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Original Article

Functional assessment of endoprosthesis in the treatment of bone tumors☆

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ABSTRACT

Objectives: Evaluate the functional grade of these patients and to identify the types of complications found that influenced the average life span of endoprostheses the functions of the operated limb.
Methods: We analyzed 14 post-operative cases of endoprosthesis, patients with malignant bone tumors and aggressive benign bone tumors submitted to surgery between 2004 and 2014. The evaluation system used was proposed by Enneking, recommended by the Musculoskeletal Tumor Society (MSTS), in addition to the radiologic evaluation.
Results: Endoprosthesis are excellent choices for the treatment of bone tumors with limb preservation in relation to pain, strength, and patient's emotional acceptance. Another factor for good results is the immediate weight-bearing capacity, generating a greater independence.
Conclusion: The authors conclude that all patients classified the therapy as excellent/good, regardless of the type of prosthesis used, extent of injury, and/or type of tumor resection performed.

Avaliação funcional das endopróteses no tratamento de tumores ósseos

Palavras-chave:
Neoplasias ósseas
Procedimentos cirúrgicos reconstrutivos

RESUMO

Objetivo: Avaliar o grau funcional desses pacientes e identificar os tipos de complicações encontradas e que influenciaram na sobrevida das endopróteses e na função do membro operado.
Métodos: Foram analisados 14 pós-operatórios de endopróteses em pacientes portadores de tumores ósseos malignos e benignos agressivos com cirurgia entre 2004 e 2014. O sistema

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Prótese articular
Salvamento de membro

de avaliação foi o proposto por Enneking, preconizado pela Musculoskeletal Tumor Society (MSTS), além da avaliação radiográfica.

Resultados: As endopróteses são ótimas opções no tratamento de tumores ósseos com preservação do membro, em relação à dor, força e aceitação emocional do paciente. Outro fator para bons resultados é a capacidade de suporte de peso imediato, que gera uma independência maior.

Conclusão: Todos os pacientes classificaram a terapia como excelente/boa, indiferentemente do tipo de prótese, extensão da lesão, tipo de tumor e ressecção feita.

Introduction

With advances in protocols and treatment of cancer patients and consequent increase in survival, the number of patients with bone metastases has increased, as well as the incidence of complications.[1–4] One of the complications often found in these patients are pathological fractures, especially in the lower limbs, which invariably affect the meta-epiphyseal region of the bone and requires joint reconstruction. Regarding primary bone tumors, these have also had better outcomes after use of multidrug therapy, resulting in limb salvage possibility; that, in most cases, is only obtained with large bony resections, leading to the need for reconstruction of this bone segment, which in most cases can be attained with non-conventional endoprosthesis.

Metastatic bone disease is the most common bone malignancy,[1] primarily affecting the axial skeleton, pelvis and femur.[5,6] Metastatic involvement of the lower limbs is associated with a greater number of pathological fractures and promotes increased morbidity / mortality due to prolonged bed rest, increased risk of pneumonia and thromboembolic events.[6] Under these circumstances, replacement of the bone segment can be attained with an endoprosthesis, which rapidly rehabilitates this patient, who becomes an ambulatory patient.[1,7–9]

Regarding primary bone tumors, osteosarcoma and Ewing's sarcoma, as well as giant cell tumors (GCT) of the bone, also occur more often in the lower limbs, with the distal femur and proximal tibia being the preferred locations, affecting the joint region while resulting in the need for joint replacement. As in the upper limbs, these tumors not infrequently affect the proximal humerus.[2,7]

For primary malignant and aggressive benign tumors, a wide resection to achieve necessary safety margin results in large bony resections and, therefore, the need for local reconstruction.[8,10]

Among the techniques based on limb salvage principle, one that has been recommended for treating bone metastases in the lower limbs and the proximal humerus, due to better response and effectiveness, is lesion resection and replacement of the resected segment by an unconventional endoprosthesis,[5,11,12] the method of choice in our service.

For malignant primary bone tumors (osteosarcoma, Ewing's sarcoma, chondrosarcoma) and aggressive benign tumors (Enneking's B3) obtaining a broad or radical margin invariably results in large meta-epiphyseal bone loss, requiring biological or prosthetic reconstruction.[13] Large bone resections occurring during surgical revisions of conventional arthroplasties are another condition that requires the use of endoprostheses.

In such cases, the biological reconstructions can be performed with autologous bone graft, free or vascularized, homologous graft (tissue bank) or other autograft methods. Although more natural, biological reconstruction shows severe limitations in most cases.[13]

Prosthetic reconstructions are performed with non-conventional endoprostheses, which replace bones and joints. They are of easy access, provides anatomical reconstruction of the limb, functionally and fast, resulting in early ambulation recovery. However, they also have a high number of complications within short- and long-term follow-up. Postoperative complications of bone tumor resections and replacement of the resected segment by an endoprosthesis are: infection, aseptic implant loosening, periprosthetic fracture, implant fracture and tumor recurrence.[1,7,14]

These complications can be responsible for the functional impairment of the affected limb, implant loss and even the amputation of the affected limb.

The purpose of this study is to identify the types of complications found that influenced the average life span of the endoprostheses and function of the operated limb of our patients, according to the functional analysis of the MSTS. These data can be used to improve implant manufacturing and surgical techniques, as the improvement of orthopedic implants and techniques used in bone defect replacement after neoplastic resection is crucial to achieve greater durability, with fewer complications and increased functionality of the operated limb.[5,12–15]

Material and methods

This is a retrospective study with 14 patients with malignant and aggressive benign (Enneking's B3) tumors, who required reconstructive surgery with non-conventional endoprosthesis. Patients with incomplete medical records that would not allow assessment and those who died or were transferred to another service before completing one year of follow-up were excluded. Patients who did not sign an Informed Consent Form were also excluded.

Mean age of patients was 56 years, with the youngest being 19 and the oldest 66 years of age. Five patients were males and nine were females. As for the tumor site, one (7%) was

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