

Rasburicase: An Innovative New Treatment for Hyperuricemia Associated With Tumor Lysis Syndrome

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Overview of Tumor Lysis Syndrome

Tumor lysis syndrome (TLS) is a metabolic oncologic emergency characterized by hyperuricemia, hyperkalemia, hyperphosphatemia, and hypocalcemia. It occurs primarily in patients with large tumor burdens, such as those with acute leukemias, aggressive lymphomas, or bulky solid tumors that are very sensitive to chemotherapy. In tumors with a high, rapid growth fraction, acute cell destruction may occur either spontaneously or following therapeutic intervention, such as chemotherapy, surgery, corticosteroids, radiation therapy, or biological therapy (Cope, 1999; Ezzone, 1999). Other risk factors include elevated lactic dehydrogenase and dehydration. In addition, patients with preexisting renal compromise are at greater risk for developing TLS because of their inability to clear tumor byproducts (Ezzone; Hogan & Rosenthal, 1998). The consequences of TLS may be life threatening and include acute renal failure and multiorgan failure (Ezzone; Hogan & Rosenthal). Many of these patients have a high probability of cure; therefore, avoiding complications or early death is an important therapeutic goal.

Hyperuricemia is a major metabolic component of TLS. Current management of TLS-related hyperuricemia includes vigorous IV hydration of 3–6 L/m² a day (usually D₅ 1/2 normal saline), urinary alkalinization

Rasburicase is a new treatment for hyperuricemia, a metabolic manifestation of tumor lysis syndrome (TLS). Rasburicase has a unique mechanism of action that allows uric acid byproducts to be easily excreted in the urine. Clinical trials have shown that rasburicase has a rapid onset of action that allows chemotherapy to be delivered on time and prevents hyperuricemia-related complications, including renal compromise. The drug has been used successfully in adults and children. The main side effect of rasburicase is the potential for a hypersensitivity reaction. The drug is contraindicated in patients with glucose 6-phosphate dehydrogenase (G6PD) deficiency because this can precipitate hemolytic anemia. The drug has not been studied in patients with a history of allergies or asthma. Oncology nurses play a major role in the assessment and management of TLS-related complications. They must assess patients for G6PD deficiency and signs and symptoms of hypersensitivity reaction before and during chemotherapy or other therapeutic interventions. Nurses play a direct role in preventing complications related to TLS and contributing to the quality of life in this patient population.

with 50–100 mEq sodium bicarbonate (NaHCO₃) per liter to maintain urine pH at 7–7.5, reduction of uric acid production with allopurinol 200–400 mg/m² IV daily or 300–800 mg a day orally, and diuretics as needed to prevent fluid overload (Spratto & Woods, 2001; Ezzone, 1999; Mahmoud, Leverger, Patte, Harvey, & Lascombes, 1998). Although the prevention and management of hyperuricemia usually is successful in lowering patient morbidity, some patients still develop renal complications,

including acute renal failure, that require dialysis (Bowman et al., 1996; Pinkerton, Gerrard, Hann, Eden, & Carter, 1993). Chemotherapy also may be delayed, thus interfering with the goal of therapy (Mahmoud et al.; Pui, Mahmoud et al., 2001). In addition, allopurinol administration can result in an overload of uric acid precursors (hypoxanthine and xanthine), which potentially may lead to xanthine nephropathy (Pui et al., 1997).

Nurses must be aware of the drug interaction between allopurinol and 6-mercaptopurine. Allopurinol inhibits enzymatic oxidation of 6-mercaptopurine to 6-thiouric acid, increasing its potential toxicity. Therefore, when the combination needs to be used, the dose of 6-mercaptopurine should be reduced to approximately one-third to one-fourth of the usual dose and subsequently adjusted on the basis of therapeutic response and appearance of toxic effects (Faro Pharmaceuticals, 2001).

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