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The giant cell tumors of the knee treated by curettage filling by acrylic cement, about a series of 15 cases

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Abstract
Giant cell tumors (GCT) are relatively common, their first location in order of frequency is the knee, and their treatment is surgical. These bone giant cell tumor close to the knee joint is a dilemma for the surgeon, the technique of curettage and cavity filling cementation presents a high recurrence rate, while resection has a recurrence rate reduces with a functional risk to the member. The authors report 15 cases of GCT of the knee treated by curettage filling by acrylic cement with the aim to analyze the results of this conservative technique, mainly long-term complications dominated by the recurrence.

Keywords: giant cell tumor, knee joint, curettage, bone cement, recurrence

1. Introduction
Giant cell tumors are generally benign but locally aggressive tumors, affecting in most cases the epiphyso-metaphyseal region of long bones. These are relatively frequent tumors, accounting for 4-5% of bone tumors and 21% of all the benign bone tumors, according to Babinet [1]. Unlike resection, the technique of curettage filling allows the joint preservation and thus a better functional result, but with a high recurrence rate. Our work aims to analyze the results of this therapeutic method for tumors located at the knee.

2. Materials and methods
Fifteen patients with a histologically confirmed giant cell tumor surgically were treated in our department, patient records from 2007 to 2013 were analyzed and 15 cases were examined retrospectively. Only complete records with a good clinical-radiological follow-up of patients with GCT located at the knee and operated by curettage with acrylic cement and whose management was exclusively carried out in our department were included in our study. The physical examination sought swelling, provoked pain, and also evaluate the state of mobility of the knee. We performed a radiological assessment of standard radiographs, computed tomography and / or MRI in our patients. The initial biopsy followed by the histological study made the diagnosis possible. Surgical treatment consisted on a curettage of the tumor followed by filling the intraosseous cavity with acrylic cement associated with a corticospongious graft (75% of cases) and stabilized by internal osteosynthesis (80% of cases).The mean follow-up of this series was 3 years and 9 months (6 months to 7 years).The follow-up revealed the appearance of complications, which are dominated by tumor recurrence, the main complication associated with the curettage and cavity filling cementation.

3. Results
The age of our patients varied between 17 and 55 years, with a slight female predominance (8 women for 7 men).62% of the giant cell tumors (GCT) in our department had knee localisation, in 9 cases it was about the distal femur and the proximal tibia was concerned in 6 other cases. Clinically, GCT were associated with pain, tumefaction (33% of cases).Partial functional impotence was present in 75% of patients. Radiologically, the tumor had an epiphyso-metaphyseal localisation with diaphyseal extension in 2 cases. According to the CAMPANACCI staging, 2 patients were classified grade I, 10 patients grade II, and 3 patients were classified grade III. CT was performed in 9 cases and MRI in 6 cases, wich was in favor of a tumor process invading soft tissue in 3 patients. The tumor was confirmed on the anatomopathological study after surgical biopsy in all cases. The decision of curettage treatment instead of resection was made with the objective of a better functional result for these patients whose mechanical stability after surgery was satisfactory. A meticulous curettage was then carried out followed by mechanical reaming of the walls, then filling with acrylic cement was associated in 9 cases with corticospongious autgrafting protecting articular cartilage. Before polymerization of the cement, the curetted zone submerged in cement was fixed with an internal fixation to ensure optimal mechanical stability in 10 cases. Patients were reviewed in consultation every 3 months for the first 2 years, clinical and radiological examinations were performed at each consultation. The mean follow-up of this study was 3 years and 9 months (6 months to 7 years).We have not noticed any osteoarthritis phenomenon within the limit of the decline of our study. However, recurrence was noted in 5 cases among the 15 patients (33%), over a period varying between 6 months and 2 years. Recurrence was diagnosed based on visualization of a progressive scalable border on the plain X-rays taken during the follow-up visits. MRI confirmed this and demonstrated the extension of the recurrence. All the recurrences were treated by curettage, iterative filling, and we did not have a recurrence at the limits of the recession of our series after this iterative gesture.

4. Discussion
Giant cell tumors (GCTs) are relatively frequent among bone tumors; they represent 5% of all primary bone tumors and 21% of benign bone tumors [1]. The tumor is the apanage of the young adult with a peak between 20 and 40 years, and a slight female predominance. They are rarely seen in periods of

growth and after 50 years [2]. Indeed, giant cell tumors affect this joint in 50 to 60% of cases with 30 to 35% femoral involvement and 20 to 25% with tibial involvement [2]. Clinical symptomatology is non-specific and we describe in a descending order of frequency: bone pain, local swelling and limitation of movement [3]. GCT often has a typical radiological appearance (Figure 1). It is a lytic lesion of geographic type, with sharp, eccentric and epiphyso-metaphyseal or epiphyseal location [3]. Cortical rupture, spicular periosteal reaction, Codman spurs and soft tissues's invasion occur in malignant forms.

The standard radiography also makes it possible to establish a classification, according to CAMPANACCI [3, 4]. The risk of recidivism is higher. 3 cases were classified as stage 3 in our series and the three recidivated. The CT allows a better study of the cortex in search of a rupture and also of the subchondral bone detecting an invasion of it. It is also recommended in cases of suspected tumor recurrence [3]. MRI is now the best method to make the assessment of extension to the joint, the neighborhood structures and for the search for "Skip" metastasis. The TCG appears in different intensities in T1-weighted sequence, usually in hypo signal or in intermediate signal similar to the soft parts [5] (Figure 2). The treatment of these tumors is surgical with two options: curettage of the lesion or then bloc resection. Because it is more conservative, Curettage filling with acrylic cement is currently the treatment of choice for bone GCTs, which are often large juxta-articular tumors with a historically high rate of local recurrence [6, 7]. (Figure 3)

The use of the cytotoxic properties of cement reduces the recurrence rate between 17 and 25% [8].

Treatment by curettage cementation allows the early detection of recurrences, and therefore their early management. Indeed, the cement forms a radiologically homogeneous and dense mass, the appearance of an evolutionary border at the interface cement / bone is very evocative of recurrence (Figure 4), emphasizing the importance of a radiological follow-up every four months for the first two years [8].

Finally, this technique is criticized to have a potential arthrogenic effect because of the proximity of these tumors to the articular cartilage. This is was invalidated by a Swedish study of March 2007 conducted by Vult Von Steyern [9] which notes no osteoarthritic development at nine years of decline.

5. Figures

Fig 1: Radiological aspect of a typical distal femur GCT

Fig 2: MRI aspect of a distal femur GCT

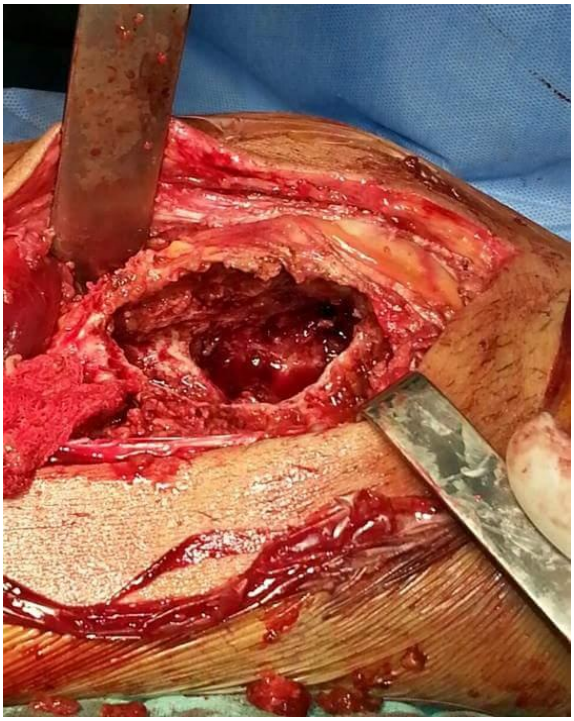

Fig 3: Intraoperative image showing residual cavity after curettage of a distal femur GCT

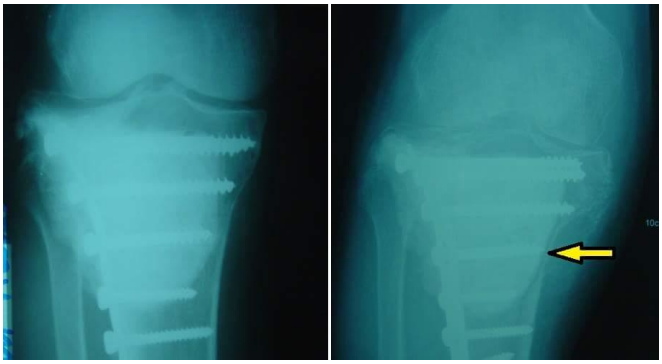

Fig 4: Image showing the recurrence of GCT of the proximal Tibia treated by curettage filling (the arrow shows the appearance of border at the cement / bone junction)

6. Conclusions

Here conclude your finding to with object of your studies.
A high rate of recurrence associated with curettage conservative treatment has been confirmed by our study. Despite this, this technique remains the treatment of choice for these tumors, and for us the quality of curettage is the key to success. This conservative treatment must be done accurately and meticulously and can be repeated using the modern tools of motorized milling. Surveillance of these tumors must be rigorous to detect tumor recurrence and / or malignant transformation. This surveillance should be done every 4 months the first two years and then regularly up to 5 years.

7. Declaration of Interest

The authors declare that they have no conflicts of interest in relation to this article.

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