

Giant Cell Tumor of Long Bones Outcomes of Treatment Corelating with Histopathological Grade

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ABSTRACT

Introduction: Giant cell tumor (GCT) of bone is a borderline lesion of bones, meaning that in certain conditions it could be transforming in malignant tumor. This article describes the clinical outcome of patients with giant cell tumor of bone and discusses the surgical options for this lesion corelating with histopathological grade.

Material and methods: From 2007 to 2015, 15 patients who met the histological criteria of giant cell tumor of bone were treated at our institution. Diagnosis and histopathological grade were established by biopsy and extemporaneous exam during surgery. Procedure to be selected was decided based on histopathological grade. Outcomes: In all cases the joint functional results were good except 3 cases (20%) where recurrence occurred. In one case the local recurrence was observed after 6 months, and in the other 2 cases, at 3, respectively 5 years after primary treatment. In all 3 cases the initial histopathological exam showed inactive lesions and were treated with curettage and bone grafting.

Conclusion: In our series it was an early recurrence at 6 months and 2 recidives after 2 years. The histopathological exam has significant role in the management of GCT. All inactive lesions were treated by curettage and bone grafting, and active lesions, by curettage and bone cement filling no matter of Campanacci's grading system. The management is depending mostly on histopathological exam. Low rate of recurrence can be achieved if treatment is selected according to this parameter and with a properly technique.

INTRODUCTION

Giant cell tumor (GTC) of bone is a borderline lesion of bones, meaning that in certain conditions it could be transforming in malignant tumor. It arises adjacent to the subchondral bone of major joints. This lesions do appear at the junction of metaphysis and epiphysis and sometimes may present metaphyseal extension (1,2). Almost 5% of all primary bone tumors are diagnosed as GTC's and has an increased prevalence

among females (3). The most common sites of appearance are the distal end of bones like femur and radius, and proximal end of tibia (2). The most usual way of treatment for giant cell tumor is curettage and bone grafting or cement filling of the resulting gap. Several studies showed that this methods have a high rate of recidive. Others showed that wide resection has a low rate of recidive but the disadvantage of this method is that is compromising the limb function (4). Some surgeons are using agents like phenol or liquid nitrogen as adjuvants. This method is performed to

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destroy the remaining tumour cells after curettage. Methylmethacrylate cement has the role of filling of the defect (5). The behavior of GCT of the bone is unpredictable and is not always related to radiographic or histological appearance (6). The aim of this work is to discuss the surgical options for this lesion correlating with histopathological grade and to describe the outcomes of patients with giant cell tumor of bone. □

MATERIAL AND METHOD

From 2007 to 2015, 15 patients were treated for GCT at our institution. Twelve tumors were localized around the knee (distal femur -5, proximal tibia -7), 1 on proximal femur, 1 on distal tibia and 1 on peroneal head. Twelve women and 3 men were studied. The mean age was 30 years (range, 18-40 years). The average follow-up was 3 years (range: 1-8 years). At presentation, all lesions were primary tumors. All patients were subjected to lesion X-ray pre and postoperatively, chest X-ray and to CT scan (Figure 1). Diagnosis and histopathological grade were established by biopsy and extemporaneous exam during surgery. The lesions were classified according to the grading system of Campanacci as 8 with grade I, 4 with grade II, and 3 with grade III. According to Enneking classification all lesions were stage I and II. Procedure to be selected was decided based on histopathological grade as follows: inactive lesions were treated by curettage and bone grafting, and active lesions, by curettage and bone cement filling. Autologous bone graft from iliac crest was used to fill up the resultant cavity in 8 cases and bone cement was used in 7 cases. In our series we

went through postero-lateral and lateral approach in all twelve cases around the knee, a lateral approach for proximal femur and antero-lateral approach for ankle. For peroneal head lesion a isolation of peroneal nerve was performed. The soft tissue around the cortical lesion was removed with care not to spread the tumor. The cortex is further enlarged with a osteotome. Then an aggressive curettage was performed. The entire intraosseous lesion was removed and macroscopically normal bone exposed. The remaining cavity was washed several times with saline solution. Fragments from lesions were sent for histopathological exam. If the tumor was inactive the cavity was filled with autologous bone graft from iliac crest. If it was an active lesion, bone cement was used instead of bone graft. Non-weight-bearing for six weeks was recommended for patients with lesions of the lower limbs. The follow up was sequential at six-week intervals until six months postoperatively. Range of motion (ROM) score was assessed for functional results of surgery performed around the knee. After, six-month intervals follow up was performed. □

RESULTS

The mean follow-up was 3 years, with a maximum of 8 years and minimum of 1 year. Functional evaluation regarding range of movement was done. When comparing ROM score of the affected knee after surgery with unaffected contralateral knee, in all but 3 cases (20%), where recurrence occurred, the joint functional results has similar values (Figure 2). All of these 3 cases were patients with Campanacci grade 2 lesions. In one case the local recurrence was observed after 6 months, and in the other 2 cases, at 3, respectively 5 years after primary treatment. In all 3 cases the initial histopathological exam showed inactive lesions and were treated with curettage and bone grafting. A second surgical treatment was performed for local recurrence with histopathological exam and bone cement filling of the remaining cavity. All cases of recurrence were observed during 1 year interval with no clinical or imagistic findings of a new relapse. No relapse was found in cases treated with curettage and bone cement. 12 patients were cured. They were free from disease at their last follow-up. No degenerative changes were observed in patients with tumors around the knee at the last follow-up. □

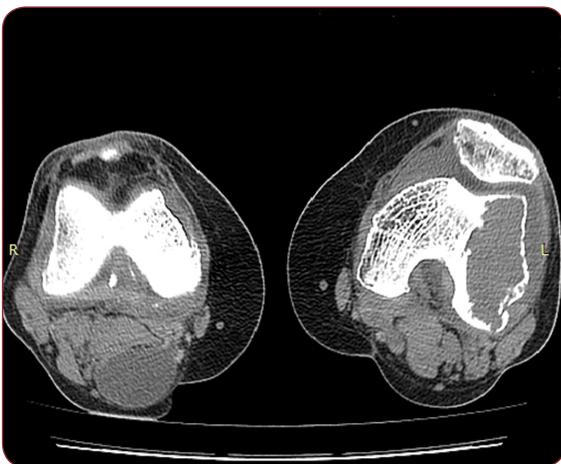


FIGURE 1. CT image of femoral condyle lesion



FIGURE 2. CT image of femoral condyle lesion

DISCUSSION

The aim of this study was to analyse the results of treatment by curettage and reconstruction by bone grafting or cement in GCT of long bones, according to histopathological grade. Good function after the combined use of curettage and chemical cauterisation was reported in some studies for treatment of GCT near joints (5). We do not used such chemical cauterisation in our series. However, local recurrences reported by our results is 20% which is comparable with other reports in the literature (7). None of the cases with recurrence were treated with resection-reconstruction because none of them were histopathological aggressive. According to Balke et al cement filling of the gap alone reduces the relapse by the factor 8.2 and additional high-speed burring by the factor 3.9 (compared to PMMA only) (8). For tumors around joints studies showed that cement filling after extensive curettage does not increase

the recurrence rate and does not induce osteoarthritis, as long as the continuity of articular cartilage is maintained. Patients with giant cell tumor of bone near the knee joint can be treated satisfactorily with intralesional resection and bone cement packing (4). Authors have claimed that most recurrences take place within two years of curettage (9). In our series it was an early recurrence at 6 months and 2 after 2 years. Two recurrences occurred near knee joint, specifically in the distal femur and one in the ankle joint. The histopathological exam has significant role in the management of GCT. All inactive lesions were treated by curettage and bone grafting, and active lesions, by curettage and bone cement filling no matter of Campanacci's grading system. If a Campanacci grade III lesion was observed and there was no intraarticular extension, bone cement was used safely. Local recurrence was observed after treating inactive lesions with curettage and bone cement, even that, according to Campanacci's grading system, were grade II. □

CONCLUSION

The success of treatment is depending by an adequately exposure and inspection of the entire lesion. The remaining cavity should be firmly filled with cancellous bone graft or cement. This is for minimizing the growth space for surviving tumour cells. The management is depending on histopathological exam. Low rate of recurrence can be achieved if treatment is selected according to this parameter and with a properly technique. □

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