SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Orthopaedics

Large Giant Cell Tumor of the Proximal Tibia: Therapeutic Management About a Case Report

Francis Zifa Pentèce ZENGUI*[1,2,3], Arnauld Sledge Wilfrid BILONGO-BOUYOU[1,2,3], Sti Yèlai Paul IKOUNGA[3], Moise Radam ELLAH[1'2'3], Kevin Bienvenu Parfait BOUHELO-PAM[1,2,3], Nevil Stève NGONA GAMPIO MVILI[1,2], Marc Fabrice NKOUA[1,2], Perry Regis MASSOUAMA[1,2], Marius MONKA[1,2,3].

[1]Trauma and Orthopaedics Department
[2]Hospital University Center of Brazzaville
[3]Faculty of Health Sciences, University Marien Ngouabi

DOI: https://doi.org/10.36347/sasjs.2025.v11i09.001 | **Received:** 18.06.2025 | **Accepted:** 22.08.2025 | **Published:** 03.09.2025

***Corresponding author:** Francis Zifa Pentèce ZENGUI
Trauma and Orthopaedics Department

Abstract | **Case Report**

Introduction and importance: Giant cell tumours account for 4–5% of primary bone tumours. In large tumours affecting the bones of the lower limbs, it can be disabling and thus requires a good therapeutic strategy. We report the clinical case of a voluminous giant cell tumour of the proximal tibia. The aim of this presentation was to explain the aggressive nature of these tumours in young patients and to present the long-term results of surgical management. ***Case presentation:*** A 23-year-old patient with no previous pathological history. He was admitted with a giant cell tumour of the proximal left tibia that had been progressing for 16 months and was becoming disabling, with repercussions on socio-professional life. A surgical biopsy confirmed the diagnosis, and the treatment strategy consisted of a wide curettage with filling of the bone defect with acrylic cement. To allow the patient to recover weight bearing, a supportive osteosynthesis was used to restore the patient's autonomy. After 2 years, the patient was reported to have moderate intermittent pain, with no signs of clinical or radiological recurrence. ***Clinical discussion:*** Giant cell tumours are characterized by their benign histological appearance, but present local aggressiveness and have an unpredictable evolution towards recurrence or malignant transformation. They are potentially debilitating to the lower limb in cases of significant bone lysis. ***Conclusion:*** Traditional surgical treatment by curettage and filling remains an effective option in the vast majority of cases, but does not provide weight-bearing support in cases of significant bone loss. The use of internal osteosynthesis for reinforcement will enable patients to recover stability and a better quality of life in the short to long term.

Keywords: giant cell tumour; proximal tibia; osteosynthesis; case report; acrylic cement; benign tumour.

INTRODUCTION

Giant cell tumors account for 4 to 5% of primary bone tumors, with an estimated incidence of 1.2 to 1.7 cases per million people annually [1–5]. They are characterized by their benign histological appearance, but are locally aggressive and have an unpredictable progression toward recurrence or malignant transformation. They most often occur in young people in their 3rd decade of life [6,7]. Treatment is generally surgical, combining bone curettage and filling with bone grafts or surgical cement. In large tumors affecting the bones of the lower limbs around the knee, it can be invalidating and therefore requires a good therapeutic strategy to restore the patient's autonomy [8,9].

We report the clinical case of a 23-year-old patient presenting with a large giant cell tumor of the proximal tibia, treated by curettage and cement filling supported by osteosynthesis using a threaded plate. The aim of this study was to highlight the aggressive character of these tumors in young patients and to assess the long-term outcomes of surgical treatment.

CASE PRESENTATION

Twenty-three-year-old patient, no significant medical history, student, consulted for a tender oedema of the left knee with limping.

The complaint began 16 months prior to his consultation with the discovery of a painless swelling in his left knee, which gradually increased in size and was

associated with intermittent discomfort and a slight claudication. That gradually worsened, making it impossible for him to practice sports or walk for long periods of time.

A constant pain when walking and a persistent joint enlargement that continued to grow in dimensions led him to contact a specialist. The patient did not report any fever or weight loss during the evolution of the disease.

The examination noted walking without crutches, with impossible monopodial support of the left lower limb, joint swelling of the anterolateral part of the proximal tibia, over the lateral condyle, firm, slightly painful, shiny. No sign of joint effusion and knee mobility was normal. There was no downstream sensory-motor deficiency. No ipsilateral inguinal adenopathy.

The radiological assessment of the left knee in frontal and lateral views revealed a large, well-defined osteolytic image with no peripheral condensation, eccentrically located, metaphyseal-epiphyseal lesions. It affected the entire lateral condyle, blowing out the lateral cortex and extending toward the lateral subchondral bone, with a compartmentalized appearance in some places, classified as Lodwick type IC (fig.1 a).

A computed tomography (CT) scan revealed a tumor matrix similar to that of the neighboring muscle. There was no calcification within the osteolysis or periosteal apposition, and cortical rupture was noted in some areas (fig.1.b).

These clinical and radiological findings strongly suggest a giant cell tumor of the proximal left tibia. A surgical biopsy was indicated and performed. Under local anesthesia, an anterolateral incision was performed centered on the swelling. After exposure, a specimen of solid tumor tissue was removed from the center of the tumor, revealing macroscopically soft tissue content, dark red in color, with a bleeding margin. It was decided to perform a complete curettage of the cavity and fill it with antibiotic-free surgical cement (fig.2 et 3).

Postoperative treatment consisted of immobilization with a knee brace, pain medication, and thromboprophylaxis.

The anatomopathological results showed a biphasic tumor proliferation consisting of multinucleated giant cells and mononuclear cells, with no evidence of osteoid substance. A stroma rich in vessels; and the rest of the tissue was made up of mature bone. Supportive osteosynthesis to enable weight bearing was indicated and then carried out three months after the biopsy.

The patient underwent surgery using locoregional anesthesia with a block under the left knee to keep the knee flexed at 30°, with a pneumatic tourniquet at the root of the limb without emptying the limb before inflation. The initial anterolateral incision from the biopsy was reopened and enlarged proximally and distally. Dissection of the soft tissue, exposure of the proximal part of the cement, and placement of a non-locking plate in the proximal left tibia with epiphyseal screws transfixing the surgical cement (fig. 3 b, c).

Postoperative treatment consisted of analgesics and low molecular weight anticoagulants for at least 45 days. Evolution at 1 month postoperatively was considered favorable, and partial weight bearing was authorized at 2 months postoperatively.

The patient returned to his studies four months after surgery. He was prohibited from participating in any sports activities requiring weight bearing on his left foot. At two-year follow-up, the patient complained of intermittent leg oedema with intermittent pain on weight bearing. There were no clinical or radiological signs of recurrence.

DISCUSSION

Giant cell tumors of bone are rare mesenchymal tumors classified according to the 2020 WHO classification as intermediate, meaning neither completely benign nor definitely malignant, due to frequent recurrence and rare pulmonary metastases [10].

Giant cell tumor of bone was first described by Astley Cooper in 1818. However, it was not until 1940 that Jeff and Lichtenstein distinguished giant cell tumors as a separate entity from other bone tumors. They consist of a proliferation of mononuclear stromal tumor cells with an osteoblastic phenotype, mononuclear cells of the monocyte-macrophage cell line, and multinucleated giant cells of the osteoclasts type involved in tumor osteolysis [11,12].

These tumors can be confused histologically with many bone tumors or pseudotumor-containing osteoclast-like giant cells, cells of the bone microenvironment. Citing chondroblastoma, brown tumors of hyperparathyroidism, aneurysmal bone cyst, non-ossifying fibroma, and central giant cell granulomas [1, 2, 13].

It is a benign tumor in young adults that most often occurs in the metaphyseal-epiphyseal region. Its local aggressiveness and rare potential for distant dissemination always compromise the functional prognosis of large joints. It affects young people in their thirties. It is rare before the growth plates close and after the age of 70[1,5].

They affect the metaphyseal-epiphyseal regions of long bones and the axial skeleton of mature skeletons after fusion of the growth plates. But multiple forms have been described in the literature, particularly affecting the

small bones of the hand and foot, and metaphyseal and diaphyseal locations have been noted [14].

The diagnosis is most often based on a combination of clinical signs and conventional X-rays. This suspicion should lead to an MRI and sometimes a CT scan, the characteristics of which make the diagnosis highly probable at this stage [1, 5, 15]. In most cases, a surgical biopsy is performed to confirm the diagnosis and decide on a treatment plan. A surgical biopsy or biopsy with extemporaneous examination provides a diagnosis by histologically revealing giant multinucleated cells, round cells resembling monocytes, and stromal cells, as observed in our clinical case. In addition to the cellular component, there is often a hemorrhagic component. Several classifications have been described, and giant cell tumors are classified into several grades. There are three grades, with grades 1 and 2 representing benign forms and grade 3 corresponding to malignant forms [2, 7, 16]. In order to differentiate between benign and malignant forms of giant cell tumors. Biopsy specimens must be obtained from areas of tissue that are vascularized and of sufficient size. Given the polymorphism of the tumor, since sarcomatous areas may exist within benign areas, and also to eliminate other tumors containing a contingent of giant cells [14].

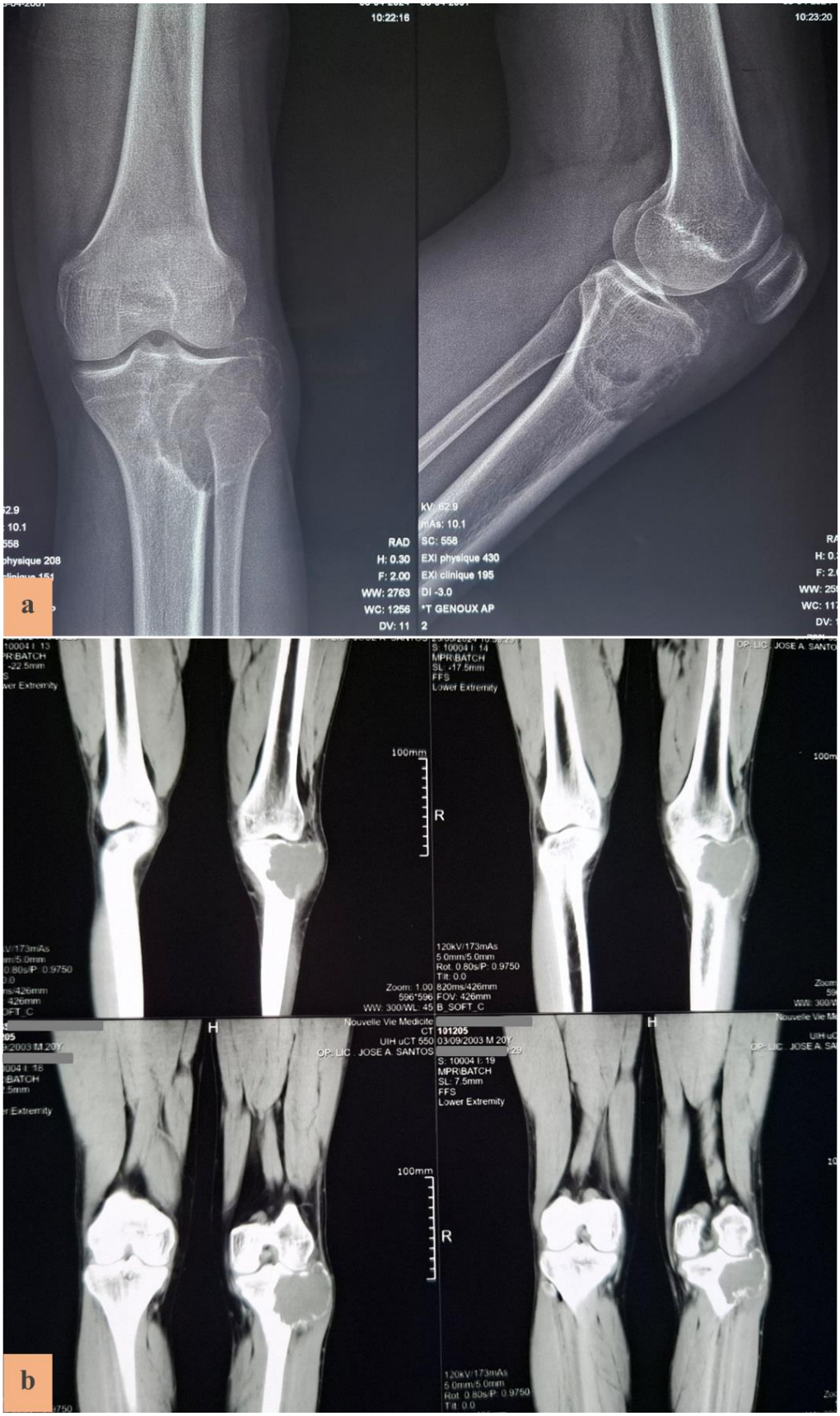
Surgical treatment remains the treatment of choice for metaphyseal-epiphyseal forms. It is conservative, involving extensive curettage of the lesion, either performed alone or in combination with filling. This curettage must be performed aggressively and thoroughly to minimize tumor residue. For mechanical reasons, particularly in the lower limb, most authors recommend filling the curettage cavity. Several materials are used: autograft, allograft, acrylic cement, and biomaterials. Autograft remains the most biological material due to its bone filling and rehabilitation capacity, but its use is limited by the often-large volume of giant cell tumors. Filling can then be performed using cancellous allograft, which can also be used alone, but we do not have a bone bank for our patient in our context. This is why acrylic cement was used in our patient to fill the bone loss [16,17].

Polymethyl methacrylate acrylic cement is also used by many authors. It has the advantage of being easy to use, inexpensive, and immediately mechanically stable. In addition, the teams that use it claims that it helps prevent local recurrence. The weak point of cement is the impact on cartilage and joint function in areas where curettage comes into contact with articular cartilage. Some authors limit its use to curettage procedures that leave a thickness of cancellous bone between the cement and the cartilage [5].

Osteosynthesis to support or reinforce the filling is also widely recommended for the lower limb, especially in cement fillings. [3,18]

Denosumab, a human monoclonal antibody that binds specifically to RANKL with high affinity, preventing the activation of the RANK receptor located on the surface of osteoclasts and their mononuclear precursors. Blocking the RANK/RANKL interaction inhibits osteoclast maturation and osteolytic activity. This treatment has been used with good results in terms of tumor necrosis and disease stabilization. However, this treatment is not curative, but merely has a protective effect, with no efficacy on tumor cells.

Furthermore, two cases of sarcomatous transformation have been described in giant cell tumors treated with Denosumab, without it being possible to know whether these tumors would have evolved spontaneously without treatment [1, 5, 7, 14]. Clinical studies are currently underway in this therapeutic field, which is likely to change the treatment of these tumors in the short term. In summary, the combination of different therapeutic options on a case-by-case basis must be discussed in multidisciplinary concertation committees for extensive and aggressive lesions.



igure 1: a. Frontal/lateral X-ray of the knee showing extensive osteolysis of the lateral condyle of the left knee with clear contours and no cortical defect.
b. CT scan of the knee showing a fracture of the lateral cortex and no intratumorale calcification.

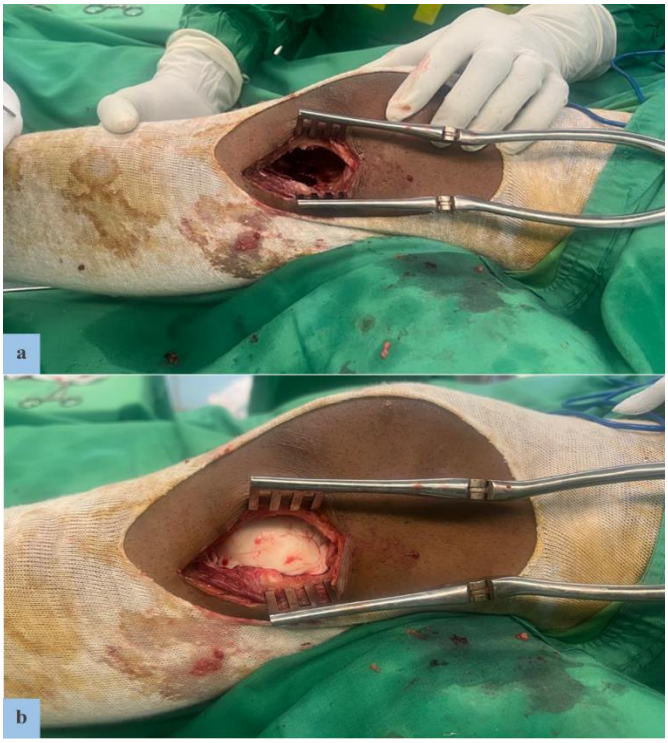


Figure 2: a. Anterolateral approach of the left knee and bone curettage of the tumor
b. Filling of the bone defect with surgical cement

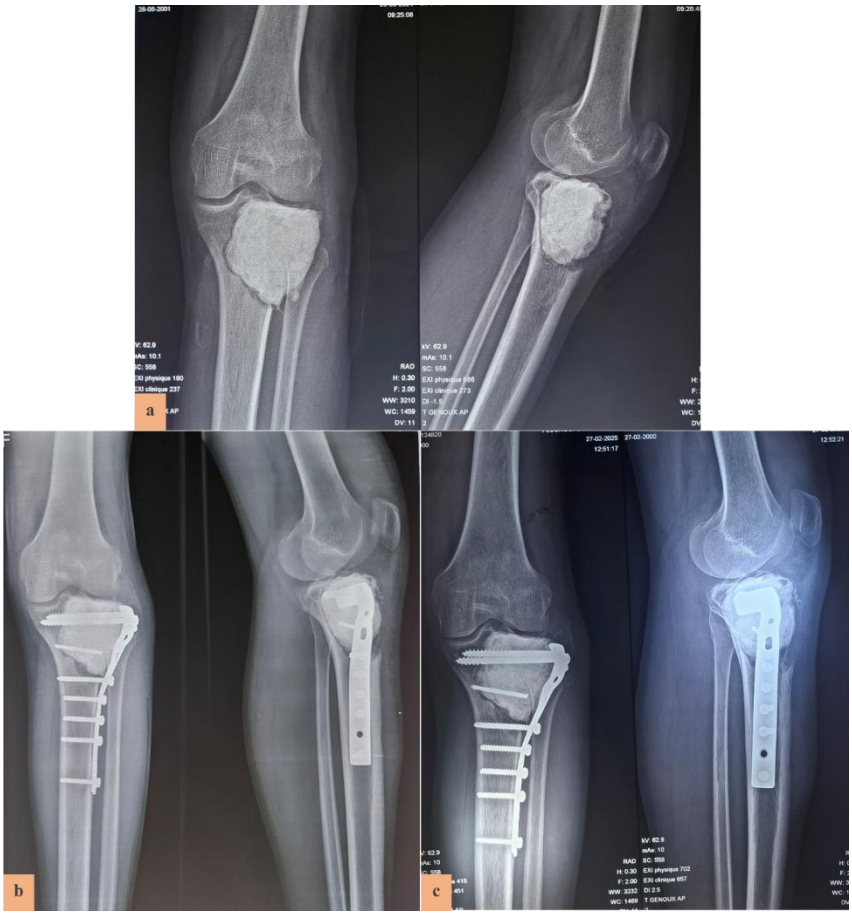


Figure 3: a. one-month post-op with surgical cement filling the bone defect
b. Three months post-op with osteosynthesis support using screws transfixing the cement
c. X-ray taken 18 months post-op showing calcification of the anterior periosteum

CONCLUSION

Giant cell tumors affecting the bones, particularly in the proximal tibia, can be very incapacitating, as they can compromise the patient's mobility. Conventional surgical treatment involving curettage and filling remains effective in the large majority of cases, but does not allow weight bearing in cases of significant bone loss. Therefore, performing epiphyseal support osteosynthesis can allow the patient to recover weight-bearing ability in cases of large giant cell tumors involving more than half of the proximal tibial epiphysis. Thereby improving the patient's quality of life despite not influencing the risk of recurrence associated with this disease.

Provenance and peer review: Not commissioned, externally peer-reviewed.

Funding: No funding for research.

Ethical approval: The study is exempt from ethical approval in our institution.

Consent: Written informed consent was obtained from all patients for publication of this case report and accompanying images.
Research registration number: NA.

Declaration of competing interest: No conflicts of interest

Highlights:

- Tumors of the young, with intermediate aggressiveness
- It can affect the functional prognosis when located on weight-bearing bones such as the knee
- Conservative treatment by curettage-filling combined with supportive osteosynthesis may be useful to allow partial weight bearing and reduce the risk of fractures
- It is characterized by a high recurrence rate associated with lung metastases.

REFERENCES

1. Harrleson J. Bone Tumours: General Aspects and Data on 6,221 Cases. Ann Surg. avr 1980;191(4):511-2.
2. Amelio JM, Rockberg J, Hernandez RK, Sobocki P, Stryker S, Bach BA, et al. Population-based study of giant cell tumor of bone in Sweden (1983–2011). Cancer Epidemiol. 1 juin 2016;42:82-9.
3. Billy J, Boudabbous S, Hannouche D, Zingg M. Tumeur à cellules géantes de l'os. Rev Med Suisse. 15 déc 2021;763:2187-91.
4. Benyas Y, Laghouagha OO, Badaoui R, Boussaidane M, Boukhris J, Benchebba D, et al. Tumeurs à cellules géantes des os. Rev Marocaine Chir Orthopédique Traumatol. 2025;(103):1-12.
5. Larousserie F, Audard V, Burns R, de Pinieux G. La tumeur à cellules géantes des os en 2022. Ann Pathol. 1 avr 2022;42(3):214-26.
6. Rockberg J, Bach BA, Amelio J, Hernandez RK, Sobocki P, Engellau J, et al. Incidence Trends in the Diagnosis of Giant Cell Tumor of Bone in Sweden Since 1958. J Bone Joint Surg Am. 4 nov 2015;97(21):1756-66.
7. Sung HW, Kuo DP, Shu WP, Chai YB, Liu CC, Li SM. Giant-cell tumor of bone: analysis of two hundred and eight cases in Chinese patients. J Bone Joint Surg Am. juin 1982;64(5):755-61.
8. Barnaba A, Colas M, Larousserie F, Babinet A, Anract P, Biau D. Quelle est la charge des complications chirurgicales des tumeurs à cellules géantes? Étude monocentrique rétrospective de 192 cas. Rev Chir Orthopédique Traumatol. 2022;108(4):430-7.
9. McCarthy EF. Giant-cell tumor of bone: an historical perspective. Clin Orthop. 1980;(153):14-25.
10. Soft Tissue and Bone Tumours WHO Classification of Tumours, 5th Edition, Volume 3. 2020.
11. Kuwahara H, Shimazaki M, Kadoya Y, Chanoki Y, Mitsuhashi T, Ogawa Y, et al. Ultrastructural immunocytochemical localization of carbonic anhydrase in a benign giant cell tumour of bone. Osaka City Med J. déc 1986;32(2):89–97.
12. Sokolova IN. [Giant cell tumour of bone (osteoblastoclastomas)]. Arkh Patol. 1973;35(12):34-9.
13. Meister P, Finsterer H. [Giant cell tumour of bone and its problems]. Munchener Med Wochenschr 1950. 14 janv 1972;114 (2):55–60.
14. Verhelst MP, Hawkins RH, Mulier JC. Giant-cell tumor of bone. An analysis of twenty cases. Acta Orthop Belg. 1974;40(3):308-20.
15. Imaging of Giant Cell Tumor and Giant Cell Reparative Granuloma of Bone: Radiologic-Pathologic Correlation | RadioGraphics [Internet]. [cité 13 mai 2025]. Disponible sur: https://pubs.rsna.org/doi/abs/10.1148/radiographics.21.5.g01se251283
16. Ferry AM. Giant cell tumour – surgery in the long bones. Clin Orthop. 1968;56:57-64.
17. Waldram MA, Sneath RS. Is bone graft necessary? Analysis of twenty cases of giant cell tumour of bone treated by curettage without graft. Int Orthop. 1990;14(2):129-33.
18. Babinet A. Tumeur à cellules géantes. In: Tumeurs osseuses bénignes. Elsevier. Paris; 2005. p. 201-19. (Cahiers d'enseignement de la Sofcot).