

Intraoperative tumor lysis-induced fatal hyperkalemia

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To the Editor:

A 40-year-old man, highly suspected as having lymphoma, without having undergone any chemotherapy or radiation therapy, was scheduled to undergo exploratory laparotomy for a definite diagnosis. Laboratory examination revealed hyperuricemia (1,115 $\mu\text{mol/l}$) and high lactate dehydrogenase (1,792 U/l) with normal serum potassium (3.9 mmol/l) upon admission to our hospital. Thus, oral allopurinol 200 mg three times a day was applied for 2 weeks to reduce the level of serum uric acid, which decreased to 303 $\mu\text{mol/l}$; lactate dehydrogenase was reduced to 1,326 U/l, with a normal serum potassium (4.7 mmol/l) the day before operation.

During the surgery with general anesthesia, the patient's blood pressure (BP) gradually decreased from the baseline of 112/65 to 72/38 mmHg when 1,000 ml ascites was suctioned and the tumor had been partially excised. Three consecutive doses of 10 mg ephedrine were administered intravenously without significant increase of BP. Phenylephrine 0.3 mg was therefore given, which only elevated

his BP to 98/56 mmHg. Furthermore, BP could not be maintained stably until phenylephrine infusion was initiated. The surgery was completed within 1 h. Unfortunately, 10 min after the patient arrived in the post-anesthetic care unit, his BP suddenly fell to 30/13 mmHg and cardiac arrest ensued. Cardiopulmonary resuscitation (CPR) was immediately performed. After intravenous injection of a total dosage of 5 mg epinephrine within 10 min, BP increased to 79/38 mmHg with cardiac massage. A synchronous arterial blood gas (ABG) revealed serum potassium 8.5 mmol/l, pH 7.21, PaO₂ 75 mmHg, PaCO₂ 37 mmHg, and base excess -13.7 mmol/l. Hyperkalemia-induced cardiac arrest was thus confirmed. Sinus rhythm did not recover despite repeated uses of epinephrine, calcium, sodium bicarbonate, insulin/glucose, and defibrillation with sustained CPR. ABG showed a progressive increase in serum potassium over 60 min (from 8.5 to 10.9 mmol/l). Thus, high-flow (6 l/h) continuous venovenous hemofiltration (CVVH) was instituted, and serum potassium slowly decreased to the range of 7 and 8 mmol/l (Fig. 1). The patient's pathological report at that time revealed the diagnosis of diffuse large B-cell lymphoma, and subsequent laboratory investigation showed hyperuricemia (967 $\mu\text{mol/l}$), hyperphosphatemia (1.87 mmol/l), and hypocalcemia (0.88 mmol/l), suggesting tumor lysis syndrome (TLS) as the cause of hyperkalemia. Regular cardiac rhythm and spontaneous circulation were not restored, and the resuscitation process was abandoned 5 h after the occurrence of cardiac arrest.

TLS often manifests as hyperkalemia, hyperphosphatemia, hyperuricemia, hypocalcemia, and renal failure in tumor patients, especially in those with lymphoma or leukemia after chemotherapy and radiotherapy [1, 2]. Clinicians should be vigilant for TLS in those tumor patients with preexisting high-risk factors of TLS and monitor perioperative serum potassium in series and in timely fashion

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