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Shoulder pain unveiling multiple myeloma in a 70 year old male: A case report

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Abstract

Shoulder pain is a common complaint in clinical practice, with various etiologies ranging from musculoskeletal disorders to systemic conditions. We present a case of Multiple myeloma (MM) in a 70-year-old male who presented with progressive right shoulder pain and weakness. Radiographic imaging revealed lytic lesion within the proximal humerus consistent with an aggressive disease. The patient underwent a comprehensive diagnostic workup, including serum protein electrophoresis, immunofixation, and bone marrow biopsy, confirming the diagnosis of MM. Treatment was initiated with prophylactic nailing along with combination of chemotherapy and bisphosphonates, resulting in symptomatic improvement and stabilization of disease progression. This case underscores the importance of considering MM as a differential diagnosis in patients presenting with bone pain and emphasizes the need for prompt diagnosis and multidisciplinary management to optimize patient outcomes.

Keywords: Multiple myeloma, proximal humerus, intramedullary nailing, serum electrophoresis

Introduction

Multiple Myeloma (MM) is a neoplastic disorder characterized by the uncontrolled proliferation of plasma cells within the bone marrow, leading to destructive bone lesions, monoclonal protein production, and end-organ damage.

The exact etiology of multiple myeloma is unknown. However, frequent alterations and translocations in the promoter genes, especially chromosome 14, are commonly found in multiple myeloma and likely play a role in disease development^[1]. While MM typically affects the axial skeleton, including the spine and pelvis, involvement of the appendicular skeleton, such as the humerus, is less common. Despite its rarity in the humerus, MM remains a significant clinical challenge due to its potential for causing debilitating symptoms and complications. The diagnosis of MM often requires a combination of clinical, laboratory, and radiological investigations, including serum protein electrophoresis, immunofixation, bone marrow biopsy, and imaging studies. Treatment strategies for MM have evolved significantly in recent years, incorporating novel agents such as proteasome inhibitors, immunomodulatory drugs, and monoclonal antibodies, leading to improved outcomes and prolonged survival for many patients. However, the management of MM involving the humerus poses unique clinical considerations, including the risk of pathological fractures, neurological compromise, and impaired upper extremity function. In this context, the present case report aims to elucidate the clinical features, diagnostic approach, and therapeutic challenges associated with MM affecting the humerus bone, highlighting the importance of multidisciplinary collaboration and personalized treatment strategies in optimizing patient care and outcomes

Case report

70-year-old male presented in OPD with a six-month history of right shoulder pain, devoid of any traumatic incidents. He had been undergoing treatment for back pain, accompanied by weight loss and decreased appetite. Additionally, he had a medical history of uncontrolled diabetes mellitus and chronic smoking. Clinical examination revealed tenderness, swelling, and restricted range of motion in the right shoulder joint, alongside deltoid muscle wasting. Radiographic evaluation displayed a lytic lesion in the right proximal humerus (Figure 1).

Corroborated by similar findings in the skull and lumbar spine upon skeletal survey. (Figure 4) Considering the patient's age, a differential diagnosis of multiple myeloma and bone metastasis was contemplated.

Laboratory investigations revealed

Hemoglobin	9.2 g/dl(14-18g/dl)
ESR	144 mm/hour
C reactive protein	31 mg/dl
Serum calcium	8.9 mg/dl(9-11mg/dl)
Alkaline phosphatase	256IU/L
Serum albumin	2.1g/L (3.4-5.4g/L)
Tumour markers CEA, PSA, CA19-9, AFP	Within normal range

Despite negative findings on contrast-enhanced CT abdomen and chest, serum electrophoresis revealed an M band, and the free light chain assay ratio was elevated at 28.15. Peripheral smear analysis demonstrated normocytic normochromic anemia with increased rouleaux formation, raising suspicion for an underlying hematologic disorder. Due to patient claustrophobia, MRI was not feasible, leading to a diagnostic dilemma. Following consultation with hemato-oncology, the case proceeded with intramedullary nailing, intraoperative biopsy, and bone marrow aspirate study, confirming the diagnosis of multiple myeloma. (Figure 2 and 3) Postoperative follow-up demonstrated comparable range of motion, and the patient was subsequently referred to hematology for initiation of treatment targeting the primary neoplasm. This case underscores the importance of comprehensive diagnostic evaluation and multidisciplinary collaboration in the management of complex hematologic malignancies like multiple myeloma. A regimen consisting of thalidomide, cyclophosphamide, dexamethasone, and bortezomib was commenced, with postoperative bisphosphonates and calcium supplementation. At the 6-month follow-up, the patient experienced significant pain relief, with X-ray evidence of good healing and no further lesions.



Fig 1: Lytic lesion of proximal humerus®

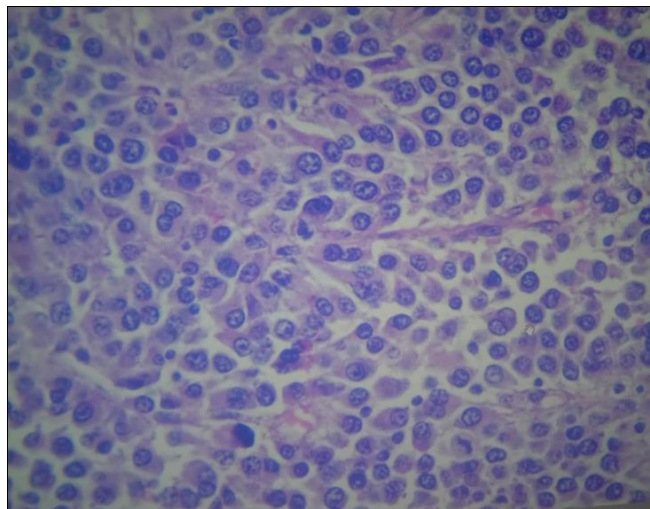


Fig 2: Hyper cellular marrow is replaced by uniform round cells with eosinophilic cytoplasm and vesicular nucleus (Plasma cells). Some with prominent nucleoli and binucleation

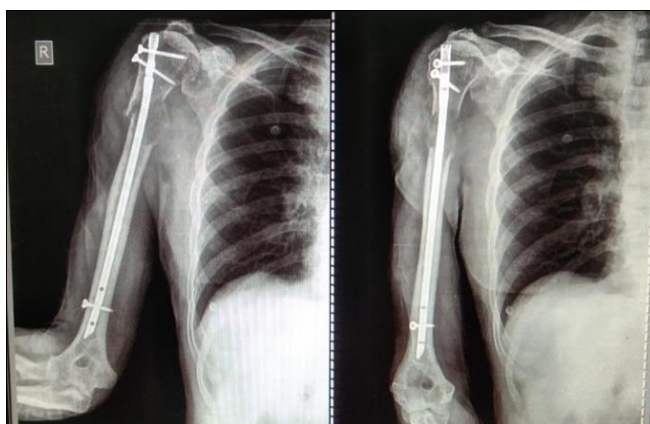


Fig 3: Post-operative X-ray after IM nailing

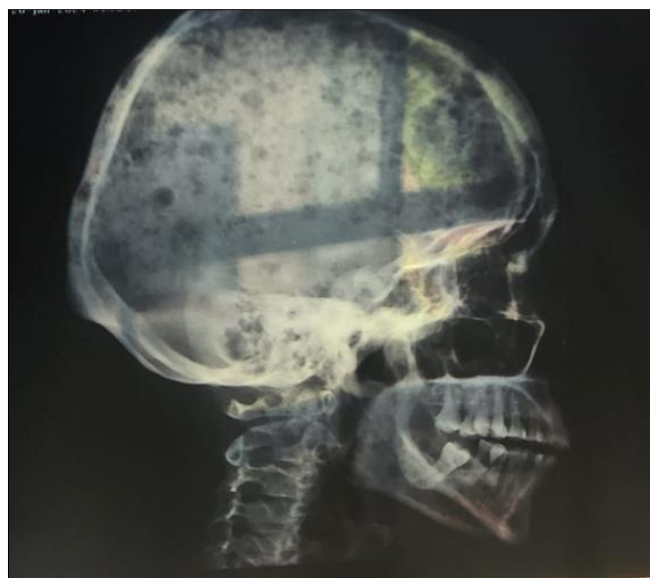


Fig 4: Lytic lesions of skull

Discussion

Multiple myeloma is a disease in the myeloma spectrum ranging from MGUS to systemic AL amyloidosis. IMWG International myeloma working group criteria for multiple myeloma includes [2]. 1) Clonal bone marrow plasma cells \geq 10% or biopsy-proven bony or extra medullary plasmacytoma. 2) Evidence of end-organ damage that can be attributed to the

underlying plasma cell proliferative disorder, specifically: a) Hypercalcemia: serum calcium > 0.25 mmol/L (> 1 mg/dL) higher than the upper limit of normal or > 2.75 mmol/L (> 11 mg/dL). b) Renal insufficiency: creatinine clearance < 40 mL per minute or serum creatinine > 177 mol/L (> 2 mg/dL).c) Anaemia: haemoglobin value of > 2 g/dL below the lower limit of normal, or a haemoglobin value < 10 g/dL d) Bone lesions: One or more osteolytic lesions on skeletal radiography, computed tomography (CT), or positron emission tomography -CT (PET-CT). e) Clonal bone marrow plasma cell percentage \geq 60% Involved: uninvolved serum free light chain (FLC) ratio \geq 100 (involved free light chain level must be \geq 100 mg/L) f) > 1 focal lesions on magnetic resonance imaging (MRI) studies (at least 5 mm in size).

More than 90% of patients have myeloma related bone events [3]. More than 60% of patients present with back ache. Myeloma involves spine, skull, pelvis, proximal joints and rarely distal bones in successive order [4]. X-Ray can detect lytic lesions only if it involves more than 30% of bone loss. X-ray shows sharply defined small punched out lytic lesions. Early diagnosis can be done by MRI [5]. Now a days PET-MRI is the initial investigation in tertiary centres but is quite expensive. MRI can detect 90% of focal lesions. It helps in early detection of marrow involvement. It is the investigation of choice of painful myeloma lesion, spinal cord compression and detection of collapsed non active myeloma vertebral lesion. Serum B2 macroglobulin and CRP levels correlate with prognosis. Extremity involvement occurs in delayed presentation and is treated by intramedullary nail/ORIF depending on the size of lesion on palliative basis. Primary neoplasm is treated by a regime of proteasome inhibitor (Bortezomib), immunomodulatory agent (Thalidomide / Lenalidomide), steroid (Dexamethasone) and stem cell therapy.

Diffusion weighted imaging I MRI /PET is the tool for checking remission status. With radiation therapy survival rate (in 1 year) can be up to 90%.5 year survival rate is 58-60%.The advent of stem cell therapy has considerably increased the survival rate [6]. Stem cell therapy has shown better results in patients older than 60 years and with decreased initial serum B2 macroglobulin. Early diagnosis and treatment has increased median survival rate to 6 years.

Conclusion

This case highlights the successful management of a patient with multiple myeloma presenting with a lytic lesion in the humerus. Following intramedullary nailing and confirmation of the diagnosis through biopsy and bone marrow aspirate, the patient underwent chemotherapy targeting the primary neoplasm. Subsequent postoperative follow-up revealed satisfactory outcomes, with significant improvement in pain scores and radiographic evidence of healing without further lesions.

Conflicts of interest

None

Funding and sponsorship

None

Informed consent

Detailed written informed consent taken regarding the

publication of images, publication of data images, treatment related documents without any objection.

Abbreviations

OPD: Outpatient Department.

MM: Multiple Myeloma.

CEA: Carcinoembryonic Antigen.

AFP: Alpha Feto Protein.

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