

## Severe Hyperkalemia in a Hematology-Oncology Patient

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### CASE DESCRIPTION

A 71-year old polymorbid man with a rapid progression of chronic lymphocytic leukemia was admitted to the Department of Hemato-oncology to undergo cytoreduction therapy with chlorambucil and prednisone.

Laboratory results are shown below. Of note, there was hyperkalemia of 7.0 mmol/L that further increased to 8.3 and 12.4 mmol/L 3 and 7 h later, respectively (see Table 1; lithium heparin plasma separated within 20 min of blood collection).

**Table 1. Laboratory findings on the first day of hospitalization.<sup>a</sup>**

	Reference interval	7:00	10:02	14:00	15:27	
Na <sup>+</sup> , mmol/L	137-145	144	139	135	144	129
K <sup>+</sup> , mmol/L	3.6-4.8	7.0	8.3	12.4	4.5	14.1
Cl <sup>-</sup> , mmol/L	98-109	110	108	109	110	125
Urea, mg/dL (mmol/L)	18-48 (3-8)	95.4 (15.9)	–	–		
Creatinine, mg/dL (μmol/L)	0.7-1.2 (62-106)	1.23 (109)	–	–		
Uric acid, mg/dL (μmol/L)	3.53-7.57 (210-450)	11.21 (667)	–	–		
Hemolysis index	0	0	0	0	0	0
pH (arterial blood)	7.36-7.44		7.39			
Leukocytes (×10 <sup>9</sup> /L)	4-10	541.9	–	–		
Erythrocytes (×10 <sup>12</sup> /L)	4-5.8	3.33	–	–		
Hemoglobin (g/L)	135-175	110	–	–		
Platelets (×10 <sup>9</sup> /L)	150-400	83	–	–		
Sample transport		PTS	PTS	PTS	M	PTS

<sup>a</sup> All samples were collected into lithium heparin (biochemical tests) and K<sub>3</sub>EDTA (blood cell count) tubes. The last sample was transported both manually (M) and by a pneumatic tube system (PTS).

### QUESTIONS

1. What other findings are consistent with extreme in vivo hyperkalemia?
2. Based on the data presented, what is the most likely mechanism of hyperkalemia in this case?

### Discussion

In vivo hyperkalemia is associated with acidemia, hemolysis, significant reduction of glomerular filtration rate,

administration of certain drugs (angiotensin-converting enzyme inhibitors, potassium-sparing diuretics), and decreased haptoglobin (not performed). Because avoiding a pneumatic tube system resulted in normal potassium concentrations, the presumptive cause in this case was the presence of high numbers of fragile leukemic lymphocytes (1, 2), along with strong acceleration and deceleration.

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tion forces in the pneumatic tube system. Malignant leukocytosis can be associated with pseudohyperkalemia (3, 4), especially when a pneumatic tube system is involved (5).

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