

Case Report

Unplanned surgery increases the morbidity of patients with solitary plasmacytoma of femoral bone: a case report

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ABSTRACT

Solitary skeletal plasmacytoma is a malignant plasma cell tumour that accounts for 3-5% of all monoclonal gammopathies. Lytic bone disease is a hallmark, and a substantial percentage of patients develop pathologic fractures. For lesions involving the femur, internal fixation frequently fails; therefore, prosthetic reconstruction may be the optimal choice for treatment. A 52-year-old male patient with pathological fracture of right femoral bone. Patient was undergone surgery with internal fixation. The pain had been continuing for several months and giant masses has developed on affected side. Further test was done and showed solitary plasmacytoma of proximal femur. The patient was treated with cemented modular prosthesis following tumor excision. Treatment of pathological fracture often challenging. Unplanned surgery could be devastating for the patient. Compare to internal fixation, cemented modular prosthesis is designed as a modular system that can be used to replace diseased or deficient bone in the femur following wide excision. Treatment of pathological fractures in solitary plasmacytoma with modular prosthesis appears to be a feasible option. They were able to mobilize early with good pain relief and had a useful functional limb. Further diagnostic test should be done for fracture of proximal femoral bone that considered pathologic. Limb salvage surgery with modular prosthesis can be considered as a viable option for treating painful pathological fractures in solitary plasmacytoma. It provides pain relief, early mobilization, and good functional outcome with improved quality of life.

Keywords: Cemented modular prosthesis, Pathological fractures, Solitary plasmacytoma

INTRODUCTION

Solitary skeletal plasmacytoma is a malignant plasma cell tumor that accounts for 3-5% of all monoclonal gammopathies. Most patients are in the sixth and seven decades of life. The median age at diagnosis is 65 years with a slight male predilection. Lytic bone disease is a hallmark of plasmacytoma, and a substantial percentage of patients develop pathologic fractures. Bone resorption occurs as the result of osteoclastic stimulation and activity.^{1,2}

Typically, a patient presents with an impending or pathologic fracture with no prior diagnosis of myeloma.

In the patient with bone lesions and unknown primary malignancy, the workup includes radiographs of the entire bone; bone scan; MRI of extremity; CT scan of the chest, abdomen, and pelvis; complete blood count; serum and/or urine electrophoresis; prostate-specific antigen in men; and, in women, a breast examination or mammogram.^{1,3}

When the electrophoresis is positive, radiographic bone survey and bone marrow biopsy are performed for staging. However, no further biopsy of lesions is required for diagnosis. Biopsy is required in some cases, such as in the patient with suspected plasmacytoma when electrophoresis is not obtained. Biopsy must be done

carefully because myeloma lesions can be very vascular, and there is a risk of substantial blood loss. This should also be taken into account during preplanning for intramedullary or open procedures.^{1,3}

In the case of primary malignant bone tumor, the orthopedic surgeon often has to deal with the need to reconstruct a large skeletal defect or replace bone of low quality. For lesions involving the femur, internal fixation frequently fails; therefore, prosthetic reconstruction may be the optimal choice for treatment. Cemented modular prostheses reconstruction is thought to be technically less demanding than other complex reconstructive procedure. A case is presented here of SP in the upper end of the femur which was causing destructive changes and was therefore treated surgically.⁴

CASE REPORTS

Case 1

A 52-year-old male retired, presented with history of inability to walk and swelling over middle thigh for one year. The patient gave a history of an ongoing pain, worsens at night and was not relieved with simple analgesic. In April 2015, patient was undergone surgery due to fracture on right proximal thigh following a trivial trauma. The fracture was fixated with internal fixation plate and screw systems. The pain had been continuing for several months and giant masses has developed on affected side.



Lytic lesion involving the shaft and extend to distal part can see.

Figure 1: Right femur shows fracture of proximal femur with internal fixation.

There was no significant proximal lymphadenopathy or distal neurovascular deficit. The general examination was unremarkable. Local examination revealed a scar over lateral and a large mass over proximal and middle aspect of the thigh, firm in consistency and fixed to the bone. Active movements of right knee were restricted. Radiological examination revealed a fracture of proximal femur with internal fixation and lytic lesion involving a

shaft and extends to distal part (Figure 1). CT angiography of proximal femur revealed femoral tumor with involvement of deep femoral artery (Figure 2). All routine hematology investigations and X-ray chest were normal. A BMP was done with Ki67 positive 80% and interpreted as plasma cell myeloma.



The femoral tumor involving the deep femoral artery.

Figure 2: CT angiography of right thigh.

Patient underwent wide excision of the tumor with clear margins. The patient was put in a lateral position, and the proximal femur was dissected through a posterolateral approach. Following tumor excision, prepare the acetabulum with a fit cup, resects the top of the tibia and ream the tibial canal. A customized, titanium, bipolar, and total femoral prosthesis was then inserted (Figure 3). Local soft tissue reconstruction was performed, and the wound was closed over a negative suction drain after meticulous homeostasis.

Postoperatively, quadriceps exercises were started on day one with knee range after day five. The patient was made to stand with support on the fifteenth day and started partial weight bearing. The wound was healed without complication.

Case 2

A 53-year-old-male patient presented with pain on right thigh. The history revealed the pain had been continuing for several months. He has had a pathological fracture of right femoral bone and surgery with internal fixation was done on May 2017. There was nothing remarkable complaint a part of the pain on physical examination.

Radiological examination revealed a fracture of distal femur with internal fixation and lytic lesion involving a shaft and extends to distal part (Figure 4).

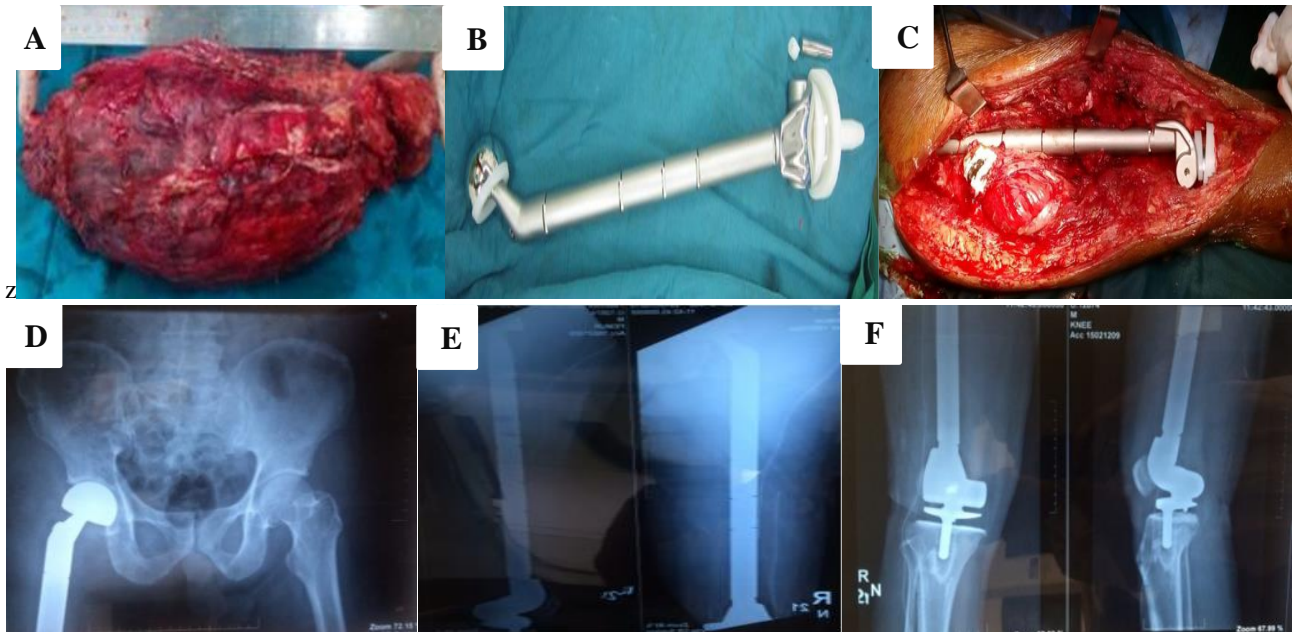


Figure 3: Total femoral replacement with cemented modular prosthesis following wide excision of the tumor. (A): clinical picture of the tumor, (B): a customized total femoral prosthesis, (C): a customized, titanium total femoral prosthesis was then inserted, (D): pelvic X-ray AP view post-operative insertion of bipolar, (E): femur X-ray AP/Lateral view post-operative insertion of femoral prosthesis, (F): knee X-ray AP/Lateral view post-operative insertion of femoral prosthesis.

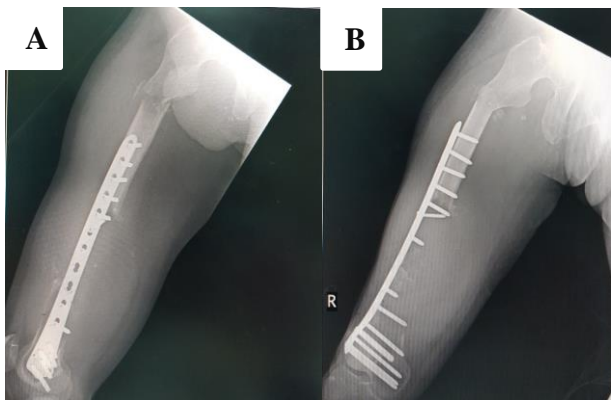


Figure 4: Plain radiograph of right femur shows fracture of distal femur with internal fixation. Lytic lesion involving the shaft and extend to proximal and distal part are observable. (A): Femur X-ray lateral view. (B): Femur X-ray AP view.

All routine hematology investigations and x-ray chest were normal. A biopsy was done because of a mass at distal part of the right thigh. The biopsy revealed monoclonal plasma cell infiltration. The surgery was done with cemented intramedullary femoral nailing extended to distal tibia following excision of tumor mass (Figure 5). The patient was mobilized with support postoperatively.

DISCUSSION

Plasma cell neoplasms are malignant tumours of the immune system. Solitary plasmacytoma (SP) and extramedullary plasmacytoma, which do not show endings of systemic myeloma are isolated tumours formed from malignant plasma cells. SP is often found in the axial skeleton, particularly bone-marrow dense bones such as vertebra. SP is seen at a rate of less than 10% in plasma cell neoplasms. SP has been reported in the femur, tibia, jaw bone and patella. Only one percent of SP are located in an extremity. It occurs as a result of unregulated, progressive proliferation of neoplastic monoclonal plasma cells. Bone destruction is due to increased osteoclastic bone resorption and inhibition osteoblastic bone formation resulting in osteolytic lesions predisposing to pathological fractures.^{5,6}

Plasmacytoma is common in elderly patients and rare in patients below 40 years of age. There is a slight male preponderance and it commonly occurs in the sixth or seventh decade of life.⁷

Diagnostic criteria for SP have been need as bone destruction in a single area by clonal plasma cells, normal bone-marrow aspiration, no involvement of another bone radiologically, no findings of anaemia, hypercalcemia or renal insufficiency, no M-protein in the serum or urine.⁵

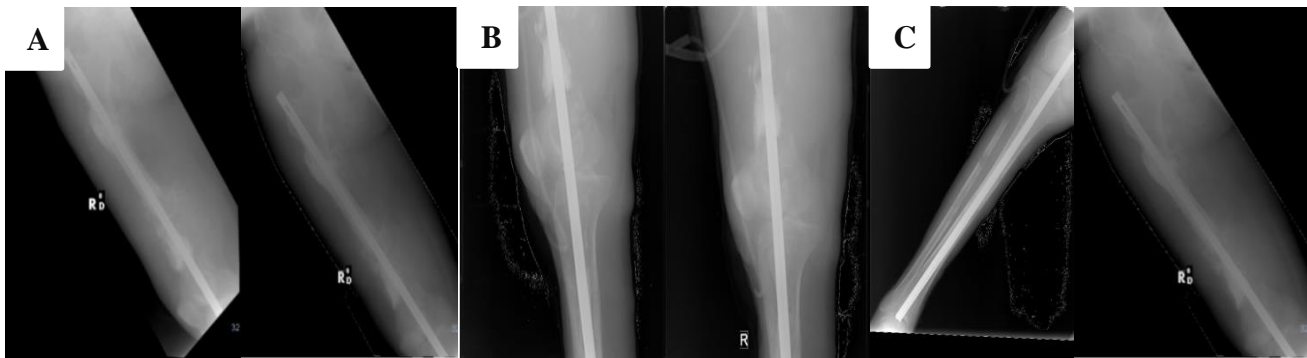


Figure 5: Cemented intramedullary nailing of right femur extended to distal tibia following wide excision of the tumor. (A): femur X-ray AP/Lateral view, (B): knee X-ray AP/Lateral view, (C); cruris X-ray AP/Lateral view.

Treatment of plasmacytoma may be difficult and challenging. Though chemotherapy is successful in many patients, it does not produce skeletal healing, and hence there is a risk of osteopenia and subsequent pathologic fracture. Also, use of radiation therapy is often able to relieve pain and diminish local tumor.^{5,8}

As the disease progression is slow and the long-term survival of these patients is better when compared to pathological fracture due to metastasis from other tumors, surgical treatment was aimed at achieving adequate margins of resection and reconstruction that can provide long term stability.⁴ The mainstay of treatment in most patients with multiple myeloma is chemotherapy and/or radiotherapy combined with bisphosphonates. However surgical treatment is indicated in the treatment of certain complications like pathological fractures of extremities and vertebral compression fractures producing progressive neurological deficit or spinal instability. As these patient have a relatively long period of survival compared to patient with other secondary bone tumors, prosthetic replacement for pathological fractures can provide better functional outcome and improve their quality of life.^{1,3,5} Limb salvage surgery, currently an accepted bone tumor treatment method, has traditionally been a difficult problem in orthopedic oncology. Currently, the three most popular option are using a modular prosthesis, allograft-prosthetic composite and biological reconstruction. Modular prosthesis replacement offers several advantages, such as early stability, mobilization, and weight bearing, a shorter operating time and hospital stay in comparison to biological reconstruction, and it allows the early introduction of postoperative adjuvant therapy.^{4,9,10}

CONCLUSION

Further diagnostic test should be done for fracture of proximal femoral bone that considered pathologic. Unplanned surgery would increase the morbidity and

mortality patient with solitary plasmacytoma of proximal femur. Limb salvage surgery with modular prosthesis can be considered as a viable option for treating painful pathological fractures in multiple myeloma. It provides pain relief, early mobilization, and good functional outcome with improved quality of life. Our first experience with the use of total femoral modular prosthesis after tumor resection was encouraging. Total femoral replacement with modular prosthesis provided for long-standing stability fixation.

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