

Lung Involvement in Multiple Myeloma - Case Study

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ABSTRACT: Introduction: Multiple myeloma (MM) cells are rarely found in extramedullary sites. The sites of extramedullary dissemination reported in the literature are spleen, liver, lymph nodes, kidneys, thyroid gland, adrenal gland, ovary, testis, lung, pleura, pericardium, intestinal tract and skin. We report a case in which the myeloma was diagnosed after we discovered the presence of monoclonal plasma cells in the bronchoalveolar lavage fluid (BAL). **Material and method:** a case in which diagnosis was established from bronchoalveolar lavage (BAL) fluid demonstrating the presence of monoclonal plasma cells in Craiova Pneumology Department. **Results:** Analysis of BAL fluid for the presence of plasma cells and for cytoplasmic immunoglobulin DNA provides a noninvasive means of establishing the diagnosis. **Conclusions:** Pulmonary parenchyma is an uncommon site of extramedullary involvement in multiple myeloma. Interstitial lung disease as pulmonary manifestation of multiple myeloma is even rarer; only isolated cases with histological proofs have been reported in the literature.

KEYWORDS: multiple myeloma, myelomatous pulmonary infiltrate, lung fibrosis.

Introduction

Multiple myeloma is a malignant monoclonal gammopathy characterized by proliferation of myeloma cell clones responsible for their osteolytic lesion appearance (favoring pathological fractures and nerve compression), bone marrow infiltration (with the advent of bone marrow failure), abnormal protein production – M component (responsible for damage kidneys, the hyperviscosity syndrome and secondary amyloidosis), installing of immune deficiency (favoring infections).

Infections are the most common complications in multiple myeloma, followed by bleeding complications, neurological, renal, hypercalcemia related complications and amyloidosis.

The mechanism of developing these infectious complications is mixed and involves several pathophysiological links like:

- Proliferation of myeloma cells in the bone marrow resulting in decreased normal hematopoiesis with bone marrow failure and peripheral cytopenias including leukopenia and granulocytopenia;

- Monoclonal immunoglobulins secreted by malignant clone can adhere to leukocytes causing their functional capacity decrease (phagocytosis, bactericidal activity) or to some fractions of complement, inducing abnormal opsonized capacity;

- Humoral immune deficiency - increased monoclonal component myeloma - is accompanied by a decrease in other normal

immunoglobulin with polyclonal hypogammaglobulinemia installation. The decrease in number and functional capacity of polyclonal B lymphocytes affects the ability of B lymphocytes to respond to specific antigens and inhibition of antibody formation in the primary and secondary immune response and thus decrease the body's defense capacity.

- Cellular immunity dependent on T lymphocytes is less affected - expressed in vitro by the decrease of reactivity of T cell lymphocytes to mitogens. Abnormal T lymphocytes, NK cells and monocytes increase humoral immune deficiency - immunosuppression due to corticosteroid and cytostatic treatment increases the risk of infections. [1]

Myeloma cells may be extramedullary located due to extramedullary plasmacytoma or extramedullary dissemination of MM.

Extramedullary plasmacytoma involves submucosal lymphoid tissue of the nasopharynx or paranasal sinuses without affecting the red bone marrow. It's an excellent prognosis MM type that responds well to local irradiation.

Case-report:

A 60 years old man, smoker, with no history of respiratory hospitalization and relative good past health was admitted in our hospital with fever, chronic cough, significant weight loss and progressive dyspnea in the previous two months. His symptoms were not influenced by previous antibiotic treatment.

Physical examination then showed pale skin, fine crepitation over bilateral lung bases, pain in some small joints, blood pressure was normal but he had sinus tachycardia (132'/min), SaO₂=90%.

Chest x-ray evidenced diffuse, bilateral lower-zone reticulo-nodular shadowing. Repeated exams of sputum smear were negative for *Mycobacterium tuberculosis* (both microscopy and culture).

His hemoglobin was half of the normal value but renal function and calcium level were within normal limits.

Chest computed tomography revealed scattered ground glass opacities in both lungs that were suggestive of interstitial lung disease and no suspect thoracic lymph nodes.

So the next step was bronchoscopy and bronchoalveolar lavage (BAL) fluid was examined and it revealed the presence of monoclonal plasmatic cells in BAL.

We transferred the patient to Hematology where he was further investigated and treated for his severe anemia.

He was diagnosed with Multiple myeloma IgG type stage III subclass A. After this the patient had a rapid decrease of cardiac and respiratory function and the chest x-ray after 4 months showed the extension of the interstitial infiltrates in lower fields of both lungs. Because of his cardiac condition (ischemic heart disease, cardiomyopathy and sinus tachycardia) he couldn't start specific chemotherapy for MM so his prognosis is severe.

Discussion

Extramedullary dissemination involves the spleen, liver, lymph nodes, thyroid, adrenal, ovary, testis, lung, pleura, pericardium, gastrointestinal tract and skin.

Antemortem diagnosis of extramedullary dissemination in the lungs can be determined by bronchoalveolar lavage (monoclonal plasma cells are found) or lung biopsy (interstitial infiltrate of plasma cells).[2]

Pulmonary parenchyma is an uncommon site of extramedullary involvement in multiple myeloma; only isolated cases with histological proofs have been reported in the literature.

One study described 13 cases with lung involvement of multiple myeloma, of which six had pneumonia, two had mass lesions, two had multiple nodular lesions, and three had interstitial infiltrates.[3]

Approximately 10% of patients with multiple myeloma demonstrate pulmonary findings

during the course of their disease. The findings most commonly described include bacterial and fungal infections, pleural-based plasmacytoma, pleural effusions, and well-circumscribed pulmonary plasmacytoma. [4,5,6]

Identifying malignant plasma cells in BAL fluid from multiple myeloma patients may be difficult, especially when the plasma cells are mature in appearance or low in number.

Diffuse pulmonary myelomatous involvement therefore may be more frequent than has previously been reported.

A high index of suspicion is required because infection, hemorrhage, idiopathic pneumonia, edema of the lung, and plasma cell infiltration may have identical radiologic manifestations.

Citologic examination of the sputum and BAL fluid and an analysis of cytoplasmic immunoglobulin DNA provide a simpler means of confirming diagnosis and may obviate the more invasive needle biopsy or open lung biopsy.

Conclusions:

We present one such case in which diagnosis was established from bronchoalveolar lavage (BAL) fluid demonstrating the presence of monoclonal plasma cells.

Diffuse parenchymal infiltrates in the lung due to MM are rare but should be considered when finding pulmonary infiltrates.

Analysis of BAL fluid for plasma cells is a noninvasive method to establish a diagnosis. Associated comorbidities increase the risk for severe infectious complications.

Pulmonary MM is associated with rapid progression of the disease unlike primary pulmonary plasmacytomas that has good prognosis.

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