

## Chondroblastoma of the patella: A case report

Kedous Mohamed Ali; Ben Romdhane Majdi\*; Rebhi Safouen; Chebbi Wael; Mbarek Mondher; Boujelbene Nadia

### \*Ben Romdhane Majdi

Department of orthopedic surgery, Traumatology and Burns center, Ben Arous, Tunisia.

Email: Majdibenromdhane87@gmail.com

### Abstract

Chondroblastoma is a rare bone tumor of cartilaginous origin representing less than 1% of all the primitive bone tumors. This lesion usually develops in the epiphysis of long bones and occurs during the second decade of life. However, there are rare atypical localizations like the patella. An atypical case of chondroblastoma of the patella is reported and the clinical, radiological and therapeutic features of this rare location were discussed. A young 20-year-old patient consulted for right knee pain evolving for 2 months with a discreet knee effusion and pain on palpation of the patella. The radiological and CT showed lytic lesion of the distal half of the patella, lobulated, with sclerotic outlines and blowing the internal cortex. The patient underwent surgery with curettage and filling with autologous iliac cancellous bone graft. Histological examination led to the diagnosis of chondroblastoma. At last follow-up, 18 months, the patient had a normal function of his knee with no recurrence for radiological control. The location of chondroblastoma in the patella is exceptional but its radiological features resemble those of usual epiphyseal locations. The most popular treatment is curettage associated with cancellous bone grafting and thus to avoid the functional consequences of a patellectomy.

### Keywords

chondroblastoma; benign bone tumor; patella; knee

### Case Presentation

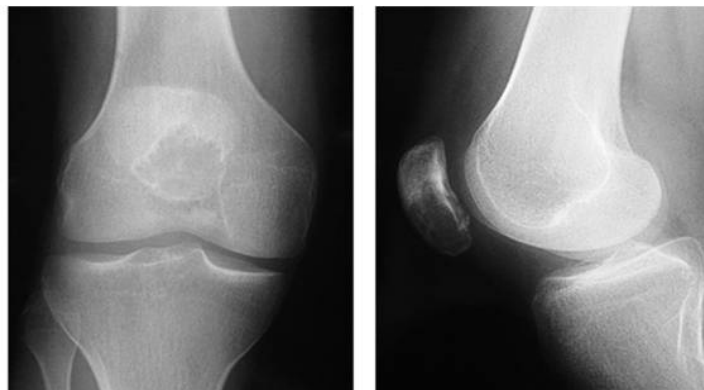
Chondroblastoma is a rare benign cartilaginous bone tumor representing less than 1% of all primary bone tumors [1,2]. This lesion usually develops in the epiphyses of long bones and occurs most often during the second decade of life. However, there are rare atypical localizations like the patella [3].

An atypical case of chondroblastoma of the patella is reported and through this observation and a review of the literature the clinical, radiological and therapeutic features of this rare localization were discussed.

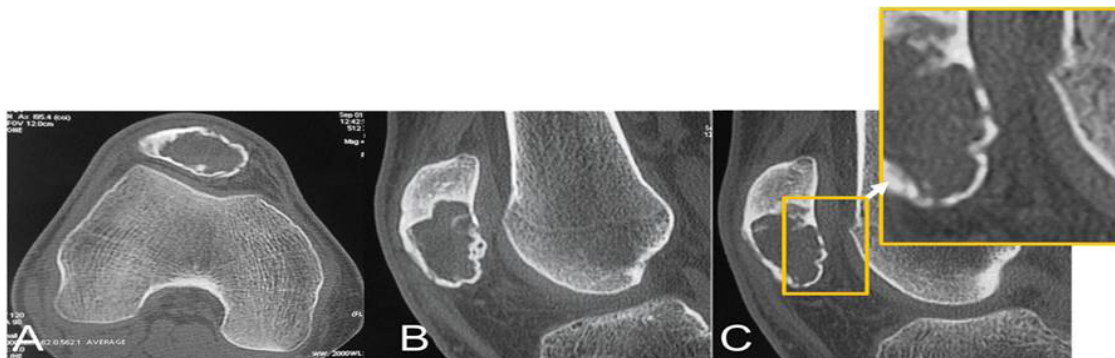
## Clinical Case

A 20 year old has consulted for right gonalgia evolving for 2 months felt mainly when exercising. The examination revealed a discreet lameness. The right knee was swollen with minimal joint effusion and a flexum of 10 degree. The palpation of the patella awoke pain. There was also amyotrophy of the ipsilateral quadriceps. Active flexion was painful beyond 90 degree.

Standard X-rays showed a lytic, multi-lobed, sclerotic image extending to the entire distal half of the patella and blowing the internal cortex (Figure 1). The computed tomography revealed a multilobulated geode, finely circled by a line of condensation, blowing the anterior and internal cortices which are thinned. In some sections, a break-in of the cortex on the articular surface was noted. (Figure 2).



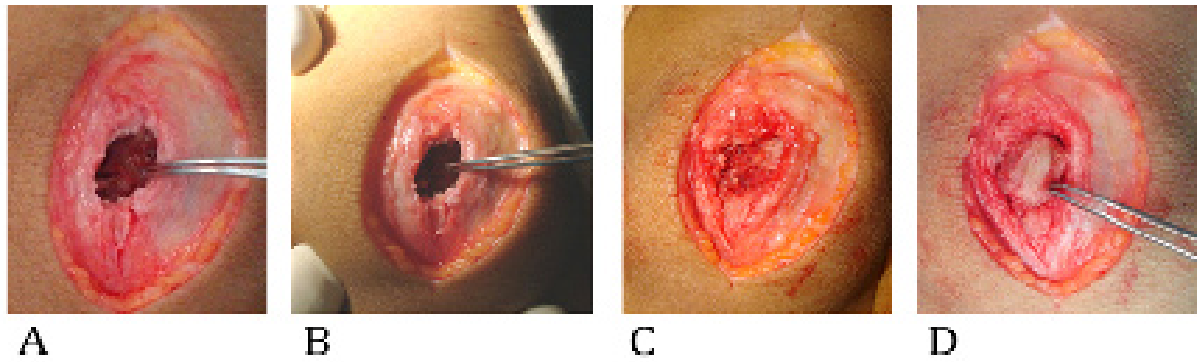
**Figure 1:** Initial Plain radiograph displaying a lytic, multi-lobed, sclerotic lesion extending to the entire distal half of the patella and blowing the internal cortex



**Figure 2:** CT scan demonstrated a multilobulated geode, finely circled by a line of condensation, blowing the anterior and internal cortices which are thinned. In some sections, we could note a break-in of the cortex on the articular surface.

The biological assessment was without abnormalities including infectious and inflammatory markers (CBC, ESR, and CRP).

The patient had a surgical treatment with anterior approach of the patella, collapse of the anterior wall of the cyst then recess of the cystic cavity whose content was firm, pink dotted with chalky areas (Figure 3A). On inspection and palpation of the cavity, the articular surface of the patella was intact. Curettage of the cavity was performed (Figure 3B) followed by filling with an autologous cancellous bone graft taken from the ipsilateral iliac crest (Figure 3C) and closure of the anterior window with an iliac cortical fragment (Figure 3D, 4).

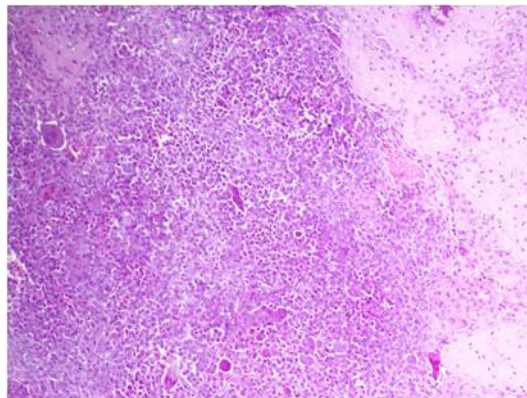


**Figure 3:** Intraoperative footage displaying: A- Collapse of the anterior wall of the cyst then recess of the cystic cavity whose content was firm, pink dotted with chalky areas. B-Resection of the lesion and Curettage of the cavity. C-Filling with an autologous cancellous bone graft taken from the ipsilateral iliac crest D- Closure of the anterior window with an iliac cortical fragment.

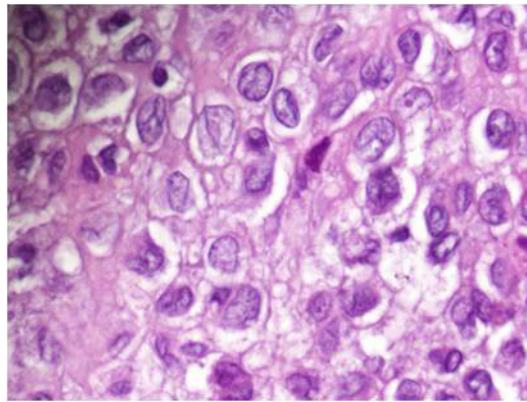


**Figure 4:** Postoperative radiograph: cavity filled with cancellous bone taken from the iliac crest.

Microscopic examination revealed a sheet-like proliferation of small to intermediate-sized round polygonal cells within a chondroid matrix (Figure 5). The cytoplasm is eosinophilic and the nucleus is centrally placed with longitudinal nuclear groove (Figure 6). Some osteoclast-type giant cells are randomly distributed.



**Figure 5:** A sheet-like proliferation of small to intermediate-sized round polygonal cells with scattered osteoclast-type giant cells (Hematoxylin-eosin, original magnification x100).



**Figure 6:** Nucleus is centrally placed with longitudinal nuclear groove (Hematoxylin-eosin, original magnification x1000)

In the postoperative period, the knee was immobilized by a removable knee splint in extension for 2 weeks with authorization of the support. Rehabilitation was then started to strengthen the quadriceps and to foster the passive recovery of the articular amplitudes. Normal activity was resumed on the 45th postoperative day.

At the 18-month follow-up, the clinical results were rated excellent on functional criteria with total indolence and mobility at 0/140 of the right knee. Radiograph showed sub-total filling of the cavity and no signs of recurrence (Figure 7).



**Figure 7:** Radiograph At the 18-month follow-up: Plain Radiograph displaying sub-total filling of the cavity and no signs of recurrence.

## Discussion

Chondroblastoma is a benign cartilaginous bone tumor consisting of chondroblastic cells with presence of chondroid substance. It is a rare lesion since it represents only 0.5 to 1% of biopsied primary bone tumors and 9% of benign bone tumors [1,2]. It has a preference for the male sex (2 to 3/1), usually between the ages of 10 and 20 years. It is therefore a tumor of the young subject, exceptional in early childhood and after the age of 30 years [3].

Chondroblastoma is typically located on an epiphysis or an apophysis always near a fertile physe. It develops in 80% of the cases at the end of a long bone with a predilection for the shoulder, knee and hip [4-7]. More rarely, it can occur on other skeletal segments and on flat bones. The localization of chondroblastoma at the patella is extremely rare estimated between 1 to 3% [3-5]. It represents 16% of benign bone patella tumors [4,5].

The revealing clinical signs are usually unobtrusive and nonspecific. The pain is most often moderate and can be revealed as a result of a trauma. Swelling may be associated with peripheral locations. When the tumor is located in the lower limbs, a lameness can be seen, as is the case in this patient. But this can sometimes be the only appealing clinical finding. Signs of joint irritation such as decreased mobility or hyarthrosis are common and have been observed in this case. The occurrence of a pathological fracture remains exceptional [8,9].

In typical forms, standard radiographs are often sufficient to evoke the diagnosis [10] by showing an osteolysis zone of oval shape well bounded by a sclerous outline which testifies to its slow evolution, eccentric to the epiphysis and its size is often between 1 and 6 cm. Small calcified pits can be seen within this osteolytic image in half of the cases. CT allows a better analysis of the contours of the lesion. MRI may be useful in assessing the relationship of the tumor to the joint, soft tissue and growth cartilage that can be crossed by the lesion [11]. In this case, CT, particularly on sagittal reconstructions, revealed a rupture of the subchondral lamina in some places with a joint break-in, explaining the signs of joint irritation present at the clinical examination. In typical epiphyseal locations, the differential diagnosis is essentially with the other “epiphyseal gaps” namely essentially chronic bone abscess and bone infarction and in adults the giant cell tumor and the clear cell chondrosarcoma [9].

Imaging is less contributory to the diagnosis when the lesion is located in flat bones, where also other lesions usually localized in the metaphyseal zone, such as the essential bone cyst, the aneurysmal cyst, but also the intraosseous lipoma and tuberculous osteitis are suspected [9]. The diagnosis in this case can only be pathological. In this case, several diagnostic hypotheses were evoked on clinical and imaging findings without being able to decide. Only the histological study of the removed tissue allowed to make the diagnosis of chondroblastoma of the patella.

The progression of chondroblastoma is usually slow but may be rapid in some cases with extension to the metaphysis through the cartilage or more exceptionally to the joint [12]. The risk of malignant transformation is very controversial. Rather, it is an undifferentiated or clear cell chondrosarcoma initially confused with chondroblastoma or a sarcomatous transformation induced by radiotherapy on a benign lesion [13]. The occurrence of always histologically benign lung metastases has been reported [9]. In the latter case, excision of lung lesions leads to healing.

The treatment of chondroblastoma is always surgical curettage-bone grafting with the removal of the bone layer that corresponds to the wall of the tumor [14]. Some authors perform in addition a wash with phenol or alcohol, a thermal cautery or cryotherapy, or even a filling with acrylic cement.

Segmental resection is only conceivable in certain localizations (fibulae, ribs, posterior vertebral arch) and in cases of very extensive lesions or recurrences.

In patella locations, patellectomy is indicated only in cases of major damage to the joint or resulting in a discontinuity of the extensor apparatus. The long-term functional results vary from one author to another.



The radiosensitivity of chondroblastoma is uncertain. Radiation therapy is therefore not recommended. It is formally contraindicated in children because of the risk of alteration of growth plates and the occurrence of radiation-induced sarcoma [9]. The recurrence rate of chondroblastoma varies according to the authors: 5.7% for Schajowicz [12], 15% for Meary [15] and up to 38% for Huvos [16]. The presence of a significant aneurysmal component would increase this risk. This recurrence seems to be related neither to the age of the patient nor to the seat of the tumor and it is usually seen in the bone adjacent to the initial tumor, the surrounding soft tissues and even in the joint. Adequate clinical and radiological monitoring is required.

The functional prognosis of chondroblastoma depends on its location, its degree of aggressiveness that may be responsible for joint destruction or an extension to a nearby bone, and in children, the involvement of the growth plate may lead to growth defect of the bone segment and shortness of a limb [9]. But this prognosis also depends on the quality of the surgical procedure. Thus, segmental resections must be exceptional. In this case, conservative surgical treatment with a curettage associated with autologous cancellous bone filling of the chondroblastoma of the limb led to an excellent functional result with less morbidity and no recurrence at the last follow-up.

## Conclusion

The patellar localization of chondroblastomas is exceptional. Its radiological characteristics are comparable to those of the usual epiphyseal localizations but the diagnosis is resolutely anatomopathological in front of the lack of specificity of the radiological findings. The most popular treatment is the curettage associated with cancellous bone grafting to avoid the functional consequences of patellectomies. The risk of recurrence of this lesion requires clinical and radiological monitoring.

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