

Treatment of Pathologic Fracture of Femoral Shaft with Abrasion of the Lytic Lesion, Open Reduction, Cement Infusion and Internal Fixation; A Case Report

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ABSTRACT

Background: Pathological fractures are a rising concern in the field of musculoskeletal oncology. Their incidence rises, mainly due to the improved diagnostic and therapeutic methods that lead to prolonged survival. The appropriate treatment has not been yet standardized, but the current bibliography describes surgical treatment capable of stabilizing the expected life expectancy. Orthopedic cement infusion in combination with broad abrasion of the bone metastasis has been described, although more research is needed.

Case Report: A seventy-seven-year-old woman arrived at the emergency department with an ambulance, due to mentioned fall from her height, without being preceded by an episode of dizziness. Pain onset was sudden and there was inability of either standing or walking. Following the laboratory blood tests and the standard radiological tests (x-rays), a femoral diaphysis fracture with osteolysis of the femoral canal and a left-lung lobar consolidation. This patient was treated with broad abrasion of the bone metastasis, cement infusion, open reduction, internal fixation, and use of bone chips.

Conclusion: Life expectancy in patients with bone metastases has been prolonged due to the evolution of chemotherapy, radiotherapy, and other oncological treatments. The broad abrasion of the bone metastasis and the filling of the bone gap with poly (methyl methacrylic acid) may give greater stability to the reduction of the fracture and reduce the risk of cancer cells spreading.

Keywords: Pathologic Fracture; Bone Metastasis; Abrasion; Internal Fixation

Introduction

An estimated 1.9 million people was diagnosed with cancer in 2022. More than half of these diagnoses will involve cancers that metastasize to bone, the most common being breast, prostate, lung, renal, and thyroid carcinomas [1]. In general, after the lungs and liver, the skeleton is the most common target for metastatic disease. The spine, pelvis, proximal femur and proximal humerus are the most frequent sites for metastasis [2]. Pathological fractures are a growing concern in the field of musculoskeletal oncology. Their incidence is increasing, primarily due to improved diagnostic and therapeutic

methods leading to increased survival. Pathological fractures due to bone metastases in the long bones are most commonly located in the femur, tibia and humerus. The femur is the most common long bone affected by bone metastases and subsequent pathologic fractures [3,4]. In the femur, approximately 50% of these fractures are located in the neck, 30% in the subtrochanteric region and 20% in the peritrochanteric region. Patients typically experience sudden pain after minimal or no mechanical trauma. The most common types of primary focus are lung cancer and renal cell cancer, often without manifestation from the primary focus [5,6]. Pathologic fractures occur in response to altered bone physiology, resulting in compromised

mechanical properties owing to an underlying lesion. The root cause can be either benign or malignant, primary or secondary. These entities require different treatments, and the consequences of a missed diagnosis can be devastating; therefore, proper evaluation of the lesion is essential before surgery. Although the differential diagnosis includes bone sarcomas, tumor-like conditions, metastases, benign bone tumors and lymphoproliferative diseases, the most common cause of pathologic fracture is metastasis [7-10].

Case Report

A seventy-seven-year-old woman arrived at the emergency department with an ambulance, due to mentioned fall from her height, without being preceded by an episode of dizziness. Pain onset was sudden and there was inability of either standing or walking. Following the laboratory blood tests and the standard radiological tests (x-rays), a femoral diaphysis fracture with osteolysis of the femoral canal (Picture 1) and a left-lung lobar consolidation (Pictures 2 & 3). The patient was treated with broad abrasion of the bone metastasis (Picture 4), cement infusion, open reduction, internal fixation with locking plate and placement of dried bone chips. The aim of injecting the cement inside the femoral shaft was, in addition to further stabilizing the reduction, to reduce the possibility of cancer cell spreading and to fill the bone deficit due to the lytic lesion [11]. Quinn et al. in their article on the contemporary management of metastatic bone disease suggest that smaller lesions should be treated with internal fixation with plate and polymethylmethacrylate (PMMA) [12]. In another study of 672 operated skeletal metastases, it was found that the en bloc resection of a metastases did not increase the average of life expectancy [13]. Biopsies were taken during the procedure for histopathological examination of material. The patient was mobilized the next day, walked without leg loading and had no local recurrence six months after surgery (Pictures 5 & 6).



Picture 1.



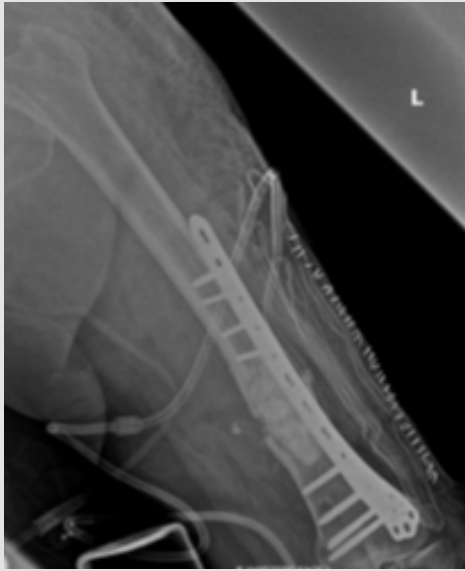
Picture 2.



Picture 3.



Picture 4.



Picture 5.



Picture 6.

Discussion

Pathological fractures of the long bones are a common complication of bone metastases. Life expectancy of patients with bone metastases has increased due to advances in chemotherapy, radiotherapy and

other oncological treatments. Appropriate treatment has not yet been standardized, although the literature describes surgical treatment to stabilize the fracture and improve expected life expectancy [14]. Orthopedic cement placement combined with wide scraping of the bone metastasis has been described as a treatment method [15] but needs further investigation. In addition to internal osteosynthesis with lock plate and screws, intramedullary ossification has been described as a treatment for pathological long bone fractures due to bone metastases from advanced cancer [16]. In patients with pathological fractures in skeletal metastases, wide resection is justified for solitary metastasis, 'favorable' tumour histotype, good general condition and long free interval from treatment of primary cancer. Another study suggests that a metastasis in the proximal or distal femur or the proximal humerus should be treated with a broad resection of the lesion and arthroplasty. On the other hand, this type of treatment is intended for palliative care and not therapeutic. On that note, there are suggestions for closed intramedullary fixation over open reduction and internal fixation or megaprosthesis reconstruction, in order to reduce the morbidity rate associated with the surgical procedure. But, in any surgical treatment that the surgeon chooses, the fixation must be rigid, so that there can be a post-operative function [17-20].

Conclusion

Internal osteosynthesis was preferred in this patient due to the location of the fracture (peripheral femoral third of the femur). Following biopsy, stabilization of the fracture and oncologically oriented surgical treatment should be performed. Attention should be given to the initial displacement, stability and location of the pathological fracture [21]. Patients with longer expected survival require a more aggressive treatment with wide resection, megaprosthesis reconstruction and postoperative radiation therapy. In contrast, patients with shorter expected survival may benefit from a less aggressive, less morbid treatment with rigid internal fixation and adjuvant radiation therapy [22-24]. Another study suggests the use of IM nails due to less blood loss during and after the operation [25].

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