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Case Report

CASE REPORT

Rhabdomyolysis as a rare paraneoplastic presentation of acute myeloid leukemia

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ABSTRACT

We present the case of a 56-year-old man who presented with rhabdomyolysis and was found to have acute myeloid leukemia (AML). Our case is the first to show an association of rhabdomyolysis with AML. Although rhabdomyolysis is likely a very rare clinical presentation of AML, our case raises awareness for workup for AML in patients who present with rhabdomyolysis and other suspicious findings. Both conditions are medical emergencies and require immediate treatment.

INTRODUCTION

About 19 950 new cases of acute myeloid leukemia (AML) diagnosed in the United States in 2016 [1]. The incidence of AML gradually increased with age, with median at diagnose is about 60 years. AML is characterized by uncontrolled proliferation of immature myeloid cells, often called blasts, which replace normal production of bone marrow including red blood cells, white blood cells and platelet [2, 3]. Due to bone marrow suppression, patients may present with anemia, infection and bleeding. Patients may also present with high peripheral blasts, symptoms and complications of blasts crisis. Acute leukemia is fatal if untreated, most people die within several months after diagnosis if not treated. We report a case of massive rhabdomyolysis as initial presentation of AML.

CASE PRESENTATION

We present a case of a 56-year-old man with history of testicular cancer diagnosed thirty years ago, that had metastasized to the right lung and brain. He was treated with radiation, chemotherapy and surgery including right orchiectomy, partial right lobectomy and craniotomy. He has been in complete remission for his testicular cancer. The patient presented now with generalized weakness, muscle pain, low back pain and diffuse erythematous papular rash. He reported having had a syncopal episode four days prior to presentation. His wife noticed that he was confused. The next day, he crashed his car against a metal post due to loss of consciousness while driving. The patient was then immediately brought into the emergency room for evaluation. He denied posticta state, bowel incontinence, urine incontinence or tongue biting. In the emergency department, the patient was found to have rhabdomyolysis and acute renal failure. Initial labs revealed an elevated creatine phosphokinase (CPK) of 158 940 U/L, lactate dehydrogenase of 8512 IU/L and serum creatinine of 4.7 mg/dL (Fig. 1). Urinalysis showed large hematuria with only 0-1 RBC, consistent with myoglobinuria. His vital signs were temperature 38.5°C, blood pressure 139/71 mmHg, heart rate 84 beats/min and respiratory rate 18/min. Abdomen and pelvis computed tomography (CT) revealed T11 compression fracture. Head CT revealed no acute intracranial abnormality and a resection cavity in the right parietal lobe. Chest CT showed patchy ground-glass opacity of the left upper lobe and lingula. Renal

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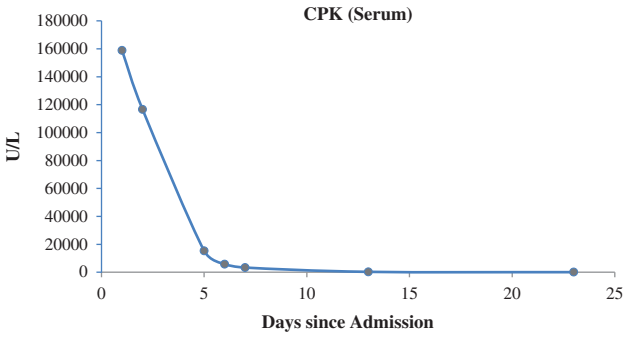

Figure 1: Serial CPK enzyme levels were collected upon presentation and during hospital course.

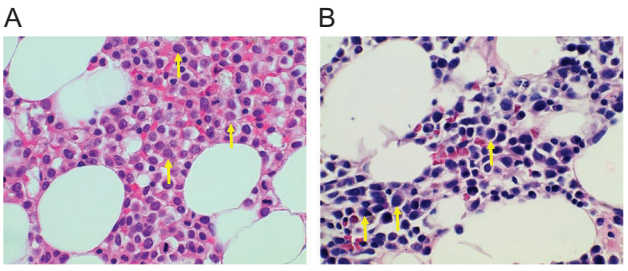

Figure 2: Bone marrow biopsies. (**A**) Bone marrow biopsy pre-chemotherapy. (**B**) Day 15 post-chemotherapy. Arrows point to representative blast cells.

ultrasound showed no evidence of hydronephrosis. He was treated with aggressive intravenous (IV) fluid and his rhabdomyolysis improved with CPK 3334 U/L (Fig. 1). His initial complete blood count revealed pancytopenia with WBC 2.1/μL, with a differential count of 43% segmented neutrophils, 49% lymphocytes and occasional blasts, Hb 10.2 g/dL and platelet count 70/μL. The patient underwent a diagnostic bone marrow aspirate and biopsy for workup of his pancytopenia and peripheral blasts, which showed granulocytic hyperplasia with increased blasts comprising approximately 40% of the total marrow. Flow cytometry showed CD34 positive AML blasts, French–American–British (FAB) classification M-2 type (Fig. 2A).

A week after admission, the patient had dyspnea, and his chest x-ray (CXR) showed diffuse bilateral infiltrates. He was treated with IV levofloxacin for presumptive hospital acquired pneumonia. The patient developed worsening shortness of breath and delirium, and then was placed on broad-spectrum antibiotics. Chest CT showed bilateral airspace disease. Echocardiogram showed ejection fraction of 50%; ruling out congestive heart failure. Brain MRI and cerebral spinal fluid (CSF) analysis were done to evaluate delirium, and were unremarkable. Despite being on broad-spectrum antibiotics, his mental status continued to decline and respiratory distress worsened. Repeat CXR revealed increasing bilateral infiltrates characteristic of pneumonia versus acute respiratory distress syndrome. Bronchoscopy was performed and bronchial washings revealed usual respiratory flora. The patient was started on induction chemotherapy with idarubicin and cytarabine two weeks after diagnosed with AML. His encephalopathy and shortness of breath improved. Repeat CXR showed improvement of bilateral infiltrates. His rhabdomyolysis completely resolved with CPK 50 U/L (Fig. 1). However, Day 15 bone marrow biopsy showed residual AML blasts indicating inadequate response to first remission induction chemotherapy (Fig. 2B). He was given a second course of chemotherapy with idarubicin and cytarabine. The patient's clinical condition then deteriorated with development of neutropenic fever, rash on shoulders and back, and lethargy. He declined further treatments and was admitted to hospice.

DISCUSSION

Rhabdomyolysis is a potentially life-threatening syndrome characterized by breakdown of skeletal muscle fibers with release of intracellular products into the extracellular fluid and systemic circulation [4–6]. Rhabdomyolysis is usually caused by alcohol abuse, muscle overexertion, the use of certain medications or illicit drugs, crush injury, infections, electrolytes abnormalities or rare cause like dermatomyositis [4–9]. In our patient, it was thought at first that he might have a viral illness that led to the diffuse erythematous papules all over his body with subsequent dehydration and falls and the development of rhabdomyolysis. However, further work-up including viral panel, blood cultures, CSF fluid cultures and urine culture were negative for infectious etiology. None of his home medications could contribute to rhabdomyolysis, thus ruling out drug induced rhabdomyolysis. Electrolytes abnormalities that can contribute to rhabdomyolysis such as hyponatremia, hypernatremia, hypokalemia, hyperglycemia, hypercalcemia and hypophosphatemia were ruled out as well since patient's initial labs were normal [6]. Dermatomyositis was excluded as patient had generalized weakness rather than proximal muscle weakness, and his diffused erythematous papular rash was not the typical skin manifestations of dermatomyositis like heliotrope rash or Gottron's papules [8–10]. We did not check ANA or anti-ARS antibody (markers of myositis) since his rash quickly resolved within three days of hospitalization, one week before his cancer treatment. Due to the short time course of the rash which resolved prior to his cancer treatment, temporally the rash was not dermatomyositis, since dermatomyositis typically would resolve upon response to cancer treatment.

In our case, it is not entirely clear whether rhabdomyolysis was a paraneoplastic presentation of AML or just a coincidence due to his falls. We think his repeated loss of consciousness was likely multifactorial. His rhabdomyolysis caused acute kidney injury and uremia which may contribute to loss of consciousness. He had no evidence of seizure or post-ictal state, ruling out seizure as a cause of syncope or rhabdomyolysis. Although he crashed his car against the metal post, it was a light accident and he had no major injury, bruising, bleeding or cut. Therefore we do not think the motor vehicle accident with a major injury caused his rhabdomyolysis. The patient had no evidence of trauma or bruises associated with his falls. Paraneoplastic rhabdomyolysis has been reported in association with other cancers including breast cancer and small cell cervical cancer [11, 12].

COMPETING INTERESTS

The authors declare that they have no competing interests.

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