

Plasma cell leukemia presenting as Steroid Resistant Organizing Pneumonia (OP)

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Introduction

Pulmonary involvement in patients with a plasma cell neoplasm is frequently associated with rapid progression of the disease and demonstrates variable manifestations which could include skeletal abnormalities, infiltrative processes, pleural effusions, plasmacytomas and diaphragmatic dysfunction due to peripheral neuropathy. Only nine cases of respiratory failure caused by multiple myeloma exist in the literature, with only one report where respiratory failure antedated the diagnosis of multiple myeloma. We report an unusual presentation of plasma cell leukemia (PCL) with organizing pneumonia (OP) refractory to high dose steroid therapy which, to the best of our knowledge, has never been reported in the medical literature.

Case summary

A 64 year old African-American woman was admitted to our institution for further evaluation of dyspnea on exertion and non-productive cough. On admission, the patient was tachypneic and fine crackles were audible over the lung fields bilaterally. CXR demonstrated patchy bilateral alveolar opacities. Laboratory evaluation showed total protein 7.3, albumin 4.0, LDH 384, calcium 13.7 with creatinine 0.9 and PTH 136. The patient's complete blood count showed hemoglobin 13.2, platelet count 144,000, leukocyte count 35,300 (neutrophil count 11,300, monocyte count 6000, lymphocyte count 17,200) with peripheral smear examination revealing a large population of immature looking plasma cells. Flow cytometric analysis identified 53% of the nucleated cells as plasma cells expressing CD38, CD 138, CD45 and lambda light chain, which was confirmed by serum immunofixation. Bone marrow showed heavy infiltration by sheets of plasma cells (63% of nucleated cells) with large nuclei, prominent nucleoli and intra-cytoplasmic vacuoles confirming the diagnosis of plasma cell leukemia.

Treatment for presumed multilobar pneumonia was initiated with Ceftriaxone and Azithromycin. Despite aggressive therapy, the patient's respiratory status continued to worsen. She was admitted to intensive care secondary to acute respiratory failure (pO₂, 39.2 mmHg, SO₂, 76%; pCO₂, 36.6 mmHg; pH, 7.42). HRCT showed diffuse ground glass opacities predominantly involving the upper lobes. Cultures and stains for *Pneumocystis jiroveci*, bacteria, and fungal elements was negative from bronchioalveolar lavage specimens. Transbronchial biopsy specimens revealed fibroblastic plugs in alveolar spaces with interstitial edema and fibrosis, diagnostic of organizing pneumonia. The patient was treated with intravenous steroids & started on chemotherapy with Bortezomib. Despite high dose steroid therapy for close to four weeks, the patient's respiratory status continued to decline. The patient died of multisystem organ failure on the 42nd day of hospitalization.

Discussion

OP is an infrequently encountered clinical condition which is difficult to distinguish from other pathologic processes and could easily masquerade a respiratory infection with fever, cough, dyspnea and malaise as the dominant symptoms. Radiologic abnormalities are also non-specific with patchy involvement and ground-glass opacities. Also, a tissue biopsy is required for definitive diagnosis of OP. It would not be wrong to suggest that this histo-pathologic entity is frequently overlooked and under-diagnosed.

OP unrelated to infection or any other identifiable culprit, has been described in patients with lymphomas,

leukemias and myelodysplastic syndrome, with an estimated incidence of 34 per 100,000 patients with hematologic malignancy. In the previously reported case series at the Mayo Clinic and Sloan-Kettering Cancer Institute, all patients in this sub-group had a preceding diagnosis of hematologic malignancy. Although most patients had an exposure to chemotherapy, radiation or bone marrow transplant, OP was seen in a few patients with no such exposure, suggesting that this condition could be directly related to the hematologic malignancy itself.

This is the first reported case of steroid- refractory organizing pneumonia as the initial presentation of plasma cell leukemia in a patient who had no prior exposure to chemotherapy or radiation. Plasma cell leukemia joins the short list of hematologic malignancies that have been directly associated with OP. This case also highlights that acute respiratory failure caused by OP can precede the diagnosis of a malignancy. Also, OP in our patient demonstrated negligible response to intravenous steroid therapy. Since OP is traditionally a steroid responsive disease, this case also raises the possibility of a steroid- refractory variant of OP in patients with hematologic malignancies, especially plasma cell leukemia, which requires further clinical investigation in a larger patient population.