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The Tumor Lysis Syndrome

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TO THE EDITOR: We recently admitted a patient to our intensive care unit with methemoglobinemia and severe hemolytic anemia after he received a single dose of rasburicase. The patient was 55-year-old black man with chronic lymphocytic leukemia in whom the tumor lysis syndrome developed after rituximab and bendamustine treatment despite saline and allopurinol prophylaxis. Within 6 hours after receiving rasburicase at dose of 0.2 mg per kilogram of body weight, he became hypoxic, with a methemoglobin concentration of 12.2% (Table 1). He subsequently had acute intravascular hemolysis, with the hemoglobin level decreasing from 13.1 to 4.5 g per deciliter, the lactate dehydrogenase level increasing from 158 to 1229 U per liter, and the haptoglobin level decreasing from 130 to 10 mg per deciliter. An elevated plasma oxyhemoglobin level (30.9 mg per deciliter [4.8 μmol per liter]; reference range, 0.0 to 12.4 mg per deciliter [0.0 to 1.9 μmol per liter]) was accompanied by acute pulmonary hypertension (tricuspid regurgitant jet velocity of 3.5 m per second; reference range, 1.7 to 2.8).[1,2] He was found to have a glucose-6-phosphate dehydrogenase (G6PD) deficiency. Rasburicase causes oxidative stress by releasing hydrogen peroxide during the conversion of uric acid to allantoin.[3] Although not specifically mentioned in the review by Howard et al. (May 12 issue),[4] the Food and Drug Administration recommends that patients from populations where G6PD deficiency is common undergo testing before treatment with rasburicase.[5]

References

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No potential conflict of interest relevant to this letter was reported.

Table 1

Biochemical Evidence of Methemoglobinemia and Intravascular Hemolysis after Rasburicase Administration.*

Variable	Reference Range	Rasburicase Administration		
		Before	6–18 Hr After	48–96 Hr After
Uric acid (mg/dl)	3.7–8.6	9.0	2.2	3.3
Hemoglobin (g/dl)	13.7–17.5	13.1	10.7	4.5
Methemoglobin (%)	0.0–1.9		12.2	6.9
Oxyhemoglobin (%)	94–97		86	
Haptoglobin (mg/dl)	30–200		130	10
Lactate dehydrogenase (U/liter)	113–226	158	1166	1229
Bilirubin, indirect (mg/dl)	0.1–0.8	0.3	0.3	3.0
Plasma oxyhemoglobin (mg/dl)	0.0–12.4			30.9
Tricuspid regurgitant jet velocity (m/sec)	1.7–2.8	2.9		3.5

*To convert the values for uric acid to millimoles per liter, multiply by 0.059. To convert the values for plasma oxyhemoglobin to micromoles per liter, multiply by 0.155. To convert the values for bilirubin to micromoles per liter, multiply by 17.1.