Radiol Oncol 2006; 40(4): 205-9.

Intracapsular and para- articular chondroma of knee: a report of four cases and review of the literature

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Background. *Intracapsular and para-articular chondroma is a rare variant of the extraskeletal chondromas. It arises from the capsule and/or the para-articular connective tissue of the large joints (mostly the knee) and is a result of cartilaginous metaplasia. In course of time these tumors ossify and this is where their second name comes from: Para-articular osteochondromas. According to Jaffe, not dependent on the degree of ossification of this tumor, there is one single entity in question.*

Cases report. *We report four new cases of para-articular chondroma of the knee. On physical examination there was slow-growing solid mass in the knee and moderate pain, the radiological findings and CT scan show soft-tissue mass with variable amount of ossification, and on histological examination the presence of mature hyaline and connective cartilage was confirmed in all of the cases.*

Conclusions. *The diagnosis of these benign tumors is made with correlation of clinical, radiological and histological features. The treatment of choice is surgical excision in toto.*

Key words: chondroma, osteochondroma, knee

Introduction

Extraskeletal chondromas are benign tumours which appear in three variants: synovial chondromatosis, para-articular chondroma and soft tissue chondroma. The first type is very common, but the last two variants are quite rare and they may show atypical features.[1-3]

Received 23 October 2006

Accepted 29 November 2006

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The fibrous coat of the capsule of a joint and/or the para-articular connective tissue, very rare, can suffer cartilaginous metaplasia. As an end result of this metaplasia, intracapsular or para-articular chondromas are formed. In time, they usually ossify so they are also known as capsular and para-articular osteochondromas. Mostly seen in the large joints (the knee), they vary in size depending on the size of the joint.[4,5] We have found only 30 cases of para-articular chondromas in the reviewed literature.[3,6,7] We report four new cases of capsular and para-articular chondroma of the knee with their clinical, radiological and histological features.

Case reports

Case 1

A male patient, 24, reports with painful mass on the medial side of the right knee, with no record of trauma. He first noticed it one year prior to the examination. On physical examination the timorous formation is movable, tender on palpation, produces pain during active motion. The profile X-ray shows para- and supra-patellar soft tissue tumorous formation (Figure 1a). On CT- scan this soft-tissue mass is clearly seen, oval shaped and intracapsular (Figure 1b). The tumour was surgically excised. During the operation, the intracapsular but extrasynovial position of the tumour was confirmed. It was oval shaped, 8 x 5 x 2.5 cm. The histological examination showed mature hyaline cartilage with foci of mixomatous tissue with benign characteristics. The diagnosis was: intracapsular chondroma without ossification.

Figure 1a. *Case 1.* Lateral radiograph of the right knee: the arrow points to a parapatellar soft tissue mass.

Figure 1b. *Case 1.* CT scan of the same knee*:* parapatelar, intracapsular soft tissue mass which has displased the patella.

Case 2

A female patient, age 41 complains of a solid mass on the lateral aspect of the left knee that has been slowly growing for the past two years. It caused limitation of joint movement and required surgical removal. The lateral radiograph of the left knee showed infrapatellar ossified mass (Figure 2a), whilst the CT- scan showed mostly ossified, encapsulated tumor just

Figure 2a. *Case 2.* Lateral radiograph of the right knee: arge infrapatellar ossified mass.

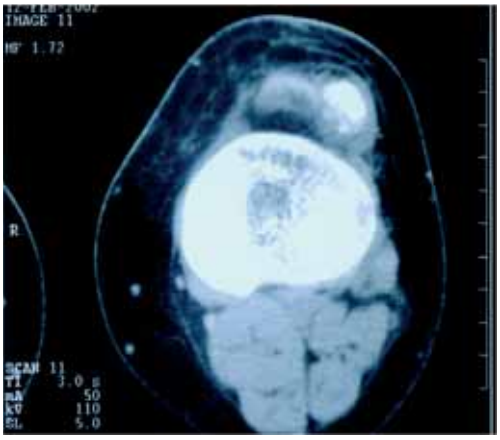

Figure 2b. *Case 2.* CT scan of the same knee: encapsulated ossified mass.

Figure 2c. *Case 2.* Macroscopic appereance of the excised tumour on cross-section.

beneath the lateral border of the patella, but not attached to it (Figure 2b). The surgically excised mass was oval, 3 x 3.5 x 2.5 cm (Figure 2c), situated in the continuity with the capsule of the joint, but extrasynovial. Macroscopically, on cross section there is a central zone of mature trabecular bone, surrounded by a hyaline cartilage cup (Figure 2c). On histological examination there was mature trabecular bone surrounded by hyaline cartilage with endochondral ossification. The diagnosis was: intracapsular chondroma with high rate of ossification.

Figure 3a. *Case 3.* Lateral X-ray of the knee shows the localization of the chondroma.

Case 3

A female patient aged 72 was admitted after a mild trauma of the left knee. Physical examination showed painful mass under the patella and limited flexion and extension of the knee which were present for more than 10 years. The recent trauma of the left knee caused pain and swelling of the knee. The lateral radiograph of the knee showed subpatellar, partly ossified mass (Figure 3a) and the transverse section on CT-Scan showed posttraumatic haematoma in the knee joint, as well as soft tissue tumour with ossification beneath the patella, situated in the para-articular connective tissue (Figure 3b). The diagnosis was: para-articular chondroma of the knee with ossification.

Case 4

A female patient aged 56 complained of intense pain and lack of extension in her right knee. There was no history of trauma, but she could remember heavy activities after which the progressive restriction of

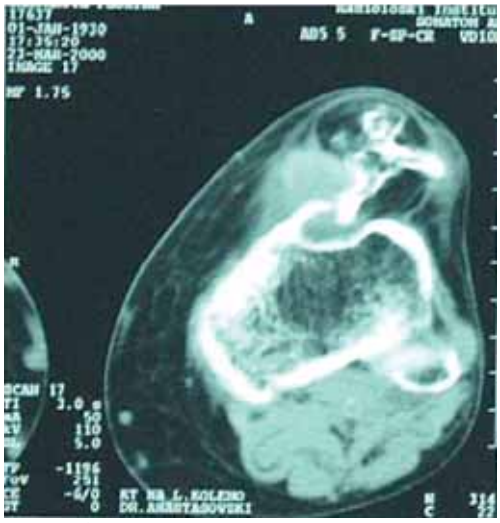

Figure 3b. *Case 3.* Transverse section on computer tomography of the knee shows proximal tibia, chondroma and posttraumatic haematoma (arrow).

the extension and pain started. History of the patient showed that she had slightly painful, slowly growing lump seated beneath and laterally of the patella for more than 30 years (Figure 4a). After the surgical extirpation of the para-articular chondroma (Figure 4b), full range of painless motion was regained.

Figure 4a. *Case 4.* Lateral x-ray of the right knee, showing infrapatellar chondroma (arrow).

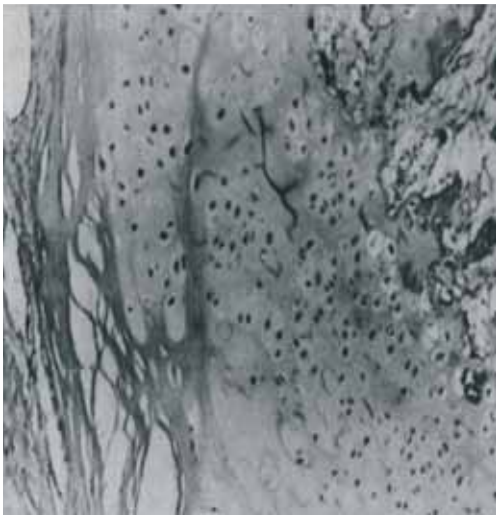

Figure 4b. *Case 4.* Histopathology of the chondroma (HE x600).

Discussion

Para-articular and intracapsular chondromas are rare benign tumours mostly seen in the vicinity of the large joints. They were often named capsular osteoma, osteochondroma or chondroma depending on the proportion of bone and cartilage.[8] According to Jaffe, there is only one single lesion in question regardless of the ossification, and in 1958 he classified all these terms under one entity: intracapsular and para-articular chondroma.[6] The Pathogenesis of these tumours is also controversial. They most likely originate from the connective tissue in the vicinity of the capsule of a joint or from the outer coat of the capsule as a result of cartilaginous metaplasia. Prior trauma is unlikely to play any significant role in the pathogenesis of these tumours. In the beginning comprising exclusively of cartilaginous tissue, in the course of time they usually ossify.[3,4] This is where their "second name" used in the literature comes from: osteochondromas.

From the relatively small number of reported cases we can conclude that, although

there have been cases in the ankle, elbow and the hip joint,[3,5] they are mostly seen in the knee joint.[4,7,8] The location is para-articular and intracapsular, mostly infrapatellar or medial to the patella. The reported age varies from 12 to 75 years. The clinical complaints are of some months to several years of local discomfort, moderate pain, slow growing mass and some degree of limited motion in the joint. Radiologically, there is a soft tissue mass with a different degree of central radiodensity due to ossification. Macroscopically their size varies, depending on the size of the involved joint, from 2 to 10 cm.

The four cases we report have all the features of the previously reported chondromas found in the literature. Clinically they present with moderate pain and restricted range of motion in the involved knee joint. On plain radiographs, there was a soft tissue mass with a different degree of ossification while the CT- scan has enabled us to make a more detailed analysis as to the exact position of the tumour (intracapsular or extracapsular), its relationship with the adjacent structures, its size and structure. In all of our cases, the tumours were intracapsular, but with no direct contact with the joint. Grossly, they were large, and the pathological analysis confirmed the presence of hyaline cartilage with variable amounts of mature trabecular bone. Using the definition of Jaffe, the diagnosis in all of the four cases was: para-articular chondroma. The treatment in all of the cases was surgical excision.

The diagnosis of these benign tumours is made clinically and radiologically in correlation with the pathological features. Although rarely seen, they should be considered in the differential diagnosis of soft tissue masses around the joints: haemathoma, bursitis, periosteal chondroma, synovial sarcoma, synovial chondrosarcoma. The treatment of choice for these tumours is surgical excision, while being careful not to injure the joint integrity. Malignant transformation has never been reported. With correct diagnosis unnecessary aggressive surgical treatment will be avoided.

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