

## Malignant pericardial effusion: an unusual presentation of multiple myeloma

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### Abstract

Malignant pericardial effusion is commonly associated with breast cancer, lung carcinoma or lymphoma. Pericardial effusion with multiple myeloma is distinctly unusual. Pericardial involvement is either caused by infection, amyloid deposits or plasmacytoid infiltration presenting late during the course of disease. Most of these patients are asymptomatic, rarely present with cardiac tamponade requiring immediate attention. Few case reports support surgical drainage and intrapericardial infusion of bleomycin as a therapeutic measure to prevent recurrence but response to systemic chemotherapy has not been documented so far in medical literature. This case report describes an unusual initial presentation of MGUS progressing to multiple myeloma with marked improvement after chemotherapy which has not been reported in medical literature so far.

**Keywords:** MGUS, Multiple myeloma, Tamponade, Pericardial effusion

### Introduction

Multiple myeloma is a plasma cell disorder characterized by clonal proliferation of malignant plasma cells [1,2]. Extraosseous manifestations are not uncommon but are associated with dismal prognosis, unsatisfactory response to chemotherapy and shorter disease-free interval and overall survival [2,3]. Usually, extraosseous spread is genome related and associated with MYC translocation. Serous cavity is an unusual site, yet well described in literature, usually involving pleural space and peritoneum [4,5]. Only a few cases reported pericardial spread and most of them as a consequence of congestive heart failure due to restrictive cardiomyopathy or amyloidosis as complication of multiple myeloma [4]. Myelomatous spread to pericardium is rarely described and usually carries poor prognosis with survival rate less than 4 months [5]. Though different treatment modalities have been described, we still lack an optimal therapeutic strategy. No case so far has shown positive results after therapy. We present our case with pericardial infiltration of myeloma cells with marked response to systemic chemotherapy which unique and not been described in medical literature so far.

### Case Report

75 year-old male with past medical history of MGUS (monoclonal gammopathy of Undetermined significance) diagnosed two years back but never followed up with hematologist presented with progressive shortness of breath on exertion for 3 weeks. His review of systems was normal. On physical examination he had unremarkable vital signs and elevated jugular venous pulse of 8 cm, and grade 1 pitting edema on bilateral lower extremities. He had mild chronic normocytic normochromic anaemia with hemoglobin of 9.1 g/dL and the rest of cell lines were preserved. His metabolic panel was grossly normal with preserved liver function tests and grade 2 chronic kidney disease, unchanged from the baseline values two years back. Diagnostic imaging showed an enlarged cardiac silhouette with bilateral moderate sized pleural effusions. Echocardiography showed a pericardial effusion around the left atrium with tamponade physiology. The patient underwent series of laboratory tests to rule out infectious process, autoimmune diseases, overt solid malignancies and multiple myeloma to explain the findings which were revealed on the diagnostic tests. Our patient had mildly elevated levels of lactate dehydrogenase (LDH) 258 IU/L in blood with elevated C - reactive protein (CRP). His serum protein electrophoresis (SPEP) revealed a monoclonal spike in gamma region with lambda predominant (294.84 mg/L) light chain disease unchanged from prior results and normal urine protein

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electrophoresis (UPEP). His beta-2 microglobulin was 5.9 mg/L and albumin was 3.0 g/L. Flow cytometry results from blood revealed CD38, CD138 and CD45 positive cells which were CD 19 and CD117 negative, with few (<1%) CD45 negative cells. Concern for progression of MGUS to multiple myeloma was high on the differential, so the patient underwent skeletal survey and bone marrow biopsy. Skeletal survey confirmed a faint lesion of the angle of left scapula and head of humerus likely lytic lesions of multiple myeloma. Bone marrow revealed >40% plasma cells with normal karyotype. Flow cytometry and fluorescent immunohistochemistry (F-iSH) revealed similar cell lineage as found in peripheral blood and abnormal chromosomal variations were ruled out. Meanwhile, our patient had progressive worsening of symptoms and repeat echocardiography showed no further increase in size of pericardial effusion. There was high concern for plasma cell infiltration as a cause of serositis and effusions but the anatomical position of fluid pocket around the left atrium chamber of heart was difficult to access and considering that the fluid in pleural space will have similar findings as the pericardial effusion so the patient underwent thoracentesis. Pleural fluid analysis revealed exudative nature of effusion with elevated LDH and plasma cells on cytology. Pleural fluid cultures were negative for bacteria or mycobacterium tuberculosis. The patient was diagnosed with multiple myeloma with extramedullary spread involving pericardium and bilateral pleural space. As the patient had multifocal spread of multiple myeloma with elevated beta-2 microglobulin (stage 3 according to International Severity Index), he was started on systemic chemotherapy with bortezomib and steroids. After the first session of chemotherapy, repeat echocardiography revealed resolving pericardial effusion with smaller size when compared to prior echocardiographs with no signs of cardiac tamponade on echocardiograph.

## Discussion

MGUS is the most common plasma cell dyscrasia, present in approximately 3% of the general population 50 years of age and older. The prevalence increases with age; 1.7% in those 50-59 years of age, and over 5% in those over the age of 70. The rate of progression to multiple myeloma or related malignancy is 1% per year [4,5]. Multiple myeloma is characterized by proliferation of malignant plasma cells and usually presents with bone pain and end organ damage. Most common presentation is anemia, hypercalcemia, and renal failure and bone destruction [6,7]. Multiple myeloma is a disease of males above age of 60 years and almost 20,000 people are diagnosed with multiple myeloma in United States every year [4]. IgG is the most common immunoglobulin found in 53% of patients suffering from multiple myeloma followed by IgA in 25% and IgD (light chains predominant) 20%. The type of immunoglobulin determines the presentation of the disease. IgM and IgG are more commonly associated with vascular symptoms and hyperviscosity syndromes [3,8]. IgM rarely presents with kidney involvement, as filtration in the tubules is limited due to its large size. IgD is the one which presents with more extraosseous disease, hepatosplenomegaly, and lymphadenopathy and is associated with serous cavity involvement [8]. Our patient had lambda chain predominant type with extraosseous involvement with small M protein spike with no hypercalcemia or kidney failure [3,8].

Extraosseous disease usually involves skin, soft tissue and liver. Extramedullary disease has poor prognosis whether they

are found in newly diagnosed patient or in relapse of multiple myeloma. Serous cavity invasion has ominous prognosis, with survival rate of less than 4 months as they have poor response to chemotherapy, shorter progression free interval and overall survival. Sasser et al. studied 56 cases of serous spread out of which 30 cases had pleural involvement and less than 3 had bilateral pleural effusions and nodular spread. There are few described cases with pericardial spread of disease [4,9,10]. Pericardial effusion in multiple myeloma can be secondary to heart failure due to amyloidosis/ restrictive cardiomyopathy (by far the most common underlying pathology), infectious etiology and rarely plasma cell infiltration. The largest study reviewed 869 patients with extramedullary presentation of multiple myeloma and found no patients with pericardial disease [1,9]. Another study on 38 patients showed no pericardial spread on autopsy [1,4,9,10]. On further review of literature, we found 12 case reports with pericardial effusion, out of which 5 cases had underlying heart failure secondary to amyloidosis, and the remaining 7 had isolated pericardial infiltration, while only 3 had bilateral pleural and pericardial spread [4]. Different treatment options were used in each of the above mentioned cases with dismal results. Response to systemic chemotherapy or instillation of chemotherapy in pericardial sac showed no positive results [1,4,9]. Treatment experience based on these case reports so far is limited and optimal therapeutic strategy is not well defined.

Our case is distinct as pericardial effusion with cardiac tamponade physiology and bilateral pleural effusions are rarely the initial presentation of multiple myeloma, especially in absence of typical presenting symptoms such as hypercalcemia and renal failure. Additionally, to our knowledge, marked improvement in pericardial and pleural effusions after systemic chemotherapy has not been described in literature so far. The clinical presentation and history of MGUS in our patient prompted us to aggressively diagnose and treat the underlying etiology of the clinical symptoms. This case report highlights the importance of appropriate follow ups in patients diagnosed with MGUS, with special attention to new signs and symptoms (at times atypical) of possible progression of MGUS to multiple myeloma [11].

## Conclusion

MGUS over a period of 5-10 years does progress to multiple myeloma but rarely serosal surface infiltration and effusions are rarely the first presenting symptoms in these patients. This case report describes an unusual initial presentation of MGUS progressing to multiple myeloma with marked improvement after chemotherapy which has not been documented in medical literature so far. Also this case report highlights the importance of close follow up on patients with MGUS for early diagnosis and prompt treatment of the underlying disease process can decrease the high mortality rate associated with myelomatous infiltration in serosal surfaces.

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