



## Case Report

# Giant cell tumor of the femoral neck: case report<sup>☆</sup>



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### ABSTRACT

The authors present the case of a patient with a giant cell tumor of the left femoral neck, with adjacent progressive invasion of bone tissue. Initial treatment was done with local curettage and autologous bone graft from fibula, electrocauterization and filling with methyl methacrylate. A local tumoral relapse was present after one year; therefore a new surgical procedure was necessary, with proximal femoral wide resection and unconventional endoprosthesis fixation. The article discusses the clinical aspects and surgical treatment. This report aimed to demonstrate the necessity to perform wide resection for giant cell tumor of the femoral neck, prioritizing total resection of the tumor and its local extension, preserving limb integrity and demonstrating the complete failure of preserving surgery in cases of femoral neck involvement.

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### Tumor de células gigantes do colo do fêmur: relato de caso

#### RESUMO

Os autores apresentam um caso de uma paciente portadora de tumor de células gigantes do colo do fêmur esquerdo com invasão progressiva de tecido ósseo adjacente. Foi tratado inicialmente com esvaziamento por meio de curetagem local e enxertia autóloga com tabiques da fíbula, eletrofulguração e preenchimento com metilmetacrilato. A paciente evoluiu com recidiva da lesão tumoral local após um ano, foi necessária uma nova intervenção cirúrgica, com ressecção em bloco da parte proximal do fêmur e fixação de endoprótese não convencional. São discutidos os aspectos clínicos e a abordagem terapêutica. O relato tem por função demonstrar a necessidade de abordar o tumor de células gigantes do colo do fêmur, em obediência aos princípios oncológicos de ressecção óssea, com prioridade para

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a total exérese do tumor e sua extensão local, preservação da integridade do membro e demonstração da total falha de tentativas preservadoras no caso de acometimento do colo femoral.

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## Introduction

Giant cell tumor (GCT) is defined as an aggressive benign bone tumor with uncertain biological behavior, characterized histologically by richly vascularized tissue with ovoid and fusiform cells and numerous osteoclastic giant cells, evenly distributed throughout the tumor tissue.<sup>1,2</sup>

GCT mainly affects young adults between the ages of 20–35 years, and the most frequent locations are the distal femur and proximal tibia. It is more common in females, and constitutes 8% of primary bone tumors.<sup>3</sup>

The main purpose of this report is to demonstrate the importance of resection following oncological principles for such lesions with involvement the femoral neck and whose treatment is mainly surgical, with radical replacement of the segment; in case of failure of other techniques, such as curettage and autologous or homologous bone grafts, prosthetic replacement (non-conventional endoprosthesis) is mandatory.

## Case report

Female patient, aged 33 years, reported pain in the left hip and lower back for the last six months and had no history of trauma or physical effort and progressive worsening of the pain. At physical examination, the patient presented pain on palpation in the anterior aspect and during movement of the left hip, with normal range of motion.

The initial radiological study (pelvis radiograph) disclosed the presence of an extensive osteolytic lesion on the femoral neck and proximal third of the greater trochanter (Fig. 1).

Magnetic resonance imaging (MRI) revealed an expansile, destructive, insufflated bone lesion the epiphysis-metaphyseal region of the left proximal femur, with regular and well-defined contours, which started on the femoral neck and extended to the anterior aspect of the femoral head. The lesion presented a homogeneous solid matrix, hypointense on T1, and with intermediate signal on T2, with intense uptake after intravenous contrast administration. Bone marrow edema was observed near the lesion, without signs of expansion to the adjacent soft tissue (Fig. 2).

In light of these findings, the possibility of GCT was considered and a bone biopsy was proposed; the biopsy was performed immediately, corroborating the primary diagnostic hypothesis. The authors decided to perform an intralesional resection, with local curettage and electrocauterization as an adjuvant treatment, as well as filling of the cavity with autologous bone graft from the fibula and bone cement (methylmethacrylate) (Fig. 3).

The patient had no significant clinical abnormalities. Full weight bearing was authorized after 120 days. One year after surgery, a control MRI was performed; although the patient is completely asymptomatic, nodular lesions of regular and well-defined borders were observed, with T1 and T2 isointensity, homogeneously capturing the intravenous contrast in the intertrochanteric region, in the lower portion of the surgical cavity. Bone marrow edema was observed adjacent to the lesion and to the bone graft/cement, as well as reactive periostitis, consistent with tumor recurrence (Fig. 4).

In light of these findings, a new surgical intervention was proposed; a block resection of the proximal third of the femur was performed, replaced with non-conventional modular titanium endoprosthesis and uncemented acetabular prosthesis (Figs. 5 and 6).

## Discussion

The treatment of GCT is essentially surgical. There is evidence contrary to curettage, but there is a correlation with surgery and method, histologic type, tumor size, location, and age of the patient – these are factors that directly influence the prognosis, as well as lesion staging.<sup>4</sup>

In 1983, Enneking proposed a three-stage radiographic classification: stage I – tumor with well-defined edges and cortical integrity; stage II – expanded cortex with well-defined edges; stage III – non-defined edges with soft tissue invasion. Stage I is treated with curettage and adjuvant treatment (electrocauterization, methylmethacrylate, liquid nitrogen, and phenol). Stage II can also be treated by this method, but it presents worse functional outcomes when treated similarly to stage III (wide resection of the lesion and replacement).<sup>4-6</sup>

Bone cement has no biological properties and long-term results are very difficult to anticipate, especially when this method is used in the treatment of GCT.<sup>7,8</sup> Although some authors have demonstrated excellent results with this method based on the clinical approach, no deleterious effects were directly related to the use of methylmethacrylate and other adjuvant treatments that have been recommended to reduce GCT recurrence were observed.<sup>9</sup>

Treatments involving substitution, such as reconstruction of the proximal femur with femoral prostheses, the use of proximal endoprosthesis for large replacements of proximal femoral neoplasms, modular titanium endoprosthesis, and conventional total hip arthroplasty are techniques used for GCT of the hip.<sup>10-13</sup>

Resection of the proximal third of the femur is defined as a surgery that removes the previously defined region of bone damage caused by GCT and the macroscopically affected local tissues. The proximal block of the femur is completely

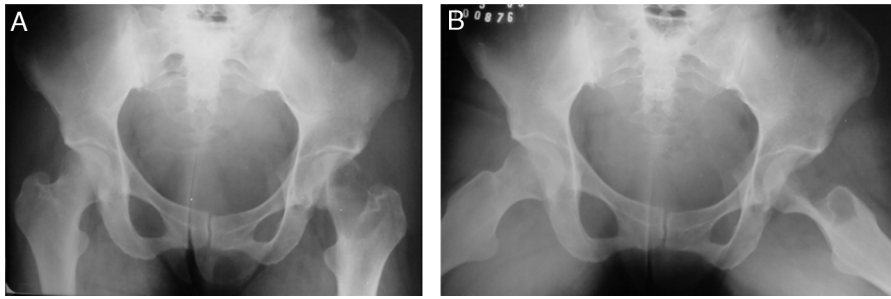


Fig. 1 – Hip radiograph in anteroposterior (A) and Lowenstein lateral (B) views showing osteolytic lesion in the left femoral neck.

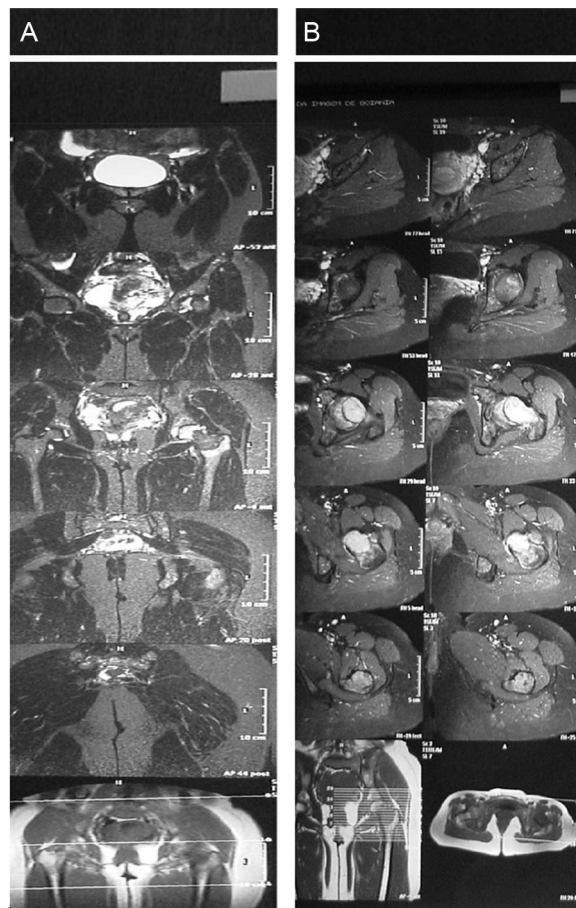


Fig. 2 – Magnetic resonance imaging of the pelvis, coronal in T2 (A), and axial plane with contrast in T2 (B) showing lesion in the left femoral neck.

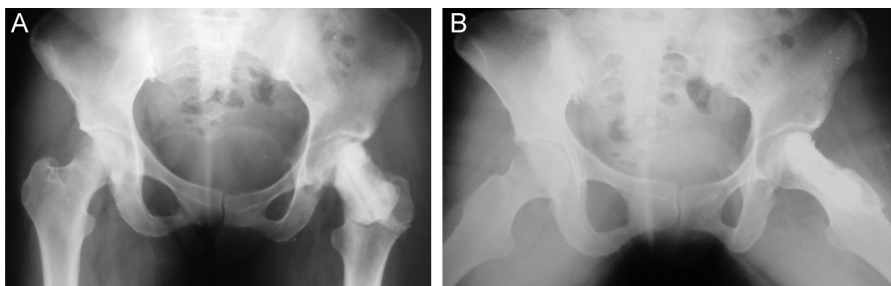


Fig. 3 – Hip radiograph in anteroposterior (A) and Lowenstein lateral (B) views showing postoperative GCT in the left femoral neck.

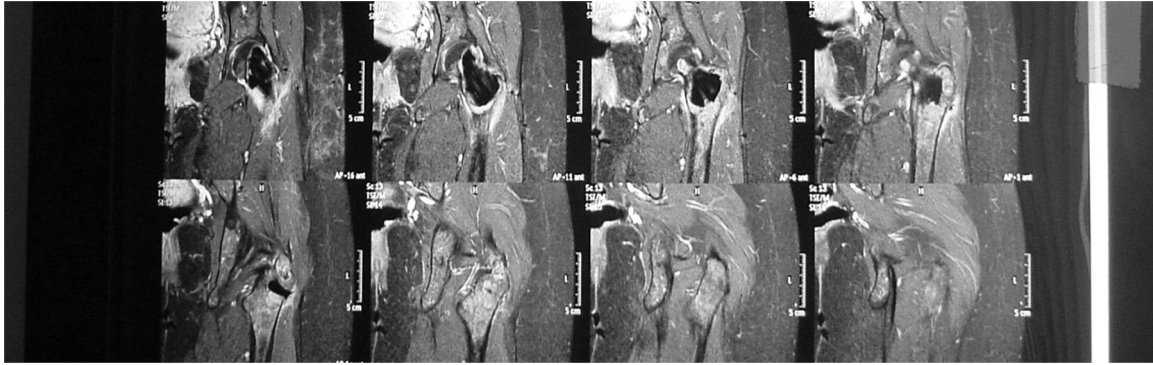


Fig. 4 – Magnetic resonance imaging of the left hip in sagittal plane in T2, showing GCT recurrence one year after the first surgery.

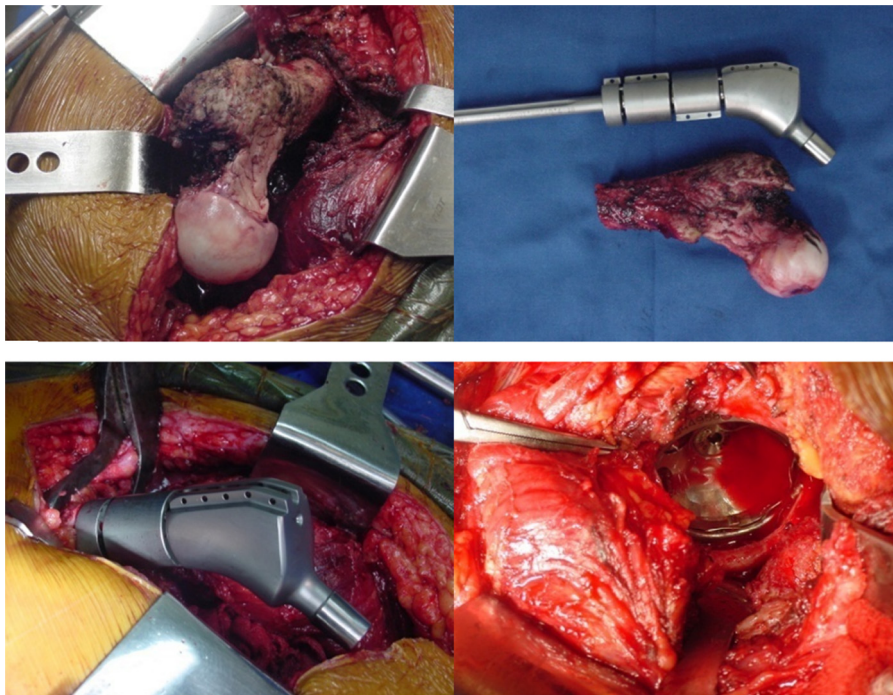


Fig. 5 – Intraoperative images with endoprosthesis.

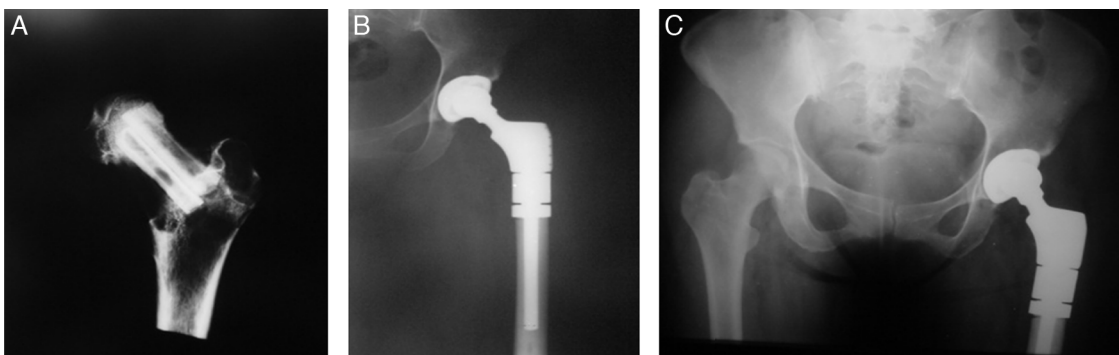


Fig. 6 – Left hip radiographs in anteroposterior view, showing the section with safety margin (A), and the endoprosthesis for the proximal femur (B and C).

removed and a cementless prosthesis is used in acetabular preparation to ensure the durability and reliability of the system.

Resection of the proximal third of the femur is a suitable surgical treatment for cases of femoral neck GCT. As in the present case, it is a viable surgical alternative to resection with curettage and other filling methods, which have been proven to be comparatively ineffective.

## Conclusion

The femoral neck is not the most common region for the presence of GCT. In the present case, the authors concluded that the femoral neck GCT should be widely resected, pursuant to all the criteria and principles of oncological surgery. Block resection of the entire lesion with a safety margin for the removal of the entire affected area, as well as the underlying tissue that presented contaminated macroscopic features, followed by a non-conventional prosthetic replacement was opted. The authors emphasize the need for complete and safe resection to prevent recurrence of the lesion.

## Conflicts of interest

The authors declare no conflicts of interest.

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