

## Operative management of patients with non-spinal metastatic bone disease. Does it actually improve quality of life?

Masood Umer, Yasir Mohib, Hafiz Umer

### Abstract

**Objective:** To determine the survival rate and functional outcome of skeletal stabilisation in patients with metastatic bone disease.

**Methods:** The retrospective study was conducted at Aga Khan University Hospital, Karachi, and comprised data of patients with non-spinal metastatic bone disease managed surgically from January 2002 to December 2010. All patients had been managed by experienced orthopaedic, oncology and multidisciplinary teams. Patients managed by non-oncologic orthopaedic surgeons were excluded. The prognostic influence of clinical, pathological and treatment variables on Musculoskeletal Tumour Society score, range of motion, local complications and death rate were measured. SPSS 19 was used for statistical analysis.

**Results:** Of the 49 patients whose records were included in the study, 21(42.9%) males and 28(57.1%) females with an overall median age of 59 years. Most common primary tumour site was breast in 15(3.8%) followed by lungs in 11(22.4%), Open reduction and internal fixation was the most commonly used procedure in 18(36.7%) patients. Mean duration of follow-up was  $30.20 \pm 29.2$  SD months (range: 10-48 months). The median patient survival was 23 months. 23% patients have superficial surgical site infection. Mean Musculoskeletal Tumour Society score was  $23.73 \pm 14.3$  SD.

**Conclusion:** The results confirm the principle that surgery for metastatic disease is done primarily to improve quality of life and ambulation status, and to alleviate pain.

**Keywords:** Metastatic Bone Disease, MSTS score, Survival. (JPMA 64: S-116 (Suppl. 2); 2014)

### Introduction

Bone is the third most common site of metastasis after lung and liver. About 10% of patients with metastatic disease may sustain pathological fractures, and 65% of all fractures requiring surgery occur in the femur.<sup>1</sup>

Pathological fractures are most distressing as severe pain complicates the condition that may significantly affect the patients' quality of life, leaving them with problems of recumbence. Previously it was thought that these patients had grave prognosis and 50% of them rarely survived beyond three months.<sup>2</sup> Recent advances and multidisciplinary approach brought improvement in the number of survivors. Successful management of the patient requires recognition, diagnosis and treatment of the underlying condition affecting the individual.<sup>3</sup> Management of these pathological fractures and impending fractures are quite different from the others, because of the associated disease and, if they remain unrecognised, they can produce detrimental effects on patients' life or limb.<sup>4</sup>

No clear guidelines or prospective studies exist regarding

.....  
Aga Khan University Hospital, Karachi.

**Correspondence:** Yasir Mohib. Email: yasirmohib@hotmail.com

treatment protocol for these lesions and the treatment is based on the patient's symptoms and radiographic appearance of the lesion. Fidler in 1973 assessed patients with impending fractures with greater than 50% cortical involvement and identified the improvement of pain post-operatively after prophylactic internal fixation.<sup>5</sup> Mirel proposed a scoring system for the prediction of fracture in which several radiographic and clinical factors were combined into a single score.<sup>6</sup>

In pathological fractures caused by metastatic bone tumours, treatment is palliative rather than curative. The majority of metastatic bone lesions are treated effectively with non-surgical modalities such as radiation therapy, chemotherapy, hormonal therapy and bisphosphonates. Operative treatment may be required for patients with existing or impending pathological fracture with intractable pain that does not respond to any non-operative procedure.<sup>7</sup>

The decision whether to perform prophylactic surgery depends on several complex factors, including life expectancy, functional demands of the patient, compliance and ability to allow early mobilisation.<sup>8</sup> Non-surgical candidates are patients with limited life expectancy, severe co-morbidities, small lesions, radiosensitive tumours, or the general condition of the

patient being inadequate to tolerate anaesthesia and the surgical procedure.

Advances in systematic treatment, multidisciplinary approach, pain control and local modalities have changed the philosophy towards aggressive care to provide improvement in quality of remaining life.

The current study was planned to determine the rate of survival and functional outcome of skeletal stabilisation in patients with metastatic bone disease.

## Material and Methods

The retrospective study was conducted at Aga Khan University Hospital (AKUH), Karachi, and comprised data of patients with non-spinal metastatic bone disease managed surgically from January 2002 to December 2010. All patients had been managed by experienced orthopaedic, oncology and multidisciplinary teams. Patients managed by non-oncologic orthopaedic surgeons were excluded. The prognostic influence of clinical, pathological and treatment variables on Musculoskeletal Tumour Society (MSTS) score, range of motion, local complications and death rate were measured at 3-month follow-up. MSTS score is a validated tool to assess the functional outcome which includes 6 categories, each given a numerical variable from 0-5. Pain, function and emotional acceptance are used in the evaluation of the upper and lower extremities. Use of walking aids, gait and walking are evaluated for the lower extremity, and hand positioning, dexterity and lifting ability are evaluated for the upper extremity. The score usually is expressed as its numerical value and can be expressed as a percentage.<sup>9</sup>

Survival overtime was calculated using Kaplan-Meier analysis. Starting from the date of the original surgery, the patients were monitored either till patient's death or till the date of last follow-up. SPSS 19 was used for statistical analysis.

## Results

Of the 107 available patient files, 23(21.5%) had to be excluded for missing data and 32(29.9%) were lost to follow-up. The final study sample, as such, stood at 49(45.8%) Of them, 21(42.9%) were males and 28(57.1%) were females with an overall median age of 59 years (range: 45-84 years). The peri-trochanteric region showed the highest involvement in 16(32.7%) patients, lower extremity in 10(20.4%) upper extremities in 10(20.4%), pelvis in 8(16.3%) and 5(10.2%) had involvement of other regions.

The most common primary malignancy was breast,

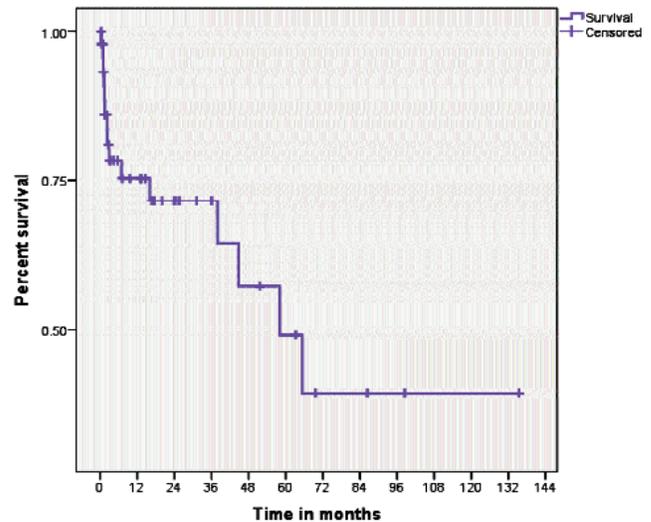


Figure-1: Survival curve.

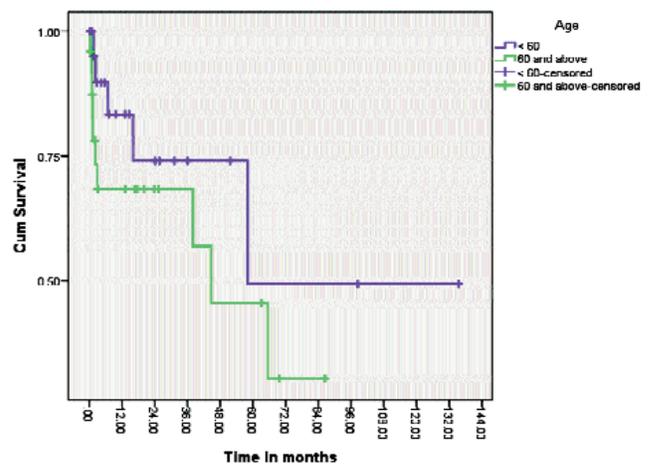


Figure-2: Survival based on patient age.

affecting 15(31%) patients, followed by lungs in 11(23%), unknown site 9(19%) prostate 3(5%), renal cells 2(4%), gastrointestinal (GI) tract 1(2%) and others affecting 8(16%).

Overall, 29(59%) lesions were found to be lytic on X-ray, 18(37%) mixed and 2(4%) blastic. Open reduction and internal fixation (ORIF) was the most commonly performed procedure in 18(37%) patients followed by arthroplasty in 17(35%), intramedullary (IM) nailing in 10(20%) and Dynamic Hip Screw (DHS) in 4(8%) individuals.

Mean MSTS score was  $23.73 \pm 14.3$  SD or 79.1% with the worst score being 16. None of the patients had fixation

failure whereas surgical site infection (SSI) was found in 10(20%) patients in whom it was managed with antibiotics. No re-operations were required.

Mean follow-up was 30.2±29.2 SD months (range 10-48 months). Median patient survival was 23 months. Survival based on patient age was also calculated (Figures 1-2). Median survival rate calculated using Kaplan-Meier analysis was 75% at 1-year follow-up and 50% at 5-year follow-up.

### Discussion

Studying the outcome of surgical treatment of metastatic bone disease is very difficult. These are severely affected patients whose condition aggravates with the progressive effects of the debilitating disease and the effects of the treatment in the form of chemotherapy or radiotherapy and other medical conditions. These factors may be apparent with the attrition in the follow-up process. As can be seen in our study, a number of patients did not return for follow-up and the surgical results thus remained unknown in our subgroup. The average MSTS score in our study was 79.1% (or 23.7) which is very much comparable with a study conducted in 2011 which compared femoral metastasis.<sup>10</sup>

MIREL's score is very important for prophylactic fixation of impending fracture and takes into account the site, size, characteristics of the lesions and pain severity affecting the patient's quality of life. Mirel's scoring system suggested prophylactic fixation when a score was greater than 86. The worst score in our sample was 16.

The limitation of our study was its retrospective nature and the limited number of patients visiting a single centre. We recommend the concept of having a tumour

registry at the national level which would possibly enable standardised collection of data and inclusion of large number of patients visiting various centres.

### Conclusion

Our results confirm the principle that surgery for metastatic disease is done primarily to improve quality of life and ambulation status, and to alleviate pain. Mirel's criterion was very useful in deciding when to operate.

### References

1. Ampil FL, Sadasivan KK. Prophylactic and therapeutic fixation of weight-bearing long bones with metastatic cancer. *South Med J* 2001;94:394-6.
2. Bickels J, Dadia S, Lidar Z. Surgical management of metastatic bone disease. *J Bone Joint Surg Am* 2009 ;91:1503-16.
3. Qadir I, Umer M, Baloch N. Functional outcome of limb salvage surgery with mega-endoprosthetic reconstruction for bone tumors. *Arch Orthop Trauma Surg* 2012;132:1227-32.
4. Van der Linden YM, Dijkstra PD, Kroon HM, Lok JJ, Noordijk EM, Leer JW, et al. Comparative analysis of risk factors for pathological fracture with femoral metastases. *J Bone Joint Surg Br* 2004;86:566-73.
5. Fidler M. Prophylactic internal fixation of secondary neoplastic deposits in long bones. *Br Med J* 1973 ; 1:341-3.
6. Mirels H. Metastatic disease in long bones. A proposed scoring system for diagnosing impending pathologic fractures. *Clin Orthop Relat Res* 1989;249:256-64.
7. Attar S, Steffner RJ, Avedian R, Hussain WM. Surgical intervention of nonvertebral osseous metastasis. *Cancer Control* 2012;19:113-21.
8. Cheung FH. The practicing orthopedic surgeon's guide to managing long bone metastases. *Orthop Clin North Am* 2014;45:109-19.
9. Enneking WF, Dunham W, Gebhardt MC, Malawar M, Pritchard DJ. A system for the functional evaluation of reconstructive procedures after surgical treatment of tumors of the musculoskeletal system. *Clin Orthop Relat Res* 1993;286:241-6.
10. Harvey N, Ahlmann ER, Allison DC, Wang L, Menendez LR. Endoprostheses last longer than intramedullary devices in proximal femur metastases. *Clin Orthop Relat Res* 2012;470:684-91.