

Metastatic Disease of the Proximal Femur

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Summary

Since January 1999, ten patients had undergone surgical treatment for metastatic bony lesions of proximal femur at this centre. Seven of these patients were treated for complete pathological fractures, one for impending fracture and one for revision of internal fixation and loosening of hemiarthroplasty. Primary malignancies were located in breast in four cases, prostate in three and one in lung, thyroid and neurofibrosarcoma. Two patients had died within six months after surgery, four after 1 year while the remaining four were still alive. The mean duration of survival was eleven months. Nine patients had been ambulating pain free and there were no failure of reconstruction.

Key Words: Proximal femoral metastatic disease, Operative fixation

Introduction

Metastatic carcinoma is the most common malignancy of bone. The proximal femur is the most common site of involvement in the appendicular skeleton^{1,2}. It is also a common site for pathological fracture because of a significant force passed through this region^{1,2}. The goal of treatment is to preserve function of the lower limb, eliminate pain and improve the quality of remaining life. The importance of early treatment and surgical stabilisation are well established, and large numbers of patients with metastatic bone disease will benefit with improvement of the quality of life^{1,2,3}.

Series of Cases

We present a series of ten patients who were surgically treated in Orthopedics Department HUSM since January 1999 to June 2002. There were five males and five females with an average age of fifty-three years (range twenty four to eighty years). Seven patients presented with complete fractures while the others were treated for impending fractures or implant failure following dynamic hip screw fixation and loosening of Austin Moore hemiarthroplasty. Primary malignancies were located in the breast in four cases, prostate in three and one each in lung, and thyroid, and a neurofibrosarcoma.

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Radiologically isolated involvements of neck of femur were noted in four patients, the subtrochanteric region in three patients and massive destruction of neck and intertrochanteric region in other three patients. All patients were either treated with internal fixation or prosthetic replacement. Two patients were treated with cemented Thompson's hemiarthroplasty, one Gamma interlocking nail supplemented with bone cement, one proximal femur replacement endoprosthesis and six allograft prosthesis with bipolar long stem hemiarthroplasty. Intralesional surgery was performed on four of these patients and marginal resection for six others. The selection of fixation devices and implants were greatly influenced by the location of the lesion and pattern of bony destruction.

All patients had Technetium 99m MDP bone scans for screening for other distant metastases. Three breast carcinoma patients had multiple osseous metastases and one required simultaneous fixation of the humerus. Two patients with breast carcinoma and another with prostatic carcinoma

had spine metastases, which were controlled by external beam radiotherapy.

All patients received external beam radiation therapy post operatively and a total radiation dose of 20-30Gy over 1 to 2 weeks duration were given to each patient. The treatments started within 2 to 4 weeks after surgery. We also started oral biphosphanates in all patients of breast and prostatic carcinoma and in four patients we started on intravenous pamidronate (90mg; 15 minutes infusion) on a monthly basis. We had observed that the requirement of analgesics was less and patients start ambulating after two weeks of surgery. Two patients had died within six months of surgery and four after 1 year while the rest were still alive. The mean duration of survival was eleven months. Nine patients were pain free and able to ambulate with the help of walking aids and one patient had been bedridden due to massive thoracic involvement of neurofibrosarcoma. There were no recurrences or failures of reconstructions in our series.

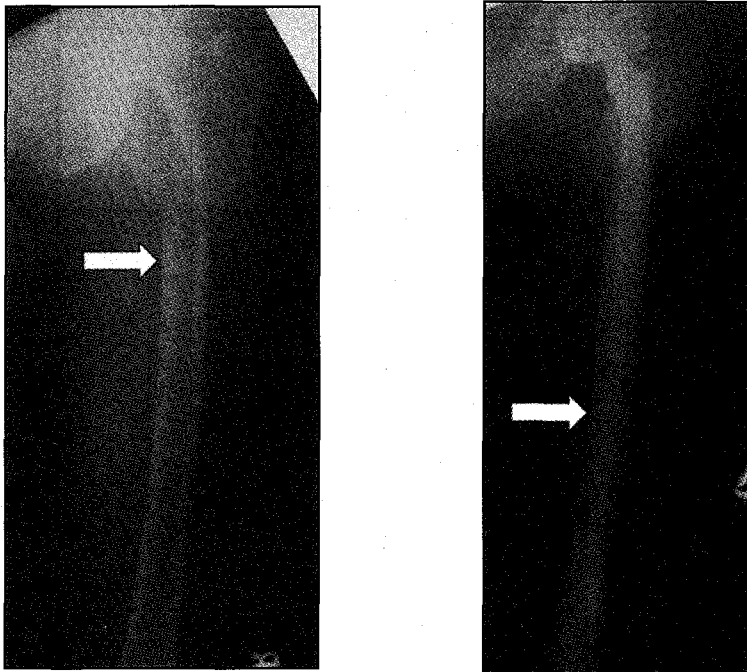


Fig. 1: Metastatic carcinoma prostate with fracture of the subtrochanteric femur treated with allograft prosthetic composite replacement

Table 1: Series of Ten Patients With Proximal Femoral Metastasis

AGE	SEX	PRIMARY TUMOUR	PROX. FEMORAL REGION	PRESENTATION	OTHERS METASTASIS	SURGICAL PROCEDURE	AMBULATION	OUTCOME
42	F	Breast	Subtrochanteric	Fracture	Lungs	Gamma interlocking Nail	2 weeks	DOD 5 months
39	F	Breast	Massive	Impending fracture	Humerus, Spine & Ribs	Endoprosthesis	2 weeks 2 weeks	DOD 12 months DOD 12 months
37	F	Breast	Neck	Fracture	Nil	APC	2 weeks	Survive 12 months
80	M	Prostate	Subtrochanteric	Implant failure Dynamic Hip Screw	Nil	APC	3 weeks	Survive 12 months
24	M	Neurofibrosarcoma	Neck	Fracture	Lungs	Cemented Thompson's Hemiarthroplasty	Non ambulating	DOD 6 months
64	M	Lungs	Neck	Fracture	Nil	Cemented Thompson's Hemiarthroplasty	1 week 1 week	Survive 12 months Survive 12 months
72	M	Prostate	Neck	Implant failure Austin Moore Hemiarthroplasty	Spine	APC	3 weeks	DOD 12 months
56	F	Thyroid	Massive	Fracture	Nil	APC	3 weeks	DOD 24 months
45	F	Breast	Massive	Fracture	Spine & Ribs	APC	2 weeks	DOD 12 months
71	M	Prostate	Subtrochanteric	Fracture	Nil	APC	2 weeks	Survive 3 months

DOD : Died of Disease

APC : Allograft Prosthetic Composit

Discussion

Metastatic carcinoma is the most common malignancy involving bone^{1,2}. The presentation of patients with skeletal metastasis is pain, and varies from abnormal bone scan with history of primary cancer; to pathological fracture. Five common carcinomas account for approximately 80% of skeletal metastases namely: breast, lung, prostate, kidney and thyroid^{1,2}. A careful evaluation of these patients are necessary to evaluate the metastasis in order to optimise treatment, avoid; and minimise complications. The treatment of bone metastases is usually palliative and aims to adequately control pain; and to anticipate or stabilise pathological fractures.

The proximal femur is the most common site of involvement in the appendicular skeleton. This is also a common site of pathological fracture because of the significant force that is transmitted through this region while standing^{1,2}. In proximal femur pathological fracture; 50% are located in the neck region, whereas 30% are subtrochanteric and 20% are intertrochanteric regions^{1,2}. A fracture involving the proximal femur may result in impaired mobility and function; with severe pain. Fixation of these proximal lesions can be particularly challenging once a pathological fracture has occurred. The morbidity and increased surgical difficulty with pathological fracture warrants early diagnosis and prophylactic fixation. All patients in our series presented late with fracture or massive bone destruction. This limited our option to conventional prosthetic replacement, or in some cases when the calcar area was destroyed; to special prosthesis or combination with allograft.

Many options are available for the reconstruction of proximal femur metastases. The aim is to provide stable reconstruction for early ambulation and to maintain function for the remaining of the patients' life. These include plate and screws; including dynamic hips screw, third generation proximal femoral reconstruction with

intramedullary nails, standard endoprosthesis, and customised or replacement endoprosthesis. The selection of implants depends on the location of the lesion and the pattern of bone destruction. Methylmetacrylate bone cement is used to augment and obliterate bone defects and strengthen the already weakened bone, thereby minimising fixation failure. Two cases of implant failure in our series were from the ongoing process of malignancy and inadequate fixation techniques. Dynamic hips screw and Austin Moore prosthesis without cement augmentation is not adequate in terms of long-term durability because of high mechanical stress in this area.

The classical indications for surgery include a destructive lytic lesion in the femur which is painful on weight bearing and measure at least 2.5 cm size in diameter, or a lesion that has weakened or destroyed at least half the cortex of bone. The presence of an avulsion of the lesser trochanter indicates involvement at the high stress calcar region and this predicts high risk of fracture. Pain that is unresponsive to radiation therapy is another commonly considered indication for surgery. A scoring system to define the risk of pathological fracture which considers the site, pain, radiological appearance and the size of the lesion was introduced by Mirels; and should be considered as a guideline for patient management³.

Postoperative external beam radiation was started in all patients. This is supported by work done by Townsend et.al whereby 15% of his patients treated with surgery alone required a second orthopaedic procedure because of increasing pain and radiographic evidence of loosening of prosthesis. In contrast, patients treated with postoperative irradiation, only 3% require a second operative procedure⁴. Prophylactic use of newer biphosphonates have been shown to decrease the actual incidence of bone metastases, minimising orthopaedic events, and malignant hypercalcaemia⁵. The use of pamidronate in patients with established osseous metastases from breast cancer, prostate cancer and myeloma; have

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been shown to decrease tumour burden and induce remission or healing in these osseous lesions without concurrent chemotherapy or radiotherapy⁵.

Conclusion

The aggressive treatment of proximal femur metastatic disease results in restoration of function and diminution of pain. Although the patients survival outlook has not changed. Good quality of life is enhanced significantly.

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