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Role of postero-medial cortex in a pathological sub-trochanteric femur fracture in elderly: A case series

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Abstract

Purpose: To analyse the role of postero-medial cortex in a pathological sub-trochanteric femur fracture in elderly and evaluation for primary neoplasm.

Methods: Six patients with pathological fractures of sub-trochanteric femur were included. The patients were over the age of sixty years comprised of both males and females. All the fractures were stabilized by internal fixation with intramedullary nailing and were followed post-operatively. The patients were evaluated for primary neoplasm by recording a clinical history, physical examination, routine laboratory investigations, plain radiography of the involved bone and the chest, whole-body technetium-99m-phosphonate bone scintigraphy, and computed tomography of the chest, abdomen, and pelvis.

Results: All the patients were mobilized by non-weight bearing mobilization with walker support post-operatively and were allowed complete weight bearing mobilisation depending on the progress and fracture healing pattern. Primary neoplasm was identified in all of these cases. Chemotherapy was continued. In four patients, fracture united at twelve weeks with fixation and chemotherapy. One patient died during the post-operative period diagnosed with plasmacytoma. Fracture did not unite in one patient who stopped chemotherapy in the post-operative period and had metastasis of the tumour.

Conclusion: Fractures in the elderly patients with trivial fall or postero-medial cortex deficit should be carefully evaluated for pathological fractures. Internal fixation with intramedullary nail can be a mainstay of treatment for such pathological fractures. Further evaluation of the primary tumour should be undertaken in all such cases.

Keywords: pathological fracture, subtrochanteric fracture, metastasis

Introduction

Sub-trochanteric fractures usually occur in young patients with high-energy trauma, old osteoporotic patients with low-energy trauma, and patients exposed to bisphosphonates.

However, patients with malignancies that are predisposed to bony metastasis are also prone to these fractures. The treatment goals are to reduce pain and restore function for the duration of the expected life span. The mainstay of treatment of sub-trochanteric femoral fracture is intramedullary nailing [6]. The other methods that are favoured are intralesional, marginal, or wide resection followed by nail, or plate combined with polymethylmethacrylate (PMMA), or endoprosthesis joint replacement [7]. In this case series, we study the pathological fractures of sub-trochanteric femur in elderly or posterior-medial cortex deficit and evaluated the patients for secondaries in the bone and for primary tumours. The sub-trochanteric fracture was stabilised by intramedullary nailing in all the cases, and the patients were allowed weight-bearing after subsequent routine follow-up.

Case Series

Case 1: A 85 year old male patient came with a history of trivial fall 1 week back following which he complained of pain in the right hip and inability to bear weight over the right lower limb. He had no other constitutional symptoms. On general physical examination patient had anasarca and appeared icteric. Local examination was done in which, the right lower limb was in external rotation and appeared shortened. Tenderness was noted at the proximal aspect of right thigh. X-ray of right femur was suggestive of a sub-trochanteric fracture of right femur. The patient was operated by closed reduction and internal fixation of right femur with long

PFN. The post-operative period was uneventful. The patient was advised non-weight bearing mobilisation with walker support. The patient was allowed full weight bearing mobilisation depending on the progress on routine follow-up and fracture healing pattern.

In view of anasarca, LFT was done which was found to be deranged. USG of abdomen and pelvis suggested a hypoechoic mass in the liver. CECT of abdomen was done which was suggestive of hepatocellular carcinoma in segment VIII of right lobe with bilateral pleural effusion and enhancing nodular lesion in adrenal glands possibly due to metastasis.

Case 2: A 60 year old female patient came with a history of trivial fall following which she complained of pain in the right hip and inability to bear weight over the right lower limb. On local examination, the right lower limb was in external rotation and appeared shortened. Xray of right femur was suggestive of a sub-trochanteric fracture of right femur with a postero-medial cortical deficit. On MRI of pelvis with both hip, there was evidence of signal intensity changes with osteolytic lesion noted in right femur neck, inter-trochanteric region and proximal shaft of right femur, with lesions noted in the right sided body of sacrum and left ilium indicating metastasis/myeloma. A ^{99m}Tc -MDP whole body skeletal scintigraphy, found increased osteoblastic activity in the right femur. In order to evaluate myeloma, serum protein electrophoresis was done which showed a normal result and normal chromatogram.

A medical oncologist opinion was sought and a lump was noted in the left breast. A fine needle aspiration was performed from the lump and cytology was indicative of atypical cells with features suggestive of carcinoma of left breast. A PET-CT was obtained where a hypermetabolic primary malignant mass was noted in the left breast with mediastinal lymph nodal, hepatic and skeletal metastases.

The patient was operated by closed reduction and internal fixation of right femur with long PFN. Samples of bone and surrounding soft tissues were sent for histopathology and features were consistent with metastatic deposits. The post-operative period was uneventful. The patient was advised non-weight bearing mobilisation with walker support and was allowed full weight bearing mobilisation depending on the progress and fracture healing pattern.



Fig 1: Pre-operative radiograph of case 1 showing subtrochanteric femur fracture

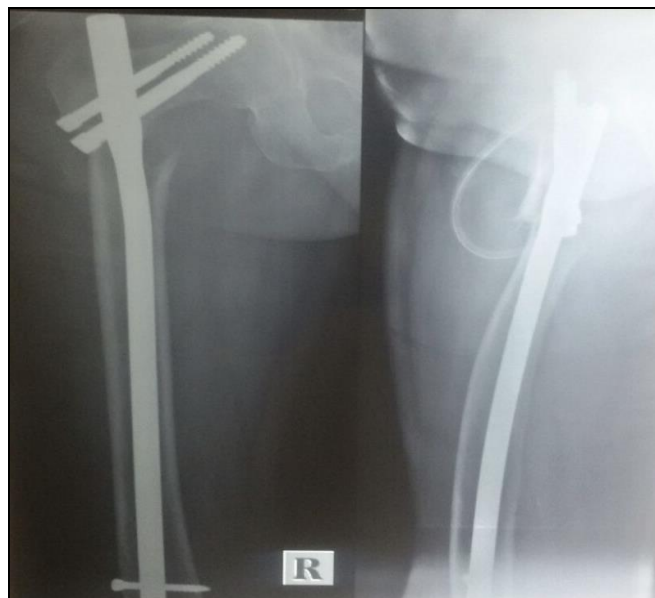


Fig 2: Post-operative radiograph of case 1 with Long PFN in situ



Fig 3: Pre-operative radiograph of case 2 showing subtrochanteric femur fracture with posteromedial cortex deficit

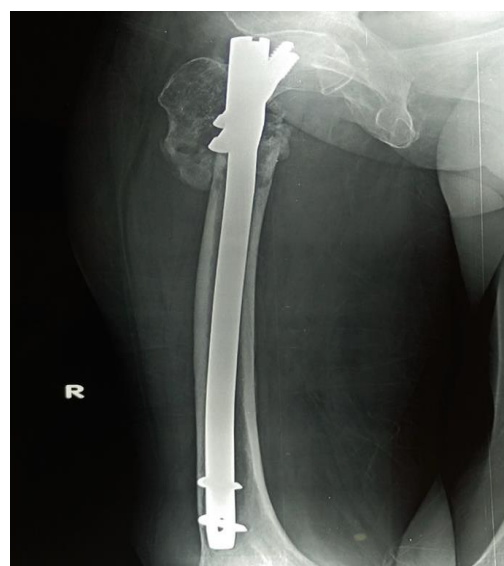


Fig 4: Post-operative radiograph of case 2 with Long PFN in situ

Results

All the patients were mobilized by non-weight bearing mobilization with walker support post-operatively and were allowed complete weight bearing mobilisation depending on the progress and fracture healing pattern. Primary neoplasm was identified in all of these cases. Chemotherapy was continued. In four patients, fracture united at twelve weeks with fixation and chemotherapy. One patient died during the post-operative period diagnosed with plasmacytoma. Fracture did not unite in one patient who stopped chemotherapy in the post-operative period and had metastasis of the tumour, and the patient was mobilized with the support of the implant.

Discussion

Subtrochanteric femur fractures occurs in low energy trauma in elderly osteoporotic patients, in malignancies and in patients exposed to bisphosphonates. The American Society for Bone and Mineral Research in revised criteria of atypical femur fractures defined that the fracture line originates at the lateral cortex and is substantially transverse in its orientation, although it may become oblique as it progresses medially across the femur^[5]. In this series, a postero-medial cortical deficit of the subtrochanteric femur was found and when evaluated, a primary neoplasm was identified in all these cases.

Pathological fracture of a long bone, especially the femur, is one of the debilitating complications in a patient with an advanced stage of malignancy. The site for secondaries in the femur can be divided into five regions: the femoral head and neck, the per trochanteric region, the subtrochanteric region, the femoral diaphysis, and the distal femoral region. Surgical options of pathological fractures should be based on anatomical locations¹ and the treatment goals are to reduce pain and restore function for the duration of the expected life span. The palliative treatment of metastatic carcinoma with intramedullary nailing has become a standard treatment option for long bone metastases, it has the advantages of being a quick procedure with limited incisions, and provides stability allowing for early weight bearing^[2]. In this case series, intramedullary nailing with long PFN was done in all the cases with satisfactory results however in one case an additional encirclage with ss-wire was done.

The management of patients with metastatic bone disease is comprehensive and requires the participation of an orthopaedic surgeon early in the clinical course. Early consultation and mutual follow-up will benefit the metastatic patient in maintaining independent function and avoid irretrievable complications^[3]. A routine strategy has to be followed for locating skeletal metastases and detecting the primary site of a carcinoma. If this does not identify the patient's primary site of tumour, no further diagnostic tests need be performed^[4]. The diagnostic strategy followed in this series and in most of the literature consisted of the recording of a clinical history, physical examination, routine laboratory investigations, plain radiography of the involved bone and the chest, whole-body technetium-99m-phosphonate bone scintigraphy, and computed tomography of the chest, abdomen, and pelvis.

Conclusion

Fractures in the elderly patients with trivial fall or postero-medial cortex deficit should be carefully evaluated for pathological fractures. Internal fixation with intramedullary nail can be a mainstay of treatment for such pathological fractures. Further evaluation of the primary tumour should be

undertaken in all such cases.

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