FATAL HEMOLYTIC TRANSFUSION REACTION DUE TO A BLOOD GROUP MISMATCH

Case study by Jim Perkins, M.D. and Elizabeth clay, SBB (©2009)

A 78 year old woman was admitted to the hospital in a coma. Her husband related a history of nausea and vomiting for 1-2 days. A syncopal episode occurred, and the paramedics were called (recorded vital signs included BP 110/90, PR 70). She stopped breathing in the emergency room and was intubated and ventilated. Electrocardiograms showed PAC's and atrial fibrillation alternating with sinus rhythm. She was thought to have either an embolic stroke or global CNS ischemia due to arrhythmia, and was started on multiple anti-arrhythmic agents, heparin and coumadin.

The following day a neurology consultant evaluated the patient. He thought she had decreased cardiac output due to arrhythmia and doubted that she had suffered a stroke. A cardiologist questioned whether the arrhythmia was due to a myocardial infarction and endorsed the treatment with anticoagulants. A computed tomography scan of the head did not show a stroke. Her mental status varied from relatively alert to obtunded. Hematuria was noted and the heparin dose was reduced.

The following table summarizes her course:

Day	Hct	WBC	Plts	PT	PTT	BUN/Cr	Comment
Adm	35	11.8k	170k	11.5	19.7	24/0.7	
2	35	11.9	130		>150	18/0.7	
3	34	21.2	131		62.9	11/0.8	Mental status varied. CT → old infarcts.
4					43.2→ 61.1		More alert.
5	33	17	124		41.3→ 55.1		Extubated; eating ice chips; oriented x3 at noon, but confused most of time.
6					57.7		Oriented x1; incontinent. Discharged from intensive care.
7				11.9	52.7		Confused.
8				13.1	67.7		Confused.
9	26	10.5	176	20.3	84.7		↓Heparin, coumadin held, received vit K. ↑PR → ↑Dig. Mild CHF. Pallor noted by nurse.
10	21→ 18			24.6→ 21.2	49.2→ 24.1		Massive retroperitoneal hematoma on CT scan. Anticoagulation discontinued; vit K.
Transfused 2 units of group B RBCs at midnight; no apparent reaction.							
11	23.4→ 28.5→ 26.5	49.7	42	21.4→ 17.7	36.5→ 32.3		Hematology consultant noted schistocytes, thrombocytopenia, slow decline in PT. DDx: 'drugs, TTP?' Last day patient walked.
12	24.6→ 23.3	48.2	41→ 64	14.3	26.6		Midnight nurse noted jaundice. Bleeding time normal. 2U FFP given. Speech pathologist noted ↓ speech. Dig. level = 2.8.

<table>
<tr><td>13</td><td>23.1→
22.4</td><td>49.4</td><td>48</td><td>12.7</td><td>21.7</td><td></td><td>Confused. Speech pathology visits discontinued. Melena. Pulse as low as 60.</td></tr>
<tr><td>14</td><td>20→
19.2</td><td>40.8</td><td>38</td><td>12.8</td><td>20.8</td><td>112/6.1</td><td>Digoxin level = 3.2. Transfusion ordered.</td></tr>
<tr><td colspan="8">"Clerical error" in blood bank discovered; patient is group O. 2 units of RBCs given.</td></tr>
<tr><td>15</td><td>26.2→
28.3→
26</td><td>28.6</td><td>30</td><td>12.3</td><td>23</td><td>122/6.3</td><td>Increasing CHF. Bradycardia. Foley placed; Urine output ≤40 cc/shift. Renal consult; "Acute renal failure due to blood loss."</td></tr>
<tr><td>16</td><td>22.3→
21</td><td>21.1</td><td>40</td><td>12.4</td><td>26</td><td>140/7.0</td><td>Digoxin level = 3.5. Schistocytes present. Little response to verbal stimuli.</td></tr>
<tr><td colspan="8">1 unit of RBCs given.</td></tr>
<tr><td>17</td><td>27.1→
25.5</td><td>15.1</td><td>55</td><td>12.5</td><td>37.5</td><td></td><td>Steroids started for 'TTP'.</td></tr>
<tr><td>18</td><td></td><td>14.7</td><td>68</td><td>12.1</td><td>27.4</td><td>138/7.3</td><td>Asystole.</td></tr>
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Study Question:

What manifestations of a hemolytic reaction were present in this case? What is their pathogenesis? Did she have TTP?