



Research Paper

Profile of Surgically-treated Metastatic Extremity Bone Tumours at a University Hospital in Hong Kong

在香港一所大學醫院用手術治療的轉移性肢端骨腫瘤的概況



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ABSTRACT

Background/Purpose: Metastatic deposits in bones increase overall morbidity in cancer patients. The orthopaedic oncologist aims at controlling the skeletal morbidity as a way of reducing the overall morbidity in the survival period of the cancer patient. This study investigated the characteristics of metastatic extremity bone tumours requiring surgical treatment, with a view to setting a template for a local database of extremity metastatic bone tumours in Hong Kong.

Methods: A retrospective review of metastatic extremity bone tumours treated surgically at a university hospital in Hong Kong, from January 2006 to December 2015, is presented.

Results: In total, 126 patients were studied. The lung (28.6%) was the most common source of metastasis to the extremity bones. The femur (70.1%) was most commonly involved. Pathological fractures (47.4%) were the most common indications for surgery. Intramedullary nailing (57.3%) was the most common surgical treatment. The overall postoperative complication rate was 8.7%. The mean duration of follow-up was 10.8 ± 4.1 months. Furthermore, 79.4% of the patients died within the study period, with mean duration of postoperative survival of 6.1 ± 1.1 months. Spinal compression ($p = 0.001$), indication for surgery ($p = 0.001$), age of the patient ($p = 0.001$), and option of surgical treatment ($p = 0.000319$) were found to have significantly affected the duration of postoperative survival.

Conclusion: The surgical management of extremity bone metastasis is a key consideration in averting potentially crippling morbidity. Options of treatment need be carefully chosen in appropriate patients for a good outcome.

中文摘要

背景: 腫瘤的骨轉移增加了癌症患者的病況。骨科腫瘤學家旨在控制骨骼的病況來降低癌症病人的總病態。這項研究調查需要手術治療的轉移性肢端骨腫瘤的特點，以便建立香港的轉移性肢端骨腫瘤的本地數據庫模板。

方法: 回顧性研究由2006年1月至2015年12月在一所香港大學醫院手術治療的轉移性肢端骨腫瘤個案。

結果: 共有126例患者進行了研究。肺部 (28.6%) 是最常見轉移到肢體骨骼的來源。股骨 (70.1%) 是最常見出現骨轉移的位置。病理性骨折 (47.4%) 是最常見的手術適應症。髓內釘 (57.3%) 是常見的手術治療方法。整體術後併發症發生率為8.7%。平均隨訪時間為 10.8 ± 4.1 個月。79.4% 的患者在研究期內死亡，平均術後生存期為 6.1 ± 1.1 個月。脊柱壓迫 (P 值 = 0.001)、手術適應症 (P 值 = 0.001)、患者年齡 (P 值 = 0.001)、手術方法的選擇 (P 值 = 0.000319) 都顯著影響術後生存期。

結論: 手術治療肢體骨轉移是避免潛在的致殘發病率關鍵。要達到好的結果，需要為合適的病人仔細選擇治療的方法。

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Introduction

Opinion is divided in literature with respect to whether or not the skeleton is the most common site of metastatic disease ahead of the lung and the liver.^{1–3} Whereas Teixeira et al¹ hold that bone is the third most common site for metastatic disease, after lung and liver, Utzschneider et al² and Coleman³ have stated that the skeleton is the most common site affected by metastatic cancer. Metastatic lesions are the most common malignant tumours affecting the skeleton, representing a significant burden on the healthcare system in a place like the United States, where more than 280,000 adults had metastatic bone disease as at 2008.⁴ The vulnerability of bone to metastasis is a consequence of the high blood flow under low pressure in the areas of red marrow, making the bone matrix a fertile ground for the implantation of tumour cells.¹ Although virtually any malignancy can metastasise to bone, about 80% of skeletal metastases originates from primary diseases in the breast, prostate, lung, kidney, and thyroid. The incidence is reportedly greatest for breast and prostate cancers.⁵ A number of adhesion molecules have been found to play significant roles in tumour cell osteotropism.^{6,7}

The appendicular skeleton, understandably, presents a large surface area for deposition of tumour metastasis. Metastatic deposits in these sites predispose to pain, mechanical instability, and fractures, all of which contribute to the overall morbidity and reduced survival in cancer patients. Managing bony metastatic disease can be challenging.⁵ Lytic skeletal metastases, especially when located in the extremity bones, present the patient and the surgeon with the risk for impending pathologic fracture requiring a decision for surgical intervention. Large destructive lesions in the femur and hip areas are particularly worrisome.⁵ Stabilisation of impending and pathologic fractures, restoration of mobility and gait, with resultant reduction in the overall morbidity during the survival period of the cancer patient, are the major objectives of orthopaedic surgical interventions in bone metastases. Surgery should, therefore, provide pain relief and improve the quality of life (QoL).^{1,8,9}

There is paucity of literature, in Hong Kong, on metastatic bone diseases in general and metastatic extremity bone tumours in particular. To the best of our knowledge, there is no literature regarding such a study in tumour patients in this region. The aim of this study was to investigate the characteristics of metastatic extremity bone tumours that required surgical treatment at a university hospital in Hong Kong and to set a template for a local database of extremity metastatic bone tumours in Hong Kong.

Methods

This was a 10-year retrospective observational review of metastatic extremity bone tumours treated surgically from January 2006 to December 2015. The study was approved by the University/Hospital Authority Hong Kong West Cluster Institutional Review Board (Division of General Orthopaedics and Orthopaedic Oncology, Department of Orthopaedics and Traumatology, University of Hong Kong, Queen Mary Hospital, Pok Fu Lam Road, Hong Kong) (Reference Number UW 15-414). All patients gave informed consent prior to surgery.

The particulars of patients seen at the orthopaedic department of the hospital for metastatic bone disease in the given period were retrieved from the medical health records. With the help of patients' particulars, the electronic patients' record domiciled in the hospital's Clinical Management System (CMS) was accessed. Patients that were treated by surgical operative procedures for extremity metastases were isolated as the study population.

The inclusion criterion was extremity metastasis treated by surgical operation. Patients treated surgically for bony metastasis in

the upper and lower limbs including the pelvic and pectoral girdles were included. The exclusion criteria were primary bone tumours, extremity soft tissue tumours, cases that did not have surgery to the extremity, cases treated conservatively, craniofacial metastasis, more than one primary site, cases outside the study period, incomplete entries into the CMS, and those whose hospital numbers were returned as invalid and could not be accessed.

The clinicopathological data of patients in the study population, as contained in the CMS, was studied with attention to the following: demographics, diagnosis and site of primary tumour, extremity bone affected by metastasis, indications for surgery, options of operative procedures, date of surgery, complications related to surgery, and date of discharge and of last follow-up. The use of postoperative adjuvant therapy and occurrence of skeletal-related events (SREs) were noted. Where applicable, the date of death was also noted. All patients signed informed consent prior to surgery and had physiotherapy as well as oncological follow-up in the postoperative period. Clinical diagnoses of metastatic bone tumour arising from pre-existing primary tumours were validated by radiological and histopathological examinations and reports. Histopathological reports of bone tissue biopsy specimens taken at the time of bone surgery were compared with those of primary tumours.

Data were analysed using the SPSS version 17 (SPSS Inc., Chicago, IL, USA). Frequency distributions were generated for all categorical variables. Numeric variables were assessed using Student *t* test, and categorical variables were assessed using Chi-square test. A *p* value < 0.05 was considered statistically significant.

Study limitations

A good number of patients are seen by oncology and other specialties and, therefore, orthopaedic referrals could either come late or not at all.

This was a retrospective study as stated in the methodology. Consequently, we did not have the opportunity of setting up and observing the known objective criteria for measuring the QoL in these patients at such designated periods as preoperative, immediate postoperative or 3 months postoperative, as would have been the case in a prospective study.

Results

In total, 280 patients were seen for bone metastases in the study period. Cancer patients from different specialties were followed-up at different departments of the hospital; therefore, the number of patients seen in the orthopaedic department for bone metastases depended on referrals from these sources. Of the 280 patients, 126 (45.0%) met the study criteria and were included in the analysis, covering the period of 2006–2015 (Figure 1). The remaining 154 patients that were excluded from the study did not meet the inclusion criteria despite having metastatic bone disease. They were

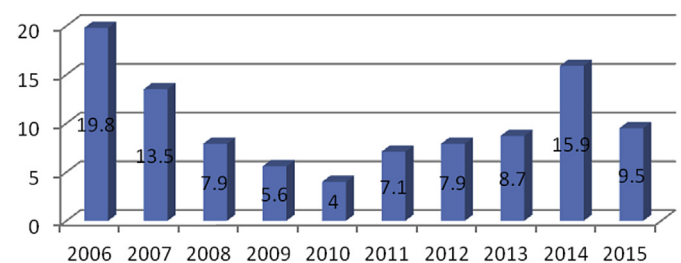


Figure 1. Percentage representation of patients seen according to year.

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