To the Editor,

Intravenous administration of 5% dextrose in water (5% D/W) with or without additional electrolytes is in common use. Clinically significant hemolysis resulting from such treatment has not been reported. Recently, we noticed marked intravascular hemolysis following the intravenous infusion of 5% dextrose in one-fourth strength saline (5% D/¼S) and 5% D/W in an 18-yr-old black male with hereditary spherocytosis (HS) in the immediate postsplenectomy state.

The operation was carried out under inhalation anesthesia using nitrous oxide and Innovar. No transfusion of blood or plasma was required. The postoperative course and the evidence of intravascular hemolysis in relation to fluid therapy is summarized in Fig. 1. Blood smear revealed Howell-Jolly bodies but no fragmented red cells. The sediment of the dark red urine contained only one to two red cells per high power field; both the urine and the dark red serum yielded a strongly positive guaiac test.

Tests for G-6-PD deficiency and sickling, the Coombs, sugar water, and presumptive Donath-Landsteiner tests were all negative. Hemoglobin electrophoresis was normal. From the seventh postoperative day, the patient improved steadily and was discharged on the tenth day. On the eighth postoperative day, the patient’s saline-washed red cells were exposed in vitro to solutions that he had received intravenously, and their osmotic fragility was compared with that of control red cells (Table 1).

DeCesare et al.1 had previously observed that red cells incubated in 5% D/¼S swelled to 160–180% of their original volume and hemolyzed when they were infused back to the donor. Because of their low critical hemolytic volume,2 spherocytes are likely to hemolyze in 5% D/¼S, while normal red cells survive. An additional factor may have been a transient increase in osmotic fragility of the red cells immediately after splenectomy.3

The present observation suggest that caution should be exercised in administering dextrose in water or hypotonic saline to patients with HS, especially in the immediate postsplenectomy phase.

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Fig. 1. The diagram illustrates the clinical course and significant laboratory findings in patient D.W. Hb., hemoglobin; Ret., reticulocytes; Bil., bilirubin (indirect); L.D.H., serum lactic dehydrogenase; 5% D/RL: 5% dextrose in Ringer’s lactate.

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Table 1. Osmotic Fragility of Red Cells Tested Against Intravenous Solutions Used in Patient D.W.

<table>
<thead>
<tr>
<th>Solutions tested</th>
<th>Normal saline</th>
<th>5% D/S</th>
<th>5% D/V/S</th>
<th>5% D/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation at 37°C, Minutes</td>
<td>30</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Per cent Patient's cells</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Per cent Control cells</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Per cent Other HS cells</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

REFERENCES


