

Multiple Myeloma

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A 42-year-old African American man with no past medical history presented with isolated worsening back pain at the lumbosacral spine with no radiation for 6 to 7 months. The patient had generalized malaise and weakness. He denied any spinal trauma.

Physical examination. The patient's vital signs were as follows: blood pressure, 122/79 mm Hg; heart rate, 80 beats/min; respiratory rate, 18 breaths/min; temperature, 37.2°C; oxygen saturation, 98% on room air; height, 174 cm; and weight, 86.4 kg.

The patient was alert, oriented, and in no acute distress. Findings from head, eyes, ears, cardiovascular, respiratory, abdominal, extremities, and neurologic examinations were within normal limits.

Diagnostic tests. Computed tomography (CT) of the spine and pelvis indicated multiple osteolytic bone lesions (Figure 1) while magnetic resonance

imaging showed multiple osteoblastic lesions (Figure 2).

Bone marrow biopsy revealed evidence of plasma cell proliferation of 50%. Additionally, he was found to have an elevated IgG level of 2601 mg/dL, elevated free λ light chains of 460, and M protein spike of 1.7 g/dL on serum protein electrophoresis. He had mild anemia with a hemoglobin of 12.8 g/dL and a normal creatinine level.

Discussion. Multiple myeloma is relatively rare and accounts for 10% of hematologic malignancy in the United States and Europe and 1% of all malignancies.¹ Incidence varies with ethnicity and sex, with African Americans having approximately twice the risk of whites and men having 1.4 times the risk of women.² The mean age at diagnosis is 66 years, with most cases diagnosed in the seventh and eighth decades of life.³

Lytic bone lesions are produced

throughout the skeleton as the result of a monoclonal proliferation of plasma cells that invade the medullary space and activate osteoclasts. In one single-center study of 1027 patients,³ the most common presenting signs and symptoms associated with multiple myeloma were normocytic normochromic anemia (73%), bone pain (58%), elevated creatinine (48%), fatigue (32%), hypercalcemia (28%), weight loss (24%), paresthesia (5%), hepatomegaly (4%), splenomegaly (1%), lymphadenopathy (1%), and fever (0.7%).

Bone pain is very common in multiple myeloma, and the pathophysiology of lytic lesions forming within the bone space predisposes patients to pathologic fractures leading to severe back pain secondary to vertebral compression fractures or pleuritic pain with involvement of the clavicles or ribs. One study using CT to assess 191 patients with multiple myeloma undergoing bisphosphonate therapy found an annual fracture incidence of 14%, all of which were vertebral compression fractures.⁴ The most commonly associated antibodies were IgG (52%), IgA (21%), κ or λ light chain only-Bence Jones protein (16%), IgD or biclonal (2%), and IgM (0.5%).

Treatment includes combinations of chemotherapy with corticosteroid suppression and bisphosphonate therapy for pathologic fracture risk and osteoclast-induced weakness. Chemotherapy agents used in combination in transplant candidates include bortezomib, thalidomide, lenalidomide, dexamethasone, vincristine, doxorubicin, and melphalan.⁵

References:

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2015. *CA Cancer J Clin.* 2015;65(1):5-29.
2. Waxman AJ, Mink PJ, Devesa SS, et al. Racial disparities in incidence and outcome in multiple myeloma: a population-based study. *Blood.* 2010;116(25):5501-5506.
3. Kyle RA, Gertz MA, Witzig TE, et al. Review of 1027 patients with newly diagnosed multiple myeloma. *Mayo Clin Proc.* 2003;78(1):21-33.
4. Vogel MN, Weisel K, Maksimovic O, et al. Pathologic fractures in patients with multiple myeloma undergoing bisphosphonate therapy: incidence and correlation with course of disease. *AJR Am J Roentgenol.* 2009;193(3):656-661.
5. National Comprehensive Cancer Network. *NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines): Multiple Myeloma.* Version 2.2016. http://www.nccn.org/professionals/physician_gls/pdf/myeloma.pdf. Accessed February 3, 2016.



Figure 1. Computed tomography scan of the spine revealed multiple lytic lesions (arrows).



Figure 2. Magnetic resonance imaging of the spine showed multiple blastic regions (arrows).