Faridkot, India

*Author for Correspondence

**ABSTRACT**

Pseudo-thrombocytopenia is an infrequently encountered phenomenon in hematology laboratories since ethylenediaminetetraacetic acid (EDTA) and automated blood analyzers are in use. It is the anticoagulant induced aggregation of platelets usually occurring with EDTA at room temperature, less commonly with sodium citrate. Most of the time no underlying cause is seen associated with it, except for some autoimmune, neoplastic and viral diseases. We herein present a case of 65 year old male, who presented with pseudo-thrombocytopenia, in the course of thrombocytopenia and hypo cellular marrow, hence increasing the apprehension and anxiety of clinician as well as patient and creating confusion about diagnosis.

**Keywords:** Ethylenediaminetetraacetic Acid, Pseudo-thrombocytopenia, Hypo Cellular Marrow

**INTRODUCTION**

Pseudo-thrombocytopenia (PTCP) is a rare condition, usually detected incidentally on automated EDTA blood analyses. This misdiagnosis of thrombocytopenia is due to the presence of EDTA-dependent cold antiplatelet antibody. Association of in vitro clumping of platelets in EDTA blood sample with some of the lesions has been detected, but pseudo-thrombocytopenia with underlying thrombocytopenia is very unusual. Here we present a case report of 65-year-old male presenting with pseudo-thrombocytopenia amidst low platelets counts.

**CASES**

A 65 year-old male was presented with dyspnea and generalized weakness for one month duration. No associated positive history was seen except history of chronic alcoholism. Routine lab investigations were performed (Hb-9.3g/dL, TLC- 3.1 x10³/μl, platelet counts 25x10³/μl) with automated blood analyzer in EDTA blood sample which revealed pancytopenia. Multiple platelet rich plasma transfusions were given.
but without significant improvement of counts. Peripheral blood smear was examined under light microscope, discovered small clumps of platelets (Figure 1). Sample was repeated in sodium citrate vacutainer, heparin vacutainer. Then EDTA sample was incubated at 37\(^\circ\) C for 30 minutes and improved counts were appreciated (Table 1). Patient underwent bone marrow aspiration and biopsy which revealed markedly hypocellular marrow with focal hematopoietic activity (Figure 2). Renal and Liver function tests were normal except raised serum alkaline phosphatase levels (139 unit/L). Unexpectedly immunoglobulin G (IgG) antibodies for dengue were positive with no related history.

**Table 1: Variation in the platelet counts**

<table>
<thead>
<tr>
<th>Anticoagulant used in blood sample</th>
<th>Automated platelet counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTA</td>
<td>25x10^3/μl</td>
</tr>
<tr>
<td>EDTA (incubated blood sample)</td>
<td>114x10^3/μl</td>
</tr>
<tr>
<td>Sodium citrate</td>
<td>10x10^3/μl</td>
</tr>
<tr>
<td>Heparin</td>
<td>120x10^3/μl</td>
</tr>
</tbody>
</table>

**Figure 2: Hematoxylin & eosin stained sections show hypo cellular marrow spaces with focal hematopoietic activity (100X)**

**DISCUSSION**

Pseudo-thrombocytopenia (PTCP) is an unusual entity. Berkman (1991) and fellows reported its frequency as 0.09-0.11% only. In another study done by Oza (2014) and associates, incidence of pseudo-thrombocytopenia reported was 0.07% only. Pegels *et al.*, (1982) and Wei *et al.*, (2011) studied that due to the presence of EDTA-dependent cold antiplatelet antibody, an immunologically mediated process takes place and in vitro platelet clumping results in inaccurate platelet concentration. This leads to misdiagnosis of thrombocytopenia when analyzed with automated analyzers. As seen by Mori (2000) and fellows, most of the time PTCP is recognized as an incidental finding without any underlying causes. This has also been reported in association with some of the lesions such as autoimmune, neoplastic, atherosclerosis, liver and viral diseases etc.

Tu (2002), Van (1987), Chi (2010) and Pidard (1986) have explained this phenomenon in different ways. The target antigen present on platelets is a cryptic epitope that is normally hidden in platelet membrane glycoprotein (GP) IIb/IIIa complex. This complex requires the presence of calcium ion to maintain its heterodimeric structure. The binding of antiplatelets antibody detected is completely/partially EDTA-dependent as well as temperature dependent too. As EDTA can dissociate it, results in exposure of target epitope an GP IIb/IIIa. Wei (2011) has been suggested the evidence of sodium citrate induced platelet aggregation also.
The findings of present case report also favors the mechanism, as platelets were aggregated both in EDTA and sodium citrate blood samples but not in heparin vacutainers or warm EDTA blood sample. Pseudothrombocytopenia with underlying pancytopenia due to hypocellular marrow is very exceptional or strange. Even on marginally low counts of platelets, pseudothrombocytopenia can further worsen the counts hence resulting in unwarranted transfusions as well as burden on hospital resources.

**Conclusion**

Although pseudothrombocytopenia is a rare condition but it has been the unexpected or unwarranted emergency in the era of automated blood cell counting. Peripheral blood smear examination should be mandatory for all automated thrombocytopenic EDTA blood samples for clumps and concerned clinician should be informed immediately. Hypocellular marrow with PTCP is a rare association or just a coincidence. Many more prospective studies are required for further exploration and evaluation.

**REFERENCES**


