

Pathological fracture humerus due to multiple myeloma evaluation and surgical fixation with intramedullary interlocking nail -a case report

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ABSTRACT

Background :-

Multiple myeloma (MM) is a bone disease and reduces patient life quality. In addition to oncological, antineoplastic systemic therapy, surgical therapy in patients with MM is an essential treatment within the framework of supportive therapy measures and involves orthopedic tumor surgery. Nevertheless, there are few reports on intramedullary (IM) nailing in the treatment of MM-induced proximal humeral fracture to prevent fixation loss. We here describe a case of pathological fracture of the proximal humerus caused by Multiple myeloma treated with Intramedullary interlocking nailing of humerus.

Aim:- Pathological fracture humerus due to multiple myeloma evaluation and surgical fixation with intramedullary interlocking nailing -a case report

KEYWORDS :-

Multiple myeloma, Bone disease, Pathological fractures, Intramedullary nailing, Surgical therapy, Case report

Methods:-

Prophylactic fixation of a pathological fracture of humerus with intramedullary interlocking nailing in a setting of multiple myeloma and assessing the functional outcome in terms of pain and functional mobility.

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I. INTRODUCTION

Multiple myeloma is a malignant plasma cell disorder characterized by proliferation of plasma cells in the bone marrow that leads to osseous destruction.¹ Multiple myeloma is the most common primary malignant bone tumor, i.e., constituting around 40% of primary bone tumors.² It is a low-grade non-Hodgkin lymphoma as a result of proliferation of malignant clone of plasma cells in bone marrow, where they induce osteolytic lesions and produce monoclonal components (paraprotein).³ It has male predominance (male:female-2:1) and mostly presents in age group between 30 and 80 years with peak incidence in 7th decade.² This presents most commonly in spine (34%) followed by femur (18%), humerus (14%), and pelvis (13%). Myeloma weakens the bone and nearly 80% patients develop pathological fractures. These pathological fractures of humerus are difficult to heal because of the disease process itself or the use of radiotherapy/chemotherapy. The principal clinical manifestation of multiple myeloma is bone disease characterized by osteolytic destruction and diffuse osteopenia. At diagnosis, pathologic fractures are the presenting feature in 30% of cases.⁴

A 62 year old male Subba Rao came to ortho opd on 19th October 2021 with chief complaints of back pain since 8 months, pain over right arm since 1 month, deformity noted over right arm since 10 days. Pain over the back and arm was insidious in onset, dull aching, gradually progressive, non radiating and with no aggravating and relieving factors. Since last 10 days patient complains of deformity over right arm and inability to perform movements with it.

Patient details were registered in arogyasri health scheme for free investigations and treatment and following blood, radiological investigations have been done.

Blood investigations of the patient are as follows :

Patient has tested positive for HbsAg.

Biochemistry

Serum phosphorus-4.1mg/dl

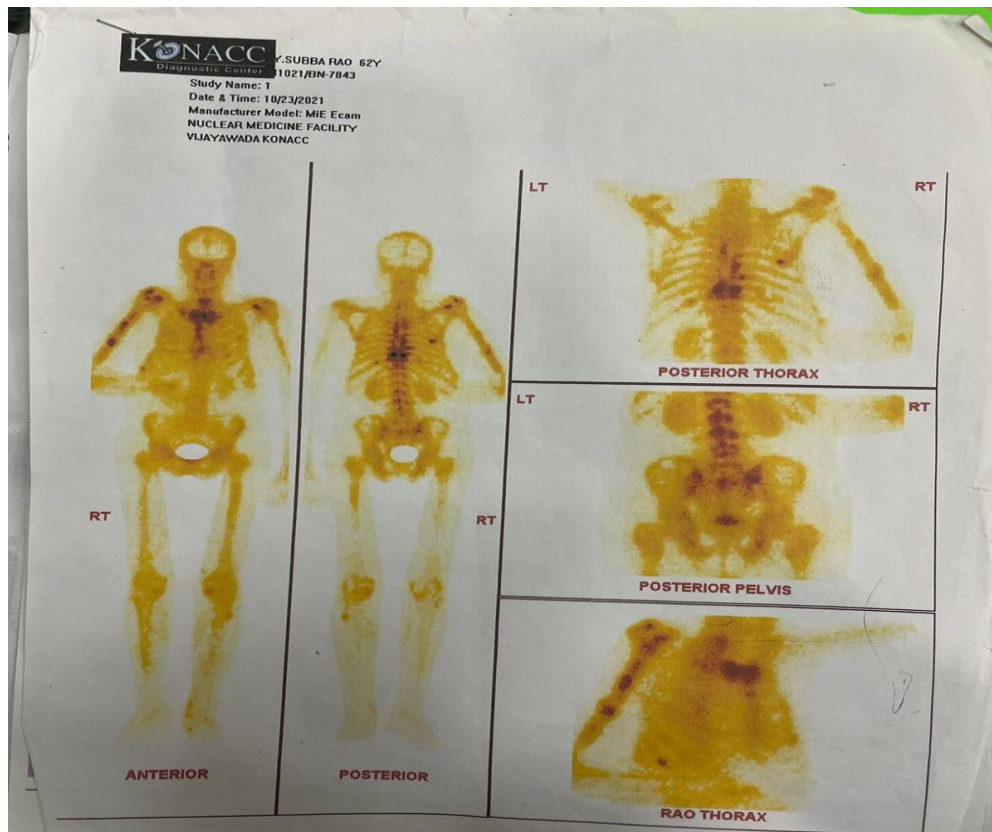
- Alkaline phosphatase-162U/L
- Liver function test
 - SGOT-28IU/L
 - SGPT-21IU/L
 - Total proteins-7gm/dl
- Renal function test
 - Blood urea-31mg/dl
 - Serum creatinine-1mg/dl
- Haematology
 - Haemoglobin-10.9gm/dl
 - Total WBC count-6,800cells/mm³
 - Platelet count – 3.32 lakh/mm³
 - Packed cell volume – 35%
- Clinical biochemistry
 - Serum kappa light chains 17.9mg/L (3.3 – 19.4)
 - Serum lambda light chains 15.3mg/L (5.71 – 26.3)
 - Serum kappa/lambda ratio 1.1mg/dl (0.26 – 1.65)
 - LDH- 535U/L (225-450)
 - Uric acid- 3.6mg/dl (3.4-7)
 - Total serum protein- 5.6 (6.3-8.3)
- Complete urine examination
 - Bence jones protein – negative,
 - Albumin- nil,
 - Sugar- nil,
 - Microscopy- 2-6 pus cells
- Patients initial plain radiograph of right arm



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- CT plain abdomen scan was done for the patient and following findings were:- normal Liver, spleen, right and left kidney, urinary bladder, bowels .
Atrophic pancreas with evidence of multiple lytic lesions in all vertebrae and pelvic bone.
- Preliminary impression by radiologist : ?metastasis ?multiple myeloma
- Bone scan : whole body bone scan was acquired following intravenous administration of 20 mCi TC – 99m MDP in anterior and posterior projections.
- Following findings were seen as Intense foci of tracer uptake in:-
 - sternum
 - left 5th,10th ribs,
 - right 8th rib,
 - right scapula,
 - right humerus,
 - dorsolumbar vertebrae(D7,D8,D9,D10)

Preliminary conclusion by radiologist : Increased tracer uptake noted in the above mentioned lesions is in favour of Multiple Myeloma/ Metastasis.



Patient was then planned for surgical fixation of pathological fracture by Open reduction and internal fixation with intramedullary interlocking nailing with biopsy was obtained from site of lesion intraoperatively and the specimen was sent for histopathology.

Intra operative photo of the patient.



Post operative x ray of the patient.



- Histopathology report of the Bone biopsy was sent as macroscopically multiple grey and white bits of size 1cm and on further processing and staining of specimen showed predominant dead bone with intervening trabeculae showing marrow elements and focal group of plasma cells.

POST OPERATIVE TREATMENT AND PATIENT STATUS :

Post operatively patient had significant pain relief and shoulder immobilizer and arm sling was given. After suture removal patient was shifted to cancer op and was started on bisphosphonates and chemotherapy with lenalidomide, bortezomib and dexamethasone.

II. Conclusion:-

Patient following prophylactic fracture fixation had a significant pain relief and has increased range of movements.

Discussion:- In a case of pathological fracture, Mirel's score is calculated and the prophylactic fixation of the fracture is done.

Mirel's scoring of this patient is:-

Localisation of lesion:- upper extremity - 1

Pain scoring:- severe 3

Type of lesion:- osteolytic 3

Size of lesion :- >2/3rd of width of the bone 3

Total mirel's score of the patient is 10.

A score of >9 carries a risk of 33% and more over it is an indication for preventive open reduction and internal fixation.

But in this case the extent of lytic lesions are severe and multiple in nature, so conventional open reduction and internal fixation is not performed, moreover as we know for a humerus fracture it is ideal to fix the fracture with open reduction internal fixation with plating rather than closed or open reduction with internal fixation with intramedullary nailing.

On a malignant lesion, by performing a more invasive procedure there is always possibility of seeding of the malignant cells all across the surgical site. Hence the patient is planned for less invasive closed reduction internal fixation with intramedullary interlocking nail along with the biopsy from the lytic lesion.

At initial presentation of the patient to OPD, the universal pain assessment tool scoring of the patient is around 8/10 (severe pain which is interfering with basic needs of the patient).

Following surgical fixation the patient's score is reassessed at the time of suture removal the score came as 5/10 (moderate pain interferes with tasks/sleep).

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