Case Report

Tumor lysis syndrome in multiple myeloma treated with bortezomib

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ABSTRACT

A 65 year old male diagnosed as multiple myeloma was started on bortezomib developed tumor lysis syndrome. Bortezomib induced tumor lysis is rare and suitable precautions should be considered in these patients.

Key words: Bortezomib, multiple myeloma, tumor lysis syndrome

INTRODUCTION

Tumour lysis syndrome is extremely rare in multiple myeloma because of the low proliferation of the plasma cells. There have been reports of spontaneous tumour lysis and induced by drugs like thalidomide and bortezomib. Early recognition would avoid undue morbidity and mortality. Here we describe a case of multiple myeloma on bortezomib who developed tumour lysis syndrome.

CASE REPORT

A 65-year-old male, presented with low back ache of 4 months duration and unable to stand or walk of 1½ months duration, with no comorbidities. On evaluation the patient had medical research council grade 3 motor weakness of lower limbs, normocytic normochromic anemia with hemoglobin of 8.5 g/dL, and normal total count with neutrophilic preponderance and thrombocytopenia. X-ray dorsolumbar spine revealed D10 vertebral compression and MRI spine revealed a posterior epidural mass from D9 to D11 levels. Further, skull X-ray showed multiple lytic lesion. Bone marrow aspiration was performed, which showed 30% plasma cells of all nucleated cells with plasmablastic morphology. Serum electrophoresis showed M band, urine Bence Jones Protein was negative, deranged renal function with blood urea of 184 and serum creatinine of 4.5, serum calcium was 14.2, serum beta-2 microglobulin was 7000 µg/L and albumin 3.8. The liver function tests were normal. The patient was diagnosed as a case of multiple myeloma, International Staging System (ISS) Stage 3.[1]

The patient was initially stabilized with palliative radiation to spine in view of low back ache and motor weakness. He was also treated for hypercalcemia with hydration, steroids, and diuretics. Bisphosphonates was not given. Back ache reduced, lower limb weakness improved from grade 3 to grade 2, calcium levels reduced to 9.2 mg/dl, and serum creatinine was 1.3 mg/dl.

In view of renal failure, bortezomib- and dexamethasone-based chemotherapy regimen was started. First cycle day 1, bortezomib 1.3 mg/m^2 and dexamethasone 40 mg

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were given. After 48 h, the patient became irritable and disoriented. However, no fever was observed. Vitals were stable with moderate to severe dehydration, bilateral crepitations in mid and lower lung fields. Upon investigation, blood sugar was 109 mg/dl, blood urea 124 mg/dl, serum creatinine 3.9 mg/dl, serum sodium 138 mg/dl, potassium >6 mg/dl, serum uric acid 8.4 mg/dl, calcium 6.3 mg/dl, and phosphorous level of 4.1 mg/dl. Blood gas analysis showed metabolic acidosis. The patient satisfied clinical and laboratory criteria of tumor lysis syndrome according to the Cairo and Bishop criteria 2. The patient was treated with insulin, sodium bicarbonate, calcium gluconate, salbutamol nebulization, and Frusemide injection. As the condition of the patient deteriorated, he underwent hemodialysis. On postdialysis, the patient developed dyspnea and desaturated even with oxygen support. Repeat blood gas analysis showed severe metabolic acidosis. The patient was put on ventilator and other supportive treatment was given, but the patient subsequently deteriorated and expired.

DISCUSSION

The tumor lysis syndrome occurs when tumor cells release their contents into the bloodstream, either spontaneously or in response to therapy, leading to the characteristic findings of hyperuricemia, hyperkalemia, hyperphosphatemia, and hypocalcemia. These electrolyte and metabolic disturbances can progress to clinical toxic effects, including renal insufficiency, cardiac arrhythmias, seizures, and death due to multiorgan failure.[3] In the current classification system of Cairo and Bishop, the tumor lysis syndrome can be classified as laboratory or clinical.[2]

Tumor lysis syndrome is very rare in multiple myeloma as it is a indolent malignancy, including 1% in patients treated with high-dose chemotherapy followed by autologous stem cell transplant[4] and approximately 1.4% in patients receiving bortezomib.[5-7] Tumor lysis syndrome, although rare, does occur in patients with MM, especially in association with poor prognostic features such as high tumor mass, immature morphology, high proliferative activity, and poor cytogenetics.[8] Bortezomib is a 26 S Proteasome inhibitor. 26 S proteasome is a multicatalytic intracellular protease expressed in eukaryotic cells. It is responsible for selective degradation of intracellular proteins responsible for cellular proliferation, growth and regulation of apoptosis, and transcription of genes involved in execution of key cellular function. Proteasome inhibition is a potential treatment option for cancer. It results in stabilization and accumulation of proteasome substrates, a phenomenon that might result in confounding signals in cancer cells, cell cycle arrest, and activation of apoptotic programs. The inhibition of transcriptional factor nuclear factor-B activation was found as one of the mechanisms in induction of apoptosis and overcoming resistance mechanism in multiple myeloma. In our patient, beta-2 microglobulin levels were 7000 µg/L indicating high tumor burden and plasmablastic variant indicating immature morphology. Cytogenetics was not sent because of logistic issues.

CONCLUSION

Tumor lysis syndrome, although rare in multiple myeloma, should be looked for during the first cycle of bortezomib treatment and also suitable precautions with hydration and alkalinization should be considered in patients of multiple myeloma with high tumor burden and other risk factors.

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