Increase of Red Blood Cells Can Shorten the Bleeding Time in Patients With Iron Deficiency Anemia

To the Editor:

The hemostatic effect of platelets has been well-known since it was first reported by Duke in 1910. The possible role of red blood cells (RBC) in hemostasis was also stop uremic bleeding. In our previous experience, adequate RBC transfusion had good hemostatic effect in patients with anemia and thrombocytopenia. Thus, the role of RBC on hemostasis seems important, but often unrecognized by most of the physicians. In the report of Blajchman et al., anemic rabbits were found to have significantly longer bleeding time than nonanemic animals with a similar degree of thrombocytopenia, and red cell transfusions were found capable of shortening the bleeding time in thrombocytopenic anemic animals. To our knowledge, there were no solid data to prove the hemostatic effect of RBC in humans. In a prospective study, bleeding time (BT), activated partial thromboplastin time (APTT), and prothrombin time (PT) were detected before and after iron administration in 20 patients with iron deficiency anemia. Eleven were men, with a mean age of 56.5 years (SD 19.1; range, 19 to 82). The mean days between two measurements, before and after iron administration, were 54.2 ± 34.51 days (range, 7 to 128). The daily oral dosage of elemental iron was 100 mg.

Platelet and BT decreased significantly, whereas hemoglobin (Hb), RBC, hematocrit (Hct), and mean cell volume (MCV) increased significantly after iron administration (P = .006, .01, <.0005, <.0005, <.0005, and <.0005, respectively, paired t-test). The mean shortening of BT after iron administration was 1.48 ± 0.18 minutes. Fifteen of the 20 patients (75%) had shortened BT after iron administration. On the other hand, APTT and PT did not change significantly after iron administration (P = .142 and .500, respectively, paired t-test) (Table 1).

In the present study, 20 iron deficiency anemic patients were enrolled to evaluate the influence of increased hematocrit on the BT, APTT, and PT. After iron administration, RBC, Hb, Hct, and MCV increased significantly as expected, whereas platelet decreased significantly (Table 1). BT, but not APTT or PT, significantly shortened. In other words, increase of the RBC could shorten BT despite decreased post–iron administration platelet count. It is rather interesting (even though the mean decrease of platelet count from 315 × 10^9/L to 262 × 10^9/L was not so clinically significant) that decreased platelet count would usually prolong rather than shorten BT. Thus, the post–iron administration shortening of BT was completely caused by the post–iron administration increase of RBC, and the effect of RBC on the shortening of BT, and consequently, better hemostasis, were prominent in the present study.

The post–iron administration changes of APTT and PT were not significantly different. Thus, the effect of RBC was unrelated to the coagulation factors but only related to the primary hemostasis. The mechanism by which RBC could affect the primary hemostasis is uncertain. Previous reports suggested two mechanisms: one is the hemodynamic effect by RBC, and the other concerns the release of adenosine diphosphate from RBC. Both of the postulated mechanisms are related to primary hemostasis, thus affecting the BT, but not the clotting time. This is consistent with our results and proved by the present study.

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REFERENCES
1. Duke WW: The relation of blood platelets to hemorrhagic disease. JAMA 60:1185, 1910

Table 1. Pre- and Post-Iron Administration Levels of CBC, BT, APTT, and PT in 20 Patients With Iron Deficiency Anemia

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
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<tbody>
<tr>
<td></td>
<td>Hb (g/L)</td>
<td>RBC (×10^12/L)</td>
<td>Hct (%)</td>
<td>MCV (fL)</td>
<td>Platelet (×10^12/L)</td>
<td>APTT (sec)</td>
<td>PT (INR)</td>
<td>BT (min)</td>
</tr>
<tr>
<td>Pre-iron</td>
<td>83.1 ± 25.8</td>
<td>3.74 ± 0.82</td>
<td>27.71 ± 7.11</td>
<td>74.57 ± 12.03</td>
<td>315.00 ± 98.81</td>
<td>41.97 ± 6.11</td>
<td>1.03 ± 0.13</td>
<td>5.55 ± 2.42</td>
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<tr>
<td>Post-iron</td>
<td>121.1 ± 13.9</td>
<td>4.58 ± 0.60</td>
<td>38.41 ± 0.25</td>
<td>84.48 ± 8.36</td>
<td>262.35 ± 88.17</td>
<td>32.33 ± 1.96</td>
<td>0.98 ± 0.05</td>
<td>4.08 ± 2.12</td>
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<tr>
<td>P value*</td>
<td>&lt;.0005</td>
<td>&lt;.0005</td>
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<td>&lt;.0005</td>
<td>&lt;.0005</td>
<td>.006</td>
<td>.14</td>
<td>.50</td>
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<tr>
<td>Mean change</td>
<td>3.81 ± 2.34</td>
<td>0.84 ± 0.73</td>
<td>10.70 ± 7.12</td>
<td>9.91 ± 5.87</td>
<td>−52.65 ± 76.35</td>
<td>−9.63 ± 7.06</td>
<td>−0.06 ± 0.08</td>
<td>−1.48 ± 2.31</td>
</tr>
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Abbreviation: INR, international normalized ratio.
* P value = the significance between pre- and post–iron administration (paired t-test).

Disappearance of Cytogenetic Abnormalities Induced by Cyclosporine Therapy in a Case of Aplastic Anemia

To the Editor:

We report a patient with aplastic anemia (AA) who exhibited cytogenetic abnormalities at presentation, but who recovered hematologically with disappearance of cytogenetic abnormalities after cyclosporine (CyA) therapy.

A 55-year-old woman presented to our hospital in September 1995 with breathlessness on exertion of 1-month duration. She was pale, and petechiae were observed on her skin. A hemogram revealed severe pancytopenia with hemoglobin (Hb) 3.8 g/dL, granulocyte count 0.35 × 10^10/L, platelet count 13 × 10^10/L, and reticulocyte count 11 × 10^10/L. Serum lactate dehydrogenase, bilirubin, and haptoglobin were within normal range. The first bone marrow aspiration showed grade 3 aplasia. A second bone marrow aspiration at presentation showed grade 2 aplasia and 12.5% normoblasts. The bone marrow cytogenetic analysis showed a translocation: t(4;6)(q21;q12) and a +8 (46,XY,t(4;6)(q21;q12),+8). After CyA therapy, bone marrow aspirate showed grade 1 recovery. The bone marrow cytogenetic analysis showed a normal karyotype (46,XY).
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