CASE REPORT

A Case of Multiple Myeloma with Unusual Serum Protein Electrophoresis

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Abstract

Monoclonal gammopathy is a group of B-cell disorders resulting in the secretion of a specific and unique monoclonal immunoglobulin (M-component); best detecting with high resolution agarose gel electrophoresis. An M-protein is usually visible as a localized band on agarose gel electrophoretic peak in the beta, gamma, or rarely in the alpha-2globulin region of the densitometer tracing. Here, we presented a multiple myeloma patient with IgA kappa paraprotein showing an M spike in the alpha-2 globulin region in agarose gel electrophoresis.

Key words

Multiple myeloma, protein electrophoresis

Introduction

Among the methods of protein electrophoresis; agarose gel electrophoresis is much more sensitive than cellulose acetate method. In order to determine the immunoglobulin subtype and ensure the presence of M-protein in all patients with local M band detected in protein electrophoresis, serum and urine immunofixation procedure must surely be performed as further investigation. M-protein is generally observed as a localized band which is frequently seen on gamma or beta region, it may also be seen on alpha-2 globulin region but this situation is very rare.[1,2] Sometimes, IgG multiple myeloma may extend to the alpha-2 globulin area, because IgG M-protein may range from the slow gamma to the alpha-2 globulin region.[3] Here, we presented an adult patient diagnosed as IgA kappa type multiple myeloma, who had an M band on alpha-2 globulin region on the protein electrophoresis performed by agarose gel electrophoresis.

Case Report

A sixty one year old woman was referred to the hematology clinic of Apollo Hospitals Dhaka with symptoms of fatigue and back pain in November 2011. On physical examination, there was no pathological finding other than paleness of the skin and conjunctiva.

In the laboratory examinations performed, the following values were found; erythrocyte sedimentation rate: 130 mm/hour, Hb- 6.2 g/dl, TLC-4.4 x10^9/L, PLT (plateletcount)-160x10^9/L. S. protein electrophoresis showed monoclonal gammopathy (Fig.1). Serum Immunofixation revealed IgA, Kappa monoclonal gammopathy with raised Beta 2 microglobulin (7369 ug/L). Creatinine clearance was found to be 18.1 ml/hour. Urinary system ultrasonography was normal.The bone marrow aspirate showed infiltration with plasma

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cells by 57%. In the bidirectional cranium X-ray graphy, five lytic lesions, the biggest one being 5 mm in diameter were detected. In dorsal and lumber vertebra direct X-ray graphs, collapse fractures were seen on L2-L3 and L4-L5. The patient was diagnosed as Stage-IIIB multiple myeloma according to Salmon-Durie staging criteria and was planned to be treated accordingly.

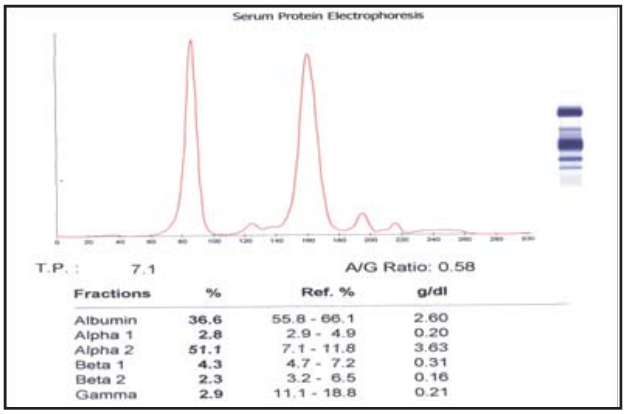

Fig. 1: Serum protein electrophoresis

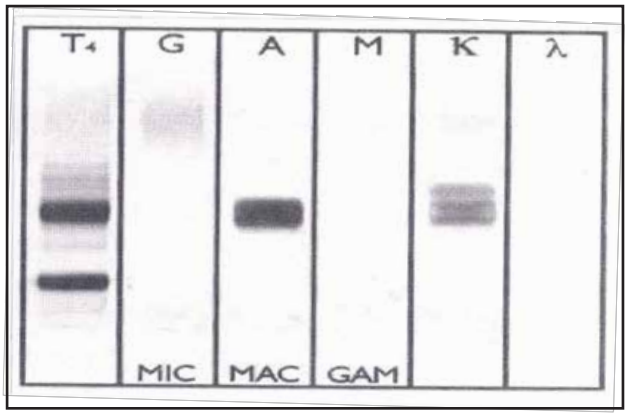

Fig. 2: Serum immunofixation

Discussion

Multiple myeloma is the second most-common hematologic cancer, representing 1% of all cancer diagnoses and 2% of all cancer deaths. Multiple myeloma affects men slightly more than women. African Americans have the highest reported incidence of this disease and Asians have the lowest.[5] The case presented here was of a 61 year old Bangladeshi female.

In multiple myeloma patients, mutated plasma cells - otherwise known as myeloma cells - grow unregulated by the processes that normally control cell division and death. By the time the disease is diagnosed, most patients have myeloma cells in multiple sites throughout the bone marrow. There are often no symptoms in the early stages of myeloma. In some cases, myeloma may be discovered by accident during routine blood testing. When present, symptoms may be vague and similar to those of other conditions.[6] Our case presented with fatigue and back pain for 2 years.

A myeloma diagnosis is often based on the presence of an increased number of plasma cells in the bone marrow and, in most cases, the presence of excess protein (M protein) in the blood or urine. Serum electrophoresis can be routinely used for the diagnosis of multiple myeloma and is well correlated with biochemical, radiological and pathological findings. In our patient most of the biochemical results were suggestive of the pattern found in multiple myeloma. The patient was having normal serum calcium level at time of diagnosis. Hypercalcemia is found initially in 22–30% patient with multiple myeloma[7,8], the exact cause

of which is unknown. The patient was not in renal failure as evident from GFR and renal function test. Renal failure, defined as a serum creatinine ≥2 mg/dl at the time of diagnosis, is seen in 21% of patients.[9,10] In the patient, the M band on the α 2 region and β region was shown to be bound to IgA. The conventional technique serum electrophoresis is still widely used for the demonstration of M-Protein in the myeloma patient and it remains a gold standard. Multiple myeloma arises from plasma cell dyscrasia. These malignant plasma cells synthesize monoclonal antibody and release it to the circulation. As a result high concentration of monoclonal antibodies is present in bone marrow as well as in serum.[4] The circulating M-protein may consist of an intact immunoglobulin, the light chain only, or (rarely) the heavy chain only. The heavy chain is from one of the five immunoglobulin classes G, A, M, D or E, while the light chain is either κ (kappa) or λ (lambda) in type. It occurs as intense, narrow band most often found with the gamma-globulins, then in a diminishing frequency between γ and the β-globulin and rarely in the β and α2 regions. Generally IgA, IgG and IgM proteins are not observed on the α2 fractions. These proteins compose β-1, β-2, and γ fractions.[5] However, in IgG multiple myeloma immunoglobulins may rarely migrate from γ fraction to α2 fraction.[6] M-protein that is seen on the α2 band is just reported in a few numbers of IgA multiple myeloma cases. Very rarely, biclonal gammopathies (accounts for 1% of all monoclonal gammopathies) or triclonal gammopathy can be observed in multiple myeloma.

Ceruloplasmin, alpha-2 macroglobulin and haptoglobulin constitute the alpha-2 fraction of the protein electrophoresis and the alpha-2 component increases as an acute phase reactant. Generally IgA, IgG and IgM proteins are not observed on the alpha-2 fractions. These proteins compose beta-1, beta-2, and gamma fractions.[4] However, in IgG multiple myeloma immunoglobulins may rarely migrate from gamma fraction to alpha-2 fraction.[3] M-protein that is seen on the alpha-2 band is just reported in a few numbers of IgA multiple myeloma cases in literature. Mseddi-Hdiji et al.[7] reported that in electrophoresis that is performed by agarose gel method 78% of the 242 monoclonal gammopathy cases had M band on gamma region whereas 22% of the cases had band on beta region and none of the cases had it on alpha-2 region. Bakta and Sutarka[8] observed two seperate M bands on the beta-2 and alpha-2 regions in the serum protein electrophoresis of a patient that they considered to have multiple myeloma. From the serum immunofixations, these were reported to be IgM and IgA immunoglobulins. In our patient, the M band on the alpha-2 region was shown to be bound to IgA like a few others.[9,10] So, this case reminds that, M band on alpha-2 region in serum protein electrophoresis can rarely be seen in IgA myeloma patients.

Reference

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