

A Rare Masquerader of Lung Cancer: Nonsecretory Multiple Myeloma with Plasmacytoma of Bone Presenting as Acute Kidney Injury

Ibrahim Guney¹, Yalcin Solak², Huseyin Atalay², Lutfullah Altintepe¹ and H. Zeki Tonbul²

Abstract

Multiple myeloma (MM) is a neoplasm of B cell lineage characterized by excessive proliferation of abnormal plasma cells which produce immunoglobulins. If a monoclonal spike is not found in serum or urine but the patient has clinical findings and bone marrow plasma cell infiltration suggestive of MM, then the patient may have a rare subtype known as nonsecretory multiple myeloma (NSMM). Here, we describe a rare case of NSMM with plasmacytoma of bone who presented with severe hypercalcemia, acute kidney injury and a large thoracic mass on chest X-ray masquerading as lung cancer.

Key words: acute kidney injury, lung cancer, masquerader, nonsecretory multiple myeloma, plasmacytoma of bone

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Introduction

The monoclonal gammopathies are a group of disorders associated with monoclonal proliferation of plasma cells. They are characterized by the secretion of monoclonal proteins. Multiple myeloma (MM) is a neoplasm of B cell lineage and a member of monoclonal gammopathies characterized by excessive proliferation of abnormal plasma cells. These malignant cells produce immunoglobulins which are detected in serum and/or urine of affected patients (1). Ninety-seven percent of patients with MM have an M-protein in the serum or urine at the time of diagnosis. Renal damage in patients with MM results, among other factors, from the toxic effects of monoclonal light chains to renal structures, mainly renal tubules, and less often to glomeruli, whereas hypercalcemia is a less common cause (2). If a monoclonal spike is not found in serum or urine but the patient has clinical findings and bone marrow plasma cell infiltration suggestive of MM, then the patient may have a rare subtype of MM which is known as nonsecretory multiple myeloma (NSMM). It comprises only 1-5% of all MM

cases (3). Renal insufficiency is less common in patients with NSMM than that of classic secretory type. Here, we report a patient who presented with hypercalcemia, acute kidney injury (AKI) and a large thoracic mass masquerading as lung cancer but was subsequently diagnosed as NSMM and plasmacytoma of bone.

Case Report

A 37-year-old man was admitted to the emergency department with a 2-week history of nausea and vomiting, lack of appetite, weakness, weight loss and back and right-sided chest pain. His past medical history was unremarkable. He had a 30 pack-year smoking history. On physical examination, temperature was 36.5°C, blood pressure 120/75 mm/Hg, pulse rate 88/min. and respiratory rate 18/min. Slight tenderness was noted on the right anterior chest wall. No neurologic deficit was evident. Other examination findings were normal.

Biochemistry panel and blood counts at admission were as follows; serum urea: 118 mg/dL, creatinine: 5.9 mg/dL, uric acid: 4.4 mg/dL, sodium: 140 mEq/L, potassium: 4.4

¹Department of Nephrology, Meram Research and Training Hospital, Konya, Turkey and ²Department of Nephrology, Meram School of Medicine, Selcuk University, Konya, Turkey

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Correspondence to Dr. Yalcin Solak, yalcinsolakmd@gmail.com

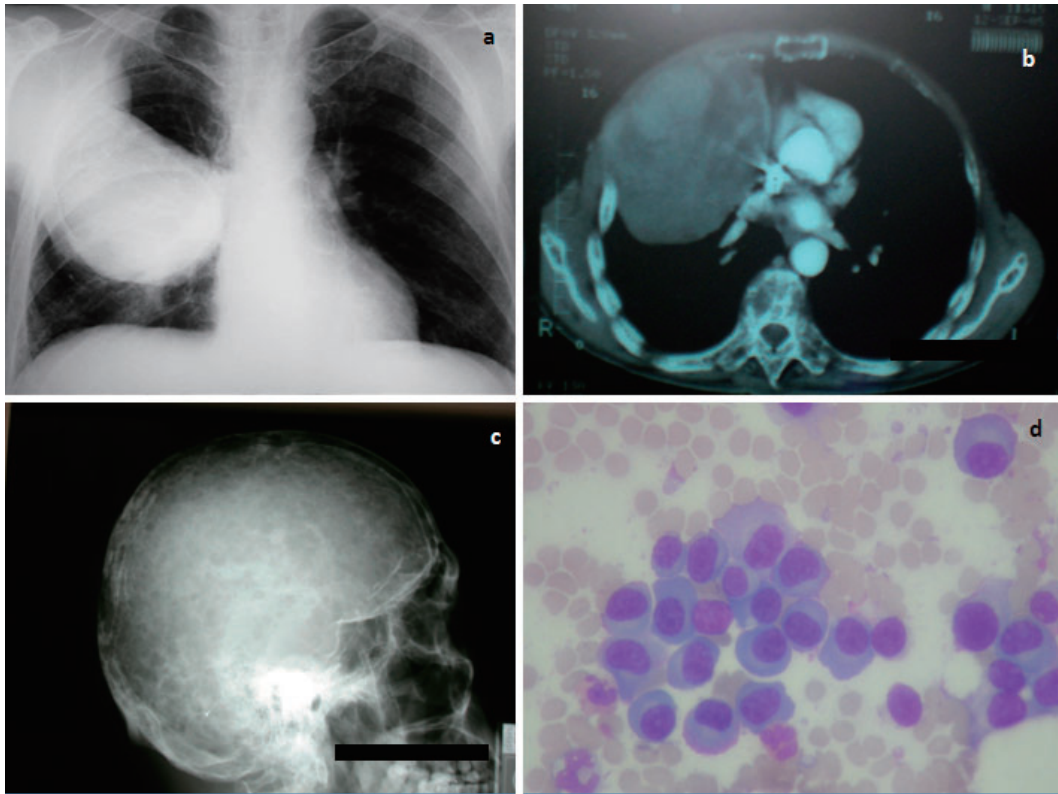


Figure 1. a. Chest X-Ray depicting a large, well circumscribed mass lesion in the right middle lung zone. b. Plasmacytoma in the right thoracic cavity shown by thoracic CT scan. c. Lateral skull X-ray showing multiple lytic lesions. d. Plasma cells are shown in the histopathologic specimen taken from plasmacytoma of the bone.

mEq/L, calcium: 16.9 mg/dL, phosphorus: 5.6 mg/dL, albumin: 3.6 g/dL, globulins: 0.9 g/dL, iPTH: 7 pg/mL, hemoglobin: 12.4 g/dL, white blood cell (WBC): 8,000/mm³ with a normal differential, platelets: 172,000/mm³ erythrocyte sedimentation rate: 30 mm/h. Urinalysis was positive for protein +, and negative for blood and WBC. Urine microscopy revealed no red blood cells but some WBCs and granular casts. He denied potentially nephrotoxic drug use and his urine output was adequate. Test for Bence-Jones protein was negative. Chest X-ray (Fig. 1 panel-a) showed a mass in the right middle lung. A computerized tomography scan of the chest (Fig. 1 panel-b) revealed an 13×9 cm enhancing mass in the upper right chest wall with multiple osteolytic metastatic lesions. There were multiple osteolytic lesions at skull X-ray (Fig. 1 panel-c). A renal ultrasound showed that both kidneys were of normal size and shape but had grade II increased echogenicity. Serum and urine protein electrophoresis were negative for monoclonal gammopathy. Immunofixation of the serum using monoclonal antisera against IgG, IgA, IgM, κ and λ was also negative. Bone marrow aspiration showed marked plasmacytosis, comprising 84% of the cellularity and multiple plasma cells with double nuclei. Ultrasound-guided transthoracic needle biopsy was consistent with plasmacytoma (Fig. 1 panel-d).

Aggressive hydration was started, because the patient had hypercalcemia and AKI causing nausea and vomiting. However, we did not observe a significant change in the serum

calcium level. In addition to hydration plus furosemid, we used methylprednisolone. Since hypercalcemia and uremic symptoms persisted despite these measures, hemodialysis was instituted. Uremic symptoms and hypercalcemia improved. Zoledronic acid in a 4 mg intravenous infusion was applied. Serum urea, creatinine and calcium levels returned to normal with fluid replacement and hemodialysis as needed within 1 month. Chemotherapy with vincristine, adriamycin and dexamethasone (VAD) was initiated. The patient tolerated chemotherapy well. After a total 6 cycles of VAD, hematologic remission was achieved. Plasmacytoma of the bone shrank with this treatment with no need for local radiotherapy.

Discussion

Renal insufficiency is a common feature of MM that may provide a clue to diagnosis and cause a major management problem. Depending on the definition of AKI, this complication occurs in 20-40% of newly diagnosed patients with MM (4, 5). Although the degree of renal insufficiency is usually moderate and serum creatinine levels are lower than 4 mg/dL, 10% of patients with newly diagnosed MM have renal damage severe enough to require renal replacement therapy with dialysis at the time of diagnosis (6). Renal damage in MM patients results from a number of factors. Monoclonal light chains cause toxic effects to various neph-

ron sites, the most pronounced of which is to proximal tubules. Additional factors may distinctively cause or facilitate toxicity of light chains, i.e., hypercalcemia, dehydration, nonsteroidal anti-inflammatory drugs, and contrast agents. Myeloma cast nephropathy (so-called myeloma kidney) is by far the most frequent form of renal damage. Hypercalcemia is the second most common cause of renal insufficiency in MM (7) Hypercalcemia interferes with renal function and impairs renal concentrating ability, causes vasoconstriction of renal vasculature and enhances diuresis, which may result in hypovolemia and pre-renal azotemia (2).

NSMM is a variant of the classic form of MM and has a similar clinical presentation except for the absence of monoclonal gammopathy. Two types of NSMM has been defined. In the first type, plasma cells produce immunoglobulin but are not able to secrete it out of the cell. This form is called the producer type. In the nonproducer type, plasma cells can not actually produce immunoglobulin. More cases of producer type have been described to date (8). NSMM presents in several different ways. The most common presenting feature is bone pain. Renal insufficiency is occasionally seen due to dehydration and hypercalcemia (4). Since no immunoglobulin or light chains are present in the serum, myeloma kidney is not a feature of NSMM. Hypogammaglobulinemia has frequently been described and bone marrow infiltration with plasma cells is usually between 20% and 75% (9). Plasmacytoma of bone presents most commonly as pain at the site of the skeletal lesion. Diagnosis is based on the histologic presence of infiltration of plasma cells. Treatment for the NSMM is the same as for MM. Response to therapy and the survival of patients with NSMM are similar to those in patients with a serum or urinary M-protein.

Due to the nonsecretory nature of NSMM, renal insufficiency in the present patient was possibly due to severe hypercalcemia and associated dehydration induced by vomiting and secondary diabetes insipidus. MM should always be in the differential diagnosis of renal failure of unknown cause when especially if the patient is elderly, has bone pain, has normal sized kidneys, and unexplained anemia. The first approach to diagnosis when MM is considered should include serum and urine protein electrophoresis and immunofixation. In most of the cases, this test along with other laboratory tests establishes the diagnosis of MM. However, as mentioned earlier, up to 5% of patients lack this proof. Thus, if clinical suspicion of MM is high enough, one should not deter to search for MM. Bone marrow aspiration and biopsy can establish the diagnosis in such cases. Renal biopsy in NSMM, in contrast to classic secretory MM, would be normal and not contributory to diagnosis. And when it is de-

tected early enough before leading to irreversible cortical necrosis, rehydration, reducing calcium levels and hemodialysis when indicated can rescue the kidney. One can argue that the origin of the NSMM in the present patient may be a solitary plasmacytoma of bone present long before the presentation. In our opinion this is not the case since our patient's bone pain over the plasmacytoma started recently and previous CXRs which are taken for other purposes showed no such a lesion at that region. When it presents alone, solitary plasmacytomas do not cause organ failures other than pain, mass and compression effects. They are treated usually with local radiotherapy. Thus, the bone lesion in our case is not solitary plasmacytoma but a form of bone disease accompanying NSMM.

In conclusion, preliminary presentation, laboratory and imaging findings were masquerading lung cancer when considering in the context of the 30 pack-year smoking history. However, further studies confirmed the diagnosis of NSMM along with a plasmacytoma of bone.

The authors have no financial disclosures to declare and no conflicts of interest to report.

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