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Case report

A Case of Multiple Myeloma Diagnosed by Renal Biopsy

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Abstract

Multiple myeloma is a malignant disease that results in the proliferation of a single plasma cell clone. The clinical manifestations are anemia, bone pain, bone fractures, hypercalcemia, hypergammaglobulinemia, increased erythrocyte sedimentation rate, rouleaux formation on the peripheral blood smear and rarely increased serum viscosity. Rarely cast nephropathy associated with acute renal failure may be the first finding of multiple myeloma. We report a clinical case of a 44-year-old female patient who presented with acute renal failure due to cast nephropathy without myeloma's typical clinical and laboratory findings. In the clinical case presented here, we highlight that multiple myeloma can be presented with acute renal failure and without any other typical symptoms.

Keywords: Multiple myeloma, renal biopsy

Introduction

Plasma cell dyscrasias result from a clonal expansion of neoplastic plasma cell. In general, plasma cell dyscrasia can be detected by the presence of one of the following findings: monoclonal light chain in the serum by immunofixation electrophoresis (SIFE), monoclonal light chain in the urine by immunofixation electrophoresis (UIFE), or monoclonal plasma cells in the bone marrow by immunohistochemistry [1]. The diagnosis of plasma cell dyscrasias including multiple myeloma (MM) can be done by bone marrow aspiration, biopsy and clinical laboratory test [2]. The diagnosis of MM requires assessment of a Wright-Giemsa stained bone marrow aspirate and a hematoxylin and eosin stained core biopsy section [2]. Kidney injury represents one of the leading characteristics of plasma cell disorders [3] and kidneys are target organs in plasma cell disorders [4]. In other words, renal function is often impaired in plasma cell disorders and this is due to the presence of monoclonal proteins [4]. Myeloma cast nephropathy is one of the most common types of kidney injury [3]. The term myeloma kidney or myeloma cast nephropathy generally refers to renal insufficiency caused by the tubulointerstitial damage. Myeloma-induced renal failure is associated with significant morbidity and mortality. Rapid intervention is critical in order to reverse kidney damage and improve renal function. In addition to clinical suspicion, further evaluation is often necessary.

Case Report

A 44-year-old woman with absent previous medical history came to the outpatient clinic complaining of nausea, vomiting and weakness over a period of 2-weeks. The patient was admitted to the Department of Nephrology for evaluation. She reported no back pain and no medication known to be associated with renal dysfunction. The patient's vital signs and physical examination were normal. Cardiac and pulmonary examination showed no abnormal findings. Routine laboratory tests were as follows: Hgb: 9.9 gr/dl, Hct: 29%, MCV: 89.5 fl, PLT: 187.000 u/l, WBC: 10.900 u/l, glucose: 98 mg/dl, urea: 157 mg/dl, creatinine: 7.3 mg/dl, potassium: 5.5 mEq, AST: 16 U/L, ALT: 24 U/L, protein: 8 g/dL, calcium: 10.4 mg/dL, phosphorus: 5.1 mg/dL, uric acid: 4.9 mg/dl, albumin: 4g/dl, globulin: 4g/dl, T. bilirubin: 0.5 mg/dl, erythrocyte sedimentation rate: 39 mm/h. Urine examination was unremarkable. Review of the peripheral smear demonsrated anisocytosis. Iron parameters and LDH were within normal limits. An abdominal ultrasound scan demonstrated normal-sized kidneys with increased echogenicity without evidence of obstruction. At the time of the evaluation, she was treated appropriately with hemodialysis. The patient underwent renal biopsy in order to elucidate the etiology of the acute renal failure. Subsequent pathology report revealed cast nephropathy. No lytic lesions were detected on direct radiographs. Monoclonal lambda-free light chain was found in serum and urine immunofixation electrophoresis, and serum immunoglobulin levels were as follows: IgA: 173 mg/dl, IgG: 1108 mg/dl, IgM: 113 mg/dl. Bone marrow aspiration revealed 35% plasma cells. A presumptive diagnosis of light chain myeloma was made. Histopathologic exami-

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nation of the bone marrow biopsy revealed multiple myeloma that was light chain myeloma and the patient was referred to a hematologist and the light chain myeloma scheduled for chemotherapy. The renal function improved and the patient was free of dialysis 6 months after the diagnosis.

Discussion

This case shows the importance to fully explore the underlying cause of acute renal failure. Morerover, treatment should be directed against the primary disease [5,6]. The patient described in this case presented with renal failure of unknown etiology. Acute renal failure may be one of the types of presentation of multiple myeloma. In internal medicine or nephrology clinics, MM may present with renal dysfunction of unknown etiology or acute renal failure. If the underlying cause of acute renal failure is thought to be multiple myeloma, it is easily diagnosed by serum M protein, hypercalcemia, anemia, increased erythrocyte sedimentation rate, albumin-globulin reversal, skeletal pain or typical bone lesions. In some patients the diagnosis will be evident from careful examination of a peripheral blood smear.

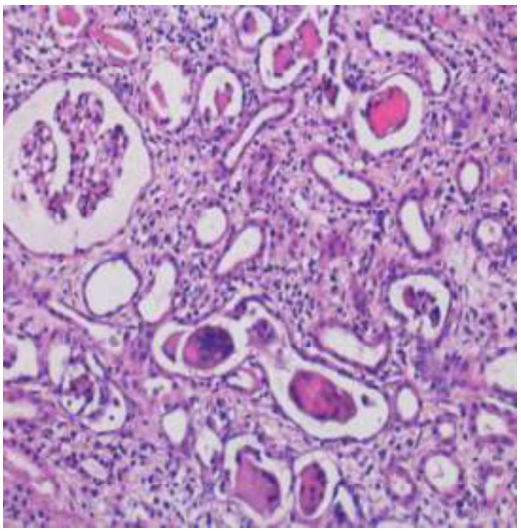

Fig. 1. Renal tubules filled with eosinophilic fractured casts in renal biopsy (H&Ex200)

On the other hand, the absence of lytic lesion, back pain and hypercalcemia makes the diagnosis of a plasma cell dyscrasia difficult. This patient had no lytic lesions, back pain or hypercalcemia. Rarely, some cases with multiple myeloma can be diagnosed by the findings of a renal biopsy without typical clinical presentation [7,8]. Border *et al*. reported that renal biopsy findings in four cases revealed typical diagnostic features of "myeloma kidney" and confirmed the diagnosis by bone marrow examination [8]. As a possible mechanism, it is suggested that tubular obstruction and retrograde urine flow precedes the development of "myeloma kidney" and acute renal failure [8]. The patient's renal biopsy, immunofixation electrophoreses, bone marrow aspiration and biopsy seem most consistent with MM. This patient developed intrinsic acute renal failure secondary to intrarenal tubular obstructions with myeloma proteins and required temporary support by hemodialysis. In the patient's renal biopsy the renal tubules were filled with eosinophilic fractured casts (Figure 1) whereas there were multinucleated histocytic giant cells around renal tubules (Figure 2). Circulating free light chains (FLC) could lead to acute renal injury due to intratubular precipitation, and initial treatment can be achieved by adequate hydration and removal of the FLC with different apheresis techniques [9]. In addition to specific myeloma chemotherapy, prolonged hemodialysis sessions had been reported to be an effective treatment for cast nephropathy [9]. Early onset of treatment could be a decisive factor for the response. On the other hand, impaired renal function has been described as a marker of poor prognosis and patients' survival is predicted more by the reversibility of renal damage associated with MM [10].

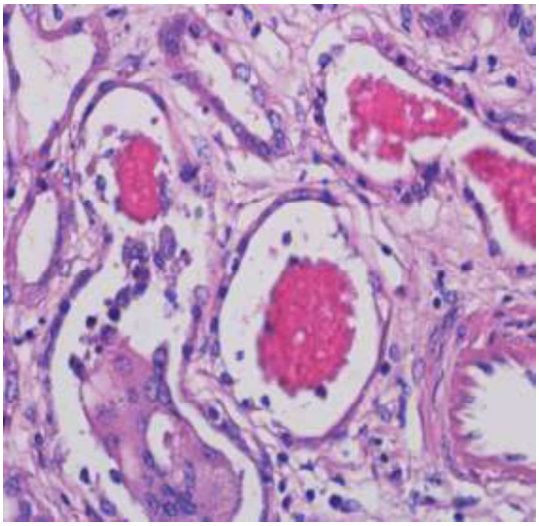

Fig. 2. There are multinucleated histocytic giant cells around renal tubules in renal biopsy (H&Ex400)

This case illustrates several important points. Acute renal failure due to multiple myeloma is rare, but it may rarely be a characteristic of the disease. It is crucial that all patients with renal failure of unknown etiology should be screened for possible plasma cell dyscrasia. The workup of a patient with renal failure of unknown etiology should include immunofixation electrophoreses. Other diagnostic tests may be necessary to confirm the diagnosis such as biopsies. The possibility of an underlying multiple myeloma in the case of acute renal failure and anemia of unknown origin should be considered.

Conflict of interest statement. None declared.

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