



## Metastatic adenocarcinoma of Proximal Femur treated by Custom made Hip Prosthesis

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### ABSTRACT

**Introduction:** Bone is the third most common site of metastatic disease. Treatment of metastatic tumours of proximal femur usually used to be either palliative in the form of radiotherapy and chemotherapy or a very radical in form of hemipelvectomy and hip disarticulation. Both forms of treatment were associated with dismal outcomes. Now with the technological advancement and refinement in surgeries a custom made hip prosthesis offers a much better treatment option to the surgeon and a good quality life to the patient.

**Case presentation:** We are presenting a case of metastatic adenocarcinoma of upper end of left femur with pathological fracture with a small primary in right lung treated with custom made hip prosthesis. Patient received chemotherapy for primary lesion and is doing well at 11 months of follow up.

**Conclusion:** This case is being presented on account of its unusual presentation and to give emphasis that in spite of metastatic disease, patient can be considered for limb salvage and megaprosthesis to improve his/her quality of life. This can be considered provided patient's general condition permits and if only a single solitary metastasis is present.

**Keywords:** metastatic adenocarcinoma, prosthesis, radical intent, proximal femur

### INTRODUCTION

A single space occupying mass in an adult is much more likely to be a focus of metastatic carcinoma [1]. In females, the breasts and lungs are the most common primary disease sites; approximately 80% of cancers that spread to bone arise in these locations [2]. In males, cancers of the prostate and lungs make up 80% of the carcinomas that metastasize to bone [3]. The remaining 20% of primary disease sites in patients of both sexes are the kidney, Gastro-intestinal tract and thyroid as well as sites of unknown origin[3]. A new bone tumor in the elderly is more likely to be malignant [4]. Metastatic bone tumors are much more common than primary tumors [5] and proximal femur is the most common site of involvement in the appendicular skeleton [6].

Pain, pathological fractures and hypercalcemia are the major sources of morbidity with bone metastasis [4]. Treatment goals aim to preserve function of the lower limb, eliminate pain and improve the quality of remaining life [6]. Treatment for bone metastasis is normally palliative [4]. An assessment of the risk of pathological fracture must be made by an experienced orthopaedic surgeon [4]. Lesions that do not represent a risk for fracture may be treated with radiation or by appropriate chemotherapy directed at the primary tumor [4]. Lesions that are regarded as a risk for pathologic fracture should be surgically stabilized on an elective basis before a fracture occurs [2]. The goals of surgery are to preserve stability and function of the musculoskeletal system as well as to alleviate pain [7]. Patients who were candidates for extensive femoral resection because of malignant tumor were long considered a high-risk group for limb-sparing procedures because of the extent of bone and soft-tissue resection, as well as the use of adjuvant chemotherapy and radiation therapy [8]. Hip disarticulation or hemipelvectomy was therefore the classic treatment for patients with large lesions of the proximal or mid femur [9]. Both procedures were associated with a dismal functional and psychological outcome [10]. The limb salvage

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surgery as a palliative treatment will provide more psychological benefit not only to the patient but also to relatives and will increase self confidence so that the quality of life is better for the expected duration of survival [11].

#### CASE REPORT:

A 65 years old female presented in September 2010, to our department with chief complaints of severe pain and swelling in left thigh since last 2 years. She was unable to walk and had loss of appetite since 1½ years.

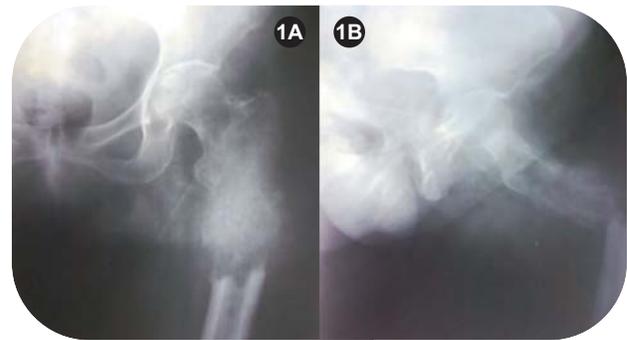
According to the patient she was apparently asymptomatic 2 years back when she developed pain in left thigh. Pain was present at the middle of flank and lateral aspect of thigh. It was constant in nature and was present even at rest, dull aching type aggravated by hip movements. It was accompanied with difficulty in walking due to pain. It was also associated with swelling over the upper part of thigh. For the above complaints patient took some local treatment but was not relieved. After six months patient was unable to bear weight even partially and was completely bed ridden. Patient also had loss of appetite and loss of weight for 1½ years.

She was not having any complaint of cough, fever, haemoptysis or hoarseness of voice, difficulty in swallowing for solids or liquids. Patient was having a history of intermittent pain in right side of middle chest, which used to relieve on taking non steroidal anti-inflammatory drugs. There was no history of any gastrointestinal upset or urinary problem, any breast lump, trauma syphilis, leprosy, diabetes and hypertension. Patient was a housewife with no history of tobacco or drug intake. No sensitivity or allergy to any drug. There was no family history of tuberculosis or malignancy. Patient was postmenopausal.

On examination there was a 10 cm × 5 cm swelling over antero-lateral aspect of upper part of left thigh. The swelling was diffuse, hard, localized to upper part of thigh, immobile, non-translucent, non-illuminant, non-fluctuant, non-pulsatile and fixed to the bone. There was deep tenderness over the swelling. The skin overlying the swelling was neither warm nor inflamed. The hip was in flexion, adduction and external rotation. Exaggerated lumbar lordosis was present. There was apparent shortening of 2 cm and true shortening of 1 cm. Straight leg raising test was negative. There was restriction of all movements of the affected hip. The inguinal lymph nodes were enlarged but seem too benign. Distal neurovascular status of the limb was intact.

Routine blood investigations were under normal limits. Serum lactate dehydrogenase – 154 U/L; Serum alkaline phosphatase – 320 U/L. Serum

calcium – 10.2 mg/dl. Plain radiographs of the affected part showed ill-defined osteolytic permeative pattern or moth eaten type of lesion with destruction of bone involving the diaphyseal and metaphyseal region of proximal femur and extension into the soft tissues (Fig. 1A, B).



**Figure 1A,B:** Pre-Operative radiograph of the patient showing permeative pattern or moth eaten type of lesion seen over the metadiaphyseal region of left femur with pathological fracture .

There was pathological fracture of femur at the distal margin of the tumor lesion with no periosteal new bone formation. The hip joint of the affected side appeared normal. Magnetic resonance imaging revealed a large expansile intramedullary osteogenic hypo intense vascular primary mitotic lesion of upper metadiaphyseal aspect of left femur with extra osseous extension of soft tissue in anterior and lateral myofascial compartment without any involvement of adjacent hip joint or neurovascular bundle.



**Figure 2:** Contrast enhanced CT Scan of thorax-showing mass lesion in the apical segment of right lower lobe.

Chest radiograph was showing a small ill defined area in right lower lobe. Contrast enhanced computed tomography scan of thorax was done to know about the nature of ill-defined opacity and it revealed a lobulated soft tissue density mass lesion measuring 26x30 mm noted in apical segment of right lower lobe. Mild adjacent pleural thickening is noted (Fig. 2).



Computed tomography guided Fine needle aspiration cytology from the lung lesion revealed adenocarcinoma. Ultrasound of whole abdomen was normal. Fluoroscopic guided needle biopsy of the femoral lesion revealed it to be a metastatic adenocarcinoma.



**Figure 3:** Intraoperative specimen of Tumour Excision with wide local excision of the tumour done

As patient was symptomatic due to metastatic lesion but not due to primary lesion so priority was given to metastatic site. The patient was planned for surgery, but as tumor was very vascular so to reduce the risk of bleeding at the time of surgery pre-operatively Radiotherapy was planned. Palliative Radiotherapy was given at a dose of 30 Gy in 10 fractions in 2 weeks with cobalt 60 in department of Radiotherapy of our institution to relieve pain and to reduce vascularization of tumor.



**Figure 4A:** Immediate Post Operative radiograph showing customised steel bipolar cemented proximal femoral mega prosthesis. 4B- 11 months follow up radiograph showing no loosening of the implant.

3 weeks after the completion of radiotherapy, hip was exposed by the postero-lateral approach extending the incision more distally. Careful dissection of the soft tissues was performed to avoid spilling of tumor cells. Wide local excision of the tumor was done. 17 cm of the affected bone including the head of the femur was

resected out (Fig. 3). Involved soft tissues were also resected. First a trial of the prosthesis was performed and checked for stability. Then it was replaced by customised steel bipolar cemented proximal femoral mega prosthesis. The cut muscles were tied at the ports at the upper end of the prosthesis. Wound was closed over suction drain. High groin slab with abduction bar was applied. Stitches were removed on 12th post-operative day and patient was allowed to walk with the help of walker.

After operative procedure for bone lesion patient was planned for chemotherapy and Radiotherapy for primary lung lesion. She received 4 cycles of chemotherapy in the form of inj. Gemcitabine and Cisplatin intravenous on day 1 and day 8, q-3wks followed by radical dose of loco-regional Radiotherapy (60 Gy/30 fractions). There were no wound problems or any other complications. She completed her treatment in April 2011. She has completed 11 months of follow up and is totally asymptomatic, pain free and walks independently with support (Fig. 4 A, B).

## DISCUSSION

Metastatic disease is the most common malignant lesion of bone [12]. Typically multifocal but renal and thyroid carcinomas are notorious for producing only a solitary lesion [13]. In our case patient presented with pathological fracture due to a solitary secondary bony lesion with incidental diagnosed lung primary. Treatment for bone metastasis is normally palliative [4]. An assessment of the risk of pathological fracture must be made by an experienced orthopaedic surgeon [4]. Lesions without a risk for fracture should be treated with radiation or by appropriate chemotherapy directed at the tumour [4]. Lesions with a risk for pathologic fracture should be surgically stabilized before a fracture occurs [2]. The goals of surgery are to preserve stability and function of the musculoskeletal system as well as alleviate pain [7]. When any patient presents with metastatic disease our intent of treatment is changed from radical to palliative; But in this case our intent of treatment was curative, because primary was a small lesion and only a single metastasis was present though patient was having pathological fracture but keeping in mind good general condition of the patient and no other metastatic lesion elsewhere, we started our treatment with radical intent. Most patients with metastatic bone disease survive for 6-48 months [9]. Our patient had a good general condition and life expectancy; she was only rendered immobile due to the pathological fracture. There are various possible constructive options to treat femoral bone loss are long-stem cemented or press-fit stems, impaction allografting, resection arthroplasty, allograft-prosthetic composite (APC) and proximal femoral mega prosthesis [14]. Most of patients with metastatic lesions to the



proximal femur respond well to radiation therapy [15]. Of the 5–10% of these patients who require surgery, the most common reason is pathologic fracture, followed by tumor progression and intractable pain [14]. Hip disarticulation or hemipelvectomy was therefore the classic treatment for patients with large lesions of the proximal or mid femur [9]. Both procedures were associated with a poor functional and psychological outcome [10]. Improved survival of patients with musculoskeletal malignancies, refinements in surgical technique and developments in bioengineering, has allowed the execution of limb-sparing surgeries in these extreme situations [10]. As a result, proximal and total femur resection have become surgical options in the treatment of primary bone sarcomas and metastatic bone disease [11]. Expecting a favorable outcome and to improve the quality of life of the patient we went for a limb salvage surgery in form of custom made hip prosthesis despite of it being a metastatic tumor. The justification for using proximal femoral replacement surgery with a one year mortality of 65% is debatable [9]. Wedin et al [16] reported 30% one year, 10% two years and 7% three years patient survival following surgery for proximal femoral metastases while Chandrasekhar et al [17] reported 35%, 20% and 10% as respective figures. In our case patient is fine at almost one year of follow-up and longer follow up will be needed to further comment of survival

#### CONCLUSION:

In long bones, the most common site for metastases is the proximal femur. For lesions involving this region, osteosynthetic devices frequently fail, and for this reason, endoprosthetic reconstruction may be the optimal choice for treatment. Despite the metastatic lesion from lung primary limb salvage by using custom mega prosthesis is a good option in the management of these patients. Although the survival rate remains grim, the patients can benefit from an improved quality of life. Moreover, the psychosocial morbidity associated with disfiguring amputations can be avoided by extending the realms. High cost is a constraint

#### CLINICAL MESSAGE

*A palliative megaprosthesis replacement is a good option in cases of pathological fractures secondary to metastatic adenocarcinoma. This will improve the patients quality of life for the remaining years, however cost is a constraint.*

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