

Case 4

L.D. was a 51 year-old physician who presented with rib and back pain. He was in his usual state of good health until one month prior to admission when he noted constant low back pain. He saw his physician who obtained X-rays that demonstrated osteolytic (bone-destroying) lesions of the lumbar spine. Further studies showed osteolytic lesions of the ribs and pelvis, anemia (decreased number of circulating red blood cells), hypercalcemia (high calcium concentration in the serum), renal dysfunction, and hyperproteinemia (increased total protein content in the serum). Serum protein electrophoresis (SPEP) demonstrated a mid-gamma spike (Fig. 1) that was identified by immunofixation as an IgG_κ. Serum concentrations of IgM and IgA were decreased. Urine dipstick showed no detectable protein. However, a 24-hour urine collection showed two grams of protein and urinary protein electrophoresis showed a gamma spike that was identified by immunoelectrophoresis as a κ Bence-Jones protein. Bone marrow aspirate showed 60-75% plasma cells (normal is < 5%) with many atypical binucleated cells (Fig. 2).

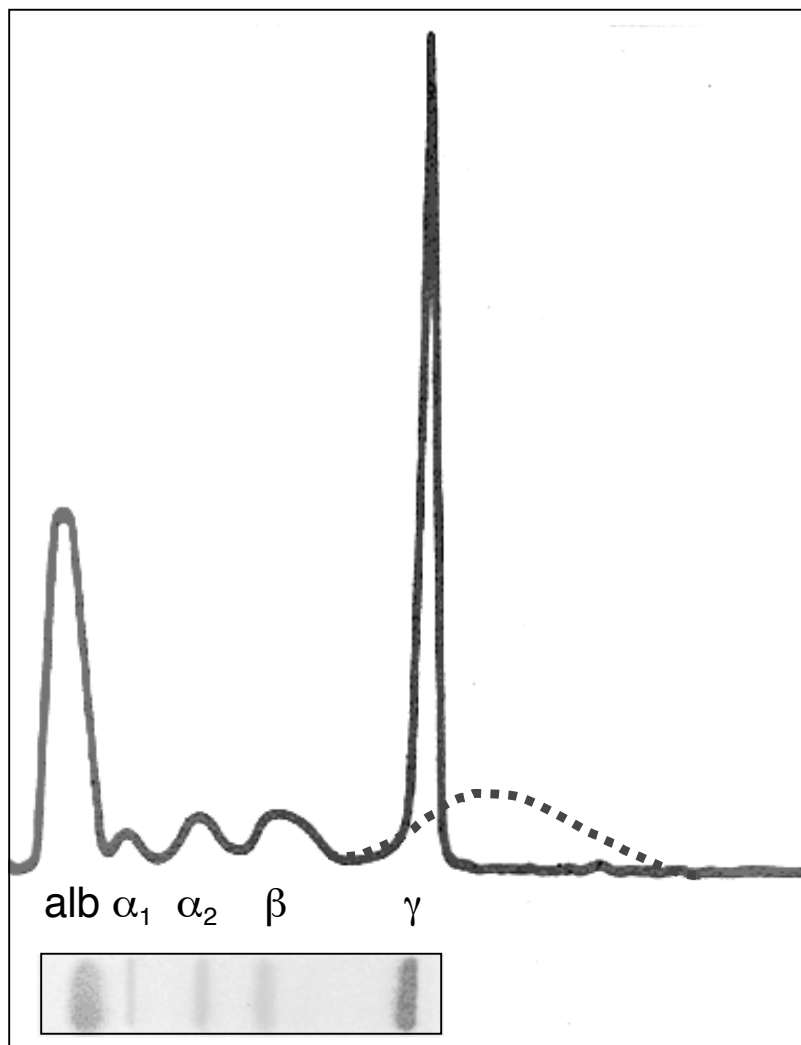


Fig. 1. Serum Protein Electrophoresis of L.D. prior to initiation of therapy. Dashed line represents γ region of normal control.

Case 4, cont'd

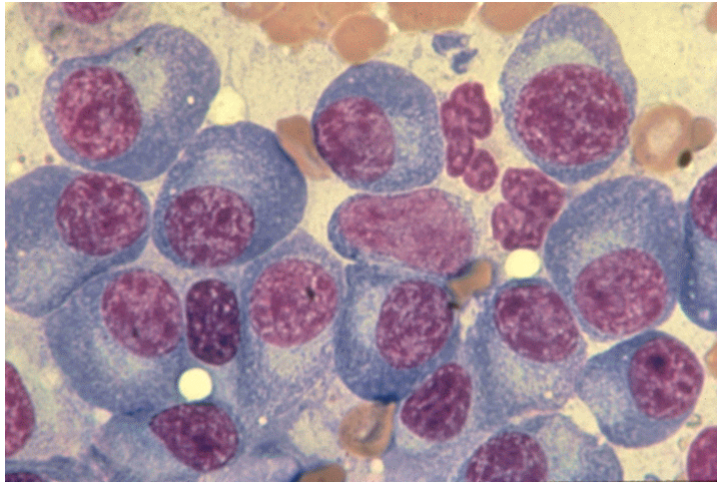


Fig. 2. Bone marrow aspirate of L.D. prior to initiation of therapy

Questions for Case 4

- (1) What features of the current case distinguish multiple myeloma (MM), a malignancy, from benign monoclonal gammopathy?
- (2) What is the biochemical nature of the proteinuria? Why do these proteins appear in the urine?
- (3) This patient had decreased levels of IgM and IgA derived from non-malignant plasma cells. How might myeloma cells affect the production of immunoglobulins in other cells? What is the clinical significance of having depressed levels of normal immunoglobulins in myeloma?
- (4) Why is the serum calcium elevated?
- (5) Most likely, this patient will be treated with chemotherapy. What biochemical parameters could be used to monitor the success of chemotherapy?
- (6) Autologous stem-cell transplantation (SCT) improves the likelihood of a complete response, prolongs disease-free survival and overall survival, and is a major advance in myeloma therapy. Why might this be helpful in MM? What is a major risk of autologous stem-cell transplantation? Would allogeneic SCT offer any advantages to autologous SCT?