

Iga Myeloma with Increased Anion Gap, Pseudo hyperphosphatemia and Pseudohyponatremia

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Introduction

Multiple myeloma (MM) is a hematopoietic malignancy characterized by proliferation of a single clone of plasma cells resulting in production of monoclonal immunoglobulins or paraproteins (IgG, IgA or IgM)¹. With elevation in serum paraprotein levels the potential for erroneous laboratory results increases secondary to interference of paraproteins with colorimetric assays^{2,3}. Paraproteins can alter anion gap (AG) depending on their cationic or anionic properties⁴. A decreased AG is usually observed in MM; however, an increased AG is a rare presentation. We report an unusual presentation of IgA myeloma with an increased anion gap and spurious laboratory findings that included pseudohyperphosphatemia and pseudohyponatremia.

Case Presentation

Fifty-seven-year-old female with a history of

hypertension presented with progressively worsening shoulder and back pain. Physical exam was significant for diffuse bone tenderness. Bone skeletal survey showed multiple punched out lesions (Image 1A, 1B), diffuse demineralization and compression fracture in T12 and L1. Laboratory findings were significant for anemia (hemoglobin 6.2 g/dL) with peripheral blood smear revealing rouleaux formation, hyponatremia 126 mmol/L, elevated creatinine 3.23 mg/dL with blood urea nitrogen 45 mg/dL, albumin of 3.1 g/dL, hypercalcemia 15.5 mg/dL (corrected calcium 16.2) and marked hyperphosphatemia 20.5 mg/dL. Patient had high serum viscosity 3.1 centipoises, elevated total protein levels 11.9 g/dL, elevated IgA 4598 mg/dL, low IgG 580 mg/dL and low IgM 24 mg/dL. Inorganic phosphorous measurements on deproteinized serum samples revealed normal phosphorous levels. Parathyroid hormone and 25-OH vitamin D levels were normal. An increased AG of 24 was observed after correcting for albumin. An

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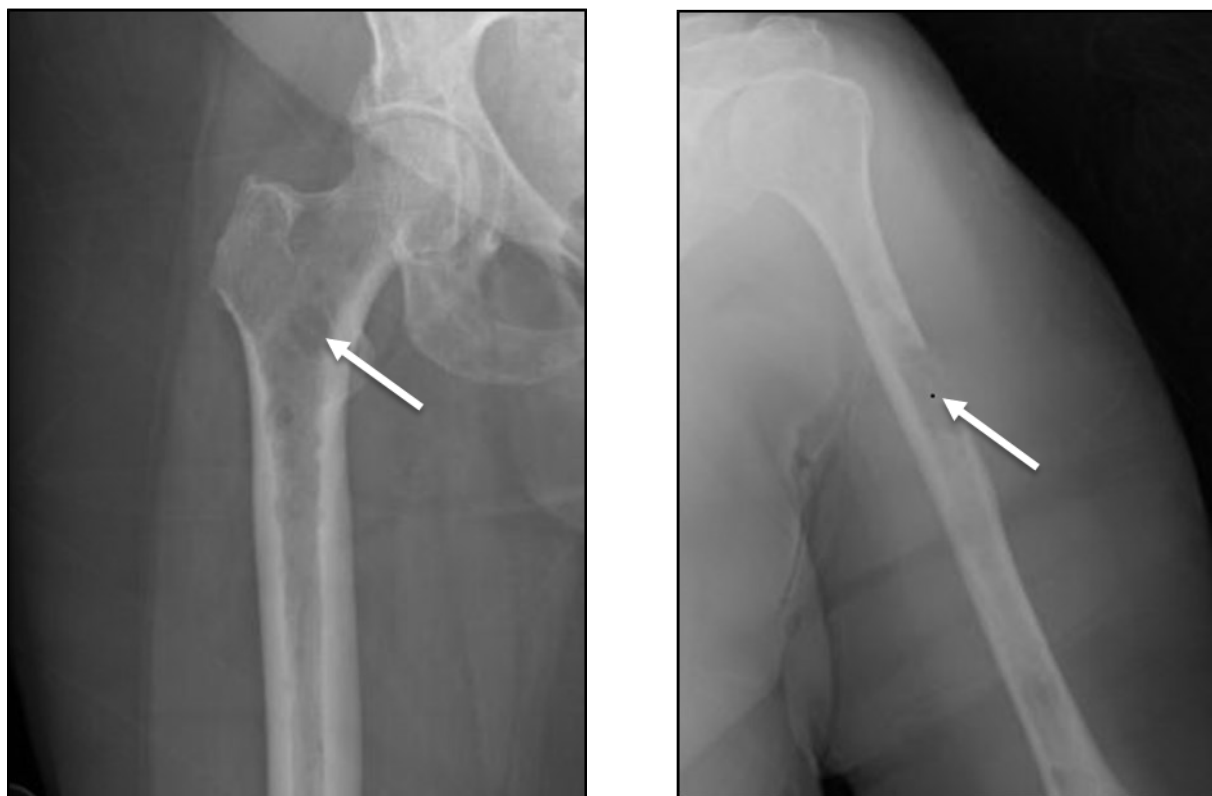


IMAGE 1 (A): Multiple focal and diffuse small lucencies throughout the right upper femurs (most prominent marked with an arrow). IMAGE 1 (B): Multiple lucencies throughout left humerus with a destructive large lesion in the upper third region.

electrocardiogram revealed osborn waves in the setting of severe hypercalcemia. Serum, urine protein electrophoresis and bone marrow biopsy were performed, and she was diagnosed as IgA kappa type multiple myeloma. MRI spine revealed rostrocaudal cord edema spanning T10-T12 secondary to significant cord compression requiring emergent intravenous steroids (Image 2). Patient was managed with intravenous fluids and pamidronate for hypercalcemia. Due to refractory nature of hypercalcemia patient required urgent hemodialysis.

Discussion

Anion gap gets significantly altered depending

on type of MM⁵. Low AG is commonly observed in IgG myeloma due to its cationic property⁵. In contrast, IgA myeloma can have an increased or a normal AG attributed to its anionic property⁵. Pseudohyperphosphatemia, not a widely known phenomenon, can result from laboratory error^{2,3}. Paraproteinemias can also result in pseudohyponatremia due to the reduction in the plasma water fraction secondary to increased total protein concentration. Our case not only demonstrates an unusual presentation of MM with increased AG but also highlights the importance of recognizing paraproteinemias as a potential source of discrepant laboratory results before instituting



IMAGE 2. Several pathologic compression and burst fractures throughout the spine. Ventral cord indentation at T1, T8 and T11. Rostrocaudal cord edema spanning T10-T12 secondary to more significant cord compression. Bulky left paraspinal osseous/extraspinal disease at T8 (arrow) causing potential impingement.

inappropriate investigation and therapy for hyperphosphatemia or hyponatremia.

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